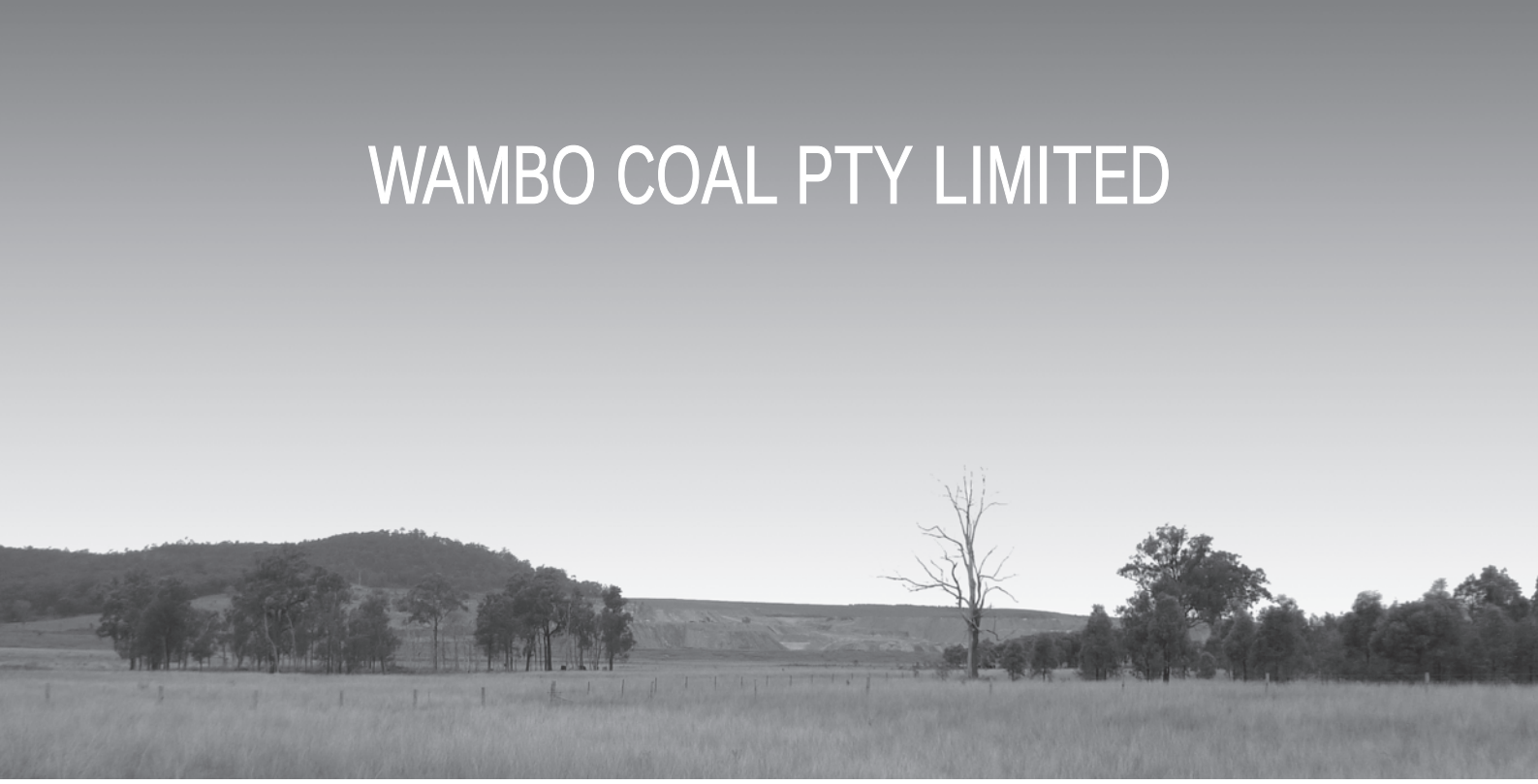
WAMBO COAL PTY LIMITED



SOUTH BATES UNDERGROUND MINE

EXTRACTION PLAN
LONGWALLS 11 TO 16

APPENDIX I
REHABILITATION MANAGEMENT PLAN

Peabody ENERGY

WAMBO COAL MINE
MINING OPERATIONS PLAN

2015 – 2020

PREPARED BY

WAMBO COAL PTY LTD

May 2017

MOP Amendment F

Wambo Coal Pty Limited

Mining Operations Plan

Name of Mine: Wambo Coal Pty Ltd

MOP Commencement Date: 31 March 2015

MOP Completion Date: 30 March 2020

Mining Authorisations (Lease / Licence No.): CL397, CCL743, CL374, CL365, ML1402, ML1594, ML1572.

Name of Authorisation/Title Holder(s): Wambo Coal Pty Ltd

Name of Mine Operator (if different):

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

Title Micheal Alexander

Position: Director of Projects & Technical Services

Contact: Ph: (02) 6570 2361

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Name and Contact Details of Environmental Representative:

Title: Steven Peart

Position: Environment & Community Manager

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

Title: Michael Alexander

Signature: 

Date: 30 May 2017

Summary of Tables, Figures and Maps

Section of MOP	Table Reference	Plan & Figure Reference	Source
Section 1.1 Summary of Operations	**Table 1**	**Figure 2 & Figure 3**	DA305-7-2003 MOD14 (EA, 2014)
Section 1.3 Current Consents, Authorisations and Licenses	**Table 2 & Table 3**	**Figure 2**	DA305-7-2003 MOD14 (EA, 2014) MOD 12
Section 1.3.4 Mining Lease & Exploration Licences	**Table 5**	**Plan 1C**	DA305-7-2003 MOD14 (EA, 2014)
Section 1.5.2 Government Consultation	-	**Section 1.5**	Appendix 3
Section 1.5.3 Community Consultation	-	**Section 1.5**	-
Section 2.2 Asset Register	**Table 8**	**Figure 8**	WCPL Technical Services Department
Section 2.3.12 Material Production Schedule During MOP Term	**Table 12**	**Plans 3A to 3F**	WCPL Technical Services Department
Section 3.1 Environmental Risk Management	**Table 13**	-	WCPL Environmental Department
Section 3.3.6 Soil Types & Suitability	**Table 14, Table 15**	-	Project EIS
Section 3.3.7 Flora & Fauna (List of Revegetation Species)	**Table 16, Table 17**	**Figure 8, Figure 9 & Plan 4**	Project EIS
Section 4.1 Regulatory Requirements	**Table 19**	-	DA305-7-2003 As Modified
Section 5.1 Domain Selection	**Table 20**	**Figure 8 & Plan 2**	WCPL Technical Services Department
Section 5.2 Domain Rehabilitation Objectives	**Table 21**	NA	DA305-7-2003
Section 5.3 Rehabilitation Phases	**Table 22**	**Plans 3A to 3F**	WCPL Technical Services Department
Section 6.0 Rehabilitation Tables	**Tables 23 to 27**	**Plans 3A to 3F**	DA305-7-2003 MOD14 (EA, 2014) Biodiversity Management Plan
Section 7.1 Status at MOP Commencement	**Table 29**	**Plan 1C & Plan 2**	WCPL
Section 7.3 Summary of Proposed Rehabilitation	**Table 31**	**Plans 3A to 3F**	WCPL
Section 9.2 Trigger Action Response Plan	**Table 33**	-	WCPL

Document Control

Document No.	WCPL_MOP_2015-2020
Title	Wambo Coal Mine Mining Operations Plan (2015 – 2020)
General Description	Mining Operations Plan (MOP)
Key Support Documents	Wambo Coal SMP/Extraction Plan LW7-10a NWU Mine Longwall 10A Modification EA SBU Mine (MOD15) South Wambo (MOD12) SBU Extraction Plan LW11-16 Wambo Coal Environmental Management System Development Consent – DA 305-7-2003

Revisions

Rev No.	Date	Description	By	Checked
A	November 2014	Original Draft	WCPL	Troy Favell, Micheal Alexander
B	March 2015	Modified Draft to include extended MOP period	WCPL	Troy Favell, Micheal Alexander
C	May 2015	Modified Draft to include DRE comments	WCPL	Peter Jaeger, Tim Britten, Micheal Alexander
D	January 2016	MOP Amendment A	WCPL	Steven Peart
E	April 2016	MOP Amendment B	WCPL	Steven Peart
F	April 2016	MOP Amendment C	WCPL	Steven Peart
G	November 2016	MOP Amendment D	WCPL	Steven Peart
H	February 2017	MOP Amendment E	WCPL	Steven Peart
I	May 2017	MOP Amendment F	WCPL	Steven Peart

The nominated Coordinator for this document is	Environment and Community Manager

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TABLES

FIGURES

APPENDIX

1.0 INTRODUCTION

This Mining Operations Plan (this MOP) for both the Open Cut and Underground Operations has been prepared by Wambo Coal Pty Ltd (WCPL) (the Mine), to satisfy conditions and the requirements of:

- ML 1402, ML 1572, ML 1594, CL 365, CL 374, CL 397 and CCL 743;
- DA 305-7-2003 & DA 177-8-2004; and
- ESG3: Mining Operations Plan Guidelines[1], September 2013 (here within referred to the *MOP Guidelines*).

The Mine is an open cut and underground coal mining operation located approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (**Figure 1**). The Mine is owned by WCPL, a wholly owned subsidiary of Peabody Energy Australia Pty Ltd (Peabody Energy). Open cut and underground mining, coal processing and other associated activities at the Mine are undertaken by WCPL. A recent aerial photograph of the Mine illustrating the existing and approved extent of open pits, underground mine plans and infrastructure is shown on **Figure 2**. Thermal coal products from the Mine are transported by rail to domestic customers for use in electricity generation and to port for export.

The Mine is bounded by Wollombi Brook to the east, coal mining operations to the north and east, grazing land to the south and north west and the Wollemi National Park to the west (**Plan 1A** & **Figure 1**). The Mine produces predominantly thermal coal for the export market. Land use in the vicinity of the Mine is a combination of coal mining operations, conservation areas, National Parks, agriculture and rural residential development.

The Department of Planning & Environment (DP&E) on the 4 May 2015 provided comment that an approved[2] MOP will satisfy Condition 94C, Schedule 3 of DA 305-7-2003 for a preparation of a Rehabilitation Management Plan (RMP). Information on the requirements for an RMP and where the requirements are addressed in this MOP are provided in **Section 1.3**.

1.1 HISTORY OF OPERATIONS

The Mine was originally granted development consent by Patrick Plains Shire Council in 1969. Subsequent development consents issued in 1972, 1974 and 1977 covered a range of early open cut and underground operations, while activities such as the construction of office buildings, bathhouses, the Homestead Underground Mine coal conveyor, Hales Crossing on Wollombi Brook, extensions to mining operations and modifications to road haulage rates were consented by Singleton Shire Council (SSC) between 1980 and 1991.

In July 1991, DA 108/91 was lodged with the SSC seeking approval for the expansion of open cut and underground mining activities at the WCPL and the consolidation of earlier development consents. Development consent for DA108/91 was granted in February 1992, approving the production of up to 3 million tonnes per annum (Mtpa) of saleable product coal over a 21 year period. Subsequent modifications to DA 108/91 have included the Wollemi Underground Mine box cut, coal transportation, tailings deposition, coal conveyor, underground borehole pumps, stockpile area and haul road for coal haulage. Subsequent to the grant of Development Consent DA 108/91 (SSC, 1992), open cut mining

[1] ESG3: Mining Operations Plan Guidelines, September 2013 issued by the NSW Trade & Investment – Division of Resources and Energy. This obligation to prepare a MOP derives from Condition 2 of CL374, Condition 3 of CCL743, Condition 3 of ML1402, Condition 2 of ML1572 and Condition 2 of ML1594.
[2] To the satisfaction of the Executive Director Mineral Resources.

operations were conducted from 1993 until closure in March 1999. Open cut operations recommenced in August 2001 at a rate of 1 Mtpa of ROM coal.

Underground mining operations at the Homestead Underground Mine commenced in 1979 and ceased in 1999. The Wollemi Underground Mine commenced in 1997 and produced in the order of 3 million tonnes (Mt) of ROM coal during the 2001/2002 financial year, prior to the cessation of mining activities. The Wollemi Underground was placed on care and maintenance in October 2002. Following the cessation of underground operations in 2002, open cut operations were subsequently expanded to maintain an overall production rate at 4 Mtpa of ROM coal.

Following submission of the Wambo Development Project Environmental Impact Statement (the Project EIS) in July 2003, WCPL was granted development consent in February 2004 (DA 305-7-2003) which enables the expansion of the current open cut operations and development of additional underground mining operations. The approved development described in the Project EIS extends the mine life for a further 21 years[3] and increases approved ROM coal production up to 14.7 Mtpa. For a summary of all modifications please refer to **Section 1.3**.

The Project EIS also addressed a separate development application (DA) for a rail spur and loop, coal reclaim and rail loading facilities for the Wambo Coal Terminal. Consent for this development (DA 177-8-2004) was granted in December 2004. The Wambo Coal Terminal was commissioned in May 2006 and allows the transport of all product coal from the WCPL by rail to the Port of Newcastle.

A copy of DA305-7-2003 (as modified) is provided in **Appendix 2** and on the Peabody Energy website (http://www.peabodyenergy.com/content/398/Australia-Mining)

All mining and associated activities are now undertaken by WCPL since the transition to an owner-operator operation was completed in April 2013. Approved run-of-mine (ROM) coal production at the Mine is 14.7 million tonnes per annum (Mtpa). ROM coal is either washed at the Coal Handling Preparation and Preparation Plant (CHPP), or where in specification, by-passed to the product stockpile, and then loaded onto trains via the train loading infrastructure. All product and domestic coal is transported by rail, with product coal to the Port of Newcastle for export markets.

In accordance with Condition 5, Schedule 2 of the DA305-7-2003, mining operations may be undertaken on the site 21 years[3] from the date of the commencement of Development Consent (DA305-7-2003). A summary of the approved Wambo Coal Mine is provided in **Table 1**. A summary of the approval history since the granting of DA305-7-2003 is provided in **Table 3** of this MOP.

[3] MOD 12 approval allows for an extension of 7 years (i.e. until 1 March 2032).

Table 1 Summary of the Approved Wambo Coal Mine

Component	Approved WCPL[1]
Life of Mine	• 21 years (from the date of the commencement of Development Consent [DA 305-7-2003]). • MOD 12 allows for and extension of 7 years (i.e. until 1 March 2032).
Open Cut Mining	• Open cut mining at a rate of up to 8 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams.
	• An estimated total open cut ROM coal reserve of 98 million tonnes (Mt).
	• ~~Open cut mining operations until 2017~~[2]. • MOD 12 provides for an extension of open cut mining operations by approximately 3 years (i.e. up to and including 2020).
Underground Mining	• As a result of MOD 12: • Changes to the alignment and extent of the approved South Wambo (Arrowfield Seam) Underground Mine longwall panels • Mining of the proposed South Wambo (Woodlands Hill Seam) Underground Mine rather than the approved South Wambo (Bowfield Seam) Underground Mine and changes to the alignment and extent. • An increase in the underground mining rate up to 9.75 Mtpa of ROM coal.
	• Underground ROM coal reserves are estimated at 114.9 Mt[2]. • As a result of MOD 12, approximately 28.4 Mt of additional ROM coal from the South Wambo Underground.
Subsidence commitments and management.	• The subsidence impact performance measures listed in Conditions 22 and 22A, Schedule 4 of the Development Consent (DA 305-7-2003).
ROM Coal Production Rate	• Up to 14.7 Mtpa of ROM coal.
Total ROM Coal Mined	• 241.3 Mt.
Waste Rock Management	• Waste rock deposited in open cut voids and in waste rock emplacements adjacent open cut operations.
Total Waste Rock	• 640 million bank cubic metres.
Coal Washing	• Coal Handling and Preparation Plant (CHPP) capable of processing approximately 1,800 tonnes per hour (tph).
Product Coal	• Production of up to 11.3 Mtpa of thermal coal predominantly for export.
Coal Handling and Preparation Plant Reject Management	• Coarse rejects and tailings would be incorporated, encapsulated and/or capped within open cut voids in accordance with existing Wambo management practices.
Total CHPP Rejects	• Approximately 29.3 Mt of coarse rejects and approximately 19.4 Mt of tailings. • As a result of MOD 12, an additional 7.3Mt of coarse rejects and 3Mt of tailings.
Water Supply	• Make-up water demand to be met from runoff recovered from tailings storage areas, operational areas, dewatering, licensed extraction from Wollombi Brook and Hunter River.
Surface Facilities	• Construction of surface facilities within the approved surface development area. • As a result of MOD 12, minor extension to the surface development area.
Mining Tenements	• Coal Lease (CL) 365, CL374, CL397, Consolidated Coal Lease 743, Mining Lease (ML) 1402, ML1572, ML1594, Authorisation 444, Exploration Licence 7211.

Notes: [1] Development Consent DA 305-7-2003 (as modified). [2] ~~Due to changes in the mining sequence and rate of mining in the Open Cut (as a result of market conditions and customer demand for example), WCPL expect the current life of the Open Cut to well exceed the EIS 2003 schedule of 2017.~~ [2] Excludes 23 Mt of Bowfield Seam reserves remaining after the 21 year approval period sought as part of the Development Application (DA 305-7-2003) and as described in the *Wambo Development Project Environmental Impact Statement* (WCPL, 2003).

1.1.1 MOP Amendment A

In accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines* (the Guidelines), WCPL are seeking minor amendments of the approved MOP[4] to provide for an additional waste rock emplacement area and update the rehabilitation tables in Section 6 to reflect current completion criteria.

Initial consultation with the Division of Resources & Energy (DRE) regarding this amendment was undertaken on 15 December 2015.

This MOP amendment (here within referred to Amendment A) seeks to revise several mining and rehabilitation plans (as shown in Plans 3B to Plan 3F) and rehabilitation performance criteria and rehabilitation monitoring, including but not limited to:

- The establishment of a permanent waste rock emplacement area;
- Revision of the rehabilitation tables in **Section 6**;
- Revision of Trigger Action Response Plans (TARPs) in **Section 9**;
- Align completion criteria with Flora and Fauna Management Plan (FFMP); and
- Revision of the rehabilitation monitoring, as outlined in the FFMP, in **Section 8**.

As required by the Guidelines, updated information in Amendment A is provided throughout in red text. Where appropriate, information superseded by Amendment A will be shown as strikethrough ~~strikethrough~~.

1.1.2 MOP Amendment B

In accordance with the Guidelines, WCPL are seeking minor amendments of the approved amended MOP[5] in regards to the application for prospecting operations under a Mining Authorisation, CL365 & CCL743 (*Mining Act 1973*). The amendments are in relation to the proposed *2016 South Wambo Drilling Program* (**Section 2.3.1** & **Appendix 8**).

As required by the Guidelines, updated information in Amendment B is provided throughout in blue text. Where appropriate, information superseded by Amendment B will be shown as strikethrough ~~strikethrough~~.

1.1.3 MOP Amendment C

In accordance with the Guidelines WCPL are seeking open cut mine plan amendments of the approved MOP[6], here within referred to Amendment C. MOP Amendment C seeks to revise several mining and rehabilitation plans (as shown in Plans 3B to Plan 3F), including but not limited to:

- A new open cut mining area referred to as Montrose East;
- A new open cut mining area referred to as Glen Munro Pit;
- A new open cut mining area referred to as Bates South Extended;
- The establishment of a waste rock emplacement area referred to as Montrose East Dump; and
- The addition of a number of surface water management structures and controls, associated with the Montrose East mining area.

[4] Mining Operations Plan approved on 04 June 2015
[5] MOP Amendment A approved on 06 April 2016
[6] MOP Amendment B approved on the 14 April 2016

Initial consultation with the DRE regarding this amendment was undertaken on 16 February 2016, with a detailed presentation of the proposed mine plan amendments provided to the DRE on the 29 April 2016.

WCPL is also seeking to provide clarification of its proposed exploration program. This will further define what standards will be adhered to, the leases exploration will occur within, the process disturbance will be assessed by and when/how regulatory approval sought.

All proposed open cut mining areas are approved under DA305-7-2003 (as modified). As required by the Guidelines, updated information in MOP Amendment C is provided throughout in green text. Where appropriate, information superseded by MOP Amendment C will be shown as strikethrough ~~strikethrough~~.

1.1.4 MOP Amendment D

In accordance with the Guidelines, WCPL are seeking open cut mine plan amendments of the approved MOP[7], here within referred to as Amendment D. MOP Amendment D seeks to rectify a drafting error during preparation of the MOP Plans for Amendment C. The amendment increases the MOP Disturbance area by 3.5ha at the north east extent of the mine to avoid only that part of Crown Land that intersects with the approved Development Consent Disturbance Boundary. Whilst the error has been identified and rectified, the RCE calculation to support MOP Amendment C in June 2016 included allowances for the disturbance and rehabilitation in this area. As a result, MOP Amendment D does not require further amendment and assessment of the current RCE.

Minor additional amendments have also been made to the MOP Plans and Main text to ensure accuracy and currency. No amendments have been made to the Appendices, other than Appendix 1.

Additional amendments include:

- Minor amendment to the active mining area boundary around the South Bates Extended open cut area-no additional disturbance required
- Updated disturbance and rehabilitation tables (Tables 11, 12 and 31), and text to reflect minor amendments to actual schedules and areas
- Update underground mine plans to reflect minor shortening of the longwall panels and to reflect the currency of mining operations
- Removal of Figure 3; now with direct reference to the MOP Plans sin Appendix 1.

Where appropriate, information superseded by MOP Amendment D is shown as a strikethrough (~~strikethrough~~).

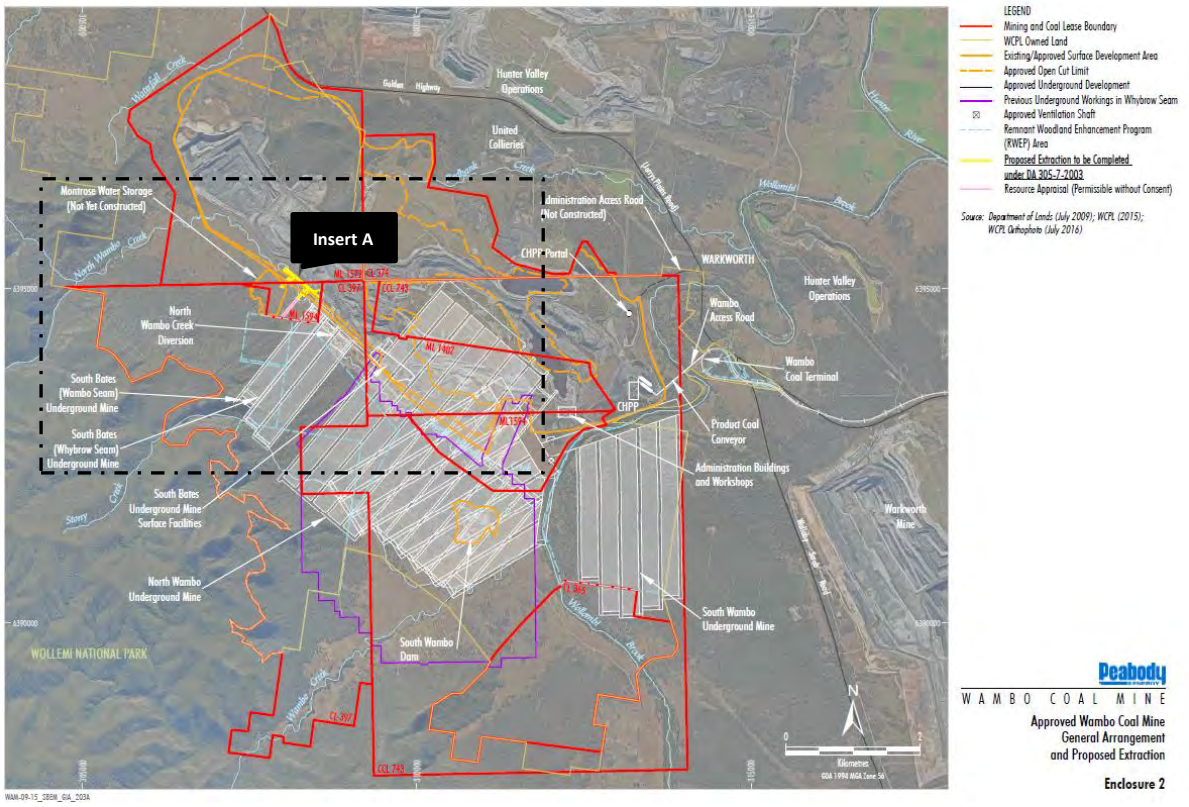
1.1.5 MOP Amendment E

In accordance with the Guidelines, WCPL are seeking a minor amendment of the approved MOP[8], here within referred to as Amendment E. MOP Amendment E seeks to modify the underground mine plan to include First Workings using underground mining methods of the Whybrow Seam, via the existing South Bates Open Cut, up to 200m beyond the open cut limit as shown by **Figure A**. This amendment would allow the recovery of coal through non-subsidising workings to further support coal recovery of the proposed South Bates Underground Extension (SBUE) Modification (i.e. MOD 17)[9].

[7] MOP Amendment C approved on the 27 June 2016
[8] MOP Amendment D approved on the 24 November 2016
[9] MOD 17 currently with the NSW Department of Planning and Environment for assessment.

Where appropriate, information superseded by MOP Amendment E is shown as a strikethrough (~~strikethrough~~).

Figure A – SBUE First Workings Consent Area



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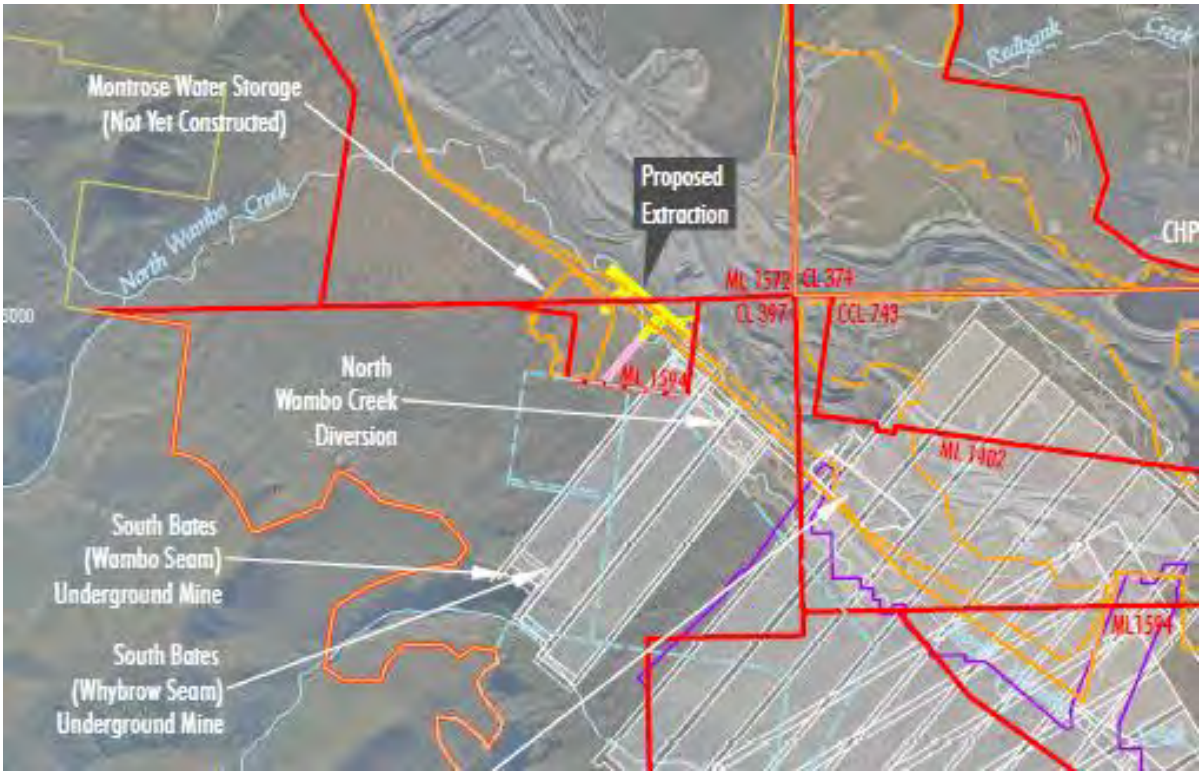


1.1.6 MOP Amendment F

In accordance with the Guidelines, WCPL are seeking a minor amendment of the approved MOP[10], here within referred to as Amendment F. MOP Amendment F seeks to amended the open cut mine plan rehabilitation and disturbance sequences within Montrose East Pit, Montrose Pit and Roses Pit open cut mining areas as displayed by Plan 3C to 3F.

MOP Amendment F seeks to amend longwall panel lengths of LW14, LW15 and LW16 at the SBU mine 'Wambo Seam', as a result of slower than forecast development rates. The revised longwall panel lengths are 976m, 1156m and 1345m (LW14, LW15 and LW16 respectively) are displayed in Plans 3C to 3F.

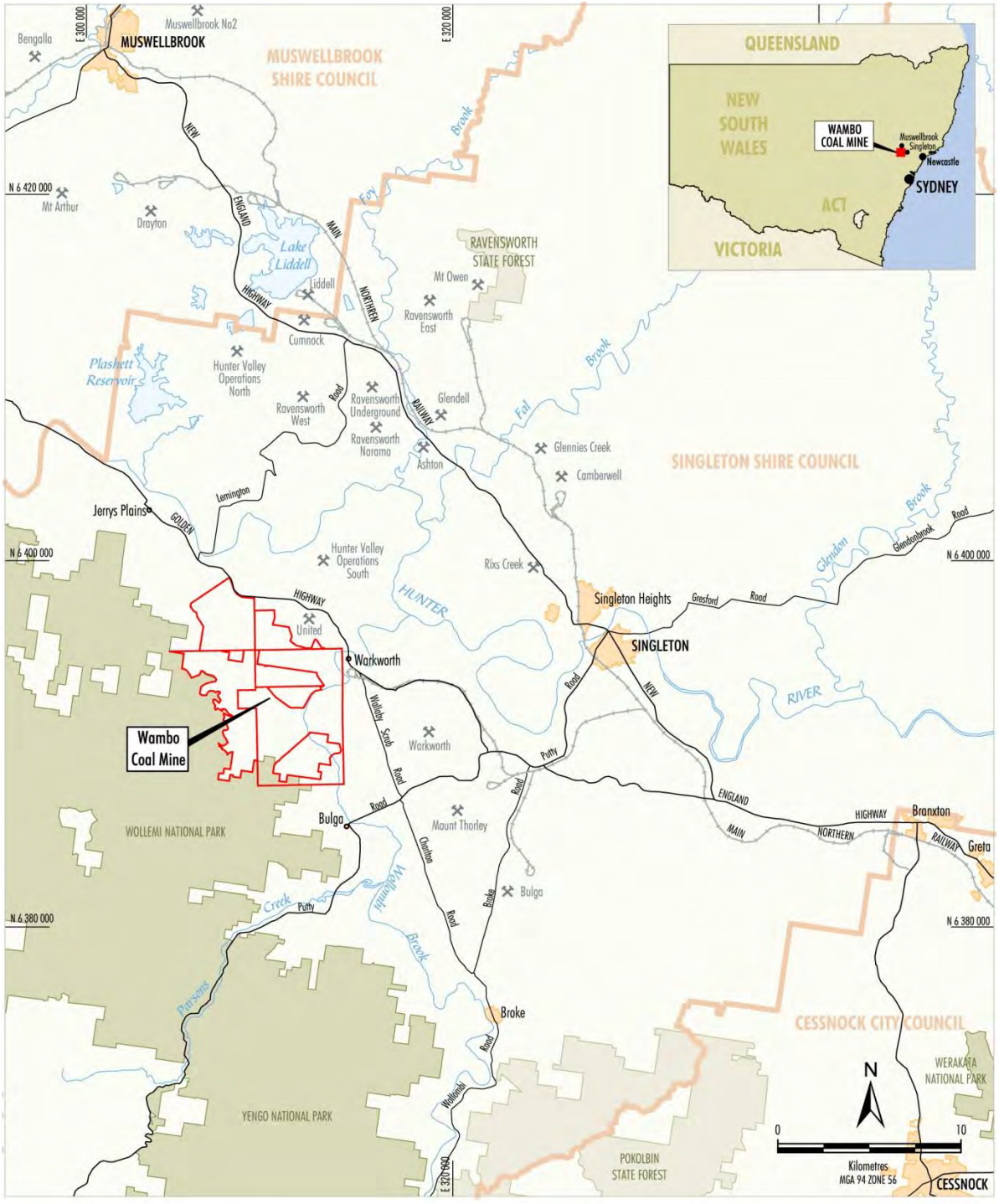
This MOP Amendment F provides information to the Division of Resources and Geoscience (DRG), formally known as the Division of Resources and Energy (DRE), regarding the revised capping methodology proposed by WCPL for the North East Tailings Dam (NETD) in **Section 2.3.2.7**.

This MOP Amendment F revised the completion criteria in **Section 6** of this MOP to align (and replace the interim criteria from MOP Amendment A) with the revised completion criteria and monitoring program (**Section 8**) within the Biodiversity Management Plan.

Where appropriate, information superseded by MOP Amendment F is shown as a strikethrough (~~strikethrough~~).

[10] MOP Amendment E approved on the 28 March 2017

Figure 1 Locality Plan



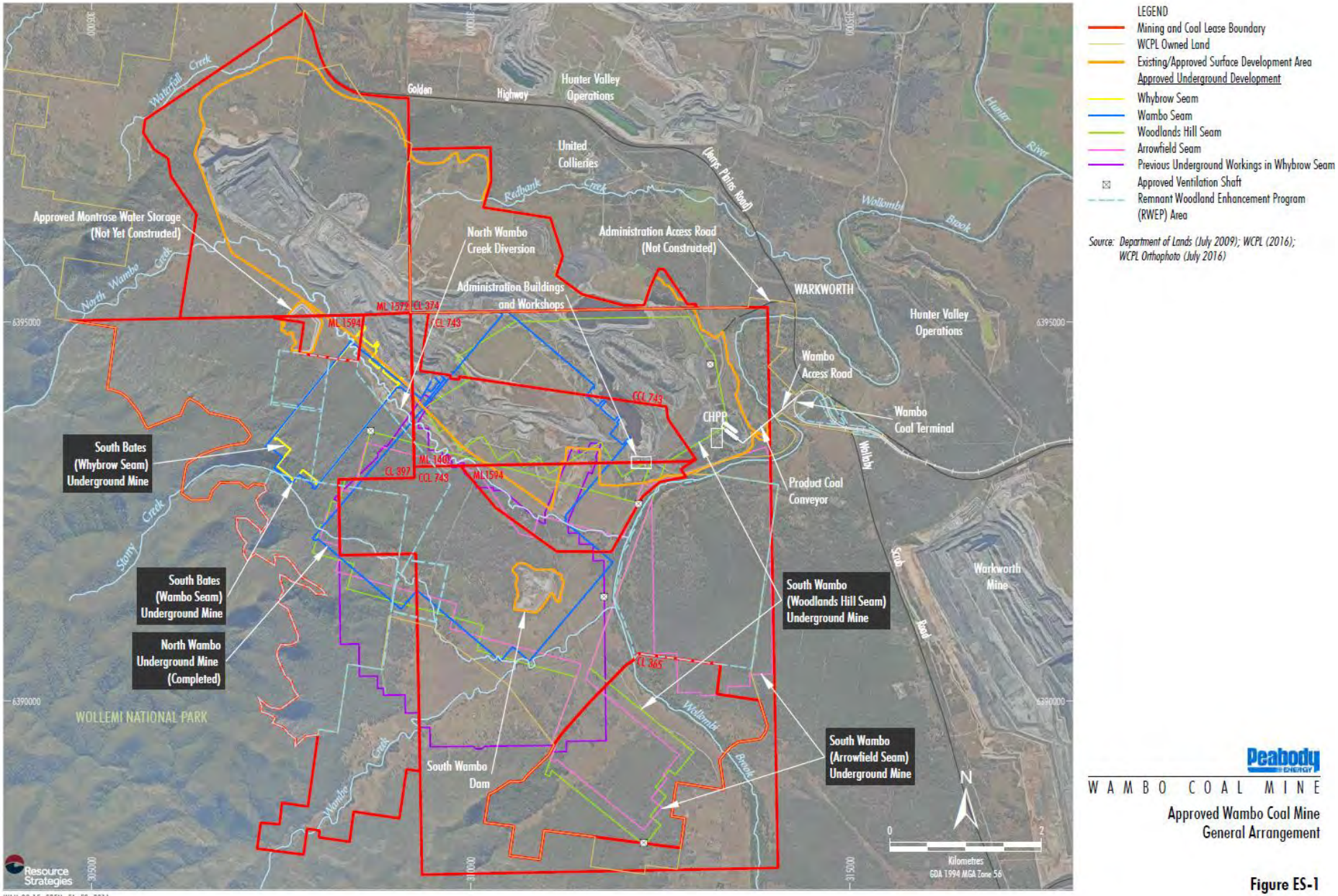
Source: Geoscience Australia (2009)

Peabody ENERGY

WAMBO COAL MINE

Regional Location

Figure 2 Approved Wambo Coal Mine Layout (MOD 12)



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Peabody ENERGY

WAMBO COAL MINE

Approved Wambo Coal Mine General Arrangement

Figure ES-1

1.1.5 Relationship with Previous MOP

In previous consultation with NSW Trade & Investment – Department of Resources & Energy (DRE), WCPL have prepared and operated under two separate Mining Operations Plans (MOP's) for the Underground and Open Cut mining operations. The current approved Open Cut MOP expires on the 30 June 2016 and the current Underground MOP expires on the 30 March 2015.

This MOP has been developed in accordance with the *MOP Guidelines* to include all proposed open cut and underground mining and mining associated activities at the Wambo Coal Mine. The MOP term will commence on the 31 March 2015 and expire on the 30 March 2020. The intent of this MOP is to replace both the existing Open Cut and Underground Mining Operations Plans.

In accordance with the definition as provided in the *Guidelines*, WCPL is classified as a Level 1 Mine.

1.1.6 Scope & Objectives

The scope of this MOP applies to the Mine and includes, but not limited to, all open cut and underground mining activities, mineral processing, material handling and mine rehabilitation areas. This MOP aims to provide an efficient approach to the management of the mining operation whilst maintaining compliance with its regulatory approvals. This MOP has also been prepared to address rehabilitation requirements, as identified by Condition 94, 94(A), 94(B) and 94(C) of Schedule 4 of DA305-7-2003.

Within the MOP term the general objectives for mining operations are as follows:

- The approved South Bates Underground (SBU) mine: Continue first workings development and longwall mine in the Whybrow Seam of the approved longwall panels (i.e. SBLW11, SBLW12 and SBLW13) in accordance with DA305-7-2003, to produce approximately 6.24Mt of ROM coal;
- The approved North Wambo Underground (NWU)[11] mine: Continue first workings development and longwall mine in the Wambo Seam of the approved longwall panels (i.e. LW9, LW10, LW10a and LW8b) in accordance with DA305-7-2003, to produce approximately 3.6Mt of ROM coal;
- The approved South Bates Underground (SBU) mine: Commence first workings development and longwall mine in the Wambo Seam[12] of the approved longwall panels (i.e. LW14, LW15 and LW16) in accordance with DA305-7-2003, to produce approximately 3.69Mt of ROM coal;
- Maximise resource recovery efficiency within the approved/existing open cut boundary, producing a total of approximately 25.01Mt of ROM coal;
- The approved South Wambo Underground (SWU) Mine Modification would involve the realignment and extension/relocation of the approved Arrowfield and Bowfield Underground Mine longwall panels within the existing tenements (i.e. ML 1594, CL 365, CL 397 and CCL 743); and
- Coal recovery using underground mining methods within the Whybrow Seam up to 200m beyond the open cut limit, producing approximately 0.04Mt of ROM coal to allow for the recovery of coal through non-subsidising workings to further support coal recovery of the proposed South Bates Underground Extension (SBUE), subject to Modification of DA305-7-2003 (i.e. MOD 17) (**Section 1.3.1**).

The MOP term will commence on the 31 March 2015 and expire on the 30 March 2020. During the MOP term, coal mining operations will be carried out to extract, process and transport product coal by

[11] Secondary extraction of the last approved longwall panel i.e. LW8b at the NWU mine was completed on the

[12] ~~SBU mine within the Wambo Seam is subject to modification of DA305-7-2003. WCPL will be seeking a modification to DA305-7-2003 during the MOP term. Subject to approval, this MOP will be amended accordingly regarding the approved mine plan.~~

rail. Rehabilitation of disturbed areas will be undertaken progressively as part of the mining operations. The proposed coal extraction mining areas for the open cut and underground operations within the term of this MOP (as amended) are presented in **Appendix 1**.

~~**Figure 3 Open Cut & Underground MOP Extraction Boundaries**~~

1.2 STRUCTURE OF THE MOP

The remainder of this MOP is structured as follows:

Section 1: Provides an **introduction** and details of the scope, objectives, consents, leases and licenses, mine geology, land ownership, consultation and existing environment.

Section 2: Describes the **proposed mining activity**, other activities, mine life, coal processing, waste disposal and material handling during the MOP term.

Section 3: Provides details of **the environmental issues management**, risk assessment and risk management during the MOP term.

Section 4: Details the **post mining land use**, regulatory requirements, post mining land use goals and rehabilitation objectives.

Section 5: Describes the **rehabilitation planning and management** activities, domain selection and rehabilitation phases.

Section 6: Provides the **performance indicators and completion criteria** for each phase of rehabilitation.

Section 7: Describes the **rehabilitation implementation** to include proposed rehabilitation activities over the MOP term.

Section 8: Outlines the **rehabilitation monitoring and research** trials to be implemented during the MOP term.

Section 9: Outlines WCPL **intervention and adaptive management** and contingency when threats to rehabilitation are identified.

Section 10: Describes the **reporting** framework and requirements for the Mine.

Section 11: The mining **plans** in A3 size are provided. The A0 mining plans are provided in **Appendix 1** (i.e. **Volume 2** & **Volume 3**).

Section 12: This section outlines the **review and implementation** of this MOP.

Appendix 1: **Plans**

Plan 1A – Project Locality

Plan 1B – Pre Mining Environment (Natural Environment)

Plan 1C – Pre Mining Environment (Built Features)

Plan 1C (2) – Mine Workings

Plan 2 – Mine Domains

Plan 3A – Sequence of Mining and Rehabilitation Activities (Year 1: 2015)

Plan 3B – Sequence of Mining and Rehabilitation Activities (Year 2: 2016)

Plan 3C – Sequence of Mining and Rehabilitation Activities (Year 3: 2017)

Plan 3D – Sequence of Mining and Rehabilitation Activities (Year 4: 2018)

Plan 3E – Sequence of Mining and Rehabilitation Activities (Year 5: 2019)

Plan 3F – Sequence of Mining and Rehabilitation Activities (Year 6: 2020)

Plan 4 – Final Rehabilitation and Post Mining Land Use at End of Approval

Plan 5 – Final Rehabilitation and Post Mining Land Use Sections

Appendix 2: DA 305-7-2003

Appendix 3: Correspondence

Appendix 4: Figures

Appendix 5: Environmental Management Plans, Asset Register & CD ROM

Appendix 6: Surface Disturbance Permit (SDP)

Appendix 7: MOP Risk Assessment

Appendix 8: South Wambo Drilling Program 2016

1.3 CURRENT CONSENTS, AUTHORISATIONS AND LICENCES

1.3.1 Development Consent

WCPL operate under DA305-7-2003 (as modified) and within the approved boundaries as displayed in **Figure 2**. WCPL was approved under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) in February 2004. Mining and rail activities at WCPL operate under separate development consents granted by the NSW Department of Planning & Environment (DP&E), formally the Department of Planning & Infrastructure (DP&I), and Singleton Shire Council (SCC).

The continued development of open cut and underground mining activities commenced under DA 305-7-2003 in February 2004. The construction of the rail spur, rail loop and train loadout area commenced under DA 177-8-2004 in January 2005. In accordance with DA305-7-2003, WCPL has development consent (**Figure 2**) to undertake open cut and underground longwall mining activities. The underground mining activities during the MOP period include:

- The approved NWU mine for longwall panels LW1 to LW10a[13] within the Wambo Seam;
- The approved SBU mine for longwall panels SBLW11 to SBLW13 within the Whybrow Seam; &
- The approved SBU[14] mine for longwall panels SBLW14 to SBLW16 within the Wambo Seam.

Table 2 provides a summary of the key approvals, leases and licences that the Mine operates under. WCPL have modified the DA305-7-2003 on fourteen occasions (**Table 3**). A copy of the modified DA305-7-2003 is provided in **Appendix 2**.

Copies of the DA305-7-2203, EPL 529 and mining leases are available on the Peabody Energy website:https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Approvals,-Plans-Reports

Table 2 Mine Approvals, Leases and Licences

Relevant Authority	Instrument	Approval/Licence No.	Expiry Date
DP&E	Development Application (DA)	• DA305-7-2003	21 years from 4 February 2004[15]
DRE	Mining Lease (ML)	• Coal Lease 365 (Coal Mining Act (1973)) • Coal Lease 374 (Coal Mining Act (1973)) • Coal Lease 397 (Coal Mining Act (1973)) • Consolidated Coal Lease 743 (Coal Mining Act (1973)) • Mining Lease 1402 (Coal Mining Act (1973)) • Mining Lease 1572 (Coal Mining Act (1973)) • Mining Lease 1594 (Mining Act (1992))	Refer to **Table 4**
	Exploration Licence	• Exploration Licence A444 • Exploration Licence EL7211	Refer to **Table 4**
	Mining Operations Plan (MOP)	• Wambo Coal Mine – Mining Operations Plan (as amended)	30 March 2020
EPA	Environment Protection Licence (EPL)	• EPL 529	Until the licence is surrendered, suspended or revoked. The licence is subject to review every 3 years.

[13] WCPL propose to longwall mine LW10a. LW10a is subject to modification of DA305-7-2003 (MOD 14). At the time of preparing this MOP, approval for Longwall LW10a remained pending.
[14] ~~WCPL propose to modify DA305-7-2003 for the longwall mining of three panels (i.e. SBLW14, SBLW15 and SBLW16) within the Wambo Seam at the SBU mine during the MOP term.~~
[15] MOD 12 allows for and extension of 7 years (i.e. until 1 March 2032).

Table 3 Development Consents & Modifications

Approval Name	Number	Approval Authority	Date Granted	Expiry Date
WCPL Mining Operations				
Original consolidated consent for mine operations	DA 108/91	SSC	17/02/1992	21 years from issue of coal lease
Modification to include Wollemi Box Cut and mine	DA 108/91	SSC	16/10/1996	21 years from issue of coal lease
Modification to include Brambles Coal Transport System	DA 108/91	SSC	21/12/1998	21 years from issue of coal lease
Expansion of open cut and underground mining operations	DA 305-7-2003	DP&E	04/02/2004	21 years from issue
(MOD 1) Modification to allow DA No. 108/91 to remain active	DA 305-7-2003	DP&E	2004	21 years from 4 February 2004
(MOD 2) Re-orientation of the Wambo seam underground mine longwall panels	DA 305-7-2003	DP&E	04/05/2005	21 years from 4 February 2004
(MOD 3) Upgrade of open cut workshop and underground surface facilities	DA 305-7-2003	DP&E	10/01/2006	21 years from 4 February 2004
(MOD 4) Extraction of the Wollemi remnants	DA 305-7-2003	DP&E	19/04/2006	21 years from 4 February 2004
(MOD 5) Construction of a temporary by-pass of North Wambo Creek	DA 305-7-2003	DP&E	20/10/2006	21 years from 4 February 2004
(MOD 6) Construction of the North Wambo Creek Diversion, gas and dewatering wells	DA 305-7-2003	DP&E	25/01/2007	21 years from 4 February 2004
(MOD 7) Construction of internal water storage dam – Chitter Dam	DA 305-7-2003	DP&E	22/06/2009	21 years from 4 February 2004
(MOD 8) Construction of internal water storage dam – South Wambo Dam	DA 305-7-2003	DP&E	27/08/2009	21 years from 4 February 2004
(MOD 9) Preparation of an Extraction Plan rather than a Subsidence Management Plan	DA 305-7-2003	DP&E	28/02/2011	21 years from 4 February 2004
(MOD 11) Montrose Water Storage Dam	DA 305-7-2003	DP&E	18/01/2013	21 years from 4 February 2004
(MOD 12) South Wambo Underground Mine Modification	DA 305-7-2003	DP&E	12/12/2016	1 March 2032
(MOD 13) Additional Longwalls LW9-10	DA 305-7-2003	DP&E	08/07/2013	21 years from 4 February 2004
(MOD 14) Additional Longwall LW10a	DA 305-7-2003	DP&E	10/04/2015	21 years from 4 February 2004
(MOD 15) South Bates (Wambo Seam) Underground Mine Modification	DA 305-7-2003	DP&E	10/11/2015	21 years from 4 February 2004
(MOD 16) United Wambo Open Cut Mine	DA-305-7-2003	DP&E	TBA	TBA
(MOD 17) South Bates Underground Extension (including Whybrow & Wambo Seams)	DA-305-7-2003	DP&E	TBA	TBA
WCPL Rail Development				
Jerry's Plains Rail Line	DA 235/97	SSC	16/07/1998	Perpetuity
Modification to DA235/97 to correct residents list and allow the preparation of management plans in a staged manner	DA 235/97	SSC	01/05/2003	Perpetuity
Altered alignment of Jerry's Plains Rail Line	DA 235/97.3	SSC	03/12/2004	Perpetuity
WCPL rail and coal loading infrastructure	DA 305-7-2003	DP&E	01/06/2004	01/06/2025
WCPL rail and coal loading infrastructure (altered alignment of rail loop)	DA 117-8-2004	DP&E	16/12/2004	16/12/2025
(MOD 1) Upgrade of Wallaby Scrub Road / Golden Hwy Intersection	DA 117-8-2004	DP&E	15/12/2006	16/12/2025

Approval Name	Number	Approval Authority	Date Granted	Expiry Date
(MOD 2) Establishment of a locomotive provisioning facility adjacent to the WCPL Rail Loadout Facility	DA 117-8-2004	DP&E	12/02/2012	16/12/2025

Note: MOD10 was withdrawn by WCPL.

~~At the time of preparing this MOP Amendment C, WCPL had lodged a modification of DA305-7-2003 (i.e. MOD12) with the DP&E. MOD12 seeks approval for rearrangement of the South Wambo Underground Mine. The modification would involve a realignment and extension/relocation of the approved South Wambo Underground Mine longwall panels and mining of the Woodlands Hill Seam rather than the Bowfield Seam. An amendment of this MOP, in consultation with the DRE would be undertaken subject to approval of MOD12.~~

At the time of preparing MOP Amendment E, WCPL were in the process of preparing an Environmental Impact Statement (EIS) to accompany an application to modify DA305-7-2003 (i.e. MOD 17) for additional longwall panels in the Whybrow Seam of the South Bates Underground Mine and construction of new ventilation shafts, gas drainage infrastructure and other ancillary infrastructure. On the 13 December 2016, the DP&E confirmed that underground mining of the Whybrow seam up to 200m beyond the open cut limit from the South Bates Open Cut was general in accordance with the conditions of consent for DA305-7-2003 (**Figure A**).

1.3.2 Rehabilitation Management Plan

During the preparing of this MOP, the DRE determined that an approved MOP will satisfy the requirements of Condition 94C, Schedule 3 of DA305-7-2003 (i.e. for preparation of a Rehabilitation Management Plan (RMP) to the satisfaction of the Executive Director of Mineral Resources).

In consultation with the DP&E, WCPL received acknowledgment on the 4 May 2015 the MOP would satisfy the requirements of the RMP, subject to the MOP being approved by the Executive Director Mineral Resources. **Table 4** provides the conditions as they related to Condition 94C, Schedule 3 of DA305-7-2003 and where they are addressed in this MOP.

New rehabilitation conditions as a result of MOD 12 are highlighted by orange text in **Table 4**. ~~At the time of preparing MOP Amendment E, WCPL had not finalised relevant strategies in consultation with the DP&E to address the new consent conditions issued in December 2016. WCPL are seeking to address these conditions in relation to rehabilitation at the next MOP amendment opportunity~~.

Table 4 Rehabilitation Management Plan Requirements

Condition 94C, Schedule 3 of DA305-7-2003	MOP Section
94C. The Applicant shall prepare and implement a Rehabilitation Management Plan for the Wambo Mining Complex to the satisfaction of DRE. This plan must: (a) be prepared in consultation with the Department, NOW, OEH, Council and the CCC; (b) be submitted to DRE by the end of June 2013; (c) be prepared in accordance with any relevant DRE guideline; (d) describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy; (e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); (f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform, and final land use;	 Section 1.5 Section 1.0 Section 3.3.7 & Section 5.4 Section 6.0 & Section 9.0 This document

Table 4 Rehabilitation Management Plan Requirements (cont.)

Condition 94C, Schedule 3 of DA305-7-2003	MOP Section
(g) include a detailed tailings management strategy that includes timing for rehabilitation of all tailings storage facilities, in order that final land form and land use objectives can be achieved in a timely manner; (h) include a plan that describes proposed grazing carrying capacity across the post mining landscape; (i) include interim rehabilitation where necessary to minimise the area exposed for dust generation; (j) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and (k) build to the maximum extent practicable on the other management plans required under this consent.	Section 2.3.2.7 Section 8.4 Section 2.3.9 Section 8.2 Section 8.1 & 8.2

1.3.3 Highwall Mining Feasibility Project

Following a review of mine planning and recent exploration results, WCPL has also identified potential coal reserves that could be economically mined with highwall mining methods. The feasibility of this project is currently under review by WCPL management and includes mine planning, resource extraction equipment and planning approvals required to proceed to the next phase of the feasibility study. Any modification to DA305-7-2003 in regards to highwall mining methods within the MOP term will be in consultation with the DRE to amend this MOP accordingly.

1.3.4 Mining Lease & Exploration Licences

The Open Cut, NWU mine and the SBU mine are located within a combination of coal and mining leases including ML 1402, ML 1572, ML 1594, CL 365, CL 374, CL 397 and CCL 743 (Plan 1C). Mining lease conditions as they relate to rehabilitation are tabularised (**Table 20**) in **Section 4.1**. The date of grant and duration of key approvals and licences issued by government agencies relevant to the WCPL underground operations are provided in **Table 5** below.

Table 5 Mining Leases and Authorisations

Lease Reference	Area (ha)	Date Granted	Expiry Date
Coal Lease 365 (Coal Mining Act 1973)	530	19/09/1990	19/09/2032
Coal Lease 374 (Coal Mining Act 1973)	382	06/12/1991	21/03/2026
Coal Lease 397 (Coal Mining Act 1973)	1,480	04/06/1992	4/06/2034
Consolidated Coal Lease 743 (Coal Mining Act 1973)	3,000	09/03/1990	14/08/2022
Mining Lease 1402 (Coal Mining Act 1973)	352	23/09/1996	14/08/2022
Mining Lease 1572 (Coal Mining Act 1973)	1,012	21/12/2005	21/12/2026
Mining Lease 1594 (Mining Act 1992)	263	01/05/2007	30/04/2028
Exploration Licence A444^*	3,060	04/10/2007	16/05/2016
Exploration Licence EL7211	967	29/09/2008	29/09/2019

Notes: - United has a strata title lease to the Arrowfield seam in the northern 1.5 km of CCL743 and CL397.
- Mining Lease 1402 covered surface rights to enable development of the Wollemi Mine.
- ^A444 is an Authority to Prospect granted under *Coal Mining Act 1973*.
- * Licence Renewal Application was submitted to the DRE on 16 May 2016 and is currently under review.

1.3.5 Environment Protection Licence

The Mine operates under Environmental Protection Licence 529 (EPL 529), issued by the NSW Environment Protection Authority (EPA), under the authority of the *Protection of the Environment Operations Act 1997*. EPL 529 also covers WCPL activities at the Mine and rail spur.

1.3.6 SMP/Extraction Plan Approval

The NWU mine previously operated under an approved Subsidence Management Plan (SMP) for LW1 - 6. The SMP for First Workings was approved in October 2005 with mining commencing in November 2005. The SMP for Second Workings was lodged in March 2006 and was approved on the 11 December 2006. This SMP covers underground mining activities until 1/11/2013 which includes longwall panels LW1 - 6.

WCPL submitted on the 18 December 2012 an SMP/Extraction Plan (EP) for approval[16], prior to secondary extraction for the remaining longwall panels LW7 - 8 at the NWU mine. The EP for LW7 and LW8 was approved on 22 May 2013 and September 2013. The approved EP for LW7 and LW8 was revised[5] to include two longwalls within the approved NWU mine extent (i.e. LW9 and LW10a) for a consolidated Extraction Plan for LW7 to LW10a. The EP for LW7 to LW10a was approved on the 24 June 2015.

The EP for longwall panels SBLW11 to SBLW13 to allow longwall extraction within the Whybrow Seam, at the SBU mine, was approved on the 9 February 2016. A separate EP for longwall panels SBLW14 to SBLW16 to allow longwall extraction within the Wambo Seam, will be prepared and submitted[5] for approval prior to secondary extraction.

The EP for South Bates SBLW13 to SBLW16 (*Extraction Plan - South Bates Underground Mine Longwalls 11 to 16)* was conditionally approved by the DP&E on the 16/05/2017. The approval considered the reduced lengths of LW13 to LW16 would result in similar or less subsidence related impacts to those approved as part of the approved layout and therefore can be generally in accordance with the Development Consent DA305-7-2003 as modified.

1.3.7 EPBC Approval

WCPL was granted approval (EPBC 2003/1138) under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) for the expansion of the mine on the 23 November 2004. In accordance with the approval WCPL have prepared a Flora and Fauna Management Plan (FFMP) (**Section 3.3.7**) to address the conditions set out in *EPBC 2003/1138*. The FFMP was revised in March 2016 and subsequently renamed as the Biodiversity Management Plan (BMP). ~~The revised BMP was being finalised for resubmission at the time of preparing this MOP Amendment C~~.

The BMP was issued to the DP&E on the 28 October 2016 after extensive consultation with NSW Office of Environment and Heritage (OEH) and the Department of the Environment and Energy (DoEE). On the 17 November 2016 the DoEE approved the BMP. On the 1 November 2016 the OEH endorsed the BMP. Although the BMP has not received final approval by the DP&E, key elements of the BMP applicable to this MOP including completion criteria, biodiversity management and monitoring programs have been implemented since late 2016. A copy of the BMP is provided in **Appendix 5**.

1.3.8 Water Licences

WCPL currently holds water licences for a number of test and dewatering bores located within and outside the mining lease.

Table 6 and **Table 7** detail the current water licenses held by WCPL.

[16] In accordance with Conditions 22 A-F, Schedule 3 of DA305-7-2003

Table 6 Water Access Licences (Water Management Act 2000)

Licence No.	Description	Water Sharing Plan	Share Component (units)
WAL718	Hunter River Pump	Hunter Regulated Water Sharing Plan, Hunter Regulated River Water Source	1,000 ML (high security)
WAL8599	N/A		6 ML (high security)
WAL8600	N/A		868 ML (general security)
WAL8604	N/A		240 ML (supplementary water)
WAL18437	Wollombi Brook Pump	Hunter Unregulated and Alluvial Water Sources	350 ML
WAL23897	Aquifer		70 ML

Table 7 Water Licences (Water Act 1912)

Licence No.	Description	Facility	Valid To	Extraction Limit
20BL132753	WAMBO-03 (mining bore)	Bore	29/07/2018	243 ML/year
20BL167738[1]	N/A	Bore	11/09/2015	57 ML/year
20BL169643	Open Cut Dewatering	Bore	7/08/2018	40 ML/year
20BL172156	Open Cut Dewatering	Excavation	3/05/2019	98 ML/year
20BL173844	N/A	Bore	4/09/2019	9 ML/year
20BL172061[1]	BH2, BH2a (Dewatering Bore)	Bore	22/03/2014	750 ML/year
20BL173040		Bore	21/05/2017	
20BL168017		Bore	21/05/2017	
20BL166910	BH4C, BH4E and BH1J	Bore	21/05/2017	450 ML/year
20BL173032		Bore	30/11/2016	
20BL173033		Bore	30/11/2016	
20BL173034		Bore	30/11/2016	
20BL173035		Bore	30/11/2016	
20BL168997	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL168998	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL168999	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL169000	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL170638	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL172237	GW14, GW18, GW21	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172238	GW12	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172240	GW15	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172242	GW16, GW17	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172244	GW20	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172255	GW22	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172256	GW13	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172257	GW19	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL172332	Piezometer	Test Bore	Perpetuity	NA -Groundwater monitoring
20BL173290	Bore	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL173291	Bore	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL173292	Bore	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL173293	Bore	Monitoring Bore	Perpetuity	NA -Groundwater monitoring
20BL009818	Bore	Stock	Perpetuity	NA - Stock
20BL009819	Bore	Stock	Perpetuity	NA - Stock
20BL009820	Bore	Stock	Perpetuity	NA - Stock
20BL009821	Bore	Stock	Perpetuity	NA - Stock
20BL143779	Bore	Stock/Domestic	Perpetuity	NA - Stock/Domestic

Note: * Licence renewals submitted pending approval from NOW. [1.] *Application for renewal has been submitted to DPI Water, pending approval.*

1.4 LAND OWNERSHIP AND LAND USE

1.4.1 Land Ownership

WCPL owns a significant area of land[17], including all of the land within the area consented to be disturbed by open cut mining and all of the land that overlies the NWU mine and approved SBU mine. WCPL land ownership is shown on **Plan 1C.**

In accordance with DA 305-7-2003, WCPL has de-gazetted and closed off Pinegrove Road which is located in the north western extent of the current approved open cut limit. Pinegrove Road was required to be closed for mining in the Montrose East and Montrose West Pits. WCPL owns all of the land serviced by Pinegrove Road. **Table 8** identifies the schedule of land ownership.

1.4.2 Land Use

Other land use includes previously cleared grazing land (rain-fed unimproved pasture) and patches of remnant native woodland. Land use in the vicinity of WCPL is characterised by a combination of coal mining operations, agricultural land uses and rural residential development (evident in the local villages of Bulga, Jerrys Plains and, to a lesser extent, Warkworth). WCPL controlled lands that are not subject to mine operations are utilised for the agistment of stock (primarily cattle) and provide a buffer to neighbouring coal operations and private landholders and the adjoining Wollemi National Park.

An aerial photograph of the WCPLs and surrounds is provided on **Figure 2**. Significant areas of land which overly NWU mine and SBU mine have been previously disturbed by historical agricultural uses. Underground access to the NWU and SBU mine are from highwall entries in the existing Open Cut. The Open Cut mining operations is bounded by the United Colliery and the Golden Highway to the north and Wollombi Brook to the east.

Table 8 Schedule of Land Ownership

Schedule of Land Ownership	
WCPL Freehold	
79 DP753792	Lot 181 DP823775
Lot 57 DP753817	Lot 177 DP823775
Lot 160 DP753817	Lot 118 DP753792
Lot 18 DP753817	Lot 95 DP753792
Lot 71 DP753817	Lot 2 DP709722
Lot 161 DP753817	Por 131 DP753792
Lot 49 DP753792	Lot 2 DP616303
Lot 50 DP753792	Lot 1 DP720705
Lot 51 DP753792	Lot 2 DP720705
Lot 52 DP753792	Lot 3 DP720705
Lot 58 DP753792	Lot 4 DP720705
Lot 66 DP753792	Lot 45 DP753792
Lot 67 DP753792	Lot 46 DP753792

[17] Lot 170, DP 823775 is Crown Reserve. The mine plan has been designed to avoid the portion of Crown Reserve to the north of the Montrose East mining area (**Figure 3**).

Schedule of Land Ownership	
Lot 62 DP753792	Lot 4 DP542226
Lot 63 DP753792	Lot 5 DP542226
Lot 64 DP753792	Lot 1 DP241316
Lot C DP33149	Lot 7 DP3030
Lot 22 DP753817	Lot 23 DP3030
Lot A DP33149	Lot 92 DP755267
Lot 79 DP753821	Lot 109 DP753792
Lot 19 DP3030	Lot 110 DP753792
Lot 129 DP755267	Lot 111 DP753792
Lot 22 DP755267	Lot 112 DP753792
Lot 1 DP616303	Lot 103 DP753792
Lot 100 DP753792	Lot 104 DP753792
Lot 101 DP753792	Lot 82 DP548749
Lot 38 DP753792	Lot 83 DP548749
Lot 39 DP753792	Lot 1 DP110084
Lot 60 DP753792	Lot 2 DP110084
Lot 61 DP753792	Lot B DP33149
Lot 1 DP709722	Lot 113 DP753817
Lot 55 DP753792	Lot 2 DP617852
Pine Grove Road (WCPL Owned)	
Road bounded by Lots 7,19 & 23 DP 3030, Lots 22 & 129 DP755267, Lot 83 DP548749 and Lot 1 DP110084	
Crown Land	
Lots 170, 175 DP 823775	Lot 208 DP 753817
Lot 76 DP753821	Lot 78 DP753821
Travelling Stock and Camping Reserve No. 5294	
Lot 175 DP 823775	
Council Roads	
Wambo Mine Road	Road within Lot 1 DP 616303
Crown Roads	
Bounded by Lots 92 & 129 DP 755267	Bounded by Lots 4 & 5 DP 542226, Lots 2 &3 DP720705 and Lot 2 DP 616303
Bounded by Lots 38, 55, 61, 100, 101, 149 DP 753792, Lot 2 DP617852 and Lot 1 DP 616303	Within Lot 2 DP617852
Bounded by Lots 175, 177, 181 DP 823775	Bounded by Lot 177 DP 823775, 60, 62-64, 95, 118 DP 753792, Lot 2 DP617852
Bounded by Lots 170, 177 DP 823775, 49-51, 58, 118 DP 753792	Bounded by Lots 170 DP 823775, 49, 50, 52, 79 DP 753792, 18, 160, 161 DP753817
Bounded by Lots A & B DP 33149, 22, 66, 67, 71 DP 753817	Adjoining to the East and North Lot 79 DP753821
Wollombi Brook	
Bounded by Lots 22 DP 755267, Lot 83 DP 548749, Lot 1 DP 110084, Lot 1 DP 241316, Lot 7 DP 3030	
Private Land within Mining Leases	
Lot 3 DP735566	Lot 92 DP586792
Lots 1, 54, 17, 20, 19, 6, 7, 23, 18 DP595702	Lot 91 DP586792
Lot 312 DP579424	Lot 23 DP858472

Schedule of Land Ownership	
Lot 311 DP579424	Lot 2 DP595702
Lot 1 DP178612	Lot 1 DP 735566

Notes: Council controlled roads have been identified using geographical names where possible. Council and Crown roads and sections of Wollombi Brook with no real property identifier have their location described relative to adjoining lots.

1.5 STAKEHOLDER CONSULTATION

All of the Mine's activities for this MOP are entirely contained within WCPL owned land, therefore no private landholders will be directly affected by the development. There are several private properties and portions of Crown Land within WCPL mining leases (**Table 5** and **Plan 1C**). Consultation with Crown Lands and private landholders are provided in **Section 1.5.1** and **Section 1.5.2**.

Consultation in relation to the Project EIS was undertaken in 2002, 2003 and 2004 with regulatory authorities, non-government organisations, relevant Aboriginal groups and the local community. This included community meetings in Jerrys Plains and at WCPL. In addition, consultation for consecutive modifications of DA305-7-2003 has been undertaken. Consultation with the local community, Aboriginal stakeholders, United Collieries, key state government agencies and Singleton Shire Council (SSC) was completed in late 2015 as a result of the most recent modification (MOD12) (**Section 1.3.1**) for South Wambo Underground Mine Modification (MOD12).

Consultation with United Collieries regarding the MOP was conducted in May 2015. WCPL and United Collieries have entered into a Joint Venture (JV) with adjoining mining tenements. Ongoing consultation with United Collieries will be undertaken regarding the JV and future operations, as required, during the MOP term.

The Project EIS and environmental assessments that accompany the various modifications are provided on the DP&E and WCPL's webpage regarding the Project.

1.5.1 Government Consultation

A meeting with the DRE and representatives from WCPL was held on the 16 May 2014 to discuss preparing and submitting a new consolidated MOP for the entire operation in late 2014. Extensive consultation with the DRE continued throughout the preparation of the MOP.

A MOP pre-lodgement meeting occurred on the 22 October 2014 (at the DRE's Maitland office) to discuss completion criteria and other aspects of the MOP. Additional correspondence and consultation was undertaken with the DRE in December 2014 in regards to increasing the term of the MOP.

A meeting with the DRE was undertaken on 30 March 2015 to discuss the DRE comments made during the review of the submitted MOP.

Consultation with the DP&E in regards to preparing the MOP, in particular with seeking endorsement from the DP&E that the approved MOP will also meet the requirements of the RMP, was received by WCPL on the 4 May 2015.

Consultation with Singleton Shire Council (SCC) was also undertaken in regards to the MOP and RMP. The formation of the community consultative committee (CCC) retains a representative from the SCC. Recent issues discussed during 2014 with the CCC have included the additional longwall panels LW9, LW10 and LW10a, an update status of both the NWU mine and the SBU mine and mining operation plans and extraction plans for longwall mining.

Consultation with the Office of Environment and Heritage (OEH) was undertaken during the review of the RMP in October 2014.

Consultation with the NSW Office of Water (Office of Water) was undertaken during the review of the RMP in October 2014. In a response on 1 December 2014, the Office of Water were satisfied that the RMP adequately addressed the conditions of the consent. The Office of Water will be provided a copy of this MOP.

Crown Lands were also provided a letter notification in May 2015 of the preparation of the MOP, as a portion of Crown Land is within WCPL mining lease area. A copy of the MOP, if requested, will be provided to Crown Lands.

An initial meeting with the DRE on the 15 December 2015 was undertaken (at the DRE's Maitland office) to discuss the proposed amendments to the approved MOP, including changes to waste rock dumping locations, amendments to the rehabilitation schedule and amendments to completion criteria.

On the 31 March 2016, WCPL received a request by the DRE to amend the MOP in regards to the application for prospecting operations under a Mining Authorisation, CL365 & CCL743 (*Mining Act 1973*).

An initial meeting with the DRE on the 16 February 2016 was undertaken to discuss the proposed amendments to the approved MOP, including changes to waste rock dumping locations, amendments to the open cut mining areas and rehabilitation schedule. A detailed presentation prior to the submission of MOP Amendment C was provided to the DRE on the 29 April 2016.

Although not impacted by the mine, a section of Crown Reserve is within the approved open cut mining area. The mine plan has been developed by WCPL to avoid this section of Crown Reserve (**Figure 3**).

Information to the DRE was provided on the 13 February 2017 in regards to MOP Amendment E, to outline the proposed changes to WCPL's underground mining area. Follow up consultation with the DRE was undertaken on the 16 February 2017.

Initial information in regards to MOP Amendment F was raised during the submission of MOP Amendment E. Follow up consultation with the DRE was undertaken in May 2017, including discussions during the Annual Review inspection held at the Mine on 25 May 2017.

1.5.2 Community Consultation

Ongoing community consultation in regards to the MOP was completed in accordance with the WCPL Environmental Management Strategy (EMS) via the CCC. The CCC was formed back in September 2005. Minutes from the CCC are placed on the WCPL webpage. The website is maintained in accordance with DA305-7-2003 requirements. The website provides the wider community with access to the sites monitoring results, details of current activities, proposed blast times, policies, environmental management plans and monitoring programs and any other information in relation to the site operation that may be considered of interest to the community. WCPL also conducts twice yearly open information sessions which are held in the local village of Jerrys Plains to allow community members access to key WCPL personnel to discuss all aspects of the Mine's operations

The Peabody Energy website address for WCPL is:

https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Approvals,-Plans-Reports

Recent issues discussed during 2014 with the CCC have included the additional longwall panels LW9, LW10 and LW10a, an update status of both the NWU mine, the SBU mine and mining operation plans and open cut operations.

Identified land holders within WCPL mining leases were provided letter notification of the preparation of the MOP. **Table 8** identifies the various private landholders within WCPL mining leases. A copy of the MOP, if requested, will be provided to each land holder.

During the CCC meeting held on 8 December 2015, WCPL provided operational information including the proposed amendments to the approved MOP (i.e. MOP Amendment A).

WCPL provided preliminary information on the proposed open cut mining areas to the northern extent of the mine (i.e. Montrose East) to members of the CCC on the 12 April 2016, with supplementary information to be provided in the next scheduled CCC meeting.

During the CCC meeting held on the 7 December 2016, WCPL provided preliminary information on the proposed Joint Venture Open Cut Mine Project, MOD12 South Wambo Underground, MOD 17 South Bates Extended Underground and MOP Amendment D. WCPL also discussed investigating a future extension to the South Bates Underground Mine.

WCPL provided a copy of the Wambo South Bates Underground Mine Extraction Plan for Longwalls 11 to 16 on the 31 January 2017 to CCC members.

In February 2017, WCPL commenced weekly community information sessions held every Friday between 11am to 2pm at an adjoining mine owned property off the Golden Highway, east of Jerrys Plains.

WCPL provided information in regards to MOP Amendment F during the latest CCC meeting held on 11 April 2017.

The Annual Review (AR) (formally known as the Annual Environmental Management Report or AEMR) also provided information about the preparation of the new MOP for the entire operation. WCPL will provide copies of this MOP to all relevant stakeholders, including the CCC members for review and comment.

1.6 REHABILITATION AND MINE CLOSURE

1.6.1 Conceptual Mine Closure Plan

WCPL are revising the conceptual Mine Closure Plan (CMCP) to undertake life of mine closure planning for mining operations, although the Mine is not planned for closure until 2025. The revision of the CMCP in 2015 will incorporate a review of the constraints and opportunities to identify potential sustainable land-use options, in consultation with relevant stakeholders in order to obtain feedback of any issues that need to be considered as part of the final land use analysis. The revised CMCP will be submitted to the DRE and other relevant stakeholders for approval in early 2016.

In addition the CMCP will provide detailed decommissioning works for infrastructure, in general:

- Infrastructure with no ongoing beneficial use would be removed from the site at the completion of the project. Foundation slabs of certain buildings may be retained for suitable end-use goals in agreement with the relevant authorities and stakeholders. Alternatively, they would be excavated for disposal or buried in a void in an approved manner.
- Process reagents and fuels unused at the completion of mining would be returned to the supplier in accordance with the relevant safety and handling procedures. Foundation soils would be chemically tested, contour ripped and chemically ameliorated, as required (in accordance with EPA requirements). Stockpiled soils would then be applied as necessary and stabilised. Revegetation would be undertaken with suitable endemic tree species or pastures, consistent with the Project revegetation strategy (see **Section 3.3.7**).
- Roads that have no specific post-mining use would be ripped, topsoiled and revegetated. Some access roads may be retained post-mining to enable access and for use in bushfire and other land management activities.
- Water management structures and sediment control structures would either be retained as wetland habitat/water features or decommissioned and rehabilitated. The design, capacity and final location of these post mining water management structures will be refined and detailed in revised water management plans as the Mine progresses towards mine closure. Some access

roads may be retained post-mining to enable access and for use in bushfire and other land management activities.

Rehabilitation monitoring results would be used to confirm rehabilitation areas are on a trajectory towards a self-sustaining ecosystem and towards meeting the rehabilitation completion criteria. Monitoring results would also be used to determine the requirement for maintenance and/or contingency measures (e.g. supplementary plantings) to improve rehabilitation performance. Contingency measures are described further in **Section 9.2**.

At mine closure, the need for maintenance/intervention would be no greater than that required for the surrounding lands whether it be for grazed lands or for existing remnant vegetation areas such as the RWEP areas.

Upon the cessation of mining operations, it would be expected that tenure of the mining leases would be maintained by WCPL until such time as lease relinquishment criteria (including rehabilitation completion criteria) were satisfied. Lease relinquishment criteria would be developed in consultation with relevant authorities and stakeholders.

It is anticipated that lease relinquishment criteria would include, but not necessarily be limited to the following:

- Land tenure;
- Landform stability and public safety;
- Water quality;
- Trajectory towards self-sustaining ecosystems; and
- Fulfilment of mining lease and other statutory approval conditions.

Rehabilitation performance would be considered to be satisfactory when the assessment process indicates a trajectory towards self-sustaining ecosystems across the rehabilitation areas. Once this rehabilitation status has been achieved, monitoring and maintenance programs may be ceased in consultation with the relevant regulatory authorities and key stakeholders at which stage a mining lease relinquishment process would be commenced.

The final determination of the success of rehabilitation prior to relinquishment would be made by the relevant authorities.

The strategies and planning set out in the MOP, with respect to mine closure, reflect the current stages of mine development and will be reviewed in consultation with all relevant government and community stakeholders during the life of the mine as strategies and planning mature and develop further. This will allow the MOP to be used as a dynamic document that can be continually improved over the life of the mine. The MOP will be reviewed and updated accordingly during the MOP term

1.6.2 Final Void Management Plan

The Final Void Management Plan (FVMP), a component management plan of the CMCP, is currently under review. In discussions with the DRE, the final location of the two final voids as proposed in the 2003 EIS are now subject to a review as potential changes of the final landform are currently being considered by WCPL. Any changes to the final landform as proposed in the EIS will require further consultation with the DP&E (and other stakeholders) and modifying DA305-7-2003. Any approved changes to the final landform will require amendments to this MOP.

The revised FVMP, a requirement of Condition 39, Schedule 4 of DA305-72003, includes a detailed description of the design and long-term management of the final voids. Final void management issues addressed by the FVMP include;

- Assessment of the predicted hydrological behaviour (long-term water quantity/quality);
- Groundwater/surface water management (inflows/outflows);
- Long-term geotechnical stability of the voids;
- Public safety, including the construction of bunds;

- Access requirements; and
- Water quality monitoring requirements

1.6.3 Rehabilitation Management Plan

Condition 94(C), Schedule 4 of DA307-7-2003 requires the Rehabilitation Management Plan (RMP) to describe measures that would be implemented to ensure compliance with relevant conditions of the DA305-7-2003 and address all aspects of rehabilitation including mine closure, final landform and final use. As previously discussed, DP&E have acknowledged the MOP does satisfy the requirements of the RMP, subject to the MOP being approved by the Executive Director Mineral Resources. **Table 20** outlines where the rehabilitation regulatory requirements are addressed in this MOP regarding mine closure.

2.0 PROPOSED MINING ACTIVITIES

2.1 PROJECT DESCRIPTION

A range of open cut and underground mine operations have been conducted at the Mine since mining operations commenced in 1969. Mining under the DA 305-7-2003 commenced in 2004 and currently both open cut and underground operations are conducted. The Mine has approval in accordance with DA305-7-2003 to carry out mining operations until 1 March 2025.

The approved run-of-mine (ROM) coal production rate is 14.7 million tonnes per annum (Mtpa) and product coal is transported from WCPL by rail. The approved Open Cut, Underground and associated infrastructure area at the Mine (**Figure 2**) comprises an area of approximately 1,990 ha. A summary of the approved Wambo Coal Mine is provided in **Table 1**.

The mining sequence and rate of mining would continue to be subject to review on the basis of market conditions and customer demand, coal quality or unforseen changes to mining conditions. An indicative mining sequence for both the Open Cut and Underground operations during the MOP term are provided in **Plans 3A – 3F**. However, the mining sequence within the approved open cut extents will continue to be subject to periodic revision over the life of the mine. Any variation of the mining sequence as described in this MOP would require WCPL to amend the MOP as required by *the Guidelines* and in consultation with the DRE.

Open Cut mining operations at WCPL involve the extraction of coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams (**Figure 4**). The Open Cut is bounded by the United Colliery and the Golden Highway to the north, Wollombi Brook to the east (**Figure 2**) and by uneconomic strip ratios to the south and west. The open cut mining fleet includes excavators, dozers, front end loaders, haul trucks, water trucks, service trucks, graders and drills.

The Open Cut mining operation uses a combination of truck and excavator mining and dozer bulk pushing of blasted overburden into the previous strip void, followed by the removal of coal and interburden, operating 24 hours per day, seven days per week (**Section 2.3.3**).

Coal and interburden are mined in a similar manner to the overburden where dozers are used to rip and push the coal/interburden, followed by truck loading using excavators. Some interburden and coal blasting is also required, depending on the thickness and hardness of the material. Overburden and interburden that is not bulk pushed with dozers is hauled into the previous strip void using haul trucks.

The following underground mines[18] at WCPL are approved (**Figure 2**):

- North Wambo Underground Mine (Wambo Seam);
- South Bates Underground Mine (also known as Whybrow Underground Mine) (Whybrow Seam);
- South Bates Underground Mine (Wambo Seam);
- Arrowfield Underground Mine (ArrowfieldSeam); and
- Bowfield Underground Mine (Bowfield Seam).

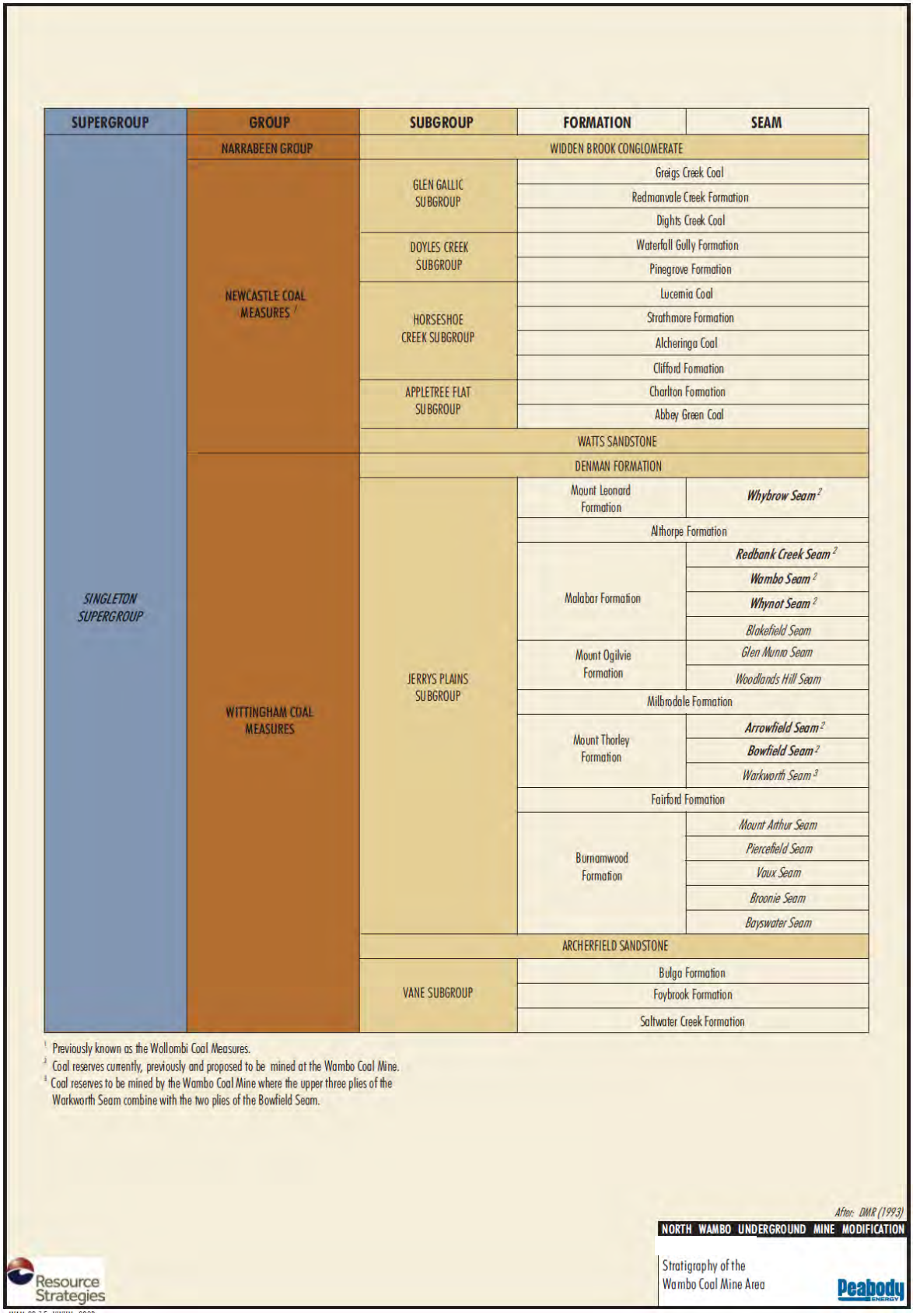
Development of the NWU mine first commenced in 2005 and production (using longwall mining methods) commenced in 2007. During the 2014 approximately 4.21Mt of ROM coal was mined at the NWU mine. Details of the approved and proposed modification to the SBU mine are provided in **Section 1.3** and **Section 2.3.6**.

The NWU mine longwall panels LW1 - 5 have been developed off main headings driven from the existing Bates North highwall. Access to NWU mine longwall panels LW6 to LW10 (and LW10a) is

[18] As a result of MOD 12: Changes to the alignment and extent of the approved South Wambo (Arrowfield Seam) Underground Mine longwall panels. Mining of the proposed South Wambo (Woodlands Hill Seam) Underground Mine rather than the approved South Wambo (Bowfield Seam) Underground Mine and changes to the alignment and extent.

from the Homestead In-Pit open cut highwall. ROM coal is conveyed to a 70,000 tonne (t) capacity stockpile adjacent to the open cut highwall where it is loaded into haul trucks and hauled to the ROM bin or the ROM coal stockpile.

Figure 4 Stratigraphy of the Wambo Coal Mine Area



Underground mining equipment includes continuous miners, longwall mining equipment, electric shuttle cars, load haul dump machines and personnel transporters (WCPL, 2011a). Mining has recently commenced at the approved Whybrow Underground Mine, however no mining has occurred in the approved Arrowfield Underground Mine or the Bowfield Underground Mine to date.

All ROM coal is transported by haul trucks along internal haul roads to the ROM pad where it is directly dumped into the ROM hoppers or is temporarily stockpiled and then rehandled to the hopper. ROM coal will either be washed at the CHPP or where required by-passed to the product stockpile and then loaded onto train carriages via the rail load facility (**Section 2.3.5**). Coal rejects produced though the washing process are transported via the operational mining fleet and positioned within the overburden waste dumps, while tailings are deposited via pipelines to tailing storage facilities located in open cut voids.

Onsite maintenance and servicing of heavy mining equipment is also undertaken at the Heavy Vehicle Workshop and in the field as required.

2.2 ASSET REGISTER

WCPL have developed an asset register of major infrastructure within the Mine's Primary Domains (**Plan 2** and **Figure 8**). Details regarding the Mine's domains are provided in **Section 5.1** and **Table 21**.

Table 9 summarises the major infrastructure assets within each Primary Domain that includes the domain area, a description of the major infrastructure and general infrastructure construction details including areas, lengths and volumes. **Appendix 5** provides a list of major surface infrastructure assets in more detail.

Table 9 Major Infrastructure within Primary Domains

Primary Domains	Domain Area (ha)	Open Cut		Underground	
		Major Infrastructure Assets	Area/ Length	Major Infrastructure Assets	Area/ Length
Mine Infrastructure Areas (Domain 1)	252.1	Rail loop	14300m		
		Small buildings (Main Workshop Area)	152.3m^2	Small Buildings (Main Workshop Area)	2085.63m^2
		Industrial Buildings (Main Workshop Area)	1345.2m^2	Industrial Buildings (Main Workshop Area)	457m^2
		Overhead powerlines	7000m	Overhead powerlines	16000m
		Remove Concrete pads, Footings and bitumen (car park) for dumping in a void on the site (Main Workshop Area)	4110m^2		
		Remove Concrete pads, Footings and bitumen (car park) (Admin)	10909.9m^2	Remove Concrete pads, Footings and bitumen (car park) (Admin)	30664m^2
		Small buildings (Admin)	745.2m^2	Small buildings (Admin)	2014m^2
		Industrial Buildings (Admin)	1205.66m^2	Industrial Buildings (Admin)	300.88m^2
		Small buildings Tanks (Sewerage)	450m^2	Small buildings Tanks (Sewerage)	559m^2
		Roadways	25000m^3	Roadways	10706m^3
Water Management (Domain 2)	34.8			Dewatering Bores	2500m^2
				Mine Water Dams	563827.3m^2
				Clean Water Dams	25843.5m^2
Tailings Emplacement Areas (Domain 3)	56.2	North East Tailings Dam	26.1 ha		
		Hunter Pit Tailings Dam	14.3 ha		

Primary Domains	Domain Area (ha)	Open Cut		Underground	
		Major Infrastructure Assets	Area/ Length	Major Infrastructure Assets	Area/ Length
North Wambo Creek Diversion (Domain 7)	90	Creek Diversion	4.25km		
Coal Handling Preparation Plant (Domain 10)	28.6	Coal Handling Prep. Plant	4074.3m^2		
		Demolish and remove conveyors & gantries (includes overland conveyors)	2344.3m	Demolish and remove conveyors & gantries (includes overland conveyors)	2030m
		Concrete Pads and Footings	7318.7m^2		
		Large Tanks	2307.38m^2		
		Small Buildings	921.9m^2		
		Industrial buildings	566.4m^2		
		Remove carbonaceous material (spillage or otherwise) from footprint of the CHPP, ROM & Product stockpiles, conveyors and workshops	31033m^3		

2.3 ACTIVITIES OVER THE MOP TERM

2.3.1 Exploration

WCPL will undertake exploration and prospecting activities within DA305-7-2003 approved mining authorisations during the MOP term. These authorisations consist of:

- CL365
- CCL743
- ML1594
- ML1402
- CL397
- ML1572
- CL374

Exploration and ancillary prospecting activities will be undertaken to further define coal reserves, coal quality and gas content of the Whybrow, Redbank Creek, Wambo, Whynot, Arrowfield and Bowfield coal seams.

Exploration and ancillary prospecting activities outside of DA305-7-2003 but within mining titles are also proposed to be undertaken during the term of the MOP.

Prior to any exploration and ancillary prospecting disturbance commencing a WCPL Surface Disturbance Permit (SDP) is approved and issued. The SDP identifies environmental, heritage and regulatory constraints requiring further management. The SDP is included as **Appendix 6** for reference.

All assessments of disturbance occurring due to exploration activities will consider *ESG5: Assessment Requirement for Exploration Activities (DRE, 2015).*

Disturbance relating to exploration is always minimised but may consist of slashing and removal of flora from access tracks and drill pad areas. Earth works may comprise the levelling of drill pads where a slope is present and installation of in ground sumps where above ground sumps are not feasible. All disturbance activities and site specific controls are detailed in the SDP.

Small scale earth moving machinery, water carts and track/tyred drill rigs will be utilised during site commissioning, operation and decommissioning. Where large scale equipment is proposed to be utilised for disturbance activities the potential environmental impacts will be assessed as part of the SDP assessment process.

Decommissioning and sealing of boreholes and site rehabilitation will be consistent with the *Exploration Codes of Practice - Rehabilitation and Exploration Code of Practice: Environmental Management (DRE, 2015)*. Decommissioning of exploration sites consists of the disposal of all waste from site, sealing of borehole to surface and removal of drill casing from one meter below surface. Drill sites are stabilised, decompacted, topsoil replaced and seed applied as necessary to facilitate the sites return to former land use.

WCPL operate under an approved Groundwater Monitoring Program (GWMMP). WCPL may expand its existing groundwater monitoring network by utilising specific exploration boreholes. The requirement to convert any exploration hole over to a groundwater monitoring bore will be subject to further determination from WCPL's groundwater specialist and consultation with DPI-Water in regards to licensing.

An exploration report will be provided to the DRE annually as part of the Annual Review process.

~~WCPL will undertake exploration and prospecting activities in DA305-7-2003 approved mining areas including CCL743, ML1572 and CL374 during the MOP term to further define coal reserves, coal quality and gas content of the Whybrow, Redbank Creek, Wambo, Whynot, Arrowfield and Bowfield coal seams.~~

~~All exploration holes will be fully grouted upon completion. The current exploration program over the MOP term will include 25 holes in 2015, 37 holes in 2016, 25 holes in 2017, 25 holes in 2018, 10 holes in 2019 and 10 holes in 2020. The exploration program within CL365, CCL743, A444 and EL7211 will continue during the MOP term (**Appendix 4**).~~

~~The 2016 drilling program includes 10 drill holes located within CL 365 and 2 drill holes located within CCL 743. Exploration activities located outside the Development Application Area of the Wambo Coal Mine Development Consent (DA 305-7-2003), will require assessment under Part 5 of the Environmental Planning and Assessment Act, 1979.~~

~~A description of these proposed activities within CL365 and CCL743, regarding drill hole locations, pre-construction, construction, operation, decommissioning and rehabilitation stages of the drilling program are provided throughout the following subsections are described in the 2016 South Wambo Drilling Program (**Appendix 8**).~~

~~WCPL will submit an exploration activities application form ESF4 into the DRE for the 2016 South Wambo Drilling Program which satisfies the environmental assessment requirements of Part 5 of the Environmental Planning and Assessment Act, 1979. WCPL believes that the proposed activity meets the requirements of a Common Exploration Activity (CEA) as detailed in ESG5: Assessment Requirements for Exploration Activities, and therefore can be assessed under the streamlined CEA Assessment Pathway.~~

~~WCPL may be required to establish temporary access tracks, sumps and drill pads to carryout exploration activities. A review of the potential environmental and heritage issues are completed prior through the Surface Disturbance Permit (SDP) process. A fully completed SDP must be in place prior to any ground disturbance activities commencing. A copy of a SDP is provided in **Appendix 6**.~~

~~Following the environmental review process within the SDP, the proposed disturbance footprint will be prepared using small earthmoving equipment to allow for the work to be undertaken safely and in a~~

~~manner that minimises environmental impacts. These works will continue to comply with DRE's Surface Disturbance Notice (SDN)[19] requirements and/or other relevant guidelines.~~

~~Following the completion of exploration and prospecting activities, bore holes will be decommissioned in accordance with *EDG01 Borehole Sealing Requirements on Land: Coal Exploration (April 2012).* All disturbed areas including access tracks, sumps and drill pads will be rehabilitated if future disturbance is not proposed.~~

2.3.2 Construction

The majority of the existing Mine facilities have been constructed, including the office administration complex, bathhouse and employees carpark, ROM pads, underground portal areas, coal handling preparation plant (CHPP), products stockpiles, coal conveyors, rail spur, rail loop and rail loading infrastructure (**Figure 2**). For the term of this MOP, all existing approved infrastructure will be utilised including:

- Main administration/bathhouse building and associated car parking areas;
- Electrical supply;
- Water management system;
- Main In-pit support facilities[20] including workshop, Control Room, Crib Room, ablution building and hardstand area;
- Main In-pit conveyor to underground ROM stockpile;
- Open cut haul roads;
- Open cut workshop;
- Main In-pit and Homestead In-pit portal entries;
- Main In-pit and Homestead In-pit ventilation fans;
- Coal handling and preparation plant;
- Coal loadout and rail line infrastructure; and
- Hunter Pit tailings emplacement area.

Construction activities currently planned, within the MOP term (i.e. outside of the normal development activities associated with mining including progressive development of water management infrastructure and light vehicle access tracks) will include:

- The Homestead Backfill Project;
- Construction at the South Bates Underground Mine (Whybrow and Wambo);
- Water management structures;
- Hunter Pit Tailings Dam Wall Lift;
- Homestead and In-Pit Tailings Dam;
- South Bates ROM Stockpile;
- North East Tailings Dam capping;
- Montrose Water Storage Dam[21];
- Maintenance of the North Wambo Creek Diversion;
- Montrose Tree Screening Project;
- Montrose Dam;
- Skyline Conveyor Extension;
- South Dam Remediation;
- Glen Munro Pit (Bunding);

[19] WCPL must notify the DRE in accordance with the *EDG10: Surface Disturbance Notice for Exploration Activities (August 2011)*.
[20] Some buildings and infrastructure in the Main In-Pit area are all transportable and may from time to time be moved between the Homestead and Main In-Pit areas.
[21] The Montrose Water Storage Dam was approved under MOD11. The construction of the dam during the MOP period remains subject to further feasibility studies.

- Gas Drainage System (SBU); and
- Subsidence remediation.

2.3.2.1 The Homestead Backfill Project

The Homestead Backfill Project (HBP) will deliver approximately 250,000m^3 of mine backfill by Q1 of 2015 through the boreholes into the former underground Homestead workings. At the commencement date of this MOP, approximately 75% of the project was completed.

The HBP involves the placement of a grouted paste into the old Homestead underground mine workings above a portion of LW8 (**Figure 3, Figure 7** and **Plan 2**). These workings are in the Whybrow seam some 40 metres below the surface. In order to fill the old underground roadways approximately 300 boreholes are planned. The boreholes are drilled down to intersect the old workings and a paste mixer is then used to produce a grouting mix that is gravity fed into the boreholes until the void and boreholes are filled.

The grouting project commenced in 2013 and is expected to continue into 2015. A series of temporary 'all weather access' roads within the HBP boundary are required to allow safe access for mine personnel and equipment during the grouting project. Subject to the completion of the grouting project in 2015, the temporary access roads will be removed and the affected area, approximately 25ha, will be rehabilitated as identified in **Table 12** and **Plans 3A – 3B**. Rehabilitation of the area disturbed during for HBP project commenced in 2015.

The remaining HBP program for 2015 included:

- Filling of remaining holes (less than 15 holes) above LW8.
- Approximately 70,000m^3 of alluvial material sourced from the South Bates pit shell is to be excavated and placed in temporary stockpiles (~3 months) for LW8 in and around the borehole network.
- Approximately 70,000m^3 is to be mixed with cement dependent on clay/fines content to achieve the designed 0.5Mpa strength. This material is then gravity fed down the boreholes to the homestead workings. Each borehole is filled with the grout mix used to seal the borehole to the surface.
- Stage removal of temporary roads associated with HBP, subject to completion of grouting the project.
- Final shaping and rehabilitation of the site with adjacent pasture species.

At the time of preparing MOP Amendment A, ground works to remove the surface material used for the roadways was underway with re-seeding activities to be carried out and completed in 2016.

At the time of preparing MOP Amendment C, ground works to remove the surface material used for the roadways was almost complete, with re-seeding activities to be carried out in 2016.

2.3.2.2 South Bates Underground Mine

Proposed new infrastructure for the term MOP will be primarily associated with the SBU mine. The majority of the infrastructure and construction activities will occur within the Bates South open cut area (see **Plan 3A – 3F**) during 2015 and include, but not limited to:

- Bench and pad preparation and drainage;
- Portal entries from the Bates South highwall, highwall meshing, adits, spiling & support;
- Electrical supply substation;
- Ventilation fan relocation;
- Compressors and associated shed (including concrete foundations);
- Conveyor and ROM pad installation construction;
- Repair existing workshop (including lubrication facility);
- Extend fibre 3km with power line;

- Setup communications (PABX & UG phone system); and
- Ablution building, water tanks, fire depot and miscellaneous power and lighting in Wollemi area.

The remaining SBU construction program includes:

- Transformer and switchyard;
- Surface transformer / Distribution board;
- Extend 11kV HT cable;
- Extend optic fibre with power line;
- Reuse existing Wollemi 5MW electrical substation for development and ventilation fans;
- High voltage switching room for Homestead pit.
- Bench and Pad preparation and drainage;
- Portals: meshing, adits, spiling & support;
- Ventilation fan relocation;
- Compressor and shed (including concrete foundations);
- Conveyor and ROM pad installation construction;
- Repair existing workshop (including lubrication facility);
- Extend optic fibre with power line;
- Setup communications (PABX & UG phone system);
- Ablution building, Fire Depot and Miscellaneous power and lighting in Wollemi area;
- Setup Real time gas monitoring;
- Fresh water supply line (6000m double skinned - 200mm) + pump, starter and fresh water tank (300kL);
- Dirty water line (2500m single skinned - 280mm) + pump and starter; and
- Dewatering system (relocate from NWU).

2.3.2.3 Water Management Structures

WCPL operate under an Erosion and Sediment Control Plan (ESCP). A number of water management structures, including diversion drains, sediment dams, sediment fencing, draining lines and other associated structures may be required throughout the life of the mine. Monitoring and maintenance of all water management structures is outlined in the ESCP (**Section 3.3.5**). WCPL are finalising several water management design options associated with the progression of the Montrose East Pit. Other identified several other areas around the mine for sediment control structures including:

- Montrose East mining area;
- South Bates ROM Pad;
- Wambo Homestead;
- Rug Dump Dam; and
- South Wambo Box Cut.

Consultation with the DRE of additional water management structures, if required during the MOP term, will be completed to determine if revisions to the MOP Plans are necessary.

2.3.2.4 Hunter Pit Tailings Dam Wall Lift

Commencing in late 2014 and continuing into 2015, the Hunter Pit Tailings Dam level was raised to RL 125 by lifting the existing dam wall. This will allow tailings from the CHPP to be stored within the Hunter Pit until 2017. Further information regarding proposed methods for capping the Hunter Pit after discontinuance in 2017 will be provided in subsequent MOP amendments and reported in the AR.

2.3.2.5 Homestead Pit and In-Pit Tailings Dams

WCPL will also commence works to establish new tailings facilities in the former open cut voids of the old Homestead Pit and In-Pit areas at the end of 2016. Commissioning of the new tailings facility in the In-Pit area is expected to occur late 2017. Previously, the Homestead and In-Pit areas provide portal access to the NWU mine. Sealing the mine entries in the Homestead Pit and In-Pit was completed in March 2016. Prior to receiving tailings in late 2022, the Homestead Pit will be used an interim mine water storage facility.

2.3.2.6 South Bates ROM Stockpile

A ROM coal stockpile pad will be constructed for the SBU mines. The new ROM pad will be located east of the former Wollemi Box Cut and cover an area of approximately 2.3ha, with an approximate stockpile capacity of 125,000 tonnes. Works are scheduled to complete the new ROM pad in late 2015.

2.3.2.7 North East Tailings Dam Capping

A Section 101 of the *Coal Mines Health and Safety Act 2002* was issued to WCPL on the 10 September 2009 for the discontinuance and decommissioning of the North East Tailings Dam (NETD). The capping and monitoring process as detailed in the Section 101 Application was carried out until early 2012 due to slower than expected progress and safety concerns accessing the NETD. The capping project was subsequently placed in a care and maintenance phase whilst alternate capping strategies were investigated.

WCPL is re-evaluation the design and capping options (including displacement capping methodologies) to identify new strategies or technological advancements that could be used to improve the success and decrease the time to cap NETD. A number of options are currently being considered by WCPL; however these options to date are unproven in the coal industry (and Australia) and are being evaluated for viability as well as options for a traditional capping strategy.

WCPL anticipate undertaking further trials, subject to a detailed peer review for adequacy, in regards to alternate methods of capping the NETD during the MOP term. Further information regarding the method proposed for capping under consideration for the NETD will be provided in subsequent MOP amendments and reported in the AR. WCPL anticipate submitting a *High Risk Activity Notification* at the end of 2016 to regarding capping the NETD, in consultation with DRE's Mine Safety Officer.

WCPL submitted the *Wambo Coal North East Tailings Dam Rehabilitation Strategy - November 2016* (NETDRS) to the DRE for approval on the 22 November 2016. The NETDRS was submitted in response to a condition from the MOP Amendment C approval. In March 2017 the DRE provided confirmation that NETDRS could not be approved, as the final landform was not consistent with the current development consent conditions for maximum emplacement heights. As a result, WCPL was required by the DRE to resubmit the NETDRS by the 31 May 2017.

As an alternate capping method, WCPL commenced a trial using secondary flocculation[22] back in July 2016 with a flocculation plant located on the crest of the Hunter Pit Tailings Dam (HPTD) embankment. The trial consisted of a cell within the HPTD. The undrained shear strength data for secondary flocculated tailings in the trial cell as measured on site with a hand shear vane on 2 March 2017 ranged from 30kPa up to about 350kPa (Fitton, 2017).

[22] Secondary flocculation is the process of adding more flocculant to the tailings slurry at (or near to) the end of the pipe to the tailings storage facility. It is sometimes referred to as "pipe-head flocculation", "Inline floccution" or "Enhanced Tailings Disposal (BASF)". This further addition of flocculant causes more agglomeration of tailings particles, and more release of water from the slurry. The main benefit from this process is that greater densities and shear strengths are achieved in the deposited tailings.

With the success of the HPTD trial, WCPL are developing a capping design viability using intermittent disposal methodology of layering 200mm of secondary flocculated tailings at a time. Each 200mm layer of flocculated material deposited will be allowed to dry, to finally form a layered crust ~3m thick as part of the capping final design.

As recommended by WCPL's tailings consultant (Fitton, 2017), Cone Penetration Testing (CPT) will be undertaken to understand the geotechnical characteristics of the tailings over the full depth of the facility, over a multiple location testing regime in both NETD and the HPTD facilities. This testing will enable a final capping design to be prepared that contains far fewer critical assumptions.

The following is a summary of key project milestones proposed by WCPL regarding the above mentioned method to cap both NETD and HPTD, they include:

- CPT testing of NETD and HPTD in July 2017;
- Finalise capping design for NETD and HPTD in August 2017;
- Capping Works - commence intermittent disposal of double flocculated tailings in NETD and HPTD in November 2017; and
- Capping Works – completion of intermittent disposal of double flocculated tailings in NETD and HPTD in February 2020.

A detailed summary of the progression of the CPT testing, capping design and outcomes from the intermittent disposal of double flocculated tailings in NETD and HPTD will be provided in the Annual Review.

2.3.2.8 Ancillary Infrastructure

During the MOP term, WCPL may need to construct or remove ancillary infrastructure including water management features (e.g. bores, pipelines, pumps, drains, bunds, sediment dams and light vehicle roads), environmental and operational monitoring equipment, electricity supply, communication towers and in-pit facilities. Consultation with the DRE will be undertaken accordingly to determine if a MOP amendment is required in regards to additional ancillary activities not described above.

2.3.2.9 Maintenance of the North Wambo Creek Diversion

During the MOP term general erosion and rehabilitation maintenance works will continue, as required, along sections of the North Wambo Creek Diversion (NWCD) (Domain 7).

Specific rehabilitation maintenance works have been identified in sections of Stage 3 of the diversion.

The rehabilitation maintenance works scheduled in 2015 include:

- Tree and shrub plantings in late 2015 with tube stock covering an area of approximately 2ha. The tree and shrub species to be planted along the upper creek banks are consistent with the riparian species. The tube stock planting program will consist of approximately 4000 trees and approximately 3740 shrubs.

The rehabilitation maintenance works scheduled in 2015 and 2016 include:

- Weed management (particular focus on Galenia *puescens*) to control this noxious weed;
- Repair areas of erosion;
- Re-seeding with selected native pasture and tree species;
- Revegetation trials with native grass species in selective areas of the diversion to assist in controlling weeds.
- Collection of native grass seeds within pasture areas on adjacent WCPL owned pasture lands.

2.3.2.10 Montrose Tree Screening Project

WCPL have implemented the Montrose Tree Screening project along a section in the north western portion of the WCPL owned Montrose Property, adjacent to Golden Highway. The tube stock planting

program will consist of approximately 1200 trees and approximately 800 shrubs. The tree and shrub species to be planted are consistent with the woodland corridor species as identified in **Table 17**. An irrigation system will also be installed to increase the rate of tree and shrub survival.

2.3.2.11 Subsidence Remediation

WCPL monitor and record the various subsidence related surface impacts from its underground operations on WCPL owned land. A record of surface related impacts are provided in AR. During 2015, WCPL will develop a subsidence remediation program to address a number of subsidence impacts (mainly surface cracking) within areas of existing pasture (Domain C) utilised for grazing and previously rehabilitated areas in the open cut (Domain 6). The implementation of the program to remediate these areas will be carried out during the end of 2015 and throughout 2016. The results of the subsidence remediation will be provided in the AR.

Other subsidence remediation works during the MOP term will include repairs to internal access tracks (where required) and civil repairs to the South Wambo Dam (Domain 5) and repairs to the North Wambo Creek Diversion as a result of mining activities by SBU (Domain 7).

WCPL have commenced subsidence repairs to an adjacent landholder's property during 2015 (**MOP Plan 2**). A specific rehabilitation management plan has been developed in consultation with the landholder and an independent agronomist was appointed to project manage the commencement of works. The rehabilitation management plan was provided to the DRE for review and adequacy prior to the works commencing.

2.3.2.12 Montrose Water Storage Dam

On the 18 January 2013, MOD 11 was determined by the DP&E. This modification comprised the construction and operation of the Montrose Water Storage Dam and associated supporting infrastructure. The Montrose Water Storage Dam would be a "turkey's nest" style dam located to the south-west of the approved open cut limit (**Figure 2**) and would have a nominal capacity of approximately 1,500 million litres (ML). WCPL are currently finalising the detailed design of the dam and anticipate the commencement of the construction of the dam in 2019, subject to commercial arrangements.

This additional storage capacity is required as a review of the site water balance indicated that additional contingent capacity is required as the frequency and duration of controlled releases under the Hunter River Salinity Scheme have been lower than previously anticipated resulting in on-site storage levels that have a higher risk of interruption to operations. Subject to finalising the detailed design and commercial arrangements, WCPL would seek consultation with the NSW Dam Safety Committee (DSC) and the DRE to determine if a MOP amendment is required.

2.3.2.13 Skyline Conveyor Extension

In 2016, WCPL are planning to extend the skyline conveyor (by one trestle) to improve the efficiencies and management the product coal stockpile area.

2.3.2.14 Glen Munro Pit (Bunding)

In 2016, WCPL are planning to construct an earthen bund around the proposed Glen Munro Pit. The proposed Glen Munro Pit is also the location of the approved CHPP portal box cut and adits that will provide access to the proposed South Wambo Underground Mine.

2.3.2.15 Gas Drainage System (SBU)

In 2016, WCPL are planning to install a gas drainage system for the SBU (Wambo) to provide for pre-mining gas drainage and goaf gas discharge to reduce the gas content in the coal seam to levels suitable for longwall operations.

2.3.3 Open Cut Mining Operations

2.3.3.1 Open Cut Mining Equipment Fleet

Open cut mining during the MOP term is to be carried out primarily with dozers, loaders, hydraulic excavators and trucks. The equipment is sized to provide maximum flexibility and minimise coal losses. The estimated number of each equipment type to be used during the MOP term is presented in **Table 10**; however this may vary during the term of the MOP based on production requirements.

Table 10 Open Cut Mining Fleet

Mining Equipment Description	Make and Model	Number of Fleet
Excavators (overburden/coal)	Komastu PC5500	3
	Liebheer 996	1
	Hitachi EX2500	1
Haul Trucks (overburden/coal)	Komastu 930	11
	CAT 793	20
	CAT 789	4
Dozers (open cut pit/product stockpile)	Cat D10	8
	Cat D11	2
Front End Loaders	Le Tourneau L1350	1
	CAT 992G	0
	CAT 992D	1
	CAT 980	2
Graders	CAT 16M	2
	CAT 24M	1
Water Trucks	CAT 777F	4
Drill Rigs	Drilltech D40K	1
	Reedrill SK50	1
	Drilltech D75K	1
Tyre Handler	Omega 16-12	1

2.3.3.2 Open Cut Mining Sequence

The Open Cut mine has been divided into a number of 'Pits'. The main pit is called the Montrose Pit. Montrose Pit has been divided into Montrose West Pit and Montrose East Pit. Each Pit is generally divided into strips (approximately 100m wide) and blocks which are orientated to suit the sequence of mining, which is influenced by seam dip, seam structures and strip ratio.

Mining in the South Bates Extended Pit (Roses Pit) will continue east during 2017. This Pit will only mine the upper coal seam (Whybow), due to interaction issues with the North Wambo Underground workings. The pit will be mined using excavators and haul trucks. Mining in the South Bates Extended Pit (Roses Pit) will be completed during 2018. The majority of the waste rock from this Pit will be used to backfill the void created. Mining in the Glen Munro Pit will completed during 2017.

Mining in Montrose West Pit for 2017 is focussed on removal of material to the south of the ridgeline and steadily progressing in a northerly direction towards the Montrose East Pit. The majority of the waste rock from this pit will be used to backfill the Montrose West void.

Montrose East Pit will also be further developed in 2017, to allow mining of lower ratio reserves. Waste rock dumps will be developed out of pit to screen mining operations, and later used to fill the advancing void.

The indicative mining schedule and sequence of open cut mining operations will be undertaken during the MOP term is illustrated in **Plans 3A – 3F** and identified in

Table 11.

Table 11 Mining Schedule and Disturbance during MOP Term

Open Cut Planned Disturbance (ha) & Mining Schedule	2015	2016	2017	2018	2019	2020	Summary 2015-2020*
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Montrose Pit - Ridge and Low Ratio Pit	52.6						
Bates South Extended Pit - Part 1	2.6						
Baron Zone Dump		17.69					
Montrose East - Corridor		~~8.75~~					
Montrose Corridor - Extension		~~1.36~~					
Montrose East - Pit and Dump Area		81.7					
Glen Munro Box Cut		2.01					
Roses Pit			13.2				
Montrose Pit			35.1	46.8	41.9	26.6	
Glen Munro Pit			9.1		3.4		
Civils			4.8				
SBU ROM Extension			1.3				
South Bates Extended				2.8			
Total	**55.2**	**101.4**	**63.6**	**49.6**	**45.3**	**26.6**	**341.6**

Notes: *2020 – Refers to end of 2020

2.3.3.3 Vegetation Clearing & Topsoil Removal

Prior to the commencing of mining areas in the open cut, pre-strip operations will be conducted to remove vegetation and topsoil. Approximately 341.6ha of vegetation would be progressively cleared over the MOP term (

Table 11). Further topsoil removal and vegetation clearance procedures are provided in **Section 3.3.5** and **Section 3.3.6** respectively. The proposed disturbance areas during the MOP term, necessary for mining and construction related activities are provided on **Plans 3A – 3F**. The mitigation measures relevant to vegetation clearance activities include the following:

- Completion of SDP's;
- Wherever practicable, existing native vegetation will be retained and vegetation clearance avoided;
- Archaeological clearance in accordance with ACHMP will be obtained from WCPL archaeologist prior to releasing the area for work;
- Sedimentation controls implemented are consistent with the ESCP;
- Follow the Vegetation Clearance Protocol (VCP), to minimise the impact of the Mine vegetation clearance activities on flora and fauna. As a component of the protocol, pre clearance surveys will be completed (where necessary) to identify habitat trees and threatened fauna species. The proposed clearance areas will be demarcated;
- Where available, topsoil resources will be identified, stripped and stockpiled for later use in rehabilitation; and
- Where vegetation clearance is undertaken, timber will be mulched and either used as a soil conditioner or timber salvaged for habitat creation on rehabilitation areas where practicable.

Due to the known variability and distribution of the soils at WCPL, the concept of soil complex units is used to identify the soil types, and provide guidance on appropriate stripping depth. The different soil complex units found at the Mine, as identified in the EIS (WCPL, 2003), are detailed in **Section 3.3.6**. Expected topsoil volumes stripped (**Table 12**) during the MOP term are provided in **Section 2.3.11**.

Surface Disturbance Permit Procedure

WCPL has implemented a Surface Disturbance Permit (SDP) procedure and checklist (**Appendix 6**). The SDP requires the approval of the Environment and Community Manager (or delegate) prior to any land disturbance and clearing activities taking place. The SDP aims to identify any environmental issues such as cultural heritage sites, flora and fauna communities, threatened species, surface drainage and the identification of any seed or timber resources that can be salvaged. The SDP procedure is completed prior to any surface disturbance being permitted on:

- WCPL owned land;
- United Collieries' owned land covered by WCPL's mining lease; and
- Privately owned land where the disturbance is subject to agreement with the landowner. A Exploration Site Permit (ESP), may be substitute the standard SDP if the disturbance is related to exploration activities.

Surface disturbance at WCPL includes, but is not limited to:

- Felling of trees on undisturbed, disturbed or rehabilitated land;
- Grading of new access roads and maintenance of existing access roads where the footprint of disturbance is greater than the original;
- Pushing up or removing topsoil on any land whether undisturbed, disturbed or rehabilitated;
- Dumping over any undisturbed, disturbed or rehabilitated land; and
- Construction of any earthworks across undisturbed, disturbed or rehabilitated land.

The following requirements (but not limited to the below), may be addressed (dependent on activity) by the SDP, prior to the Environment and Community Manager (or delegate) granting approval:

- A plan with proposed area for disturbance delineated;
- Pre-clearance surveys completed for both ecological and heritage assessments;
- An erosion and sediment control plan;
- Topsoil management measures;
- Noise management measures;
- Dust management measures; and
- Light management measures.

Salvage and Re-use of Materials

Where practicable, clearing operations required for the open cut will be managed to re-use the cleared timber. Timber resources that can be salvaged will be identified as part of the SDP procedure.

Cleared timber suitable for fence posts and habitat for fauna will be set aside and salvaged where possible. Habitat features such as logs and hollows collected during a clearance campaign may be utilised in rehabilitated and RWEP areas to augment habitat features for fauna.

2.3.3.4 Drilling and Blasting

The majority of overburden material cannot be ripped or excavated by mobile plant; therefore blasting techniques using ammonium nitrate based explosives loaded into blast holes, drilled with rotary drills

will be undertaken. Blasting activities will also be required for the purposes of excavation blasting to develop drift access to coal seams for underground mining.

WCPL have developed a Blast Management Plan[23] (BMgtP) to outline blast management and mitigation strategies, procedures, controls and monitoring programs that are to be implemented at the Mine. The BMgtP was prepared to satisfy:

- Development consent DA 305-7-2003, Schedule 4, Consent Conditions 11,12,13,13A,
- 14,15,16,17,18,19, 20, 20A, 63, 64, 65, 66, 67 & 68;
- Development consent DA 305-7-2003, Schedule 6, Consent Conditions 3 & 4;
- Development Consent DA 177-8-2004, Schedule 4, Consent Conditions 8, 9 & 10;
- Environment Protection Licence No.529 (EPL 529) Condition L5; and
- *Australian Standards (AS) 2187.2:2006 Explosives – Storage and Use – Use of Explosives*

The approved blasting hours for the Mine are between 9.00 am and 5.00 pm Monday to Saturday inclusive.

No blasting is allowed on Sundays, Public Holidays, or at any other time without the written approval of the Secretary of the NSW Department of Planning and Environment.

A maximum of three blasts events per day (unless an additional blast is required following a blast misfire), and fifteen blasts per week for all operations at the Mine.

WCPL must develop a Traffic Management Plan[24] for blasting within 500 metres of a public road that has been prepared in consultation with the Roads and Maritime Service (RMS) and Singleton Shire Council (SSC).

Exceedance of the overpressure limit of 115 dB at the nearest sensitive receiver should be limited to a maximum of 5 percent (%) of the total number of blasts (over a period of 12 months), and should not exceed 120 dB at any time.

Exceedance of the ground vibration limit of 5 mm/sec at the nearest sensitive receiver should also be limited to 5% of the total number of blasts, and should not exceed 10mm/sec at any time. For more details about blasting and blasting management measures refer to **Section 3.4.9**.

2.3.4 Rock/Overburden Emplacement

The open cut operations are expected to produce approximately 640Mbcm of waste rock (or overburden material) during the life of the Mine (WCPL, 2003). Only a limited amount of waste rock will be produced from the underground operations. The overburden and interburden waste rock materials comprise mudstones, siltstones, sandstone, shale and conglomerates (WCPL, 2003).

Waste rock material is progressively placed back in-pit once the coal has been mined. A combination of temporary and permanent out-of-pit waste rock emplacements are located adjacent to the open cut mining operations (**Plans 3A – 3F**). Mine waste rock emplacements behind the advancing open cut are progressively constructed to form the final landform. Some of the waste rock is also utilised to construct internal walls for the tailings emplacements and for capping.

The coarse reject material is selectively handled and co-disposed of with waste rock in open cut voids or would be used as bulk fill in the covering and rehabilitation of tailings materials (WCPL, 2003). Coarse reject material is dispersed throughout the overburden within the mine waste rock emplacements to manage its geochemical characteristics.

[23] Condition 20, Schedule 4 of DA305-7-2003
[24] Condition 80, Schedule 4 of DA305-7-2003

Rehabilitation of mine waste rock emplacements would be progressive and would be undertaken as soon as practicable. Landform reshaping consists of re-contouring overburden dumps to the designed shape for final rehabilitation.

Reshaping results in a stable landform incorporating slopes and drainage which blend in with the surrounding natural topography. Slope stability is integral to rehabilitation design and the objective during rehabilitation planning is to design all slopes to a gradient of 10° or less (1V:5.7H). Slopes steeper than 10° may be necessary in some locations to ensure rehabilitation merges seamlessly with adjacent undisturbed land.

Mine waste rock emplacements would cover an area of approximately 1,300 ha and be rehabilitated to a final landform up to 160m AHD. Where long slopes are present, contour drains or deep staggered rips would be established. Waster rock emplacements will be constructed in 15 to 20 metre lifts and shaped to the final landform profile when completed.

The surface of mine waste rock emplacements would be constructed to form a pattern of ridges and valleys. The valley areas would be shaped into a network of constructed drainage structures. Mine waste rock emplacement surfaces would be formed to maximise rainfall absorption and to minimise the requirement for artificial drainage structures. Mine waste rock emplacement berms would generally be reverse graded with perimeter bunds constructed as necessary.

Natural slopes commonly evolve to form an 'S' shape as a result of natural erosion and deposition processes. Mine waste rock emplacement slopes would generally be constructed in profile to form an 'S' shape with the upper 20 to 30% being convex and the lower 70 to 80% being concave.

Until an adequate vegetation cover is established, heavy rainfall may cause erosion, resulting in a dissected land surface, resource loss and the need for expensive remedial treatment. Therefore, slope length is reduced by fit for purpose designed structures such as contour drains, to intercept and divert water off the slopes. The structure(s) principle aim is to drain water safely from the landform, via a sediment detention structure if the water is to be discharged from the mine water management footprint.

Once bulk reshaping is completed, the landform is ripped to approximately 200-300 mm and then the final trim and rock raking are undertaken. The ripping loosens up any near surface strata within the landform that have been compacted during placement, aiding root penetration during vegetation establishment. The final trim smooths out any washouts, rough edges, temporary access tracks, local steep topography and prepares the surface for revegetation.

Rock-raking removes exposed surface rock greater than 200 mm in diameter. This raking is usually done along the contour, leaving a textured surface that assists with erosion minimisation until vegetation can be established.

Overburden characterisation will be completed to determine appropriate ameliorants and rates of application. Ameliorants, if required, are applied to the trimmed overburden surface. Overburden sampling and laboratory analysis will be undertaken to gain an understanding of the type and rate of ameliorant required to treat the overburden.

Gypsum is commonly applied at a rate of approximately 5-10 tonnes per hectare (t/ha) depending on laboratory soil results/analysis to assist in treating sodic, poorly structured or heavy clay material. Lime (calcium carbonate) may also be applied to treat hotspots of low pH (acidic) overburden if encountered; however, acidity has not historically been a problem with overburden at the Mine.

Following shaping of the landform the mine waste rock emplacements would be covered with approximately >100 mm of topsoil sourced from soil stockpiles or freshly stripped open cut mining areas. Site preparation works following the placement of topsoil would include chisel ploughing or deep ripping along contour, depending on the vegetation type to be established.

Mine waste rock emplacements would be progressively revegetated with a pasture cover crop and endemic woodland shrubs and trees planted on ridgelines and other selected areas, consistent with the proposed revegetation strategy as described in **Section 2.3.4**.

Material identified having potential spontaneous combustion risks will not be used in rehabilitation works. This material, if identified, will be covered to a depth of at least 5m below the final landform RL using inert waste rock material.

Likewise, coarse reject emplacements integrated into the landform will be covered to a depth of at least 2m below the final landform RL using compacted inert waste rock material.

Overburden material exhibiting hostile characteristics (acidity, excessive alkalinity, sodicity, etc.) will be identified during material characterisation of the final landform and isolated from vegetation root zones and areas of potentially high surface runoff (i.e. this material not be used in the final 2m of the final landform RL).

A dump mass balance was performed, based on a material swell of 1.25, to give the landform as shown in **Plan 5**.

Overburden removal is carried out mostly by excavators and haul trucks with the waste rock material hauled to open cut voids or waste rock emplacements. Approximately 26.7 Mbcm of waste rock was excavated during the 2016 reporting period.

Overburden removal will be carried out typically by 500t excavators and a 290t or 220t truck fleet. Some overburden material will be loaded with the 250t excavator and loaders. The overburden material will generally be hauled and dumped in pit or on existing dump surfaces. Waste from the Montrose Pit (east) has been scheduled to report to an out-of-pit dump which will be adjacent to the pit limit (see **Plans 3A – 3F**).

The approximate annual volumes of stripped topsoil material, overburden, ROM coal, processing waste and product coal during the MOP term are provided **Table 13**.

A small amount of overburden material above the Wambo and Whynot seams will be moved with dozers employing a combination of cast blast and dozer push. This overburden material will be disposed of in the immediately adjacent mined out strip.The stripping sequence will be planned so as to minimise any traffic on the exposed coal seams.

The disposal sequence of the overburden material is designed to form ongoing and continuous rehabilitation of the mined out areas. As no acid forming strata has been identified, dumping will be designed around the achievement of the most cost effective dump sequence.

The majority of overburden material from Montrose Pit (west) will be placed into the void created by mining. Some material from Montrose Pit (west) will be placed into the Bates Pit void, and used to construct a pad for underground access to Whybrow seam within South Bates.

Bates South Pit waste will be primarily used to construct a pad for the underground access to the Whybrow, with some overburden material going to the Bates Pit Void. The initial overburden material from the Montrose Pit (east) will be hauled out of pit to create a visual bund on the northern side of the operation. Once the bund is completed, all Montrose East overburden material will report in pit.

2.3.3.5 Final Landform Concepts

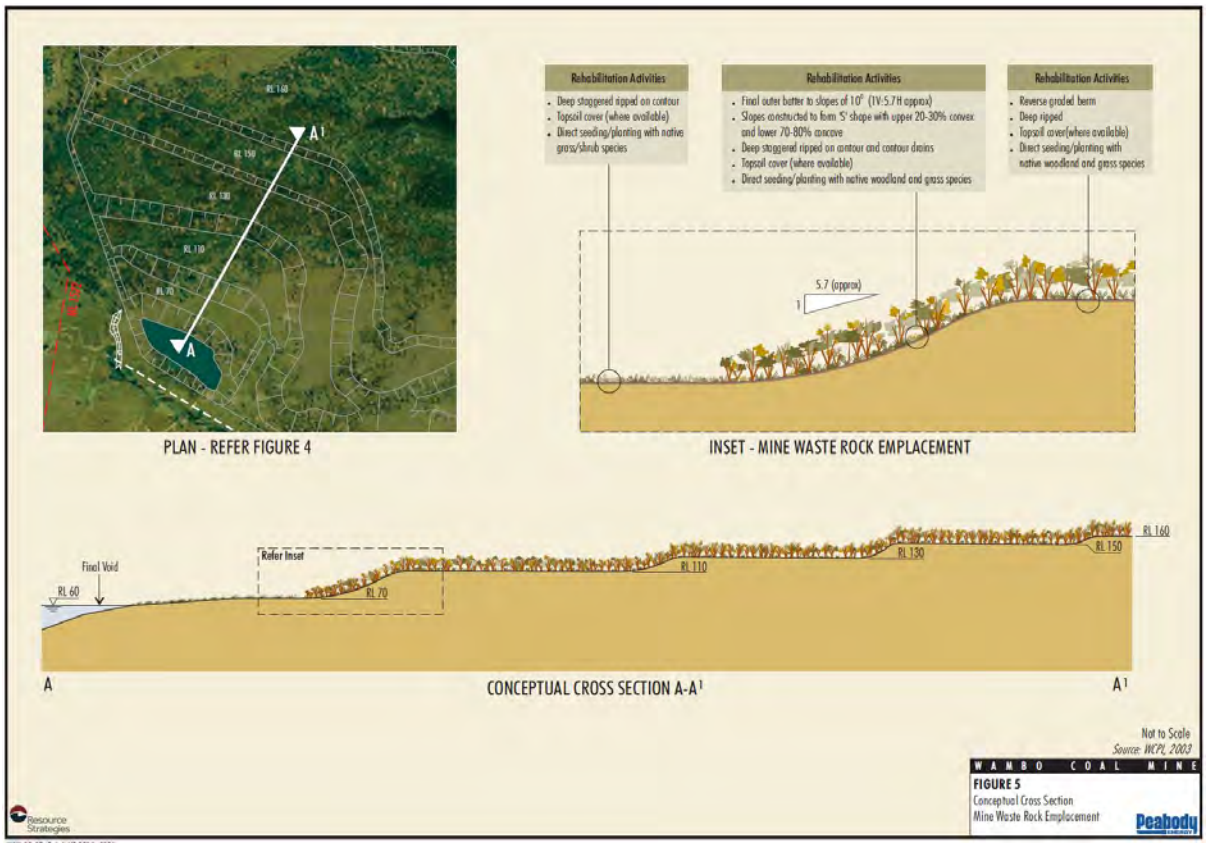
As shown on **Figure 8**, the final landform will consist of a single, broad ridgeline with a south-east to north-west alignment, which reaches approximately 160 metres (m) Australian Height Datum (AHD). Key features of the final landform include:

- Rehabilitated waste rock emplacements, infrastructure areas and tailings disposal areas which include woodland corridors to facilitate fauna movement across the rehabilitation areas and provide linkages with existing remnant vegetation and the Wollemi National Park;
- Two final voids located on the western extent of the final landform; and

- Permanent water management features including diversions and contour drains and some permanent ponds (located on the eastern extent of the final landform) to integrate landform drainage with the surrounding catchment.

Figure 8 illustrates the final landform concept and the revegetation strategy comprising a mixture of pasture and woodland communities. A conceptual cross section of a portion of rehabilitated mine waste rock emplacement is provided in **Figure 5.**

Figure 5 Conceptual Cross Section Waste Rock Emplacements



2.3.3.6 Coal Removal

Coal and partings operations will include:

- Coal will be mined with the 500t and 250t hydraulic excavator or front end loaders loading direct into 180t to 290t trucks;
- Thinner coal seams will be ripped and dozed into suitably sized stockpiles prior to loading;
- Coal in the floor will be dozed to the hydraulic excavator concurrent with the mining of the last pass thus minimizing dilution and/or losses at the floor of the coal;
- Parting bands will be removed by ripping with a track dozer and pushing into stockpiles prior to loading by the hydraulic excavator;
- Upon removal of each coal and parting band a dozer or grader will clean the floor to maximise coal recovery; and
- Utilising this coal mining fleet will eliminate, in most circumstances, the need for blasting of the coal. ROM coal is transported by haul trucks along internal haul roads to the ROM pad where it is directly dumped into ROM hoppers for crushing or is temporarily stockpiled and then rehandled to the ROM hoppers.

2.3.5 Processing Residues and Tailings

The Reject Emplacement Strategy[25] (RES) for the Mine is currently under review. The RES outlines the management of coarse reject material consistent with that described in the EIS (WCPL, 2003) and the planned tailings production and void deposition rates and status of void capacity.

When a sufficient stockpile is present at the underground ROM stockpiles, coal will be loaded onto trucks for transport to CHPP for processing. ROM coal from the open cut mining operations is hauled directly to the ROM coal stockpile area for processing in the CHPP.

The majority of ROM coal is placed directly into the 400 t ROM bin and the remainder is placed onto the 250,000 t capacity ROM coal stockpile. ROM coal is reclaimed from the ROM coal stockpile by front end loader as required.

ROM coal is crushed and washed in the CHPP which operates at a rate of up to approximately 1,800 tph of ROM coal feed. A product coal stockpile with an approximate capacity of 500,000 t is used to stockpile product coal, prior to reclaim and loading to trains for transport off-site.

The CHPP operates up to 24 hours per day, 7 days per week and during the 2016 calendar year approximately 9.4 Mt of ROM coal was processed at the CHPP, producing approximately 6.3 Mt of product coal.

The Wambo Coal Terminal (WCT) is capable of loading product coal onto trains at a rate of 4,500 tph. Product coal is reclaimed from the product coal stockpile at three reclaim points and is transferred via conveyors to the train load-out bin.

Approximately 11.82 Mt of coarse reject material will be produced over the MOP term from the washing of open cut and underground ROM coal and will primarily comprise minor quantities of coal as well as sandstone, siltstones, shales, conglomerates and mudstone (as predominantly gravel and cobble sized fragments). The coarse reject material produced from the CHPP is expected to be geochemically similar to that currently produced and will continue to be selectively handled and disposed of in waste rock emplacement areas or used as bulk fill in the covering and rehabilitation of tailings materials. The coarse coal reject material from the CHPP is hauled back to the mining operation and is dispersed throughout the mine waste rock emplacements to manage its geochemical characteristics.

Tailings Disposal Areas

Approximately 2.62Mt of tailings will be produced over the MOP term from the washing of open cut and underground ROM coal. The tailings management procedures developed for the WCPL to address the physical characteristics of tailings generated to date will continue to be. Approximately 18 Mt of tailings (dry basis) are expected to be produced over the life of the Mine (WCPL, 2003).

Approximately 80-85% of the CHPP reject is in the form of coarse reject. The remainder is fine reject (tailings). The tailings are slurry with 18 to 20% solids, the solids comprising very fine stone and clay material. Tailings will be pumped as slurry to approved purpose-built tailings dams constructed within mined out voids from where supernatant waters will be recovered to the mine water management system for dust suppression or reuse in the CHPP.

Tailings from the CHPP will be directed to the Hunter Pit Tailings Dam until the end of 2017. During 2015/16 the Hunter Pit Tailings Dam level was raised to RL 125 by lifting the existing dam wall.

WCPL will also commence works to establish a new tailings facility in the former voids of the old Homestead In-Pit and In-Pit by the end of 2016. Commissioning of the new tailings facility in the In-Pit area is expected to occur late 2017. Previously the Homestead Pit and In-Pit areas provided portal

[25] Condition 22G, Schedule 4 of DA 305-7-2003

access to the NWU mine. Sealing the mine entries[26] in the Homestead In-Pit and In-Pit areas was completed in March 2016. Tailings will be alternated between the In-Pit and Hunter Pit in 2016. Prior to receiving tailings in late 2022, the Homestead Pit will be used an interim mine water storage facility.

Tailings produced at the CHPP primarily comprise carbonaceous shale, sands and clay materials (WCPL, 2003). The tailings are pumped as slurry to the approved[27] final void tailings facility. Once tailings disposal areas have reached capacity and allowed to consolidate, decommissioning will commence with a progressive covering of coarse rejects and/or waste rock material using a combination of encapsulation and incorporation when the surface of the tailings dam is deemed trafficable and safe.

The final capping of inert overburden material will be to a minimum depth of cover of 2m (or greater subject to final capping requirements), prior to final profiling and rehabilitation, to restrict oxygen and water ingress to the underlying tailings and prevent salts from rising to the soil surface.

The engineered cover design would consider site topography, prevailing climatic conditions and the availability of suitable fine textures material (i.e. highly weathered mine water rock) as a cover material. The capping process creates a final landform that is stable and can be rehabilitated using the same rehabilitation concepts and methods as for the mine waste rock emplacements. Final rehabilitation of the tailings emplacement areas will occur when the dams have been capped and deemed stable and suitable for rehabilitation to occur.

Currently there are a number of tailing facilities in various life stages at the commencement of this MOP term, including:

- North East Tailings Dam (Decommissioned. Commencement of alternate capping method trial in 2017 until completed in 2020) (refer to **Section 2.3.2.7**);
- Hunter Pit Tailings Dam (Currently active but scheduled for decommissioning in 2017. Commencement of alternate capping method trial in 2017 until completed in 2020) (refer to **Section 2.3.2.7**); and
- Homestead and In Pit Tailings Dams (Commissioning expected in 2017 for the In Pit subject to relevant approvals from government authorities).

Specific WCPL personnel have completed training to undertake inspection of all tailings facilities. These routine inspections are completed weekly. Other routine inspections include annual independent inspections as required by the relevant Dams Safety Committee (DSC) approval.

2.3.6 Underground Mining Operations

2.3.6.1 Underground Mining Equipment Fleet

Underground mining at WCPL during the MOP term will employ a longwall operating system. Mining equipment to be utilised during the MOP term at the NWU and the SBU mines (within the Whybrow and Wambo Seam) will include the following:

- Construction fleet items will include cranes, low loaders, backhoes and other typical construction equipment.
- Major underground development equipment will include:
  - two Joy 12CM30 5.4m single pass continuous miners (***Note:*** SBU mine in the Wambo Seam will require an additional Joy 12CM30 5.4m single pass continuous miners until development completion of the SBU mine in the Whybrow Seam);
  - up to four electric shuttle cars with 15 t payload;

[26] In accordance with *MDG6001 Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams (February, 2012)*

[27] As required by the relevant Section 100 Approval as issued under the *Coal Mines Health and Safety Act 2002*

  - two stamler feeder breakers to size coal produced during development;
  - four auxiliary fans (21.5 m^3/s);
  - eight Load Haul Dump (LHD) machines;
  - nine personnel transporters (PJBs or SMVs);
  - power reticulation and distribution system (11 kV/1 KV); and
  - mobile pumping stations and face dewatering system.
- Major longwall panel equipment will include:
  - longwall supports rated to 1,000 t capacity (1.75 m width);
  - AFC/BSL design of 2,000- 3,000 tph.
  - longwall shearer;
  - maingate equipment;
  - monorail system for supply of services;
  - hydraulic pumps and shearer water pumps; and
  - longwall electrical transformers.
- The main headings conveyor will be approximately 1,200 m in length and will re-use the existing trunk conveyor from the sealed North Wambo Underground Mine and will comprise:
  - 2,500 T/Hr (Peak 3,000 T/Hr) rating;
  - 3 x 320 kW driveheads;
  - 5 m/s belt speed;
  - 1600 ply belt; and
  - PLC Control.
- The 2 development panel conveyors will each be approximately 2,000m in length and will re-use the existing gate road conveyors at a capacity of approximately 1,500 tonnes/hr, including;
  - 2 x 600 kW driveheads;
  - 4.5 m/s belt speed;
  - 1500 ply belt; and
  - loop take up- 13 bays, 240 m belt storage.
- The main gate longwall conveyor will be approximately 2,000m in length and will comprise;
  - 1,800 – 2,200 t/hr rating;
  - 2 x 600 kW driveheads;4.5 m/s belt speed;
  - 1500 ply belt;
  - loop take up- 13 bays, 240 m belt storage;
  - 1 new tripper drives; and
  - 2 of 2 x600 kW tripper drives

Mobile surface fleet associated with the NWU mine will include a front end loader and standard open cut haul trucks (777 or 785 dump trucks) that will be utilised occasionally from the open cut fleet to internally transport coal produced by NWU to the ROM stockpile along the open cut main coal haul road.

Additional surface conveyors will be required to transport coal from the South Bates bench on the Whybrow and Wambo seam level to the ROM pad adjacent located at previous Wollemi Underground Mine ROM pad. The equipment used to operate this conveyor will be of a similar type to the current NWU mine surface conveyor arrangement

Mining and other non-mining equipment to be utilised during the MOP term at the SBU mine will include the same mobile and fixed plant equipment utilised by the current NWU mine.

2.3.6.2 Underground Mining Layout

The approved NWU mine consists of eleven 250m longwall panels, with the panels oriented south-west to north-east. Longwall panels LW1 - 5 have been developed off main headings driven from the

existing Bates South highwall. Access to longwall panels LW6 to LW10 (and LW10a) is from the Homestead In-Pit open cut highwall. The longwall panels are approximately 1.7km to 3.6 km in length and extend to the southern side of Stony Creek (**Figure 2**).

The approved SBU mine (Whybrow Seam) consists of three 228 - 240m longwall panels, with the panels oriented south-west to north-east. Longwall panels SBLW11, SBLW12 and SBLW13 will be developed off the Bates South highwall. ~~The longwall panels are approximately 1.9km - 2.0km in length and extend to the southern side of Stony Creek~~ Longwall panels SBLW11, SBLW12 and SBLW13 are approximately 1.6km – 1.8km in length (**Figure 2**).

The approved SBU (Wambo Seam) mine consists of three 222 - 240m longwall panels, with the panels oriented south-west to north-east. Longwall panels SBLW14, SBLW15 and SBLW16 will be developed off Main Headings developed off the Bates South East highwall. ~~The longwall panels are approximately 1.5km – 1.8km in length and extend to the southern side of Stony Creek~~ Longwall panels SBLW14, SBLW15 and SBLW16 are approximately 976m, 1156m and 1345m in length. The shortened longwalls do not extend to the southern side of Stony Creek (**Plan 2**).

2.3.6.3 Underground Mining Method

WCPL primarily use Joy Mining Longwall equipment, including the longwall operating system. The longwall panels are formed by driving two sets of gateroads (the tailgate and maingate roads). Each gateroad requires two roadways (headings) to be driven parallel to each other (approximately 31 m apart). One of the roadways is used for personnel and materials access and fresh air intake ventilation while the other is used for coal clearance and return air ventilation. The roadways are developed using Joy 12CM30 continuous miners.

The headings are connected approximately every 120m by driving a cut through from one heading to another. This forms pillars of coal along the length of the gateroad. The tailgate and maingate roads are separated by the 222m-252m wide longwall panel. The maingate roads and tailgate roads are then linked together by driving an installation road and bleeder road at the inbye end of the longwall panels.

Generally roadway development height is 2.9m, while the average extraction height across the face will range from 2.2m to 2.9m depending on the seam thickness.

2.3.6.4 Underground Mining *Sequence*

NWU mine

At the end of the December 2014, approximately 110,403m of development has occurred since the commencement of the NWU mine, with a total of 28,348m of longwall retreat. Longwall panels completed to date at the NWU mine include LW1 to LW10a. The remaining longwall panel, at the time of MOP Amendment A, at the NWU mine is LW8b. The development of the underground roadways for LW8b is scheduled was completed in June 2015 (**Plan 3A**).

Longwall mining of LW10a was completed in October 2015 (**Plan 3A**). Longwall mining of LW8b is scheduled to commence in November 2015 (**Plan 3A**) and completed during January 2016 (**Plan 3B**).

The Wambo Homestead Complex (WHC) is positioned above LW8b longwall. Currently, WCPL have in place an exclusion zone of approximately 300m where longwall mining will not occur beneath the WHC to prevent possible damage to the structures from subsidence related impacts. This will effectively mean that 500m of coal (approximately 0.5Mt) will be left in situ.

SBU mine (Whybrow Seam)

During the MOP term, the proposed development of the main headings, tailgate and maingate roadways for SBLW14 is scheduled for completion in June 2017, April 2017 and July 2017 respectively. Development of the remaining roadways for longwall panels SBLW15 and SBLW16 are scheduled for completion in December 2017 and April 2018 respectively (**Plans 3A – 3D**).

Longwall mining of proposed SBLW14 is scheduled to commence in August 2017 (**Plan 3C**) and completed during December 2017. Longwall mining of SBLW15 is scheduled to commence in January 2018 and completed in May 2018 (**Plan 3D**). Longwall mining of SBLW16 is scheduled to commence in July 2018 and completed during November 2018 (**Plan 3D**).

WCPL proposes to recover coal within the Whybrow Seam (within 200 m of the approved open cut limit) using continuous miners (underground mining method) with access directly into the Whybrow Seam from the Bates South open cut (**Plan 3C**). WCPL is in the process of preparing an application for the South Bates Extension Modification (DA 305-7-2003 i.e. MOD 17) for further extraction (including longwall extraction) that would use the roadways created by the proposed extraction. Subject to MOD 17 approval from DP&E, a revised MOP will be prepared and submitted to the DRE.

SBU mine (Wambo Seam)

During the MOP term, the proposed development of the main headings, tailgate and maingate roadways for SBLW14 is scheduled for completion in January 2017, June 2017 and August 2017 respectively. Development of the remaining roadways for longwall panels SBLW15 and SBLW16 are scheduled for completion in January and March 2018 respectively (**Plans 3C – 3D**).

Longwall mining of proposed SBLW14 is scheduled to commence in July 2017 (**Plan 3C**) and completed during October 2017. Longwall mining of SBLW15 is scheduled to commence in October 2017 and completed in February 2018 (**Plan 3D**). Longwall mining of SBLW16 is scheduled to commence in February 2018 and completed during June 2018 (**Plan 3D**).

2.3.7 Waste Management

WCPL implemented a total waste management system (TWMS). The TWMS facilitates the management and disposal of multiple waste streams, including hazardous waste, in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act), *POEO (Waste) Regulation 2005* and the *POEO Amendment (Scheduled Activities and Waste) Regulation 2008*. The TWMS is managed by the Environment and Community Manager, with waste management operations being undertaken by the licensed waste management contractor. Key strategies of the TWMS include:

- Segregation of waste at the source;
- Appropriate transport, handling and disposal of hazardous waste;
- Recycling;
- Reduction in the risk of contaminating non hazardous waste;
- Waste tracking - comprehensive monthly reports detailing volumes, recycling, disposal and transportation of waste; and
- Improved data capture to increase the efficiency and accuracy when reporting.

Sewage is treated on-site at Main Administration Building and CHPP sewage treatment plants. Each sewage treatment plant is maintained by a licensed contractor. Some of the treated effluent is used for irrigation purposes around administration buildings.

Various waste materials are collected and sorted for recycling including paper, cardboard, metals, glass, air filters, oil filters, waste oil, waste grease, oil rags and hydraulic hoses by the Mine's licensed waste contractor.

In the event hydrocarbons have contaminated soil material as a result from spillages for example, the contaminated material will either removed from site by WCPL licensed waste contractor to an appropriate licensed facility for treatment or removed to WCPL's on-site bioremediation area for treatment. The treated material from the bioremediation area will be disposed of within the Mine's waste emplacement areas, only when the material has been deemed remediated. Contamination assessments of the Mine site during the mine closure phase will be carried out as described in **Section 8.0**.

2.3.7.1 Hazardous Materials

Hazardous reagents and explosives required for the Mine will be transported in accordance with the appropriate regulations under the NSW *Dangerous Goods (Road and Rail Transport) Act, 2008*. These regulations apply versions of the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) (National Transport Commission, 2007). Explosives, including explosive precursors, will be managed in accordance with the NSW *Explosives Act, 2003* including a Security Plan developed in consultation with the explosives contractor for the Mine. All persons working with or having access to explosives will be licensed in accordance with the *Explosives Act, 2003*. Detonators and boosters are stored on-site in a purpose built compliant facility. Bulk explosives will only be mixed using a Mobile Manufacturing Unit.

Bulk ammonium nitrate (AN) and emulsion are stored on-site during the loading process and mixed using mobile manufacturing plants before being delivered down the blast holes.

Hydrocarbons used on-site for the Mine include diesel, oils, greases and degreaser. Hydrocarbon storage facilities are designed, located, constructed and operated in accordance with *AS 1940:2004* The storage and handling of flammable and combustible liquids and *NSW Work Health and Safety Act, 2011*. This will include the use of re-locatable self-bunded double skinned storage tanks.

Waste hydrocarbons will be collected, stored and removed by licensed waste transporters. All waste streams are captured by the site's Total Waste Management System. The workshop infrastructure includes waste oil extraction equipment for efficient removal of waste oil during machinery servicing. Runoff from the workshop floor and apron, refuelling pads and truck washdown area pass through a purpose built oil/water separator system which is inspected and maintained on a regular basis. Oily water from the oil/water separator is remove from site by WCPL licensed waste contractor.

WCPL operate *ChemAlert*, a comprehensive tracking, storage and chemical information management system. No chemical or hazardous material will be permitted on-site unless a copy of the appropriate Material Safety Data Sheet (MSDS) is available. All chemicals brought on-site will be recorded in a register which will identify the type of product, dangerous goods class, liquid class, hazardous chemical class and the quantity held on-site. The inventory register will also identify the compatibility of materials and the emergency response procedures in the event of a spill.

Chemical storages will be provided within the workshop and storage buildings and will be separated according to chemical type and storage requirements. Notifications, placarding and preparation of safety plans will be in accordance with the *WorkCover Guideline for Dangerous Goods*.

2.3.8 Decommissioning and Demolition Activities

Infrastructure with no ongoing beneficial use will be removed from the site at the completion of the Project. Foundation slabs of certain buildings may be retained for suitable end-use goals in agreement with the relevant authorities and stakeholders. Alternatively, they would be excavated for disposal or buried in a void in an approved manner.

Process reagents and fuels unused at the completion of mining will be returned to the supplier in accordance with relevant safety and handling procedures.

Foundation soils will be chemically tested, contour ripped and chemically ameliorated, as required and in accordance with relevant regulatory requirements. Stockpiled soils will then be applied as necessary and stabilised. Revegetation would be undertaken with suitable endemic tree species or pastures, consistent with the revegetation strategy (**Section 3.3.7**).

Roads that have no specific post-mining use will be ripped, topsoiled and revegetated. Some access roads may be retained post-mining to enable access and for use in bushfire and other land management activities.

Ventilation infrastructure, including fans and vents will be removed. A detailed plan of each ventilation shaft will be prepared and the sealing/capping procedure determined in consultation with the relevant authorities and other stakeholders. Post-mining, ventilation shafts will be backfilled and sealed in accordance with DRE requirements (currently the *Mine Design Guideline [MDG] 6001 Guideline for*

the Permanent Filling and Capping of Surface Entries to Coal Seams [NSW Department of Trade and Investment, Regional Infrastructure and Services [DTIRIS] Mine Safety Operations, 2012]).

At the completion of underground mining operations all underground infrastructure (e.g. conveyors and dewatering systems) that can be recycled or reused will be removed. The various drift accesses and portals will be sealed to prevent discharge of waters from the workings as they become flooded by groundwater.

Portals will be sealed (or access restricted) in accordance with DRE requirements (*MDG 6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams* [DTIRIS Mine Safety Operations, 2012]). Box cut areas will be regraded, where necessary, and revegetated using appropriate plant species.

Areas in the vicinity of the rail loop will be revegetated with native species characteristic of the Warkworth Sands Woodland (such as *Angophora floribunda* and *Banksia integrifolia*) to compensate for the removal of a small portion of Warkworth Sands Woodland.

Decommissioning and demolition activities are planned for relocating infrastructure associated with the NWU mine within the Homestead and In-Pit areas. These activities are expected to commence in 2016.

Other decommissioning activities will generally involve capping trials of the North East Tailings Dam and consolidation of Hunter Pit Tailings Dam, once the storage capacity of the tailings dam has been reached (**Section 2.3.2.7 & Section 2.3.5**).

2.3.9 Temporary Stabilisation

Several waste rock emplacement areas have been identified by WCPL for stabilisation works during the MOP term, commencing with a trial in 2017. The objective will be to stabilise outer batters temporally in active pit areas with a vegetative cover (e.g. by aerial seeding) to minimise erosion, but primarily to assist in the management of dust. Finalisation of the waste rock emplacement areas will be subject to further assessment of their dust risk potential during the MOP term. Other temporary stabilisation works completed in 2016 included seeding with couch a small area of mine disturbed land adjacent to the South Bates underground haul road.

2.3.10 Progressive Rehabilitation & Completion

To minimise the area of disturbance at any one time, rehabilitation occurs progressively at the Mine of final mine landforms when they become available for revegetation. The mine waste rock emplacements behind the advancing open cut would be constructed to approximate the pre-mining topography or the final landform (**Plan 4**) approved by DA305-7-2003.

Mine waste rock emplacements would be shaped by dozer prior to the commencement of rehabilitation activities i.e. re-profiling, reapplication of topsoil/subsoil and revegetation and soil amelioration activities (**Section 3.3.6 & Section 3.4.1**).

Rehabilitation activities during the MOP term will are displayed in **Table 12**. At the completion of the MOP term, a total of 286.5ha will be rehabilitated. Progressive rehabilitation of waste rock emplacement areas within the open cut is identified in MOP **Plans 3A – 3F**.

In addition, WCPL plan to decommission the Hunter Pit Tailings Dam in 2016, under the relevant Section 101 Approval[28] for discontinued use of a tailings emplacement area. It is anticipated that rehabilitation of the Hunter Pit Tailings Dam would occur after the capping phase, during the next MOP term.

[28] *Work Health and Safety (Mines) Regulation 2014 [NSW] Schedule 3 High risk activities.*

As previously discussed, capping trials for the North East Tailings Dam will continue during the MOP term. The method of capping tailings dams, prior to rehabilitation activities commencing, are detailed in **Section 5.3**. Further details regarding the rehabilitation activities during the MOP term are provided in **Section 7** of this MOP.

Table 12 Open Cut Planned Rehabilitation

Open Cut Planned Rehabilitation	2015	2016	2017	2018	2019	2020*	Summary 2015-2020*
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Backfill Project		23.1					
Rug Dump - Area 1		9.14					
Rug Dump - Lower Slope		10.38					
Rug Dump - Area 2		5.47					
Rug Dump - Area 3		8.3					
Montrose East Out of Pit Dump - 1		~~6.4~~					
Rug Dump - Area 4		19.5					
Son of Montrose/Wombat Dump		17.3					
RL160		10.2					
Rug Dump			39.9	11.6	23.2		
Barren Zone				16.8			
RL110 Embankment				3.9			
Waterfall Ramp				2.6			
Montrose East			5.8	8.6			
Montrose					21.1	42.4	
Totals	**0**	**103.4**	**52.9**	**43.5**	**44.3**	**42.4**	**286.5**

Notes*: Refers to end of 2020

2.3.11 Material Production Scheduled during MOP term

The indicative mining schedule and sequence of open cut and underground mining operations during the MOP term is outlined in **Section 2.3.3** and **Section 2.3.4** and displayed in **Plans 3A – 3F**. An indicative material production schedule during the MOP term is provided in **Table 13**.

Table 13 Material Production Schedule during the MOP term

Material Production Schedule during the MOP term							
Material	**Unit**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***
Open Cut							
Stripped Topsoil	Mm^3	0.14	0.21	0.19	0.14	0.04	0.11
Rock/Overburden	Mm^3	25.79	25.99	33.39	32.16	26.49	26.59
ROM Coal	Mt	4.73	4.78	4.82	3.76	3.50	3.42
Coarse Reject Material	Mt	1.41	1.29	1.40	0.97	1.00	0.96
Tailings	Mt	0.25	0.23	0.25	0.17	0.18	0.17
Product Coal	Mt	3.07	3.26	3.17	2.62	2.32	2.00
NWU Mine							
ROM Coal	Mt	4.20	0.45	-	-	-	-
Coarse Reject Material	Mt	1.38	0.12	-	-	-	-
Tailings	Mt	0.24	0.02	-	-	-	-
Product Coal	Mt	2.57	0.31	-	-	-	-
SBU Mine (Whybrow Seam)							
ROM Coal	Mt	0.29	3.64	2.31^	-	-	-
Coarse Reject Material	Mt	0.09	0.82	0.68	-	-	-
Tailings	Mt	0.02	0.14	0.12	-	-	-
Product Coal	Mt	0.19	2.68	1.46	-	-	-
SBU Mine (Wambo Seam)							
ROM Coal	Mt	-	0.17	1.94	1.58	-	-
Coarse Reject Material	Mt	-	0.05	0.6	0.41	-	-
Tailings	Mt	-	0.01	0.1	0.16	-	-
Product Coal	Mt	-	0.11	1.24	1.01	-	-

Notes: *2020 – Refers to 1st Jan – 31st December 2020

^ Includes 0.04MT from SBUE Consent Area

3.0 ENVIRONMENTAL ISSUES MANAGEMENT

3.1 ENVIRONMENTAL RISK ASSESSMENT

A Broad Brush Risk Assessment (BBRA) workshop for the MOP was undertaken in May 2014. A revision of the BBRA for the site was also completed in March 2015. The BBRA was conducted generally in accordance with the Australian Standard *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*, and the Peabody *Hazard Identification and Risk Management Standard* (*PEA-S&H-STD-001.3*).

The BBRA identified a number of 'medium and low' risks[29] associated with the rehabilitation and mining operations that may be encountered during the MOP term. **Table 14** provides a summary of key mining and rehabilitation risks identified in the BBRA (identified by shaded cells) and where they are addressed in the MOP. A summary of the BBRA is provided in **Appendix 7**.

WCPL have developed environmental management plans (EMP)[30] incorporating the necessary controls to manage environmental risks, as identified through the BBRA process.

Table 14 Key Elements from the BBRA

Key Environmental & Community Aspects Assessed	Potential Consequence and/or Hazard	Mitigation Measures addressed in MOP
Aboriginal Cultural Heritage	Damage or loss of Aboriginal Cultural Heritage	**Section 3.4.12**
Approvals	Non-compliances with operating approval conditions	**Section 1.3**
Blasting	Blasting at the mine exceeds criteria or results in a complaint	**Section 3.4.9**
Bushfire	Fire impacts new revegetation in open cut	**Section 3.4.14**
Dust/Air Quality	Mine generated dust that exceeds criteria or results in a complaint	**Section 3.4.3**
Erosion & Sediment Control	Pollution of surface water and breach of environmental protection licence (EPL)	**Section 3.3.5**
Flora & Fauna	Breach of legislation and site procedures from unauthorised clearing	**Section 3.3.7**
Green House Gases	Non-compliance with the abatement requirements in the Project Approval	**Section 3.4.7**
Hazardous Materials & Dangerous Goods	Contamination or pollution events and breach of EPL and legislation	**Section 2.3.8 & 3.4.6**
Historic (European) Heritage	Damage or destruction of European heritage sites	**Section 3.4.12**
Land & Property Management	Poor land management practices and loss of community reputation	**Section 5.0**
Reject Management	Rehabilitation and mine closure impacts as a result from spon comb and AMD.	**Sections 3.3.2 & 3.3.3**
Land Contamination	Potential land contamination risk include chemical spills, storage etc.	**Section 3.3.19**
Monitoring & Reporting	Non compliance with reporting requirements for the Project	**Section 8.0**
Noise	Mine generated noise that exceeds criteria or results in a complaint	**Section 3.4.10**
Rehabilitation & Mine Closure	Unstable landform, poor drainage and failure to meet lease relinquishment	**This document Section 1.6.1**
Spontaneous Combustion	Spontaneous combustion of carbonaceous material	**Section 3.3.2**
Mine Subsidence	Subsidence impacts compromise final land use	**Section 3.3.4 and Section 5.5**
Stakeholders	Inadequate consultation leads to negative community perception	**Section 1.5**
Topsoil	Loss of topsoil resource from poor storage, handling and	**Sections 3.3.5 & 3.3.6**

[29] Note that all residual risks were acceptable/as low as reasonably practicable with the implementation of appropriate controls

[30] As required by the DA305-7-2003

Key Environmental & Community Aspects Assessed	Potential Consequence and/or Hazard	Mitigation Measures addressed in MOP
	maintenance	
Visual Impact	Poor rehabilitation outcomes and increased mining footprint	**Section 3.4.11**
Waste Management	Inappropriate waste disposal resulting in a EPL and legislative breaches	**Section 2.3.7**
Water	Pollution to surface and groundwaters	**Section 3.4.4 & 3.4.5**

Section 9.0 outlines potential risks and consequences associated with rehabilitation activities. A Trigger Action Response Plan (TARP) has been developed to identify appropriate response measures to manage any potential rehabilitation risk. **Table 36** illustrates how the various rehabilitation risks, management measures and responsibilities are structured to achieve compliance with the relevant statutory requirements, and the framework for management and contingency actions.

3.2 ENVIRONMENTAL RISK MANAGEMENT

An Environmental Management Strategy (EMS)[31] for the existing mining operations has been prepared by WCPL. The EMS has been developed to meet corporate and statutory requirements and was prepared generally in accordance with IS0 14001. The EMS encompasses a range of management plans and monitoring programmes overseen by statutory planning provisions (**Figure 6**).

Further information regarding how specific environmental issues are managed in accordance with the appropriate management plan are provided further in this section. WCPL's approved management plans and monitoring programmes include, but not limited to:

- Environmental Management Strategy (EMS001);
- Environmental Monitoring Program (EMP003);
- Biodiversity Management Plan (EMP010);
- Air Quality and Greenhouse Gas Management Plan (EMP008);
- Noise Monitoring Program (EMP011);
- Blast Monitoring Program (EMP007);
- Water Management Plan incorporating the following:
  - North Wambo Creek Diversion Plan;
  - Groundwater Monitoring Program (EMP016);
  - Surface Water Monitoring Program (EMP015);
  - Erosion and Sediment Control Plan (EMP012); and
  - Surface and Groundwater Response Plan (EMP017)
- NWU Subsidence Management Plan for Longwalls LW1 to LW6;
- NWU Extraction Plan Longwalls 7 to 10a;
- SBU Extraction Plan Longwalls 11 to 13;
- SBU Extraction Plan Longwalls 14 to 16;
- Bushfire Management Plan (EMP005); and
- Wambo Homestead Complex Mine Management Plan (EMP002).

As required by DA305-7-2003, the EMS and all associated management plans will be reviewed for adequacy during the MOP term.

WCPL maintains an extensive environmental monitoring program whereby data is collected, analysed and maintained to establish baseline data, reporting, future examination and assessment. The locations of existing environmental monitoring sites are shown on **Appendix 4**.

[31] Condition 1, Schedule 6 of DA305-7-2003

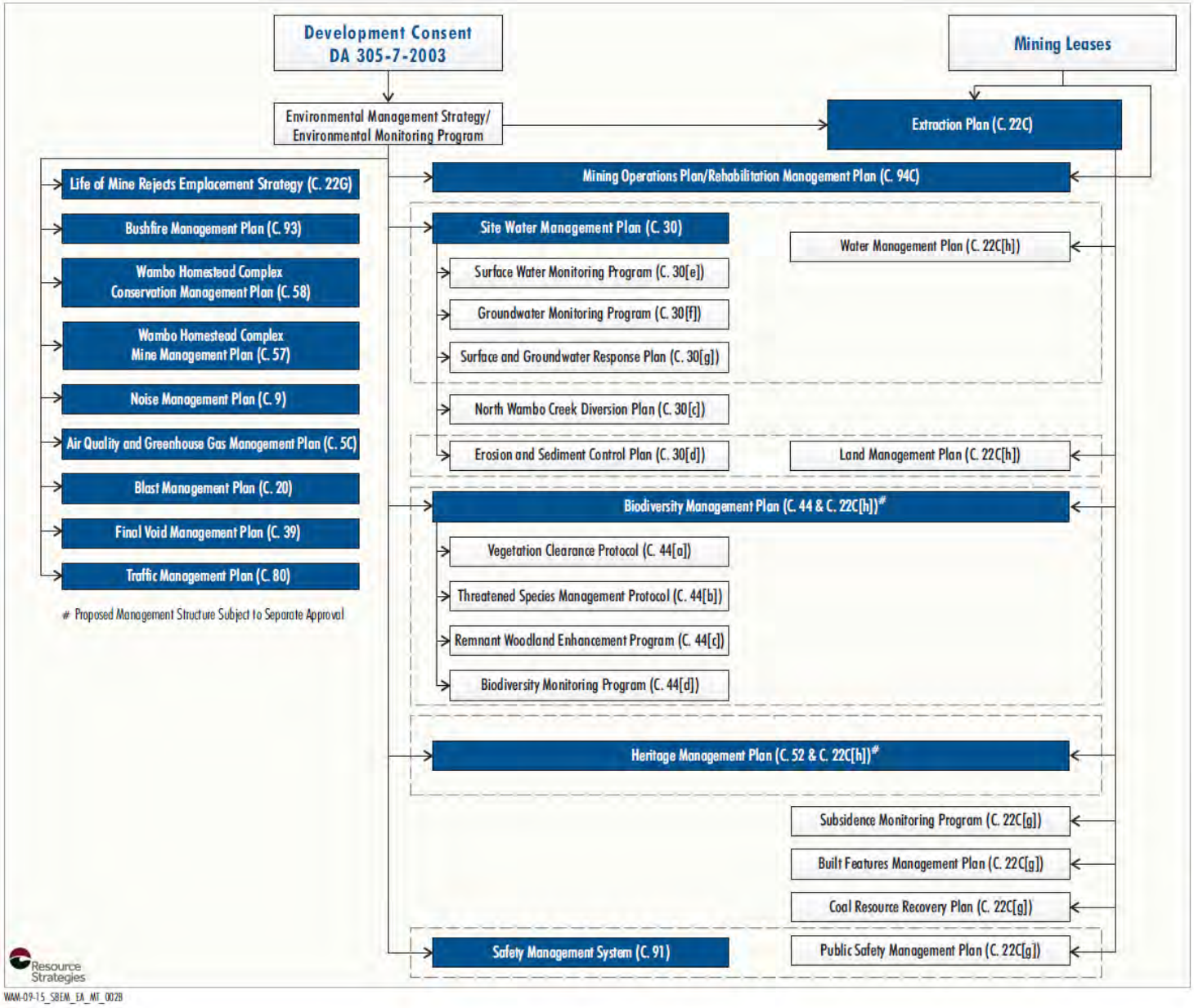
On behalf of WCPL, Peabody Energy Australia maintains a website for all stakeholders to access recent environmental assessments, environmental management plans, environmental monitoring reports and community information using the following link:

https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wilpinjong-Mine/Approvals,-Plans-Reports

In accordance with Condition 10, Schedule 6 of DA305-7-2003, the results from the environmental monitoring program are provided on the website. In accordance with Condition 5, Schedule 6 of DA305-7-2003 annual reporting from the environmental monitoring program is also provided within the Annual Review (AR) and accessible on the website.

The Mine maintains a 24 hours a day, 7 days per week community complaints line which is directed to the Environment and Community Manager (phone: **02 6570 2245**). Community complaints can also be directed to the community email: wambocommunity@peabodyenergy.com

Figure 6 Wambo Coal Mine Environmental Management System



3.2.1 Pollution Incident Response Management Plan

A Pollution Incident Response Management Plan (PIRMP) has been prepared by WCPL, as holder of Environment Protection Licence No.529 (EPL 529) in accordance with Part 5.7A of the *Protection of the Environment Operations Act 1997* (POEO Act) and Part 3A of the *Protection of the Environment Operations (General) Regulation 2009* (Regulation).

The PIRMP has been implemented by WCPL, including all of its employees and contractors, in the event of a pollution incident at WCPL. In particular the PIRMP provides information regarding procedures for:

- The identification of a pollution incident;
- Notification of pollution incidents in certain circumstances; and
- Responses to pollution incidents by WCPL including all of its employees and contractors.

3.3 SPECIFIC RISK RELATING TO REHABILITATION

3.3.1 Geology and Geochemistry

WCPL is situated within the Hunter Coalfield, a subdivision of the Sydney Basin, which forms the southern part of the Sydney-Gunnedah-Bowen Basin. The coal bearing rocks of the Sydney Basin are Permian in age (i.e. approximately 225 to 270 million years old) and are typically associated with low-lying gentle topography. The overlying rocks of Triassic age (i.e. approximately 180 to 225 million years old) cover large parts of the Sydney Basin and tend to form prominent escarpments where they outcrop.

The Whittingham Coal Measures are divided into the Jerrys Plains Subgroup, Vane Subgroup, Denman Formation and Archerfield Sandstone. The upper part of the Whittingham Coal Measures, the Jerrys Plains Subgroup, contains some 15 formally named coal seams (**Figure 4**). Seam structure is relatively simple with the seams dipping gently to the southwest at approximately 2-3 degrees. Minor local variations do occur around fault zones that are well known, having been mapped in previous open cut and underground operations. Previous longwalls and pillar extraction workings exist within the Whybrow Seam above the NWU mine.

The Open Cut operations extract coal from Whybrow[32], Redbank Creek[33], Wambo[34] and Whynot[35] Seams (**Figure 4**). The NWU mine undertakes coal extraction within the Wambo Seam. The proposed SBU mine will be developed in the Whybrow Coal Seam.

The waste rock materials generated by the WCPL are typically alkaline and slightly sodic which are common geochemical characteristics of coal mine waste rock material in the Hunter Valley (Project EIS). If inappropriately managed, the sodicity of the WCPL soils and waste rock materials has the potential to impede revegetation success due to typical sodicity-related problems such as poor soil structure, surface crusting, low infiltration and increased erosion potential.

Section 2.3.4 and **2.3.5** of describes the management strategies for waste rock and tailings emplacement respectively. **Section 3.4.1** describes the general process for characterisation of the waste rock material to determine the appropriate application of ameliorants where necessary. These ameliorative measures include the use of lime, gypsum and/or fertiliser to improve the chemical and/or nutrient properties of the soil. Further management measures are provided in **Section 6.0** of

[32] The Whybrow Seam is part of the Mount Leonard Formation (the uppermost unit of the Jerrys Plains Subgroup) and consists of piles A, B and C.
[33] The Redbank Creek Seam is part of the Malabr Formation (the uppermost unit of the Jerrys Plains Subgroup) sequence consists of four plies A, B, C and D.
[34] The Wambo Seam is part of the Malabr Formation (the uppermost unit of the Jerrys Plains Subgroup) and is mined as a single seam.
[35] The Whynot Seam is part of the Malabr Formation (the uppermost unit of the Jerrys Plains Subgroup) and is mined as a single seam.

this MOP. WCPL will continue to use these types of soil management strategies where appropriate to optimise the potential for achieving rehabilitation objectives and maintaining a stable, sustaining vegetation cover.

3.3.2 Material Prone to Spontaneous Combustion

Spontaneous combustion is oxidation at exposed coal surfaces which occurs at or near ambient temperature producing heat energy. No major incidents of spontaneous combustion within rehabilitation areas have been reported at WCPL during the past 30 years of operation, even though laboratory testing results indicate a moderated to high propensity for spontaneous combustion. Minor spontaneous combustion events at WCPL have historically been rare and associated with heating events in long term coal stockpiles.

Therefore the risk to rehabilitation, as a direct result of possibly spontaneous combustion events, is considered low at WCPL. However, routine inspections for indicators of spontaneous combustion in the Open Cut will continue to be conducted by Production Supervisors and Open Cut Examiners (OCE) during the MOP term. Inspections for indicators of spontaneous combustion will also be carried out during each monthly environmental inspection undertaken by WCPL Environmental Department.

With respect to rehabilitation, material that has the potential to have spontaneous combustion risks will not be used in rehabilitation works. This material, if identified, will be covered to a depth of at least 5m below the final landform RL using inert waste rock material.

Likewise, reject emplacements integrated into the landform being reshaped will be covered to a depth of at least 2m below the final landform RL using inert waste rock material.

3.3.3 Material Prone to Acid Mine Drainage

Waste rock samples were taken from exploration drillholes within the Project open cut area and were assessed for acid mine drainage (AMD) potential and element leaching (2003 EIS). Results of the testwork undertaken classified the waste rock samples as non-acid forming (NAF) and unlikely to generate environmentally harmful leachate when exposed to surface oxidation processes. These results are consistent with the observed behaviour of waste rock at the WCPL i.e. acidity has not historically been a problem with WCPL waste rock material. The pH of the tested overburden material and interburden materials range from pH 6.8 to pH 9.6, which is typical of unweathered rocks in the Singleton Coal Measures (EIS 2003). Therefore the risk to rehabilitation, as a direct result of possibly AMD events, is considered low at WCPL

Coal reject samples (coarse reject and tailings) taken from the CHPP were classified as indeterminate (IND) and potentially acid forming (PAF), respectively. However, AMD has not been identified at WCPL and is not expected to occur during the life of the Project provided if appropriate CHPP reject management practices are implemented, whereby tailings are incorporated and encapsulated and/or capped with bulk non-acid forming (NAF) waste rock (**Section 2.3.5**).

Characterisation of soil and waste rock material during the mine planning phase will be undertaken. With respect to rehabilitation, overburden material exhibiting hostile characteristics (acidity, excessive alkalinity, sodicity, etc.) will be identified and isolated from vegetation root zones and areas of potentially high surface runoff (i.e. will not be used in the final 2m of material in the final landform).

WCPL routinely monitors surface water quality, groundwater quality and rehabilitation aspects as required by SWMP and GWMP to monitor the water levels, electrical conductivity (EC) and pH in site water storages. Historical surface water monitoring of sediment dams around the CHPP, coal stockpile areas and other mine water dams typically return a pH range between pH 8 and pH 9.

3.3.4 Mine Subsidence

The overriding objective for subsidence management is to minimise the potential for, or extent of, the predicted subsidence impacts. The key issues relating to subsidence impacts on rehabilitation,

surface water and ground resources, land resources and agricultural activities, biodiversity, built features, heritage sites and values and public safety are described in detail in the relevant Extraction Plan (EP). The EP also details relevant monitoring and management measures that will be undertaken relevant to each identified impact.

As required by the EP, remediation will be conducted of subsidence impacts or environmental consequences detected by subsidence monitoring, where required in consideration of the potential impacts of the unmitigated impact (including potential risks to safety and the potential for self-healing or long-term degradation) and the potential impacts of the remediation.

A number of potential management measures are available to mitigate/remediate subsidence impacts on land in general resulting from underground mining operations. The requirement and methodology for any subsidence remediation techniques will be determined in consideration of:

- Potential impacts of the unmitigated impact, including potential risks to public safety and the potential for self-healing or long-term degradation; and
- Potential impacts of the remediation technique, including site accessibility.

Minor cracks that develop are not expected to require remediation as geomorphologic processes will result in natural filling of these cracks over time.

Remediation of typical surface cracks (generally in the order of 25mm to 50mm, but up to approximately 150mm) will use conventional earthmoving equipment (e.g. a backhoe) and will include:

- Infilling of surface cracks with soil or other suitable materials; or
- Locally re-grading and re-compacting the surface.

Areas of surface cracking will be stabilised using erosion protection measures (e.g. vegetation seeding and planting and/or brush matting). Drainage works and rehabilitation of subsidence troughs (i.e. areas of induced ponding) will be conducted as necessary, and may include stabilisation of banks subject to soil slumping.

If surface crack remediation works are required in remnant vegetation areas, compact mobile equipment will be utilised, where practicable, to minimise damage to surrounding vegetation. If the remediation work requires clearing of remnant vegetation to an extent that would exceed the benefit of the remediation, the requirement for remediation will be reviewed. Vegetation that requires clearance will be subject to the VCP.

Contingency plans will be implemented where a potential exceedance of a subsidence impact performance measure or an unexpected impact is detected including consideration of identified potential contingency measures.

In accordance with the relevant EP, if subsidence impacts from either the NWU mine or SBU mine result in greater than predicted impacts, exceeence of the performance criteria or requires greater than expected remediation activities as described in relevant EP, WCPL will notify and consult with the DRE.

If required, a revision of this this MOP will be undertaken to ensure rehabilitation activities are consistent with the revised subsidence predictions and mitigation measures outlined in the EP.

3.3.4.1 Subsidence on Steeper Slopes and NWC Diversion

The surface topography overlying the Longwalls 8 to 10A at the NWU Mine is gently to moderately undulated, with slope angles less than 18 degrees. No natural steep slopes occur within the Longwalls 8 to 10A Application Area, with the exception of localised areas around the creek banks and walls of the WCPL's farm and water storage dams).

All longwall panels associated with the NWU Mine and the SBU Mine are offset 26.5^0 from the base of the Wollemi National Park escarpment. Subsidence monitoring to date of the NWU Mine has determined no significant deviations from subsidence modelling predictions.

Potential impacts and the relevant mitigation and management measures on steep slopes in the Wollemi National Park escarpment resulting from the proposed extraction of longwalls, associated with the SBU mine, is provided in *Extraction Plan - South Bates (Whybrow Seam) Underground Mine Longwalls 11 to 13*.

The remediation measures and implementation of additional measures if required, regarding subsidence impacts on sections of the North Wambo Creek Diversion, are outlined in the approved *Extraction Plan - South Bates Underground Mine Longwalls 11 to 16*. All subsidence remediation measures to be undertaken by WCPL, in regards to the North Wambo Creek Diversion will be in consultation with the DRE.

3.3.4.2 Historical Subsidence

As described in **Section 2.3.2**, WCPL has commenced subsidence repairs to an adjacent landholder's property in 2015 (**Plan 2**). The subsidence was a result of underground mining activities associated with the former Homestead underground workings. The nature of the works primarily involves filling in pot holes and surface cracks, soil amelioration and reseeding with pasture species of these areas.

More recent subsidence events have been associated with the NWU mine on WCPL owned land. Subsidence monitoring has identified surface cracking in the predicted range of 20mm to 100mm wide, however surface cracking within the predicted range 150mm to 200mm has been identified on LW8a. In general, as the depth of cover decreases to the north, subsidence cracking widths tend to increase.

Remedial actions to date of subsidence impacts from the NWU mine have included repairs to internal roads i.e. filling in cracks to reduce safety risks. WCPL will also be recommissioning South Dam in consultation with the DSC (before water is returned to the dam) during the MOP term.

WCPL are developing a subsidence remediation program to address a number of subsidence impacts (mainly surface cracking) within areas of existing pasture (Domain C) utilised for grazing and previously rehabilitated areas in the open cut (Domain 6). The implementation of the program to remediate these areas will be carried out during 2016. The results of the subsidence remediation activities will be provided in the AR.

3.3.4.3 Subsidence Management and Extraction Plans

A subsidence impact assessment was undertaken by G.E. Holt and Associates (2003) for the Project EIS. Following the modification of Development Consent (DA 305-7-2003), G.E. Holt and Associates re-assessed the potential subsidence impacts of the re-orientation of the longwall panels in the NWU mine as part of the Wambo Development Project Wambo Seam Underground Mine Modification (2005 SEE). Further subsidence impact assessments have been completed including:

- Ditton Geotechnical Services (2012) NWU Mine Subsidence Assessment for LW 7 and 8;
- MSEC (January 2014) NWU Mine Subsidence Assessment for LW7 to 10;
- MSEC (August 2014) NWU Mine Subsidence Assessment for LW10a;
- MSEC (July 2015) SBU MOD15 and EP LW11 to LW13; and
- MSEC (December 2016) Extraction Plan for WYLW11 to WYLW13 in the Whybrow Seam and WMLW14 to WMLW16 in the Wambo Seam.

The various SMP and EP approvals are summarised below, and include:

- ***NWU SMP LW1 to 6***
  The NWU previously operated under an approved Subsidence Management Plan (SMP) for LW1 - 6. The SMP for First Workings was approved in October 2005 with mining commencing in November 2005. The SMP for Second Workings was lodged in March 2006 and was approved on the 11 December 2006. This SMP covered underground mining activities until 1/11/2013 which includes longwall panels 1 through to 6 (LW 1- 6).
- ***NWU EP LW7 to LW10a***

The approved NWU EP for LW7 to LW10 was revised to include the approved LW10a. The revised EP for LW7 to LW10a was approved on the 24 June 2015;

- ***SBU – EP LW11 to 13***
  The EP for LW11 to LW13 for the SBU mine in the Whybrow Seam was approved by the DP&E on the 9 February 2016; and
- ***SBU – EP LW11 to 16***
  The EP for South Bates SBLW13 to SBLW16 (*Extraction Plan - South Bates Underground Mine Longwalls 11 to 16)* was conditionally approved by the DP&E on the 16/05/2017. The approval considered the reduced lengths of LW13 to LW16 would result in similar or less subsidence related impacts to those approved as part of the approved layout and therefore can be generally in accordance with the Development Consent DA305-7-2003 as modified.

3.3.4.4 Subsidence Monitoring Program

Visual monitoring of remediated subsidence areas will be conducted monthly to identify any requirement for maintenance measures and/or remedial works (**Section 8.2**).

Any installed sediment control structures will be inspected on a monthly basis, or following rainfall events of equal to or greater than 20 mm/day (midnight to midnight) as recorded by the Wambo Meteorological Station. The sediment control structures will be inspected for capacity, structural integrity and effectiveness.

Details of subsidence impacts observed is GPS and photographically recorded in the Subsidence Impact Register, maintained by the WCPL's Chief Surveyor. Visual inspections will be undertaken in accordance with inspection checklists as provided in the relevant Extraction Plan.

3.4.4.1 Prescribed Dams

The NWU longwall panels LW7 to LW10a are located within the *Notification Area* of the following Prescribed Dams:

- South Wambo Dam Notification Area (Plan Number NA-231); and
- North East Tailings Dam Notification Area (Plan Number NA-56).

The South Wambo Water Dam Notification Area overlies LW8 to LW10 only, while the North East Tailings Dam Notification Area overlies LW7 and LW8 only.

WCPL's application to extract LW8 and develop gate roads for LW9 and LW10 within the South Wambo Water Dam Notification Area (Application WAMBO-04) was endorsed at the NSW Dam Safety Committee (DSC) meeting in October 2013.

The Public Safety Management Plan (PSMP) in the Extraction Plan for LW7 to LW10 addresses the recommendations of the DSC in relation to the application. As required, approval from the Minister for Mineral Resources prior to secondary extraction of LW9 and LW10 within the South Wambo Dam Notification Area was granted on 30 April 2014.

Submission of the detailed monitoring and management measures for Prescribed Dams have been developed by WCPL as part of applications for mining within the South Wambo Dam Notification Area (Plan Number NA-231) and the North East Tailings Dam Notification Area (Plan Number NA-56) to the DSC prior to mining within these areas. The various components in the application are summarised in the further details in the Extraction Plan for LW7 – 10a. WCPL have dewatered South Wambo Dam to the appropriate level as required for safety for the mining of LW8, LW9 and LW10 in accordance with the Extraction Plan for LW7 – 10a.

3.3.5 Erosion & Sediment Control

An Erosion and Sediment Control Plan (ESCP) has been developed to satisfy Condition 32, Schedule 4 of the Development Consent (DA 305-7-2003) and details erosion and sediment control methods. The control measures described in the ESCP aim to:

- Minimise soil erosion and sediment generation in areas disturbed during the development; and
- Minimise the potential for mining activities to adversely affect the water quality of the Wollombi Brook or the Hunter River.

The ESCP includes:

- Identification of activities that have the potential to cause soil erosion and sediment generation;
- A description of the location and capacity of erosion and sediment control structures;
- A description of measures to minimise soil erosion and the potential for the migration of sediments to downstream waters; and
- A program to monitor the effectiveness of control measures.

The ESCP will be reviewed as required by DA305-7-2003 and in consultation with the relevant authorities and updated where necessary. The following control measures as identified in the ESCP for land disturbance, land rehabilitation, topsoil management and monitoring include:

- **Subsidence Management**
  Regular monitoring for surface cracking and ponding sites are carried out in accordance with the relevant EP. Should surface cracking and/or ponding sites be identified as presenting an immediate safety, environmental hazard (e.g. an erosion hazard) or risk to final land use, the area will be repaired and rehabilitated as identified in **Section 3.3.4.** As required by the ESCP, appropriate sediment controls must be in place during these repair works until the area is considered suitably stable.
- **Land Disturbance**
  Land disturbance will be minimised and limited to those areas outlined in this MOP. Prior to any disturbance of land, an SPD must be completed by the operational manager (or delegate), in consultation with the Environmental Department. The SDP process identifies potential erosion and sediment risks associated with proposed disturbance projects, and requires appropriate erosion and sediment control measures to be implemented prior to disturbance commencing.
- **Land Rehabilitation**
  Progressive rehabilitation is a key element for erosion and sediment control. Mining disturbed land (with altered topography, surface conditions and increased catchment sizes) represents a high potential for erosion and sediment impacts. The potential for erosion and sedimentation impacts decreases substantially as disturbed land is reshaped and revegetated as part of the land rehabilitation process. In order to minimise erosion and sedimentation impacts until the rehabilitated area is suitably stable, sediment control structures (such as contour drains, drop structures and sediment control ponds) will be designed and constructed. For further details refer to the ESCP.
- **Topsoil Management**
  Topsoil will be stripped and handled in accordance with the requirements under the SDP. Erosion and sediment control measures, as identified in the completed SDP, will implemented prior to topsoil removal. Once topsoil is stripped, it will either be placed directly onto shaped overburden (where possible) and seeded or will be stockpiled for later use. If stockpiling is required, stockpiles will be managed as outlined in **Section 3.3.6** and **Table 16**.
- **Inspections and Monitoring**
  Sediment control structures and tailings dams will be inspected on a frequency as specified in the ESCP. The sediment control structures and tailings dams will be inspected for capacity and visual integrity by the Environmental Department (or delegate).

3.3.6 Soil Types & Suitability

Soil landscapes of the Project were classified and mapped in accordance with descriptions in the Soil Landscapes of the Singleton 1:250,000 Sheet (Kovac and Lawrie, 1991) and the Project EIS. Major soil types identified include alluvial soils along major drainage lines, siliceous sands to the east of

Wollombi Brook, yellow podzolics and yellow solodic intergrades adjacent to the alluvials on lower slopes and undulating plains, soloths on moderately elevated slopes and lithosols along the eastern boundary of the Wollemi National Park.

Due to the known variability and distribution of the soils at the Mine, the concept of soil complex units is used to identify the soil types, and provide guidance on appropriate stripping depth. The different soil complex units found at Wambo, as identified in the EIS (WCPL, 2003), include:

- Red Podzolic – found on the ridges and middle to upper slope position of the site. The upper 0.10 m of the profile of each soil type is suitable for use as topsoil.
- Yellow Podzolic / Solodic – found on the mid to lower slopes of the hills within the site. The upper 0.20 m of the profile of each soil type is suitable for topsoil.
- Lithosols – Stony or gravely soils generally occurring on upper slope and hill top areas. No depth of the profile is suitable for topsoil.
- Alluvials – found around North Wambo Creek. Suitability for topsoil recovery highly variable from 0.30 m, to limited areas of 1.0 m.

A rural land capability assessment was conducted in accordance with the standard NSW eight class system (Cunningham *et al.*, undated) which assesses biophysical soil properties and categorises land according to limitations such as erosion hazard, climate and slope. Seven of the eight classes were identified in the vicinity of the WCPL. **Table 15** lists the pre mining land classification for the with the proposed disturbance area of the open cut.

Table 15 Pre-Mining Land Classification for the Disturbed Area

Land Capability Classes	Definition	Areas (ha)
Class IV	*Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation with soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or re-establishment of permanent pasture.*	**428**
Class V	*Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation and structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices in Class IV*	**733**
Class VI	*Land not capable of being regularly cultivated but suitable for grazing with soil conservation practices such as limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin.*	**84**
Class VII	*Land best protected by green timber*	**14**
	TOTAL	**1259**

Table 16 provides a summary of the soil resource strategies undertaken by the Mine. **Section 5.6.1** outlines the detailed topsoil management practices to ensure soil viability and maintenance of this resource. In areas of significant earthworks, topsoil and subsoil resources will be identified, stripped and, wherever practicable, spread directly onto areas prepared for rehabilitation to make use of the potential seed bank.

Table 16 Soil Resource Management Strategies

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works
• Quantification of soil resources. • Characterisation of the suitability of soil resources for rehabilitation works. • Topsoil will be stripped prior to any land disturbance. • Recommended stripping depths[1]	• Minimisation of vegetation clearance. • Mulching of vegetation prior to topsoil stripping, where possible, to provide additional organic matter. • Selective stockpiling of soil according to soil type and	• Implementation of measures to ensure long-term viability of soil resources and manage soil salinity, including: – Soil stockpiles to be located outside of active mining areas; – Stockpiles to be constructed with a rough surface to reduce erosion hazard, improve drainage and promote vegetation;

Prior to Soil Stripping	During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting use in Rehabilitation Works
as provided by the soil survey in the WCPL EIS: – Red Podzolic (100mm) – Yellow Podzolic (200mm) – Alluvial (300mm) • Topsoil will be placed directly onto reshaped areas where possible. **Note:**[1] Subject to quantification of soils	chemical characteristics. • Stockpiling of soils in a manner that does not compromise the long-term viability of the soil resource. • Maximum height for stockpiles will be 3 m.	– Stockpiles which are to be inactive for extended periods to be fertilised and seeded with cover crop and/or preferred native pasture species (**Table 17**) mix to maintain soil structure, organic matter, and microbial activity; – Silt fencing to be installed around soil stockpiles to control potential loss of soil where necessary; and – Soil stockpiles to be deep ripped to establish aerobic conditions, prior to re-application for rehabilitation. – Annual (or as required) weed control and maintenance program of topsoil stockpiles. – Sign posted to clearly identify topsoil stockpile areas.

Prior to soil stripping, soil resources will be quantified. Where a deficit of topsoil is identified, investigations will be undertaken to determine the viability of the use of subsoils and to identify the need for treatment measures (e.g. use of fertilisers) applied where there is a deficit of topsoil. Where direct spreading is not practicable, the stripped soil will be stockpiled and seeded with grasses, as outlined below to maintain soil viability prior to being re-spread.

Spoil areas reshaped following mining to construct a post mining landform will contain appropriate drainage works prior to the topsoil application. The area will then be ripped and seeded using direct seeding techniques. Waste rock/soil characterisation will assist in determining appropriate ameliorates in rehabilitation where necessary (e.g. the use of lime, gypsum and/or fertiliser to improve the chemical and/or nutrient properties of the soil).

Topsoil Stripping and Handling

During topsoil stripping operations, direct placement of excavated topsoil onto re-shaped areas is preferred to stockpiling, to avoid rehandling and reduce the potential for topsoil degradation or loss. If a re-shaped surface is not available, the topsoil will be stockpiled. The following controls shall be observed when undertaking these actions.

The following management measures shall be observed during topsoil stripping and handling:

- Stripping depths and limits (including areas of no recovery), as pegged or taped, are to be adhered to during stripping operations;
- Topsoil stripping must be adequately supervised by a member of the Environmental Department (or delegate), with operations being checked to ensure continued suitability of stripping methods and topsoil management;
- Topsoil stripping should be limited to daylight hours where possible;
- Stripping operators shall be experienced in topsoil work, or otherwise be closely supervised, to ensure topsoil stripping depths are adhered to;
- Care is to be taken during topsoil stripping to avoid structural degradation of soils – taking particular care to avoid excessive compaction (i.e. avoiding re-handling and limit stripping activities in wet conditions);
- Potential generation of dust will be considered in planning of topsoil stripping, with weather conditions, water truck availability, potential downtime and alternate standby tasks being key planning considerations;
- Preferably, soils should be stripped in a slightly moist condition and should not be stripped in either a dry or wet condition, thus reducing deterioration in topsoil quality and dust generation;

- Grading or pushing topsoil into windrows with graders or dozers for later collection for loading into rear dump trucks by front-end loaders, is the preferred soil stripping method, as it minimises compression effects of the heavy equipment generally used transport of soil material; and
- Work must be stopped if any aboriginal heritage artefacts, or other items of archaeological interest are uncovered during stripping activities. Any such items will be inspected and cleared by a member of the Environment & Community Department before stripping activities continue.

Topsoil Stockpile Management

Where direct placement of topsoil is not possible, the period of stockpiling should be minimised to reduce the detrimental effects of storage on topsoil quality, especially topsoil structure, aeration and permeability, native seed bank viability, and biological activity levels in material stockpiled greater than one metre deep. Where topsoil is likely to exceed three months, the following measures should be followed.

Location of Topsoil Stockpiles

- Topsoil stockpiles should not be located in the path of planned, or potential, projects or operations. A long-term perspective should be adopted during this planning (preferably life-of-mine) and organisation-wide consultation should be undertaken during this process. Rehandling of topsoil is expensive and detrimental to topsoil quality.
- The planned final rehabilitation location for the topsoil should be considered when locating the stockpile (i.e. where it is to be used for rehabilitation). Haulage requirements (distance and volume) to get it to the stockpile location and how it will be recovered from that stockpiled location and transported to that final destination should also be considered.
- Stockpiles should:
    - Not be placed on excessively steep landform, that will increase erosion and potentially hamper recovery;
    - Not be placed adjacent to, or amongst, existing woodland vegetation, that will potentially cause topsoil loss or damage to remnant vegetation;
    - Be located away edges of dumps, ramps, dams, drains and pits, where future recovery may be constrained, increasing cost or planning complexity;
    - Be shaped to reduce their susceptibility to wind erosion, especially if placed on top of overburden dumps;
    - Not be located in, across or adjacent to watercourses or drainage lines with potential to flow; and
    - Not be located on flat and/or low-lying areas susceptible to flooding.

Stockpile Construction

- If soil is to be stored in stockpile for more than three months, the proposed stockpile pad should be cleared of large surface rocks, vegetation and isolated from local drainage;
- Materials of different quality, source location or vegetation type should not be stockpiled together (i.e. subsoil with topsoil, exotic pasture with native woodland), and should be clearly distinguished if co-located in same vicinity.
- Preferably, topsoil stockpiles shall be no greater than three metres in height;
- Topsoil will be block tipped. Under no circumstances will topsoil be tipped over a tip head or a second lift of block tip be used;
- Stockpiles should be trimmed and graded to ensure they shed water, to avoid pooling or waterlogging;
- Stockpile surfaces should be left coarsely textured to minimise erosion until vegetation is established, and avoid surface compaction and surface sealing;

- The working face of the stockpile should be battered down to approximately 30^{o};
- Every effort will be made to avoid equipment trafficking over topsoil. Stockpiles should be isolated from adjacent operations and accidental vehicle access (by berm, ditch, substantial fence, bollards, old electricity poles, etc.), and clearly identified by a sign to reduce the likelihood of interference;
- Following construction, stockpiles will be surveyed and recorded on mine plans. This information will be recorded on the topsoil stockpile register, along with other relevant data pertaining to each stockpile.

Guidance on Temporary Rehabilitation

- If long-term stockpiling is planned (i.e. greater than three months), stockpiles should be ripped, fertilized and sown with pasture cover (**Table 18**) to provide sufficient erosion control, weed suppression and promote biological activity in the stockpiled soil; and
- Sterile cover crop species should be selected in consideration of secondary pasture/woodland species.

Maintenance of Existing Stockpiles

- Vegetation establishment should be regularly monitored for the first three months (or until a cover crop has successfully established), with remedial works undertaken immediately, as required, until vegetation establishment;
- On an annual basis, the stockpiles will be inspected for erosion, vegetation cover health, weed infestation and other general degradation or interference;
- Maintenance and remedial works will be scheduled, as needed. Such maintenance or remedial works may include:
    - Repair of erosion (i.e. re-grading of eroded areas), diversion of drainage paths and de-silting of sediment control structures;
    - Slashing, re-seeding or supplementary planting;
    - Application of fertiliser to address nutrient deficiency;
    - Application of ameliorants;
    - Replacing signage and access barriers; and
    - Weed and pest animal control measures.
- If stockpiles are borrowed from, but not completely removed, the excavated face will need to be re-shaped to ensure water shedding and stockpile stability, and re-sewn with a protective cover crop. Those stockpiles will also need to be ear-marked for re-survey as part of the annual topsoil survey; and
- For long-term stockpiles, a weed control and maintenance fertilising is required as part of the stockpile management program.

Stockpile Management

- All records pertaining to the assessment, inspection, management and maintenance of stockpiles will be recorded on the topsoil stockpile register;
- At the beginning of each planning/reporting year, topsoil requirements should be estimated for rehabilitation programs in the upcoming year, and adequate stockpiled topsoil allocated to meet that requirement;
- Considerations for selection of appropriate material include proximity of stockpiles to rehabilitation area, age and quality of topsoil, topsoil source vegetation type compared to selected rehabilitation outcomes, and direct placement opportunities;
- If the stockpiled topsoil is old (greater than five years) an assessment of topsoil quality should be undertaken. Such an assessment should include visual inspection, soil sampling and analytical testing to determine whether the material is still usable, or whether application of supplements and/ or ameliorants may be required; and

- Sufficient evidence of a stockpile's complete loss of inherent value would need to be recorded, and approved by the Environment and Community Manager, before a stockpile was entirely written off and spoiled or abandoned.

Topsoil Placement and Treatment

- Prior to recovery and re-spreading of stockpiled topsoil, an assessment of weed infestation on stockpiles should be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading;
- A pre-rehabilitation topsoil stockpile inspection and testing program to characterise stockpiled material, identify suitability for the proposed rehabilitation and identify any requirement for soil ameliorants;
- Topsoil should be spread to the depth nominated;
- Preferably, topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion;
- All topsoiled areas should be contour ripped (after topsoil spreading) to create a "key" between the soil and the spoil. Ripping should be undertaken on the contour. Best results will be obtained by ripping when soil is moist and when undertaken immediately prior to sowing; and
- The respread topsoil surface should be scarified prior to, or during seeding, to reduce runoff and increase infiltration. This can be undertaken by contour tilling with a fine-tyned plough or disc harrow for example.

Ameliorant Application

- If the pre-rehabilitation assessment determines the stockpiled material is sodic, gypsum should be applied at a standard rate of 5 - 10 t/ha, depending on material sodicity.
- Preferably gypsum should be mixed in with the topsoil as part of the stripping operation (ameliorants applied to topsoil surface prior to stripping), irrespective of whether the topsoil is to be placed in storage or directly applied to a rehabilitation area.
- Application of ameliorants as part of the topsoil stripping process is cost effective, and – in the case of gypsum in particular - gives the ameliorants additional time to react and modify the soil to ensure it is a stable growing medium.
- Although low pH soil has not historically been a concern, a lime requirement test should be undertaken to determine the lime application rate, if low pH material is identified during the pre-rehabilitation assessment.
- Addition of organic supplements is recommended for high and low pH, sodic (dispersive) and low fertility soils. Such supplements can also assist in returning favourable soil microorganisms to sterile long-stockpiled material; and
- Organic material application will also be considered, if sub-optimal (sterile, low fertility, poorly structured) material is identified in stockpiles.

3.3.7 Biodiversity

The management of flora and fauna, including the implementation of a vegetation clearance protocol, threatened species management protocol, remnant woodland enhancement programme and flora and fauna monitoring programme is described in the BMP (**Appendix 5**).

A flora survey and assessment was conducted by Orchid Research in spring and summer 2002 for the Project EIS. Areas of remnant vegetation were systematically surveyed using quadrats and spot sampling sites to compile a comprehensive species list and to detect threatened species which may have been present. The BMP provides a summary of the 16 vegetation communities recognised in the study area.

No threatened flora species or endangered[36] populations listed in the schedules of the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act*, *1999* (EPBC Act) at WCPL by Orchid Research in 2003. Two Endangered Ecological Communities have been identified, namely, the Warkworth Sands Woodland Endangered Ecological Community (listed in the TSC Act) and the White Box, Yellow Box, Blakely's Red Gum Woodland/Grassy White Box Woodlands Endangered Ecological Community (listed in both the TSC Act and EPBC Act).

Avifauna, mammals, reptiles and amphibians were surveyed in September and October 2002 as part of the Project EIS terrestrial fauna assessment. Bat fauna were surveyed separately in September 2002. A number of reference sources containing the results of regional fauna surveys and database records (e.g. NPWS Atlas of NSW Wildlife, Birds Australia, Australian Museum and Hunter Bird Observers Club) were also reviewed and, where appropriate, included in these assessments. The fauna surveys recorded a relatively large number of woodland birds and birds associated with waterbodies. Threatened fauna species recorded in the vicinity of WCPL are summarised in the FFMP and include eight birds and five mammals.

Aquatic macroinvertebrate, fish and water quality sampling was conducted for the Project EIS. North Wambo, Wambo and Stony Creeks are intermittent streams which cease to flow in extended dry periods. These creeks have been highly disturbed by historic and present day grazing activities. In some locations on Wambo and Stony Creeks, earthworks have been conducted to re-contour the stream channel and banks to remediate subsidence effects from past underground mining activities.

North Wambo and Wambo Creeks are considered to represent minimal fish habitat. Two native and one introduced fish species were recorded from North Wambo Creek, and three native and one introduced species recorded from Wambo Creek. A summary of specific flora and fauna management measures undertaken by WCPL, as outlined in the existing BMP, for the management of flora and fauna are provided below.

3.3.7.1 Vegetation Clearance Protocol

A Vegetation Clearance Protocol (VCP) has been developed to minimise impacts on both non-threatened and threatened flora and fauna (as listed under the TSC Act or the EPBC Act). The VCP is applicable across all WCPL managed land. The key components of the VCP are:

- Pre-clearance surveys;
- Fauna management strategies;
- Seed Collection;
- Vegetation Clearance; and
- Salvage and re-use of materials.

Procedures in relation to the salvage of Aboriginal sites prior to vegetation clearance are detailed in the Wambo Development Project – Aboriginal Heritage Research Design and Study Plan (incorporating Salvage Programme) (Navin Officer Heritage Consultants, 2005). An updated VCP, which meets the requirements of DA305-7-2003 and DA177-8-2004, is included as Appendix J of the BMP.

3.3.7.2 Threatened Species Management Protocol (TSMP)

A Threatened Species Management Protocol (TSMP) has been developed to facilitate implementation of threatened species management strategies to minimise the potential impacts on threatened flora and fauna species. The key components of the TSMP are:

[36] In 2003, the flora and fauna assessment for the expansion of Wambo mine identified the vegetation community adjacent to North Wambo Creek as *Acacia anuera*. During 2004, an inspection of the vegetation community above LW4 was undertaken by and Acacia expert who concluded that this stand was most likely *A. pendula*. WCPL have developed and implemented the *A. pendula Management Plan for* LW4.

- Site observations/surveys;
- Threatened species management strategies;
- RWEAs restrictions;
- Threat abatement;
- Capture and release;
- Relocation; and
- Provision of habitat resources.

An updated TSMP, which meets the requirements of DA305-7-2003 and DA177-8-2004, is included as Appendix K of the BMP.

3.3.7.3 Seed Collection

Seed collection will be on-going over the life of the mine the timing of which will be determined by WCPL's Environmental Department. Seed collection will be sourced from onsite ecological communities identified across WCPL mine and Remnant Woodland Enhancement Areas. Where seed is required and not available from onsite sources in adequate volumes supplies may be supplemented from external providers.

3.3.7.4 Revegetation Strategy

The revegetation program will establish significant areas (some 1,570 ha) and a net increase in woodland vegetation over the long-term (WCPL, 2003). The objectives of the revegetation program are to increase the amount of native vegetation, particularly in those landscapes that have been extensively cleared. The rehabilitation program will aim to increase the continuity of vegetation in the region through the establishment of woodland corridors. Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park (**Figure 8**). The revegetation strategy includes the revegetation of disturbance areas with areas of woodland (corridors), areas which contain a mixture of woodland and pasture, and riparian vegetation, as described further below.

Native Woodland Corridors

The revegetation program will aim to re-establish as much of the floristic diversity as possible within the native woodland areas. Revegetation of native woodland areas will include the:

- Use of endemic plant species which are characteristic of the vegetation communities to be disturbed within the open cut operations area;
- Establishment of upper, mid and lower storey native vegetation; and
- Use of regionally significant flora species where practicable and appropriate.

A provisional list of species for use in the revegetation program for native woodland corridor areas is provided in **Table 17**. Plant species selection will be subject to prior rehabilitation experience/performance, the outcome of revegetation trials, consultation with regulatory authorities and stakeholders and availability.

Mixed Native Woodland/Pasture Areas

The areas proposed to contain a mixture of native woodland and pasture will be rehabilitated in a manner that results in strips or zones of native woodland which are connected to the native woodland corridors, as opposed to scattered patches of native woodland within the pasture areas. The strips or zones of native woodland will be revegetated in a similar manner and with similar species to that described for the native woodland corridors. The areas proposed to be revegetated with pasture will be revegetated using native grass and non-native species, and select exotic grass species suitable as an initial cover crop. A provisional list of native and non-native grasses that may be used in the revegetation of pasture areas is provided in **Table 18**. Species selection will be subject to prior rehabilitation experience/performance, the outcome of revegetation trials, consultation with regulatory authorities and stakeholders and availability.

Riparian Zone

The revegetation strategy for Wambo includes the planting of the banks of the NWCD (**Figure 2**) with such species as River Oak (*Casuarina cunninghamiana*) and Rough-barked Apple (*Angophora floribunda*) for example. A comprehensive species list is being developed by WCPL and external consultants to identify appropriate species diversity for the NWCD. A net increase in the quantity of riparian vegetation along NWCD is proposed. A selection of native and non-native grasses (such as those listed in **Table 18**) may also be used in the revegetation of the North Wambo Creek riparian zone. Other riparian zones (Stony Creek, Wollombi Brook, Wambo (South) Creek within Wambo Coal lands are also targeted for riparian revegetation and weed control throughout the life of mine.

Table 17 Provisional Species Lists for Woodland Corridors

Scientific Name	Common Name
Trees*	
Allocasuarina luehmanii	Bulloak
Allocasuarina verticillata	Drooping Sheoak
Angophora floribunda^	Rough-barked Apple
Brachychiton populneum	Kurrajong
Casuarina glauca	Swamp Oak
Corymbia maculata	Spotted Gum
Eualyptus albens	White Box
Eualyptus crebra	Narrow-leaved Ironbark
Eucalyptus dawsonii	Slaty Gum
Eucalyptus fibrosa	Red Ironbark
Eucalyptus moluccana	Grey Box
Eucalyptus punctata	Grey Gum
Eucalyptus teretitornis^	Forest Red Gum
Melaleuca decora	A Honeymyrtle
Notelaea microcarpa	Native Olive
Geijera salicifolia	Brush Wilga
Shrubs*	
Acacia filicifolia^	Fern-leaf Wattle
Acacia implexa^	Hickory Wattle
Acacia amblygona	Fan Wattle
Acacia falcate	Sickle Wattle
Acacia decora	Western Silver Wattle
Acacia decurrens	Green Wattle
Acacia parvifolia^	-
Grevillea montana	A Grevillea
Hibbertia linearis	-
Cassinia quinquefaria	A Cough Bush
Grasses and Herbs*	
Dianella revoluta	Blue Flax Lily
Lomandra multiflora	Many-flowered Matrush
Chloris venticosa	Tall Windmill Grass
Laxmannia gracilis	Wire Lily
Gahnia aspera	Rough Saw-sedge
Aristida vagans	Threeawn Speargrass
Austrodanthonia sp.	A Wallaby Grass
Austrostipa scabra ssp. *falcata*	Speargrass
Cymbopogon refractus	Barbwire Grass

Note: ^ Species identified for the Montrose Tree Screening project. * *Sowing rates for tree and shrub species, pasture species will be in consultation with WCPL rehabilitation specialist.*

Table 18 Provisional Species Lists for Pasture

Scientific Name	Common Name
Native Species List*	
Austrodanthonia	Bunderra Wallaby Grass
Austrodanthonia caespitosa	Ringed Wallaby Grass
Austrodanthonia richardsonii cv. Hume	Hume Wallaby Grass
Austrodanthonia richardsonii cv. Taranna	Taranna Wallaby Grass
Austrodanthonia setacea	Smallflower Wallaby Grass
Austrostipa aristiglumis or *Austrostipa bigeniculata*	Plains Grass
Austrostipa scabra	Speargrass
Austrostipa verticillata	Slender Bamboo Grass
Dichelachne micrantha	Shorthair Plumegrass
Elymus scaber	Common Wheatgrass
Lachnagrostis filiformis	Blown Grass
Aristida ramosa	Wiregrass
Bothriochloa macra/decipiens	Redgrass/Pitted Bluegrass
Chloris truncata	Windmill Grass
Chloris ventricosa	Tall Windmill Grass
Cymbopogon refractus	Barbed Wire Grass
Dichanthium sericeum	Queensland Bluegrass
Digitaria brownii	Cotton Panic Grass
Digitaria divaricatissima	Umbrella Grass
Eriochloa pseudoacrotricha	Early Spring Grass
Panicum decompositum	Native Millet
Panicum effusum	Hairy Panic

Cover Crop and Pasture Species List		
	Rate (kg/ha) Autumn Sowing	**Rate (kg/ha) Spring Sowing**
Couch (Hulled/Unhulled)	3	3
Wimmera Rye Grass	5	5
Green Panic	4	4
Perennial Rye Grass	6	6
Sub Clover	2	2
Seaton Park Clover	3	3
Vetch (Namoi Wolley Pod)	5	5
Fescue (Dovey, Demter)	5	5
Sephi Medic	2	2
Cavaliar Medic	2	2
Japanese Millet		10 - 15
Kikuyu (Whittet)	2	2
Setaria (Spleda/Narok)	2	2
Lucerne	6	6
Oats	15 - 20	

Notes:. *Shaded Cells: A light cover crop at 2-5kg/ha for assisting initial soil stabilisation when direct seeding with woodland corridor species.* *****Sowing rates for native pasture species will be subject to availability and in consultation with WCPL rehabilitation specialist.

3.3.7.5 Revegetation Establishment & Timings

Vegetation may be established by the following methods:

- Sowing or direct seeding;
- Propagules (seeds, lignotubers, corms, bulbs, rhizomes and roots) stored in the topsoil;

- Spreading harvested plants with bradysporous seed (seed retained on the plant in persistent woody capsules) onto areas being rehabilitated;
- Planting nursery-raised seedlings (tubestock); and
- The most common method of vegetation establishment is broadcast seeding of selected pasture or tree seed mixes.

Seed sowing is usually supplemented by the concurrent application of granulated fertiliser. Sowing is undertaken shortly after topsoil spreading to avoid loss of topsoil due to wind and rain action. Tubestock is generally only used to establish vegetation where rapid growth or specific species establishment is required, such as remedial revegetation, erosion control or visual bunding.

Fertiliser application is beneficial to vegetation establishment to replenish any nutrient deficiencies. The type of fertiliser and application rate varies according to the specific site, soil type and post-mining use of the area. When applying any additional chemical or products to the soil, the effects of runoff and leaching will be considered, as rapid leaching from organic wastes are known to provide ideal conditions for algal blooms and exacerbate weed growth and infestation.

Timing for initial vegetation establishment is an important factor for successful revegetation. Where possible, sowing and planting are planned to occur as soon as possible prior to the expected onset of reliable rains or after a break of the season (i.e.Autumn and Spring).

Following the changes in topography, drainage and soil conditions that results from open cut mining, some local provenance species may not be suitable for revegetation and seed sourced from outside the immediate district may be required. The most appropriate species to use to rehabilitate the area are those most suited to the soil types, drainage status, aspect and climate of the site. The biodiversity values of the surrounding native vegetation communities are considered during rehabilitation planning.

Distribution of vegetation type and species selection will be designed to enhance these values, whilst ensuring that weed and fire hazards are not increased for surrounding local agricultural areas. In recognition of the importance of vegetation corridors to regional biodiversity, rehabilitation initiatives aim to increase the connectivity of vegetation in the region through the establishment of woodland corridors. Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park. In doing so, WCPL will in some ways, assist in addressing the issue of discontinuity in remnant vegetation across the Hunter Valley floor.

3.3.7.6 Roosting & Nesting Resources

Where practicable, habitat features (e.g. large hollows) would be salvaged during vegetation clearance activities and utilised in the rehabilitation areas, regeneration areas and RWEP. In addition, artificial roosting/nesting boxes for fauna, particularly threatened fauna, may be used in the rehabilitation areas, regeneration areas and RWEP to provide additional habitat resources.

3.3.7.7 Weed and Feral Animal Control

WCPL's weed management program will involve six monthly inspections of the RWEAs and Mine Revegetation Areas. In addition to this, an annual routine weed management program will be implemented whereby herbaceous weed species are treated to prevent further spread. Treatment of all weeds will be undertaken by suitably qualified and experienced personnel.

A variety of vertebrate pest species have been identified within WCPLs RWEA and rehabilitation areas. These have primarily consisted of feral pigs, rabbits, foxes and dogs. The WCPL operated pest control program (as detailed in Section 6.1.1.3.1 of the BMP) is complemented by a year round WCPL agister-managed pest control program. The agister-managed program primarily targets feral pigs on grazing and buffer lands surrounding WCPLs open cut mine site. The agister-managed program utilises WCPL-owned night vision cameras to monitor the movement of pet species. Humane trapping and shooting practices are employed to capture and euthanize targeted feral species.

3.3.7.8 Rehabilitation Monitoring Programme

- Rehabilitation performance will be monitored to ensure vegetation is establishing and to determine the need for any maintenance and/or contingency measures.
- A series of monitoring locations have been set up in the RWEP and rehabilitation areas to monitor regeneration of vegetation.
- Reference sites in the undisturbed woodland and grazing lands have also been established to develop suitable completion criteria against which rehabilitation/regeneration performance can be assessed.
- Sites will be monitored annually to record changes in vegetation progress and determine performance against reference sites and criteria (**Section 8**);
- Rehabilitated spoil areas will be monitored for spoil pH, Electrical Conductivity (EC), major cations and organic matter.
- Terrestrial fauna surveys are conducted to sample fauna species diversity and abundance in the rehabilitation areas, RWEP and regeneration areas. Systematic survey sites have been established to monitor amphibians, reptiles, birds and mammals.

3.4 OTHER ENVIRONMENTAL AND REHABILITATION RISKS

3.4.1 Overburden Characterisations

Overburden and interburden materials would typically comprise sandstone and claystones respectively. The overburden and interburden materials are expected to be non-saline and non-acid forming.

Overburden characterisation, for example pH and EC monitoring, of the final landform prior to the application of topsoil, will assist determine appropriate ameliorates in rehabilitation where necessary (e.g. the use of lime, gypsum and/or fertiliser to improve the chemical and/or nutrient properties of the soil), prior to the application of topsoil.

As previously mentioned in **Section 3.3.1**, rehabilitated areas will be monitored for pH, electrical conductivity (EC), major cations and organic matter to understand the soil ability to support vegetation goals and post mine land use. Additional testing may be undertaken annually at the recommendation of the Mine's rehabilitation specialist for some areas. For further details regarding soil monitoring refer to **Section 8.2.2**.

The data will be used to identify potential deficiencies over time and assist with the development of maintenance programs if under-performing areas are identified during visual and other monitoring. This will also assist with determining/demonstrating whether the waste rock is suitable as a long-term substrate for sustainable rehabilitation.

3.4.2 Slopes and Slope Management

Rehabilitated slopes of the final landforms are to be constructed to no greater than 1:6 (10 degrees or 17%). Graded banks will be constructed across the slope of rehabilitated areas to collect and direct water flowing from newly rehabilitated areas into rock waterways. For more information regarding water management on rehabilitated areas refer to **Section 3.3.5**.

3.4.3 Air Quality

WCPL currently implements general dust mitigation measures (e.g. haul road watering) as part of operations to minimise potential dust emissions as described in the Air Quality and Greenhouse Gas Management Plan[37] (AQGGMP) for the operations.

The AQGGMP summarises relevant air quality criteria, identifies potential sources of dust, provides the air quality monitoring station locations and presents the protocols for air quality monitoring. The

[37] Condition 5C, Schedule 4 of DA305-7-2003

location of the air monitoring sites are provided in **Appendix 4**. The AQGGMP also outlines proactive and reactive air quality management and mitigation measures and provides reporting procedures including complaints handling procedures and independent review.

Dust generation from mining activities has been identified as one of the main potential impacts during the term of this MOP. The Mine will continue watering of haul roads[38] to reduce emissions of particulate matter during the MOP term. Other best practice measures are described below:

- The results of dust suppressant trials at other Peabody-owned operations will be used to determine the need (or otherwise) for additional investigations at the Mine;
- The air quality monitoring network has been installed and will continue to be used to monitor air quality during the term of this MOP;
- A rehabilitation programme to revegetate previously disturbed areas as soon as practicable. This seeks to minimise the amount of disturbed land susceptible to dust generation potential;
- Implementation of a real-time air quality management system to assist in the pre-emptive management actions and to avoid potential non-compliances. This involves monitoring of instantaneous (i.e. 5 minute) and 24-hour average PM_{10} concentrations and the implementation of a response protocol in the event that internal performance indicators are exceeded. The response protocol includes the modification or cessation of dust generating activities (i.e. excavation of material) as required.

3.4.4 Water Management

The site water management strategy is based on the containment and re-use of mine water as well as the control of sediment laden water that may be potentially carried with runoff from disturbed areas such as waste rock emplacement areas.

The water management system controls waters generated from development and operational areas while diverting upstream water around such areas. It includes both permanent structures that will continue to operate post-closure and temporary structures that will only be required until the completion of rehabilitation works. The water management system includes:

- Up-catchment diversion structures;
- Water storage dams;
- Sediment dams;
- Water transfer infrastructure (i.e. pumps and pipelines); and
- The North Wambo Creek Diversion.

The site water management system operates predominately as a closed self-contained system. The water balance of the system fluctuates with climatic conditions and as the extent of the mining operations evolves over time.

A section of the North Wambo Creek has been diverted to avoid the Open Cut Mine. The North Wambo Creek Diversion (NWCD) was constructed in accordance with the approved North Wambo Creek Diversion Plan (WCPL, 2013).

Water is predominantly required for operation of the CHPP, wash down of mobile plant, dust suppression on haul roads and hardstand areas and for dust emission control sprays in the ROM and product coal stockpile areas. Water is also used in underground mines to control dust emission in active mine areas. Some water is also used for watering vegetation establishment areas, fire fighting and other non-potable uses.

A Surface Water Monitoring Program (SWMP) has been prepared to satisfy DA 305-7-2003 to monitor the quality of water in adjacent natural waterways and mine water with the operations. The

[38] *Wambo Coal Mine Pollution Reduction Program – Assessment and Best Practice Report*

surface water monitoring sites are displayed in **Appendix 4**. The SWMP will be reviewed and updated where necessary during the MOP term.

3.4.5 Groundwater

A Groundwater Monitoring Programme[39] (GWMP) has been prepared to satisfy DA305-7-2003, a component of the Water Management Plan (WMP). The groundwater monitoring sites are displayed in **Appendix 4**. The groundwater monitoring program involves the monitoring of water levels and water quality from the water supply bores and groundwater seepage and surface water runoff which collect in pit sumps during mining operations. The groundwater monitoring program also involves the monitoring of groundwater levels in alluvium and selected bores. The GWMP will be reviewed and updated where necessary during the MOP term.

The Surface and Groundwater Response Plan (SGWRP) outlines the triggers used to determine if an investigation is required (i.e. implementation of the ground water investigation and contingency protocol) in the event of a groundwater performance criteria exceedence. The SGWRP relevant to groundwater includes:

- Groundwater investigation triggers, including a process to deal with a groundwater-related complaint;
- Groundwater impact investigation protocol; and
- Response plan, in the event that an investigation conclusively attributes the Mine to an adverse impact to an existing groundwater supply user.

3.4.6 Hazardous Materials Storage

Hydrocarbon Storages

Hydrocarbons used on-site include fuels (i.e. diesel and petrol), oils, greases, degreaser and kerosene. Hydrocarbon storage facilities are constructed and operated in accordance with *Australian Standard (AS) 1940:2004 The Storage and Handling of Flammable and Combustible Liquids* and the *NSW Work Health and Safety Regulation, 2011*.

The workshop infrastructure includes waste oil extraction equipment. An oil/water separator is located downslope of the workshop area, located at the vehicle washdown bay area. All waste hydrocarbons collected in the separators are disposed of by a licensed contractor.

Explosives Storage

Explosives required for the Mine include initiating products and detonators, ammonium nitrate fuel oil and emulsion explosives. The explosives storage and blast reload facilities are currently located in the Rug Dump. Explosives on-site are stored and used in accordance with *AS 2187.2:2006 Explosives – Storage, Transport and Use – Use of Explosives. AS 2187.2:2006* details the requirements for the safe storage, handling and land transport of explosives, safe storage distances from other activities and bunding requirements.

3.4.7 Greenhouse Gases

Management of greenhouse gases are described in the AQGGMP[40]. As provided by the National Greenhouse Accounts Factors (NGA Factors) (Commonwealth Department of Climate Change and Energy Efficiency, 2012), direct greenhouse emissions are referred to as Scope 1 emissions, and indirect emissions are referred to as Scope 2 and Scope 3 emissions. The major sources of greenhouse gas emissions at the Mine include:

- Combustion of diesel during mining operations (Scopes 1 and 3);

[39] Condition 33 of Schedule 3 of the Project Approval
[40] Condition 5C, Schedule 4 of the DA305-7-2003

- Use of explosives (Scope 1);
- Fugitive emissions of methane (Scope 1);
- Use of petroleum based greases and oils (Scopes 1 and 3);
- Off-site generation of electricity that is consumed at the Mine (Scopes 2 and 3); and
- Transport of product coal and combustion of product coal by third parties (Scope 3).

Greenhouse gas emissions from the Mine would continue to be monitored and reported annually in accordance with Peabody Energy's obligations under the Commonwealth Government National Greenhouse and Energy Reporting System. Peabody Energy and WCPL will also comply with obligations under the Commonwealth *Clean Energy Act, 2011*.

3.4.8 Acid Mine Drainage

As described in **Section 3.3.3**, coarse reject material produced from the CHPP is expected to contain some sulphur and is likely to have some capacity for acid generation, whilst tailings from the CHPP would be expected to be potential acid forming (low capacity).

The pH of overburden material and interburden materials range from pH 6.8 to pH 9.6. This is typical of unweathered rocks in the Singleton Coal Measures (EIS 2003). There are no known Acid Mine Drainage (AMD) issues at WCPL, however the implementation of management strategies in regards to material with the capacity for acid generation are described in **Section 3.3.3**.

3.4.9 Blasting

WCPL have prepared a Blast Management Plan[41] (BMgtP) which describes the blast management and mitigation measures for the Mine. Open cut blasting is undertaken to comply with Section L5 of EPL 529 and *AS 2187.2-2006*. The BMgtP provides details on best practice control measures, blasting criteria, adverse meteorological conditions, fume and dust management, management of heritage sites, cumulative impacts, monitoring and reporting.

The results of the blast monitoring program are assessed against the airblast overpressure and ground vibration criteria identified in **Table 19** and reported annually in the AR, EPL Annual Return and updated regularly on the Peabody Energy website. The BMgtP will be reviewed and updated where necessary during the MOP term.

The objective of the monitoring is to obtain assurance that amenity overpressure and vibration limits are being achieved at privately-owned residences, safety of mine employees.

The approved blasting hours are between 9.00 am and 5.00 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

Condition 11 and Condition 12 of Schedule 4 of DA305-7-2003 stipulates the blast impact assessment criteria as displayed in **Table 19**.

Table 19 Blasting Impact Criteria

Location	*Airblast overpressure (dB(Lin Peak))*[1]	*Ground vibration (mm/s)*[2]	*Allowable exceedance*
Residence on privately owned land *(with the exception of property 13C)*	115	5	5% of the total number of blasts over a period of 12 months
	120	10	0%

Notes: [1] dB(Lin Peak) = decibel linear in peak. [2] mm/s = millimetres per second.

[41] Condition 20, Schedule 4 of DA305-7-2003

WCPL operate a Blasting Hotline and an SMS message service[42] to enable the public to get up-to-date information on blasting operations at the Mine. The Environmental and Community Manager (or delegate) updates the Blasting Hotline 24hrs (**ph. 02 8250 5205**) prior to the schedule blast event.

Advertisement of both the Community Enquires Line and Blasting Information Line contact details are provided local newspapers.

3.4.10 Noise

WCPL have prepared a Noise Management Plan[43] (NMP), describing the noise monitoring programme comprising both attended and real-time monitoring. Integrated protocols for both monitoring methodologies are outlined in the NMP.

Attended monitoring will be used for demonstrating compliance with noise criteria, whilst real-time monitoring will be used as a management tool for taking pre-emptive management actions to avoid potential non-compliances. Potential sources of noise at the Mine during operations include:

- Open cut mining activities involving the operation of trucks, dozers, excavators, the drill and ancillary equipment in the open cut pits;
- Coal handling and preparation, including conveyors, crushers, loading into bins, the Coal Handling and Preparation Plant (CHPP) and other material handling infrastructure and associated mobile equipment;
- Haul trucks running from the active pits to the ROM stockpile area; and
- Loading of product coal at the rail load out bin.

The NMP contains protocols for responding to noise related complaints (**Section 3.2**) and is subject to continual review and reporting through the AR process. The NMP will be reviewed and updated where necessary during the MOP term. Real-time monitors are located adjacent to the mine at points indicative of local rural residential areas (**Appendix 4**).

The real-time system records 15 minute statistical noise data, continuous audio files and meteorological data. The continuous audio recording can also be downloaded, so that a listener can consider whether the noise being recorded is mine-related.

3.4.11 Visual and Lighting

The design and construction of surface infrastructure was undertaken in a manner that minimises visual contrasts where such infrastructure is potentially visible from private residences or public vantage points. Progressive revegetation onto rehabilitated landforms will further minimise the visual impact of the Mine and will be completed soon after landform shaping. Night-lighting effects will be minimised through the implementation of management measures and control structures designed to minimise light spillage.

3.4.12 Aboriginal and European Heritage

A Heritage Management Plan (HMP) for Longwalls 7 to 10a and Longwalls 11 to 16 outlines the management of potential environmental consequences of the proposed secondary workings described in the Extraction Plan on heritage sites or values. The HMP has been prepared in accordance with Condition 22C(h) of Schedule 4 of the Development Consent (DA 305-7-2003). The HMP describes the management and mitigation measures for both the Wambo Homestead Complex and Aboriginal Heritage sites.

[42] WCPL provide a blast SMS notification service to members of the community who have registered for the service. The SMS message with blasting details is sent out the day before the scheduled blast event.
[43] Condition 9, Schedule 4 of DA305-7-2003

The *NSW National Parks and Wildlife Act*, 1974 (NPW Act) provides the primary basis for the legal protection and management of Aboriginal heritage in NSW. Implementation of the Aboriginal heritage provisions of the NPW Act is the responsibility of the NSW Office of Environment and Heritage (OEH).

The aim of the NPW Act is to prevent unnecessary or unwarranted destruction of Aboriginal objects and to protect and conserve objects where such action is considered warranted. Under section 86(4) of the NPW Act it is an offence for a person to harm or desecrate an Aboriginal place. Consents regarding impacts to Aboriginal objects are authorised by OEH under section 90 of the NPW Act and clauses 80D and 80E of the *National Parks and Wildlife Regulation*, 2009.

AHIP #2222 was issued to WCPL on the 20 June 2005 under sections 87 and 90 of the NPW Act. The AHIP allowed for the disturbance and/or salvage of all known and unknown Aboriginal objects. AHIP #2222 is scheduled to expire on 1 March 2025 ~~19 June 2015~~. AHIP #C0001474 was approved for the development of the South Bates Underground Mine on 19 November 2015 and is valid until 2025. WCPL obtained a Care and Control Permit (#3130) for the temporary storage of salvaged artefacts until they can be replaced on the post mining rehabilitated landscape.

3.4.14 Bushfire

A Bushfire Management Plan (BFMP) has been prepared to satisfy with the requirements of DA 305-7-2003. The BFMP has been prepared to the satisfaction of the SSC and the NSW Rural Fire Service (RFS). The BFMP identifies bushfire management issues relevant to the local environment, analyses bushfire risk, discusses objectives and activities and outlines standard procedures to be followed in the event of a bushfire. The BFMP is revised as necessary to include activities such as the development of fire breaks in strategic locations around the Mine. Any revision of the BFMP is undertaken in consultation with SSC and the RFS.

3.4.15 Exploration

As previously discussed in **Section 2.3.1**, the exploration drilling program will continue during the MOP term to update gas and coal quality data for WCPL. In general, all land preparation required will be in accordance with the (**Section 3.2.1**) and associated SDP. Mitigation measures relevant to exploration and land clearing activities at WCPL include the following:

- Drilling sites and access will be located to avoid areas of remnant vegetation, other sensitive areas and minimise the requirement for vegetation clearance;
- A vegetation clearance protocol and a SDP have been developed. The SDP requires the approval of the Environmental Manager (or delegate) prior to any land clearing activities taking place. The vegetation clearance protocol and SDP aims to minimise environmental impacts, including minimising the area required for disturbance for drill sites and access tracks, identify environmental issues such as Aboriginal and European heritage sites, identify sensitive flora and fauna communities, outline erosion and sediment control measures, provide topsoil management and limiting soil disturbance measures, avoiding threatened species, and the identification of any seed or timber resources that can be salvaged. In accordance with SDP process, follow up inspections are completed by WCPL's Environmental Department to ensure the SDP is carried out and each drill site is rehabilitated to the appropriate standard. Please refer to **Appendix 6** for a copy of a SDP.
- Additionally, an Exploration Drilling Permit (EDP) has been developed that details the requirements and controls to be in place before the commencement of exploration activities. The EDP must be completed and signed off by the relevant departmental manager for all exploration activities.

3.4.16 Construction

A number of infrastructure projects are planned to within the MOP term (**Section 2.3**). The existing infrastructure is largely located within the present approved open cut disturbance area. All ROM coal

handling and haulage to the CHPP will remain within the confines of the existing approved open cut mining disturbance area. Notwithstanding, some minor construction activities may be required outside of the existing open cut disturbance area within WCPL's land and will including clean water diversion drains, light vehicle access tracks and environmental monitoring sites e.g. groundwater monitoring piezometers. Mitigation measures relevant to construction activities outside approved open cut disturbance area will include the following:

- Infrastructure will be located to avoid areas of remnant vegetation, RWEPs and regeneration areas. Vegetation clearance will be kept to a minimum where practicable and in accordance with Project Approval conditions;
- Implementing vegetation clearance protocol and SDP procedure;
- Topsoil resources will be identified, stripped and stockpiled for later use in rehabilitation in accordance with **Section 3.3.6**; and
- Where vegetation clearance is undertaken, timber will be cleared, mulched, salvaged and windrowed. Windrowed timber, where practicable, will then be used in rehabilitation.

3.4.17 Public Safety

All efforts will be made to ensure the safety of the public, both as visitors to the Mine and off the Mine site. Measures to minimise risks to the public include:

- Induction programmes for employees, contractors and visitors;
- Signage and communication protocols for visitors and suppliers;
- Identification systems for visitor access to the site;
- First aid training requirements for employees and contractors;
- Maintenance of fire trails and fire management measures in accordance with the bush fire management plan;
- Fence lines maintained in an operational condition;
- Right of way accesses to neighbours are maintained;
- Speed control signs have been installed on roads on Mine owned land; and
- Maintenance of locked gates around the site for security purposes.

Public and employee safety are fundamental considerations in the design and operation of the Mine and will be addressed through site procedures and work methods.

3.4.18 Contaminated Land

As described in the EIS (WCPL, 2003), potential land contamination risk include spills, fires or explosions associated with the transport, storage and usage of fuels, chemical and explosives. **Section 2.3.7** and **Section 3.4.6** outlines the operational procedures or mitigation measures that will be implemented to prevent or reduce the potential for land contamination.

In addition to these measures at mine closure, a land contamination assessment of areas where potential land or soil contamination (e.g. fuel and explosive storage areas), will be completed in consultation with relevant regulatory authorities. Information regarding baseline knowledge of potential land contamination areas will be incorporated into the CMCP.

Any contaminated soils identified during the assessment would be remediated on site or excavated, removed from site and disposed of at a licensed facility and the area remediated in accordance with recommendations made by the contamination assessment.

4.0 POST MINING LAND USE

4.1 REGULATORY REQUIREMENTS

Table 20 identifies the regulatory requirements that specially affect the post mining land use, landscape and rehabilitation outcomes as identified in the Development Consent (DA305-7-2003), the Project Environmental Impact Statement (Project EIS), mining and coal lease/s.

Table 20 Rehabilitation Regulatory Requirements

<table>
<tr><th>Rehabilitation Regulatory Requirements</th><th>Sections in the MOP</th></tr>
<tr><td colspan="2">Rehabilitation Conditions from DA305-7-2003</td></tr>
<tr><td>Final Void Strategy
39. At the end of Year 7 of the development, or as directed otherwise by the Secretary, the Applicant shall prepare a Final Void Management Plan for the development, in consultation with the DRE, the Secretary and Council, and to the satisfaction of the Secretary. This Plan must:
(a) investigate options for the future use of the final void;
(b) re-assess the potential groundwater impacts of the development; and
(c) describe what actions and measures would be implemented to:
- minimise any potential adverse impacts associated with the final void; and
- manage, and monitor the potential impacts of, the final void over time.
The Applicant must implement the approved management plan as approved from time to time by the Secretary.</td><td>Section 1.6.2</td></tr>
<tr><td>Rehabilitation
69. Following the cessation of the use of the coal haulage road which traverses the Wambo Homestead Complex property, the land is to be returned to its former condition (pre1999) and the half palisade fence on the southern alignment of the mounting yard, which was removed, is to be reinstated as required by the approval of the Heritage Council for the construction of the road on 12 February 1999.</td><td>Section 1.6.1</td></tr>
<tr><td>Visual Amenity
81. The Applicant shall implement measures to mitigate visual impacts including:
(a) design and construction of development infrastructure in a manner that minimises visual contrasts; and
(b) progressive rehabilitation of mine waste rock emplacements (particularly outer batters), including partial rehabilitation of temporarily inactive areas.</td><td>Section 2.3.9</td></tr>
<tr><td>Overburden Dumps
84. The Applicant shall construct the overburden emplacements generally in accordance with the EIS, and to the satisfaction of DRE.</td><td>Section 2.3.4</td></tr>
<tr><td>Rehabilitation Objectives
94. The Applicant shall rehabilitate the Wambo Mining Complex to the satisfaction of the Executive Director Mineral Resources. The rehabilitation must be generally in accordance with the proposed rehabilitation strategy described by the documents listed in Condition 2 of Schedule 3 and the objectives in Table 18.
Table 18: Rehabilitation Objectives
<table>
<tr><th>Area/Domain</th><th>Rehabilitation Objectives</th></tr>
<tr><td>Mine site (as a whole)</td><td>• Safe, stable and non-polluting;</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless DRE agrees otherwise.</td></tr>
<tr><td>Community</td><td>• Ensure public safety; and
• Minimise the adverse socio-economic effects associated with mine closure.</td></tr>
<tr><td>Landforms</td><td>Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.</td></tr>
<tr><td>All watercourses subject to subsidence impacts</td><td>Hydraulically and geomorphologically stable, with riparian vegetation established that is the same or better than prior to commencement of mining</td></tr>
</table></td><td>Section 4.3</td></tr>
</table>

Rehabilitation Regulatory Requirements	Sections in the MOP
Operating Conditions 94A. The Applicant shall: (a) develop a detailed soil management protocol that identifies procedures for: • comprehensive soil surveys prior to soil stripping; • assessment of top-soil and sub-soil suitability for mine rehabilitation; and • annual soil balances to manage soil handling including direct respreading and stockpiling; (b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within Wambo Mining Complex and for enhancement of biodiversity offset areas; (c) ensure that coal reject or any potentially acid forming interburden materials must not be emplaced at elevations within the pit shell or out of pit emplacement areas where they may promote acid or sulphate species generation and migration beyond the pit shell or out of pit emplacement areas; and (d) ensure that no dirty water can drain from an out of pit emplacement area to any offsite watercourse or to any land beyond the lease boundary.	**Section 3.3.6** **Section 2.3.11** **Section 3.3.6** **Section 2.3.3.3** **Section 2.3.4** **Section 2.3.5** **Section 3.3.4**
Progressive Rehabilitation 94B. The Proponent shall rehabilitate the site progressively as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot be permanently rehabilitated. *Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the project*	**Section 2.3.10**
Rehabilitation Management Plan 94C. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the DRE. This plan must (a) be prepared in consultation with the Department, DPI-Water, OEH, Council and the CCC; (b) be submitted to the DRE by the end of June 2013; (c) be prepared in accordance with any relevant DRE guideline; (d) describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy; (e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); (f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform, and final land use; (g) include a detailed tailings management strategy that includes timing for rehabilitation of all tailings storage facilities, in order that final land form and land use objectives can be achieved in a timely manner; (h) include a plan that describes proposed grazing carrying capacity across the post mining landscape; (i) include interim rehabilitation where necessary to minimise the area exposed for dust generation; (j) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and (k) build to the maximum extent practicable on the other management plans required under this consent.	**This MOP (see Table 4)**
Mine Exit Strategy 95. The Applicant shall work with the Council to investigate the minimisation of adverse socio-economic effects of a significant reduction in local employment levels and closure of the Wambo Mining Complex at the end of its life.	**Section 1.6.1**
Rehabilitation Conditions from Mining & Coal Leases	
CL374, ML1572, ML1594 13(a). Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that:- • There is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. • The state of the land is compatible with the surrounding land and land use requirements. • The landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land. • In cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re-established with close reference to the flora survey included in	**Section 3.3.5** **Sections 4.2 & 4.3** **Sections 4.0** **Section 3.3.7**

Rehabilitation Regulatory Requirements	Sections in the MOP
the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density. • The land does not pose a threat to public safety. 13(b). Any topsoil that is removed must be stored and maintained in a manner acceptable to the Director-General. **CL397** 30. Subject to any specific condition of this lease providing for rehabilitation of any particular part of the subject area affected by mining or activities associated there within, the registered holder shall: (a) reinstate, level, regrass, reforest and contour to the satisfaction of the Minister any part of the subject area that may, in the opinion of the Minister have been damaged or deleteriously affected by mining operations; and (b) fill in, seal or fence, to the satisfaction of the Minister, any excavation within the subject area. **CCL743, ML1402,** 7. Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.	**Section 3.4.17** **Section 3.3.6** **This MOP**

4.2 POST MINING LAND USE AND LANDSCAPE GOALS

Land use in the vicinity of the Mine is characterised by a combination of coal mining operations, agricultural land uses and the village of Warkworth. Wollemi National Park is located to the south and west of Wambo and forms part of the Greater Blue Mountains World Heritage Area (WCPL, 2003). Accordingly, the final landform proposes a balanced rehabilitation outcome which recognises the alternative land uses that exist in the region, and therefore aims to establish the potential for both sustainable agriculture and endemic woodland habitat (**Section 3.3.7**). The proposed design of final landforms and revegetation strategy is described **Section 5.0** and illustrated by **Figure 7** and **Plan 4** (**Appendix 1**).

As outlined in **Section 1.6.1**, the post mining land use will be considered in further detail in the revision of the CMCP. The revision of the CMCP will incorporate a review of the constraints and opportunities to identify potential sustainable land-use options, in consultation with relevant stakeholders in order to obtain feedback of any issues that need to be considered as part of the final land use analysis. The revised CMCP will be submitted to the DRE and other relevant stakeholders for comment and approval in 2016.

Surface infrastructure with no ongoing beneficial use will be removed from the site at the completion of mining. Some infrastructure (e.g. site access roads, water storages) may be retained for alternate post mining uses (where agreed in consultation with relevant authorities and local landholders). The revision of the CMCP will also examine WCPL-owned lands that are not subject to mining operations or land affected by mine subsidence, which are currently used for the agistment of stock and whether the land can transferred to local landholders or sold.

4.2.1 Integration with RWEP Areas (Biodiversity Offsets)

In recognition of the importance of vegetation corridors to regional biodiversity, rehabilitation initiatives will aim to increase the continuity of vegetation in the region through the establishment of woodland corridors. Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park (WCPL, 2003).

Remnant Woodland Enhancement Program (RWEP) areas have been established at WCPL to help to conserve regional biodiversity, whilst enhancing the habitat available to flora and fauna. Details of the management of the RWEP areas are provided in the FFMP (WCPL, 2014a). WCPL is currently in the process of finalising agreements to conserve the RWEP areas as part of a Voluntary Conservation Agreement under Part 4, Division 12 of the NSW *National Parks and Wildlife Act, 1974* in accordance with Condition 41, Schedule 4 of Development Consent (DA 305 7 2003).Wherever possible, it is proposed to link existing woodland with woodland rehabilitation areas to provide corridors for the

movement of fauna and to establish a net increase in woodland areas in the Hunter catchment. The revegetation strategy includes revegetation of disturbance areas with areas of woodland (corridors), areas which contain a mixture of endemic woodland and pasture, and riparian vegetation. A detailed description of the revegetation strategy is provided in **Section 3.3.7**.

The final distribution of woodland to be established on rehabilitated landforms will ultimately depend on the outcome of closure planning including the shape of final landforms and the agreed post mine land use (WCPL, 2003).The final rehabilitated landform at lease relinquishment is shown on **Plan 4**. The rehabilitation phases during this MOP term are described in **Section 5.3**.

4.3 REHABILITATION OBJECTIVES

The objectives for rehabilitation are guided by the rehabilitation objectives outlined in **Table 20** of the Development Consent (DA 305-7-2003) as shown in **Table 22**. The overall rehabilitation objectives for Wambo (as provided in Wambo Development Project Environmental Impact Statement [the EIS] [WCPL, 2003]) build on and incorporate the rehabilitation objectives outlined in the Development Consent (DA 305-7-2003) and include:

- The creation of safe, stable, adequately drained post-mining landforms that are consistent with the local surrounding landscape;
- Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park;
- Preservation of existing beneficial use of water resources; and
- Development of a sustainable post-mining land use plan towards the end of mine life.

The following key rehabilitation principles form the basis for rehabilitation planning and design at Wambo (WCPL, 2003):

- Existing remnant vegetation to be preserved wherever possible;
- Integration of open cut mining and rehabilitation planning to minimise the area of disturbance at any one time;
- Progressive rehabilitation of disturbed areas, including partial rehabilitation of temporarily inactive waste rock emplacements;
- Creation of post-mining landforms that enhance the amenity of the local landscape and contribute to local and regional habitat corridors as presented in the Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales (NSW Department of Mineral Resources, 1999);
- Consideration of issues of public safety in the design of final landforms;
- Consultation with the relevant state government authorities, SSC and the CCC during the final design and planning of rehabilitated landforms;
- Implementation of trials and design studies as necessary to maximise effectiveness of the rehabilitation program; and
- Routine monitoring in order to identify rehabilitated areas requiring maintenance works.

4.3.1 Progressive Rehabilitation of Disturbed Areas

As an integral component of staged mining operations, rehabilitation of the final mine waste rock landform (when they become available) and other areas of disturbance will be conducted progressively over the life of the mine and will be scheduled to minimise the disturbed area at any point in time. Particular focus will be placed on the outer batters of the mine waste rock emplacements. Interim rehabilitation measures, including the establishment of cover crops and dust management controls on incomplete landforms and other inactive disturbance areas, will be implemented where they may remain inactive for an extended period. These measures will provide initial stabilisation of mine landforms, reduce the visual impact of the mine and minimise the potential for generation of windblown dust and sediment laden runoff.

5.0 REHABILITATION PLANNING

5.1 DOMAIN SELECTION

Mine closure or rehabilitation domains for this MOP (**Plan 2**) have been identified on the basis of their operational and functional purpose within the mining disturbance boundary and presented in **Table 21** and displayed in **Figure 7**.

Primary domains can be defined as land management units within the mine site, usually with unique operational and functional purpose and therefore similar geophysical characteristics. Primary domains outline current land use during the MOP period.

Secondary domains are land management units characterised by a similar post mining land use objective. Secondary domains define the final land use at mine closure.

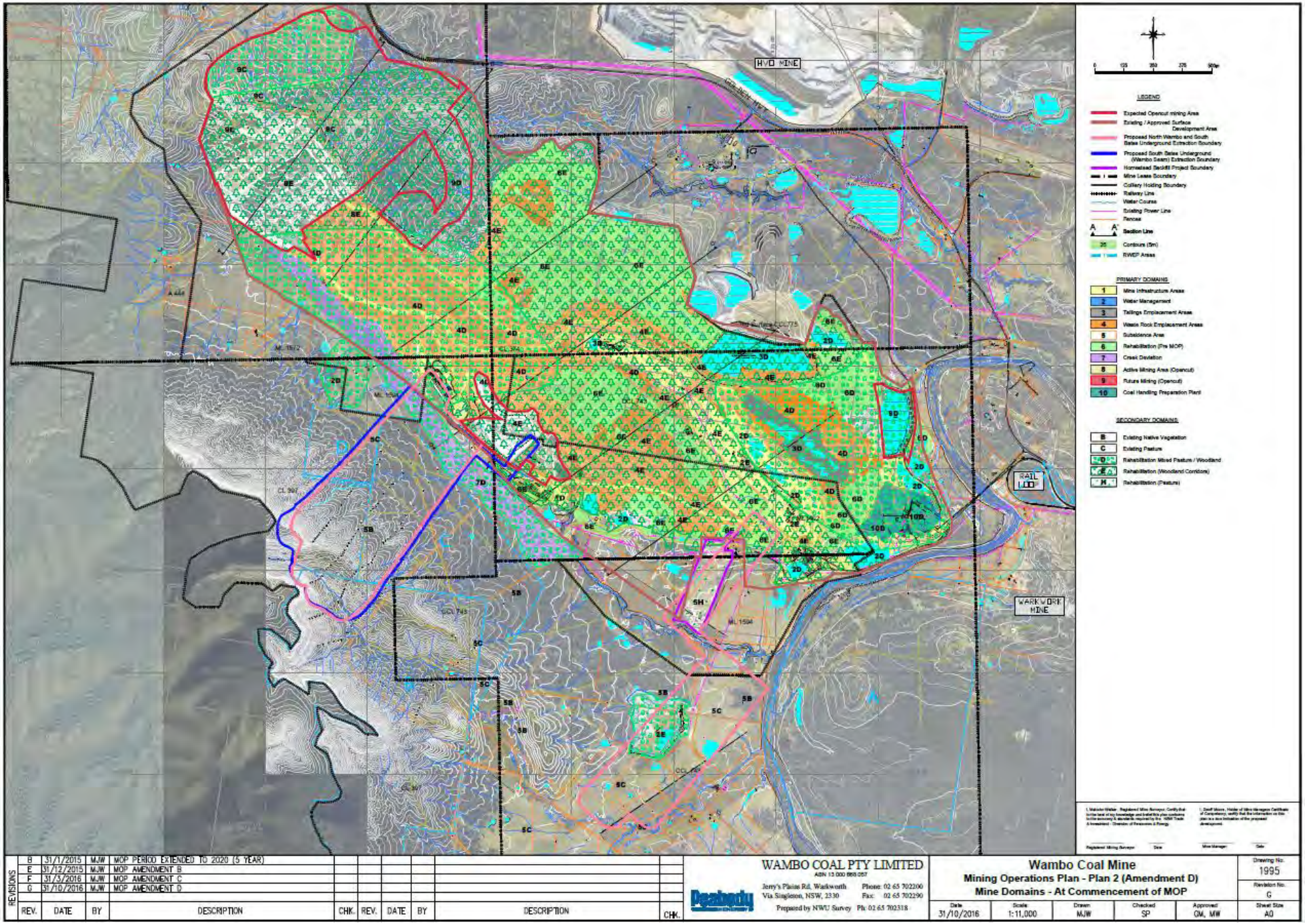
Table 21 MOP Rehabilitation Domains

Primary Domains	Code	Secondary Domains	Code
Mine Infrastructure Areas	1	Water Management	A
Water Management	2	Existing Native Vegetation	B
Tailings Emplacement Areas	3	Existing Pasture	C
Waste Rock Emplacement Areas	4	Rehabilitation (Mixed Pasture/Woodland)	D
Subsidence Area	5	Rehabilitation (Woodland Corridors)	E
Rehabilitation (Pre MOP)	6	Final Void	F
North Wambo Creek Diversion	7	Mine Infrastructure Areas	G
Active Mining Area	8	Rehabilitation Pasture	H
Future Mining	9		
Coal Handling Preparation Plant	10		

In summary, the following rehabilitation domains have been developed for WCPL (as shown on **Figure 7** and **Plan 2**) for the MOP term, including:

- Domain 1D – Mine Infrastructure Areas – Rehabilitation Mixed Woodland/Pasture.
- Domain 2A – Water Management Area.
- Domain 3D – Tailings Emplacement Area – Rehabilitation Mixed Pasture/Woodland.
- Domain 4D/4E – Waste Rock Emplacement Areas – Rehabilitation Mixed Woodland/Pasture and Woodland Corridor.
- Domain 5B/5C – Subsidence Area – Existing Native Vegetation or Existing Pasture or Rehabilitation Pasture.
- Domain 5H – Subsidence Area – Existing Pasture.
- Domain 6C/6D – Rehabilitation Pre MOP – Existing Pasture or Rehabilitation Mixed Woodland/Pasture.
- Domain 7H – North Wambo Creek Diversion – Rehabilitation Pasture or Rehabilitation Mixed Woodland/Pasture.
- Domain 8F – Active Mining Area – Final Void.
- Domain 9D or 9E – Future Mining Area – Rehabilitation Mixed Woodland/Pasture or Woodland Corridor.
- Domain 10D, 10E, or 10G – Coal Handling Preparation Plant – Rehabilitation Mixed Woodland/Pasture or Woodland Corridor or Mine Infrastructure Area (decommissioned).

Figure 7 Mine Domains



5.2 DOMAIN REHABILITATION OBJECTIVES

As discussed in **Section 4.2 and Section 4.3** the objectives of final rehabilitated landform is to establish a safe, non-polluting and stable landform that is compatible with the surrounding landscape and that meets the requirements of the post mining land use (**Section 4.2** and **Figure 8**). In addition, domain rehabilitation objectives are further outlined in **Table 22**. This will incorporate selective vegetation communities determined by beneficial post closure land uses, to be defined and agreed in consultation with relevant stakeholders, the community and government.

Final rehabilitation requirements would ultimately be refined and developed in consultation with key government authorities and other relevant stakeholders and reported in consecutive Open Cut MOP's for approval prior to implementation.

Table 22 Domain Rehabilitation Objectives

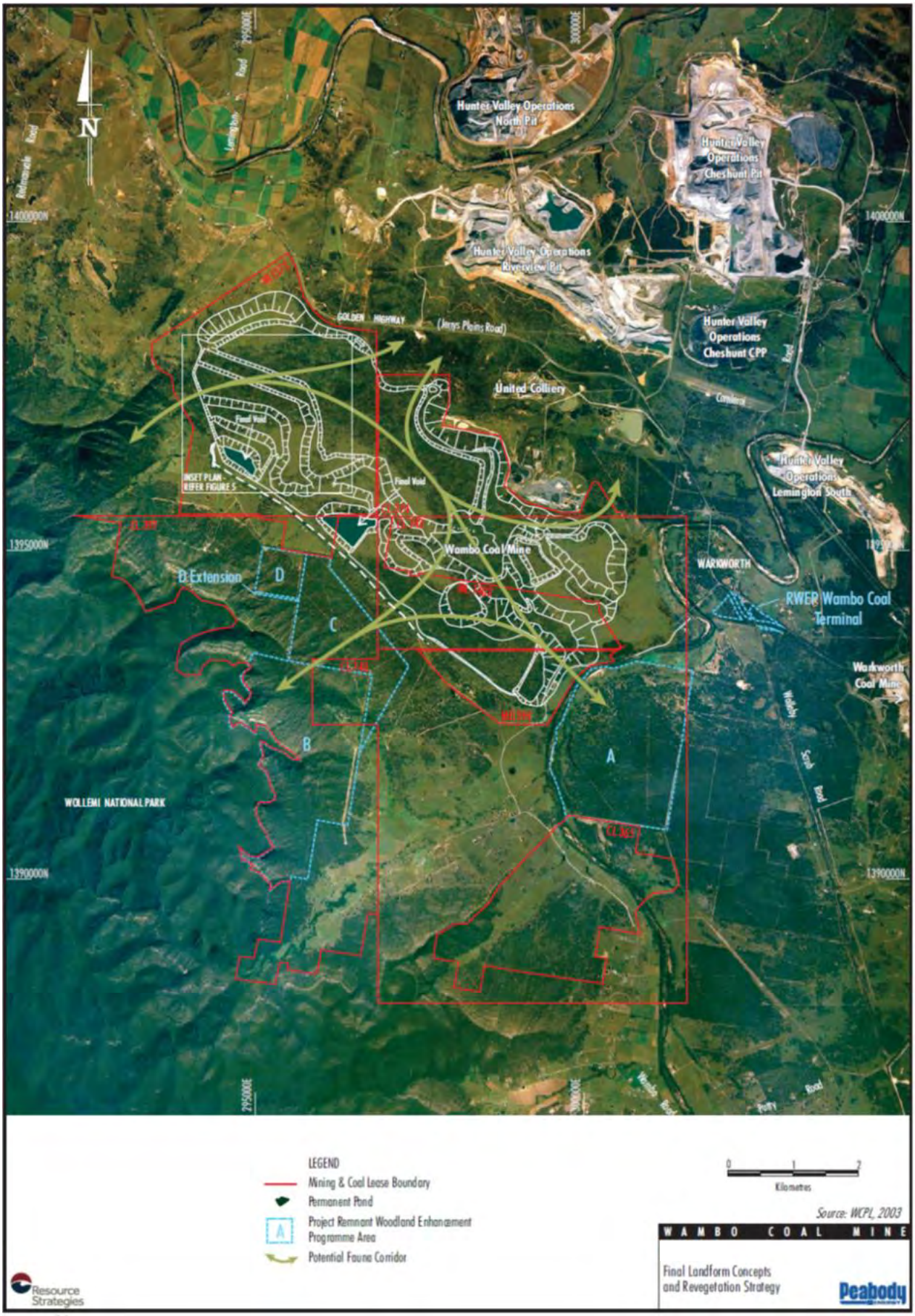
Domain	Rehabilitation Objectives
Primary Domains	
Domain 1: **Mine Infrastructure Areas**	• All infrastructure removed that is not required post closure. • All hazardous materials and contaminated materials removed. • Entrances to underground mine workings sealed and made safe. • Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than • surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 2: **Water Management**	• All hazardous materials and contaminated materials removed. • All infrastructure removed that is not required post closure. • Preservation of existing beneficial use of water resources. • Provide a self-sustaining land form post mine closure. • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. – Water quality non-polluting and appropriate for conservation end land use. – Water quality leaving site to be in accordance with the EPL water quality criteria.
Domain 3: **Tailings Emplacement Areas**	• All hazardous materials and contaminated materials removed. • Design of capping to prevent soil erosion and exposure to tailings material beneath. • Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 4: **Waste Rock Emplacement Areas**	• All hazardous materials and contaminated materials removed. • Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural

Domain	Rehabilitation Objectives
	landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 5: **Subsidence Area**	• Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options. • All watercourses subject to subsidence impacts shall be hydraulically and geomorphologically stable, with riparian vegetation established that is the same or better than prior to commencement of mining.
Domain 6: **Rehabilitation (Pre MOP)**	• Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 7: **North Wambo Creek Diversion**	• Pasture species established consistent with revegetation strategy. • Tree species established along creek line consistent with riparian zone.. • Creek diversion stable and will not present a greater safety hazard than surrounding land. • Creek diversion able to shed water safely without causing excessive erosion, jeopardising landform integrity or increasing pollution of downstream watercourses. • All watercourses subject to subsidence impacts shall be hydraulically and geomorphologically stable, with riparian vegetation established that is the same or better than prior to commencement of mining.
Domain 8: **Active Mining Area**	• Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 9: **Future Mining**	• Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy.

Domain	Rehabilitation Objectives
	• Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain 10: **Coal Handling Preparation Plant**	• All infrastructure removed that is not required post closure. • All hazardous materials and contaminated materials removed. • Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI) • Woodland Corridor and Mixed Woodland/Pasture Areas established consistent with revegetation strategy. • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Secondary Domains	
Domain A: **Water Management**	• Objectives as outlined for Domain 2
Domain B: **Existing Native Vegetation**	• Conserve regional biodiversity, whilst enhancing the habitat available to flora and fauna. • Existing remnant vegetation to be preserved wherever possible. • Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.
Domain C: **Existing Pasture**	• Conserve and maintain existing pasture, wherever possible, to support sustainable land use e.g. grazing activities. • Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.
Domain D: **Rehabilitation (Mixed Pasture/Woodland)**	• Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V) • Mixed Woodland/Pasture Areas established consistent with revegetation strategy and analogue vegetation communities. • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.
Domain E: **Rehabilitation (Woodland Corridors)**	• Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class VI) • Woodland Corridor Areas established consistent with revegetation strategy and analogue vegetation communities • Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park; • Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. • Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.

Domain	Rehabilitation Objectives
Domain F: **Final Void**	• Objectives as outlined for Domain 2 • **Note:** The final land form use of the Final Void is subject to review and will be included in the CMCP.
Domain G: **Mine Infrastructure Areas**	• All infrastructure removed that is not required post closure. • All hazardous materials and contaminated materials removed. • Stable landform and non-polluting.
Domain H: **Rehabilitation Pasture**	• Land capability returned to a class similar to that existing prior to disturbance (i.e. Class III). • Pasture Areas established consistent with analogue pasture communities. • Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.

Figure 8 Conceptual Final Landform and Revegetation



5.3 REHABILITATION PHASES

The objective of the final rehabilitated landform is to establish a safe, non-polluting and stable landform that is compatible with the surrounding landscape and that meets the requirements of the post mining land use. The following key rehabilitation phases will be undertaken, including:

- **Stage 1: Decommissioning** – removal of hard stand areas, buildings, contaminated materials, hazardous materials;
- **Stage 2: Landform Establishment** – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- **Stage 3: Growth Medium Development** – incorporates physical, chemical and biological components of the growing media and ameliorants that are using to optimise the potential of the media in terms of the preferred vegetative cover;
- **Stage 4: Ecosystem and Land Use Establishment** – incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control /management and establishment of flora;
- **Stage 5: Ecosystem and Land Use Sustainability** – incorporates components of floristic structure, rehabilitation maintenance including subsidence remediation, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape; and
- **Stage 6: Relinquished Land** - lands that have met the required mine rehabilitation and closure requirements for lease relinquishment.

The rehabilitation phases identified within Primary Domains during the MOP period are outlined in **Plans 3A** to **3F** and summarised in **Table 23**.

Table 23 Rehabilitation Phases During the MOP term

Primary Domains / Rehabilitation Phase	(Domain 1) Mine Infrastructure Areas	(Domain 2) Water Management	(Domain 3) Tailings Emplacement Areas	(Domain 4) Waste Rock Emplacement	(Domain 5) Subsidence Area	(Domain 6) Rehabilitation (Pre MOP)	(Domain 7) North Wambo Creek Diversion	(Domain 8) Active Mining Area	(Domain 9) Future Mining Area	(Domain 10) Coal Handling Preparation Plan t
Decommissioning	x	x	✓	x	x	x	x	x	x	x
Landform Establishment	x	x	x	✓	x	x	x	x	x	x
Growth Medium Development	x	x	x	✓	x	x	x	x	x	x
Ecosystem Establishment	x	x	x	✓	x	x	x	x	x	x
Ecosystem and Land Use Sustainability	x	x	x	✓	✓	✓	✓	x	x	x
Relinquished Lands	x	x	x	x	x	x	x	x	x	x

6.0 PERFORMANCE INDICATORS AND COMPLETION CRITERIA

WCPL have prepared the following rehabilitation tables to address each rehabilitation phase during the MOP term as identified in **Table 23**. The rehabilitation tables provide the preliminary performance indicators and criteria to achieve the rehabilitation objectives applicable to each domain.

Although no decommissioning of infrastructure (other than decommissioning activities associated with Domain 3), is currently scheduled to occur during the MOP term, **Table 24** provides the appropriate performance indicators and criteria should WCPL require decommissioning of infrastructure during the term of the MOP in Domain 1 and Domain 2.

Landform establishment, growth medium development, ecosystem and land use establishment activities during the MOP term will primarily be undertaken in Domain 4 and Domain H. **Tables 24** to **28** provide the appropriate performance indicators and criteria applicable within Domain 4 during the MOP term. However, should areas within other Domains be identified for rehabilitation during the MOP term, these performance indicators and criteria will also apply.

Ecosystem and land use and sustainability activities during the MOP term will primarily be undertaken in Domain 4, Domain 5, Domain 6 and Domain 7. The objectives, indicators and completion criteria for each rehabilitation phase are specified in following tables:

- Decommissioning Phase – **Table 24**;
- Landform Establishment Phase – **Table 25**;
- Growth Medium Development Phase – **Table 26**;
- Ecosystem and Land Use Establishment Phase – **Table 27**; and
- Ecosystem and Land Use Sustainability Phase – **Table 29**.

WCPL have not identified areas within the mining lease that will be subject to relinquishment during the MOP term. As mining activities at WCPL are scheduled to continue past the MOP period and the Mine has an approved 21 year mine life, there will be no areas subject for lease relinquishment at the end of the MOP term. Therefore no Relinquishment Land Phase table has been developed for this MOP.

Further details regarding the rehabilitation activities during the MOP term are provided in **Section 7.0** of this MOP.

WCPL have developed preliminary completion criteria and indicators for each domain and rehabilitation phase. In consultation with the DRE during the preparation of this MOP, the preliminary completion criteria and associated rehabilitation tables will be reviewed and refined throughout this MOP period. The refinement of the criteria will involve, but not limited to, results from research and rehabilitation trials and monitoring results from the various monitoring programs and proposed monitoring programs as outlined in **Section 8.0**.

Where relevant, the performance indicators and preliminary completion criteria have been based on monitoring results collected from selected reference sites representative of the proposed post-mining land use for that domain (e.g. woodland corridors and pasture areas).

The refinement of the completion criteria during the MOP term will be utilised to quantitatively demonstrate the progress and ultimate rehabilitation success throughout the life of the mine.

Table 24 Rehabilitation Performance Indicators and Completion Criteria – Decommissioning Phase

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
Rehabilitation Phase - Decommissioning						
Domain 1 (Infrastructure) , Domain 10 (Coal Handling Preparation Plant)						
All infrastructure is removed that is not required post closure. All hazardous materials and contaminated materials removed. Entrances and shafts to underground mine workings sealed and made safe. Domain does not present a greater safety hazard than surrounding land.	Removal of services	All redundant services (including electrical, water and communication services) have been disconnected and removed.	Condition 94, Schedule 4 of DA305-7-2003. *Table 18 Rehabilitation Objectives* Volume 1 - 2003 Project EIS: Section 5.7 *Mine Closure and Lease Relinquishment*	No	15	Ongoing Operations
	Removal of infrastructure	All redundant infrastructure (including all buildings, fixed plant and other infrastructure with no beneficial use at mine closure) has been demolished and removed from site.		No		Ongoing Operations
	Removal of roads and car parks	Removal of hardstand areas, car parks, concrete footings and roadways (with no beneficial use) at post mining has been completed.	Section 6.3 Conceptual Mine Closure Plan	No		Ongoing Operations
	Removal of carbonaceous material	All carbonaceous material on the surface has been removed and disposed on-site within appropriate coarse reject emplacement areas.	Section 6.3 Conceptual Mine Closure Plan	No		Ongoing Operations
	Removal of hazardous materials	All hazardous materials have been have been classified in accordance with the EPA's *Waste Classification Guidelines* and removed from site.	Section 6.3 Conceptual Mine Closure Plan	No		Ongoing Operations
	Removal of wastes	All wastes generated during decommissioning have been classified in accordance with the EPA's *Waste Classification Guidelines*, and have been disposed and/or removed from site.	Section 6.3 Conceptual Mine Closure Plan	No		Ongoing Operations
	Land contamination	All land contamination assessments have been completed and all identified contaminated sites have been successfully remediated and verified by contamination specialists reports.	Section 6.3.Conceptual Mine Closure Plan	No		Ongoing Operations
	Seal underground portals	All underground portals have been sealed in accordance with with the requirements of *MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams).*	*MDG6001 Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams (February 2012) -*	No		Ongoing operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Seal ventilation shafts	All underground mine ventilation shafts have been sealed in accordance with *MDG6001 (Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams).*	Mine Safety Operations NSW Trade & Investment).	No		Ongoing operations
	Management of mine water	All water discharged from site meets relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
	Signs of spontaneous combustion	No spontaneous combustion evident at mine closure and during decommissioning.	Section 7.0 Conceptual Mine Closure Plan	No	6	Ongoing Operations
Domain 2 (Water Management)						
All infrastructure is removed that is not required post closure. All hazardous materials and contaminated materials removed. Domain does not present a greater safety hazard than surrounding land.	Removal of services	All redundant services have been disconnected and removed.	Condition 94, Schedule 4 of DA305-7-2003. *Table 18 Rehabilitation Objectives* Volume 1 - 2003 Project EIS: Section 5.7 *Mine Closure and Lease Relinquishment* Volume 1 - Section 6.1.3 Project 2003 EIS (Mine Closure Plan) Section 6.3 Conceptual Mine Closure Plan	No	15	Ongoing Operations
	Removal of infrastructure	All redundant infrastructure (including pumps, pontoons and pipelines) have been removed.		No	15	Ongoing Operations
	Dewater mine water dams	All mine water dams that are not required at post-closure have been completely dewatered.		No	15	Ongoing Operations
	Removal of contaminates	Removal of contaminated sediments from mine water dams has been completed. Removal of contaminated sediments verified in contamination specialists reports.		No	15	Ongoing Operations
	Reshape mine water dam	Reshaping of mine water dams to their intended post mining use has been completed.		No	15	Ongoing Operations
	Management of mine water	All water discharged from site meets relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
Domain 3 (Tailings Emplacement)						
All infrastructure is removed that is not required post closure. All hazardous materials and contaminated materials removed. Domain does not present a greater safety hazard than surrounding land.	Removal of services	All redundant services have been disconnected and removed.	Condition 94, Schedule 4 of DA305-7-2003. *Table 18 Rehabilitation Objectives* Volume 1 - 2003 Project EIS: Section 5.7 *Mine Closure and Lease Relinquishment* Volume 1 - Section 6.1.3 Project 2003 EIS (Mine Closure Plan)	No	15	Ongoing Operations
	Removal of infrastructure	All redundant infrastructure has been removed.		No	15	Ongoing Operations
	Removal of supernatant water	Dewatering (where necessary) of remaining surface water above tailings has been completed.		No	15	Ongoing Operations
	Desiccation of tailings	Desiccation of tailings completed and permits a trafficable surface. Confirmation of trafficable surface verified in geotechnical reports.	*Work Health and Safety (Mines) Regulation 2014 [NSW] Schedule 3 High risk activities.*	No	15	Ongoing Operations
	Signs of spontaneous combustion	No spontaneous combustion evident during decommissioning.	Section 5.6 Conceptual Mine Closure Plan	No	6	Ongoing Operations
	Management of mine water	All water discharged from site meets relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
Domain 4 (Waste Rock Emplacement Areas), Domain 5 (Subsidence Area), Domain 6 (Rehabilitation Pre-MOP), Domain 8 (Active Mining Area), Domain 9 (Future Mining)						
All infrastructure is removed that is not required post closure. All hazardous materials and contaminated materials removed. Domain does not present a greater safety hazard than	Removal of services	All redundant services have been disconnected and removed.	Condition 94, Schedule 4 of DA305-7-2003. *Table 18 Rehabilitation Objectives* Volume 1 - 2003 Project EIS: Section 5.7 *Mine Closure and Lease Relinquishment*	No	15	Ongoing Operations
	Removal of infrastructure	All redundant infrastructure has been removed.		No	15	Ongoing Operations
	Removal of carbonaceous material	All carbonaceous material on the surface has been removed and disposed on-site within appropriate coarse reject emplacement areas.	Section 6.3 Conceptual Mine Closure Plan	No		Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
surrounding land.	Signs of spontaneous combustion	No spontaneous combustion evident during decommissioning.	Section 6.3 Conceptual Mine Closure Plan	No	6	Ongoing Operations
	Subsidence cracking	No subsidence surface cracks remaining that present a risk to the environment, safety and the final land use objectives.	Section 5.11 Conceptual Mine Closure Plan	No	14	Ongoing Operations
	Management of mine water	All water discharged from site meets relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
Domain 7 (North Wambo Creek Diversion)						
All infrastructure is removed that is not required post closure. All hazardous materials and contaminated materials removed. Domain does not present a greater safety hazard than surrounding land.	Removal of services	All redundant services have been disconnected and removed.	Section 6.3 Conceptual Mine Closure Plan	No	15	Ongoing Operations
	Removal of infrastructure	All redundant infrastructure has been removed.	Section 6.3 Conceptual Mine Closure Plan	No	15	Ongoing Operations
	Management of surface water	Water quality discharged from diversion meets water quality trigger values for North Wambo Creek, under normal flow conditions, as provided in the SWMP.	Section 6.4 Conceptual Mine Closure Plan Surface Water Monitoring Program	No	12	Ongoing Operations

Table 25 Rehabilitation Performance Indicators and Completion Criteria – Landform Establishment Phase

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
Rehabilitation Phase – Landform Establishment						
Domain 1 (Infrastructure), Domain 4 (Waste Rock Emplacement Areas), Domain 8 (Active Mining Area), Domain 9 (Future Mining), Domain 10 (Coal Handling Preparation Plant)						
All hazardous materials and contaminated materials removed. Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses. Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape.	Waste rock material characterisation	Material characterisation of the final land form surface (to identify appropriate soil ameliorants and application rates) has been completed.	Volume 1 - Section 5.3 of the Project 2003 EIS (Final Landform Design Concepts)	No	4	Ongoing Operations
	Application of ameliorants	Application of appropriate soil ameliorants applied (at specified rates) has been completed.	Section 5.6 Conceptual Mine Closure Plan	No	4	Ongoing Operations
	pH	Soil pH (H_2O) range: pH 5.5 – pH 7.8	Volume 4, Appendix G Tailings Management Project 2003 EIS	No	4	Ongoing Operations
	Electrical conductivity (EC)	Soil EC (H_20) ≤1200 µS/cm	*Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	4	Ongoing Operations
	Coarse rejects capped	Coarse rejects capped with a minimum of 2m of inert overburden material.	Volume 1 - Section 5 Rehabilitation, Project EIS 2003	No	6	Ongoing Operations
	Coarse rejects on surface	No coarse rejects within the waste rock emplacement areas to be within 2m of the final landform surface RL.	Volume 1 - Section 5 Rehabilitation, Project EIS 2003	No	6	Ongoing Operations
	Large rocks on surface	Rock racking of the final landform completed to remove rocks >200mm in diameter.	*Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	6	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Slope gradients	No greater than1:6 (10 degrees or 17%) across the entire ML area (unless otherwise agreed by DRE).	Volume 1 - Section 5 Rehabilitation, Project EIS 2003	No	8	Ongoing Operations
	Slope lengths	Slope length within range of 50 m – 80 m (subject to slope gradient)	*Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	7	Ongoing Operations
	Landform stability	No slumping evident.	*Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	6	Ongoing Operations
	Final landform height	Final landform height ≤160 m AHD.	Volume 1 - Section 5.3 of the Project 2003 EIS (Final Landform Design Concepts)	No	8	Ongoing Operations
	Slope shape (Preferred Profile)	Mine waste rock emplacement slopes constructed to form an 'S' shape with the upper nominally at 20 to 30% being convex and the lower 70 to 80% being concave.	Volume 1 - Section 5 Rehabilitation, Project EIS 2003	No	8	Ongoing Operations
	Slope shape (Profile design when external features limit the Preferred Profile)	Mine waste rock emplacement slopes constructed with a "back-sloped bench', approximately 4 m wide, constructed on the contour approximately mid-point of the slope.	Section 5.6 Conceptual Mine Closure Plan	No	8	Ongoing Operations
	Drainage designs	Drainage lines with <3% fall have been appropriately armoured.	Volume 1 - Section 5.3 of the Project 2003 EIS (Final Landform Design Concepts)	No	6	Ongoing Operations
	Landform drainage	Reinstatement of natural drainage patterns (where possible).	Volume 1 - Section 5 Rehabilitation, Project EIS 2003	No	6	Ongoing Operations
	Signs of spontaneous combustion	No spontaneous combustion evident during decommissioning.	Section 6.3 Conceptual Mine Closure Plan	No	6	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Acid mine drainage (AMD)	No evidence of AMD.	Appendix G of Project EIS 2003 Waste Rock and CHPP Rejects/Tailings Management	No	6	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
	Management of mine water	Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
Domain 2 (Water Management)						
Preservation of existing beneficial use of water resources. Provide a self-sustaining land form post mine closure. Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses.	Dam dewatering	Mine water from dam returned to mine water system.	Volume 1 - Section 5.3 of the Project 2003 EIS (Final Landform Design Concepts) Section 6.3 Conceptual Mine Closure Plan	No	15	Ongoing Operations
	Contaminates removal	Contaminates removed from dam and placed within open cut voids is completed.		No	15	Ongoing Operations
	Dam reshaping	Re-shaping dams (where required) in accordance with their intended use completed.		No	15	Ongoing Operations
	Material characterisation	Material characterisation of the final land form surface (to identify appropriate soil ameliorants and application rates) has been completed.		No	4	Ongoing Operations
	Application of ameliorants	Application of appropriate soil ameliorants applied (at specified rates) has been completed.		No	3	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
	Management of mine water	Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
Domain 3 (Tailings Emplacement)						
All hazardous materials and contaminated materials removed. Design of capping to prevent soil erosion and exposure to tailings material beneath. Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land. Mined land will be re-contoured to a landform compatible with the surrounding natural landscape.	Tailings capping	Tailings capped with 2m to 5m (subject to final design requirements) of inert overburden material.	Approvals granted under *Work Health and Safety (Mines) Regulation 2014 [NSW] Schedule 3 High risk activities* Section 5.10 Conceptual Mine Closure Plan	No	5	Ongoing Operations
	Capping drainage	Capping layer has been designed to allow for surface water runoff, with slope grades of <1%.		No	5	Ongoing Operations
	Capping landform	Capping layer has been re-profiled and is compatible with the local surrounding landscape.	Volume 1 - Section 5 of the Project 2003 EIS (Final Landform Design Concepts	No	5	Ongoing Operations
	Material characterisation	Material characterisation of the final land form surface (to identify appropriate soil ameliorants and application rates) has been completed.	Volume 1 - Section 5.3 of the Project 2003 EIS (Final Landform Design Concepts) Section 5.6 Conceptual Mine Closure Plan	No	4	Ongoing Operations
	Application of ameliorants	Application of appropriate soil ameliorants applied (at specified rate) has been completed.		No	4	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	pH	Soil pH (H_2O) range: pH 5.5 – pH 7.8	Volume 4, Appendix G Tailings Management Project 2003 EIS *Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	4	Ongoing Operations
	Electrical conductivity (EC)	Soil EC (H_20) ≤1200 µS/cm		No	4	Ongoing Operations
	Spontaneous combustion	No spontaneous combustion evident at mine closure and during landform establishment.	Section 6.3 Conceptual Mine Closure Plan	No	6	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
	Management of mine water	Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.	Section 6.3 Conceptual Mine Closure Plan EPL 529	No	12	Ongoing Operations
Domain 5 (Subsidence Area)						
Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.	Subsidence cracking	No subsidence surface cracks remaining that present a risk to the environment, safety and the final land use objectives. Remediation of surface cracks >50 mm.	Section 5.11 Conceptual Mine Closure Plan SBU Extraction Plan LW11-13	No	14	Ongoing Operations

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
All watercourses subject to subsidence impacts shall be hydraulically and geomorphologically stable.	Creek stability	Creeks affected by subsidence have been repaired and their functionality and stability has been confirmed by a hydrological engineer (or equivalent).	DA305-7-2003	No	14	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Groundcover is >60%. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan SBU Extraction Plan LW11-13 Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
Domain 6 (Rehabilitation Pre-MOP), Domain D (Rehabilitation – Mixed Pasture/Woodland), Domain E (Rehabilitation – Woodland Corridors), Domain H (Rehabilitation Pasture)						
Land capability returned to a class similar to that existing prior to disturbance (i.e. Class III). Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.	Subsidence cracking	No subsidence surface cracks remaining that present a risk to the environment, safety and the final land use objectives.	Section 5.11 Conceptual Mine Closure Plan	No	14	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
Domain 7 (North Wambo Creek Diversion)						

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options. All watercourses subject to subsidence impacts shall be hydraulically and geomorphologically stable. Rehabilitated land will be geotechnically stable and will not present a greater safety hazard than surrounding land Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses.	Management of surface water	Water quality discharged from diversion meets water quality trigger values for North Wambo Creek under normal flow conditions, as provided in the SWMP.	Section 6.4 Conceptual Mine Closure Plan Surface Water Monitoring Program	No	12	Ongoing Operations
	Subsidence cracking	No subsidence surface cracks remaining that present a risk to the environment, safety and the final land use objectives. Remediation of surface cracks >50 mm.	Section 5.11 Conceptual Mine Closure Plan	No	14	Ongoing Operations
	Creek stability	Creeks affected by subsidence have been repaired and their functionality and stability has been confirmed by a hydrological engineer (or equivalent). Remediation of all visible surface cracks in the low flow channel as soon as practicable.	DA305-7-2003 SBU Extraction Plan LW11-13	No	14	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Groundcover is >60%. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan SBU Extraction Plan LW11-13 Erosion and Sedimentation Control Plan	No	13	Ongoing Operations
Domain F (Final Void)						

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
All hazardous materials and contaminated materials removed. All infrastructure removed that is not required post closure. Provide a self-sustaining land form post mine closure. Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing pollution of downstream watercourses.	Surface water management	Surface water inflows to the final voids have been minimised through appropriate land forming and water management structures.	Volume 1, Section 5.3.4 Project EIS 2003 (Final Voids) Volume 1, Section 6.1.3 Project EIS 2003 (Mine Closure Plan) Final Void Management Plan[39] **NOTE: To be updated in revised CMCP.**	No	16	Ongoing Operations
	Geotechnically stable	Final voids have been geotechnically designed and profiled for long term stability.		No	16	Ongoing Operations
	Perimeter bunding	Perimeter bunding has been formed around final voids to reduce the risk for all flood events.		No	16	Ongoing Operations
	Safety fencing	Safety fencing erected to limit public access to voids		No	16	Ongoing Operations
	Carbonaceous material	No exposed carbonaceous materials remaining in the final void floor.		No	16	Ongoing Operations
	Covered coal seams	Coal seams sufficiently backfilled with overburden material so no coal seams are exposed in accordance with Final Void Management Plan.		No	16	Ongoing Operations
	Void design	Final void design in accordance with the Final Void Management Plan.		No	16	Ongoing Operations

Table 26 Rehabilitation Performance Indicators and Completion Criteria – Growth Medium Development Phase

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
Rehabilitation Phase – Growth Medium Development Phase						
Domain 1 (Infrastructure), Domain 3 (Tailings Emplacement Areas), Domain 4 (Waste Rock Emplacement Areas), Domain 8 (Active Mining), Domain 9 (Future Mining), Domain 10 CHPP						
All hazardous materials and contaminated materials removed. Provide a growth medium that is suitable for the establishment and maintenance of the selected revegetation species to achieve the final land use. Provide a growth medium that has physical and chemical properties comparable with reference sites. Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and/or VI).	Topsoil depth	Topsoil has been applied at a minimum of approximately 100mm thickness in all areas and/or otherwise been achieved with the addition of humus/compost material to form a topsoil/composite mix.	Volume 1 - Section 5 Rehabilitation, Project EIS 2003 *Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	1	Ongoing operations
	Topsoil characterisation	Topsoil characterisation of the final land form surface (to identify appropriate soil ameliorants and application rates) has been completed.			3	
	Topsoil (pH)	Soil pH (H_2O) range: pH 5.5 – pH 7.8	Appendix G Project EIS 2003 (Waste Rock and CHPP Rejects and Tailings Management) *Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009) *Hazelton, P.A., Murphy, B.W. (1992); A Guide for t e Interpretation of Soil Test Results, NSW Dept Conservation and Land Management.*	No	3	Ongoing operations
	Topsoil Electrical conductivity (EC)	Soil EC (H_20) ≤1200 µS/cm			3	
	Topsoil (Phosphorous)	**Phosphate Test Method** / **Productive Pasture** / **Native Vegetation** Colwell / 20-40 mg/kg / 10-20 mg/kg Bray / 12-22 mg/kg / 6-12 mg/kg			3	
	Topsoil (Organic Carbon)	Organic Matter % (g/100g) >3%			3	
	Application of ameliorants	Application of appropriate soil ameliorants (at specified rate) has been completed.	Volume 1 - Section 5 Rehabilitation, Project EIS 2003 *Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	3	Ongoing operations
	Topsoil ripping	Ripping has been carried out to an approximate depth of 300 mm to 500 mm on the contour. Full and continuous ripping has been undertaken between rip lines.			1	

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Topsoil stockpile	Stockpiles which are to be inactive for extended periods have been fertilised and seeded with annual cover crop and/or preferred native pasture species (**Table 17**).	Volume 1 - Section 5 Rehabilitation, Project EIS 2003 *Rehabilitation Standards for Wambo Coal* (Global Soil Systems, February 2009)	No	2	Ongoing operations
	Topsoil stockpile signage	Once constructed, the topsoil stockpiles have been signposted. Barriers constructed if necessary.			2	
	Topsoil stockpile location	No topsoil stockpiles are to be placed in the invert of drainage lines or drainage works.			2	
	Exotic cover	Biometric monitoring confirms exotic cover <33%.	Flora and Fauna Management Plan	No	11	Ongoing operations
	Management of mine water	Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.	Erosion and Sediment Control Plan (ESCP) EPL 529	No	12	Ongoing operations
	Water quality	Water quality discharged from diversion meets water quality trigger values for North Wambo Creek under normal flow conditions, as provided in the SWMP.	Surface Water Monitoring Program	No	12	Ongoing operations
	Spontaneous combustion	No spontaneous combustion evident.	Section 6.3 Conceptual Mine Closure Plan	No	6	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing operations

Table 27 Rehabilitation Performance Indicators and Completion Criteria – Ecosystem and Land Use Establishment Phase

<table>
<tr><th>Objectives</th><th>Performance Indicator</th><th>Completion Criteria</th><th>Justification</th><th>Complete (Yes/No)</th><th>TARP Ref No#</th><th>Progress at start of MOP</th></tr>
<tr><td colspan="7">Rehabilitation Phase – Ecosystem and Land use Establishment Phase</td></tr>
<tr><td colspan="7">Domain 1 (Infrastructure), Domain 3 (Tailings Emplacement Areas), Domain 4 (Waste Rock Emplacement Areas), Domain 7 (North Wambo Creek Diversion), Domain 8 (Active Mining), Domain 9 (Future Mining), Domain 10 CHPP, Domain D (Mixed Woodland/Pasture Areas), Domain E (Woodland Corridors)</td></tr>
<tr><td rowspan="3">Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and Class VI)

Mixed Woodland/Pasture Areas established consistent with revegetation strategy.

Woodland Corridor Areas established consistent with revegetation strategy.

Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing</td><td>Ground cover</td><td>Minimum 70% of area has a vegetative cover.

No single bare area <20m^2</td><td>Erosion and Sediment Control Plan</td><td>No</td><td>11</td><td>Ongoing operations</td></tr>
<tr><td>Habitat Augmentation</td><td>Where appropriate and practical salvaged tree hollows, timber logs etc will be incorporated into the final landform to augment the habitat value.</td><td>Volume 1 - Section 5 Rehabilitation, Project EIS 2003</td><td>No</td><td>17</td><td>Ongoing operations</td></tr>
<tr><td>LFA (Woodland Rehabilitation)

LFA (Pasture/Woodland)

LFA (Riparian)</td><td>A colour system in the BMP highlights the performance of each LFA site within each rehabilitation area.

<table><tr><th>Green</th><th>Yellow</th><th>Orange</th><th>Red</th></tr><tr><td>Area is generally meeting or exceeding target values and values do not show trend of decline over time – where monitoring sites are meeting targets and values are relatively consistent, reduce monitoring to infrequent LFA when changes in landscape or management practices occur i.e. fire or grazing)</td><td>Area generally falls below target values but within 75% of targets or appears to be on a trajectory of improvement without the need for management intervention – further monitoring required</td><td>Area generally falls between 75% and 50% of target values or shows little sign of improvement over
several monitoring events – further monitoring and possibly management actions required</td><td>Area falls below 50% of target and is unlikely to improve without management actions or shows trend of decline which is unlikely to improve without management actions</td></tr></table></td><td>Tongway, D.J. and Hindley, N.L.,2004. Landscape function analysis. Procedures for monitoring and assessing landscapes. CSIRO Sustainable Ecosystems, Canberra.</td><td>No</td><td>10</td><td>Ongoing operations</td></tr>
</table>

<table>
<tr><th>Objectives</th><th>Performance Indicator</th><th>Completion Criteria</th><th>Justification</th><th>Complete (Yes/No)</th><th>TARP Ref No#</th><th>Progress at start of MOP</th></tr>
<tr><td rowspan="4">pollution of downstream watercourses.

Soil properties are suitable for the establishment and maintenance of selected vegetation species

Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park;

Pasture Areas established consistent with analogue pasture communities.

Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options.</td><td></td><td>Target scores were developed to provide quantitative measures that can be used to compare rehabilitation areas with reference sites throughout the course of the monitoring program. These scores were developed using the baseline data and data from nearby sites within relatively undisturbed riparian habitat. Target scores are provided in below, along with the average scores from the 2015 baseline monitoring program

<table>
<tr><th>Site Type</th><th></th><th>LOI</th><th>SI</th><th>INFI</th><th>NI</th></tr>
<tr><td rowspan="2">Woodland Rehabilitation</td><td>Average Score</td><td>0.77</td><td>56.58</td><td>40.43</td><td>33.95</td></tr>
<tr><td>Target Score</td><td>>0.87</td><td>>59</td><td>>43</td><td>>36</td></tr>
<tr><td rowspan="2">Pasture Rehabilitation</td><td>Average Score</td><td>0.84</td><td>60.03</td><td>38.64</td><td>31.86</td></tr>
<tr><td>Target Score</td><td>>0.93</td><td>>61</td><td>>29</td><td>>25</td></tr>
<tr><td rowspan="2">North Wambo Creek Diversion</td><td>Average Score</td><td>0.56</td><td>53.26</td><td>28.76</td><td>19.34</td></tr>
<tr><td>Target Score</td><td>>0.84</td><td>>62</td><td>>41</td><td>>37</td></tr>
<tr><td rowspan="2">Wambo Creek</td><td>Average Score</td><td>0.67</td><td>52.3</td><td>45.0</td><td>29.6</td></tr>
<tr><td>Target Score</td><td>>0.84</td><td>>62</td><td>>41</td><td>>37</td></tr>
</table>

The ongoing use of LFA will be result-based, with achievement of a self-sustaining stable landform no longer requiring further monitoring.</td><td>Biodiversity Management Plan</td><td>No</td><td>10</td><td>Ongoing operations</td></tr>
<tr><td>Exotic cover</td><td>Biometric monitoring confirms exotic cover <33%.</td><td>Flora and Fauna Management Plan</td><td>No</td><td>11</td><td>Ongoing operations</td></tr>
<tr><td>Management of mine water</td><td>Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.</td><td>Erosion and Sediment Control Plan (ESCP)

EPL 529</td><td>No</td><td>12</td><td>Ongoing operations</td></tr>
<tr><td>Water quality</td><td>Water quality discharged from diversion meets water quality trigger values for North Wambo Creek under normal flow conditions, as provided in the SWMP.</td><td>Surface Water Monitoring Program</td><td>No</td><td>12</td><td>Ongoing operations</td></tr>
</table>

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
	Spontaneous combustion	No spontaneous combustion evident.	Section 6.3 Conceptual Mine Closure Plan	No	6	Ongoing Operations
	Erosion control	No tunnel erosion evident. No gully erosion evident. No rill erosion >200mm deep and/or >200mm wide. Appropriate erosion controls are in place and effective.	Section 5.6.2 Conceptual Mine Closure Plan Erosion and Sedimentation Control Plan	No	13	Ongoing operations

Table 28 Rehabilitation Performance Indicators and Completion Criteria – Ecosystem and Land Use Stability Phase

<table>
<tr><th>Objectives</th><th>Performance Indicator</th><th>Completion Criteria</th><th>Justification</th><th>Complete (Yes/No)</th><th>TARP Ref No#</th><th>Progress at start of MOP</th></tr>
<tr><td colspan="7">Rehabilitation Phase – Ecosystem and Land use Establishment Phase</td></tr>
<tr><td colspan="7">Domain 1 (Infrastructure), Domain 3 (Tailings Emplacement Areas), Domain 4 (Waste Rock Emplacement Areas), Domain 7 (North Wambo Creek Diversion), Domain 8 (Active Mining), Domain 9 (Future Mining), Domain 10 CHPP, Domain D (Mixed Woodland/Pasture Areas), Domain E (Woodland Corridors)</td></tr>
<tr>
<td>Land capability returned to a class similar to that existing prior to the commencement of mining (i.e. Class V and Class VI)

Mixed Woodland/Pasture Areas established consistent with revegetation strategy.

Woodland Corridor Areas established consistent with revegetation strategy.

Rehabilitated landforms will be designed to shed water safely without causing excessive erosion, jeopardising landform geotechnical integrity or increasing</td>
<td>LFA (Woodland Rehabilitation)

LFA (Pasture/Woodland)

LFA (Riparian)</td>
<td>A green, yellow, orange and red colour system has been developed to rank each measured attribute according to the performance and management actions required. This colour ranking system is shown below. The number of hollow-bearing trees and length of fallen logs have been presented as a measure of fauna habitat attributes. However no performance criteria has been set for these attributes in remnant vegetation, as in some cases it may take many years (50+) for a suitable density of hollows and logs to form naturally.
<table>
<tr><th>Site Attribute</th><th>Red (needs greater improvement)</th><th>Orange (in need of improvement)</th><th>Yellow (Not meeting target but values still acceptable)</th><th>Green (Excellent – within target range)</th></tr>
<tr><td>Native Plant Species Richness (NPS)</td><td>0-10%</td><td>>10-<50% of target range</td><td>50-<100% of target range</td><td>≥ target range</td></tr>
<tr><td>Native Overstorey Cover (NOS)</td><td>0-10% or >200% of target range</td><td>>10-<50% or >150-200% of target range</td><td>50-<100% or >100-150% of target range</td><td>Within target range</td></tr>
<tr><td>Native Midstorey Cover (NMS)</td><td>0-10% or >200% of target range</td><td>>10-<50% or >150-200% of target range</td><td>50-<100% or >100-150% of target range</td><td>Within target range</td></tr>
<tr><td>Native Ground Cover – grasses (NGCG)</td><td>0-10% or >200% of target range</td><td>>10-<50% or >150-200% of target range</td><td>50-<100% or >100-150% of target range</td><td>Within target range</td></tr>
<tr><td>Native Ground Cover – shrubs (NGCS)</td><td>0-10% or >200% of target range</td><td>>10-<50% or >150-200% of target range</td><td>50-<100% or >100-150% of target range</td><td>Within target range</td></tr>
<tr><td>Native Ground Cover – other (NGCO)</td><td>0-10% or >200% of target range</td><td>>10-<50% or >150-200% of target range</td><td>50-<100% or >100-150% of target range</td><td>Within target range</td></tr>
<tr><td>Proportion of native overstorey species regenerating (OR) in vegetation zone</td><td>0</td><td>0-0.5</td><td>0.5-1</td><td>1</td></tr>
<tr><td>Exotic plant cover (EPC)</td><td>>66%</td><td>33-66%</td><td>5-33%</td><td>0-5%</td></tr>
</table>
</td>
<td>WCPL's Completion Criteria and monitoring program has been developed based on the Biometric (Gibbons et al 2009)

Biodiversity Management Plan</td>
<td>No</td>
<td>10</td>
<td>Ongoing operations</td>
</tr>
</table>

<table>
<tr><th>Objectives</th><th>Performance Indicator</th><th>Completion Criteria</th><th>Justification</th><th>Complete (Yes/No)</th><th>TARP Ref No#</th><th>Progress at start of MOP</th></tr>
<tr>
<td>pollution of downstream watercourses.

Soil properties are suitable for the establishment and maintenance of selected vegetation species

Establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park;

Pasture Areas established consistent with analogue pasture communities.

Land affected by subsidence will be stable and will not present a greater safety or environmental hazard than surrounding land or present a risk to future final land use options</td>
<td></td>
<td>Completion criteria for seven Plant Community Types (PCT) present within the RWEAs has been developed considering both the baseline data collected during the 2014/2015 monitoring program and OEH benchmark values for each PCT . This criterion is included below, along with the average value calculated from the site value scores for each monitoring plot within the PCT.
<table>
<tr><th>Plant Community Type (PCT)</th><th></th><th>NPS</th><th>NOS (%)</th><th>NMS (%)</th><th>NGC G</th><th>NGC S</th><th>NGC O</th><th>EPC</th><th>OR</th><th>HBT</th><th>FL</th></tr>
<tr><td rowspan="3">PCT 42: River Red Gum / River Oak riparian woodland wetland in the Hunter Valley</td><td>Average Value</td><td>14.3</td><td>15.3</td><td>14.5</td><td>28.9</td><td>1.1</td><td>6.9</td><td>38.3</td><td>1</td><td>0</td><td>14.9</td></tr>
<tr><td>Benchmark Value</td><td>38</td><td>10-50</td><td>10-50</td><td>20-60</td><td>1-5</td><td>10-30</td><td><5</td><td>1</td><td>0.1</td><td>10</td></tr>
<tr><td>Completion Criteria</td><td>>20</td><td>10-50</td><td>10-50</td><td>20-60</td><td>1-5</td><td>5-30</td><td><10</td><td>1</td><td>-</td><td>-</td></tr>
<tr><td rowspan="3">PCT 1658: Rough barked Apple–Narrow leaved Ironbark-Blakely's Red Gum-Bull Oak–Coast Banksia woodland on sands of the Warkworth area</td><td>Average Value</td><td>27</td><td>11.8</td><td>10.8</td><td>19.5</td><td>3.5</td><td>31</td><td>10.4</td><td>1</td><td>1</td><td>13.9</td></tr>
<tr><td>Benchmark Value</td><td>26</td><td>13-40</td><td>10-50</td><td>4-15</td><td>5-30</td><td>5-25</td><td>0</td><td>1</td><td>0.8</td><td>20</td></tr>
<tr><td>Completion Criteria</td><td>>20</td><td>10-40</td><td>10-50</td><td>4-20</td><td>5-30</td><td>5-35</td><td><10</td><td>1</td><td>-</td><td>-</td></tr>
<tr><td rowspan="3">PCT 1603: Narrow leaved Ironbark – Bull Oak - Grey Box shrub- grass open forest of the central and lower Hunter</td><td>Average Value</td><td>29</td><td>13.8</td><td>9.2</td><td>26</td><td>7.4</td><td>4</td><td>0.2</td><td>1</td><td>0.7</td><td>26.35</td></tr>
<tr><td>Benchmark Value</td><td>41</td><td>15-40</td><td>5-10</td><td>30-50</td><td>5-10</td><td>20-40</td><td><5</td><td>1</td><td>3</td><td>5</td></tr>
<tr><td>Completion Criteria</td><td>>25</td><td>10-40</td><td>5-10</td><td>15-50</td><td>5-10</td><td>5-40</td><td><5</td><td>1</td><td>-</td><td>-</td></tr>
</table>
</td>
<td>WCPL's Completion Criteria and monitoring program has been developed based on the Biometric (Gibbons et al 2009)

Biodiversity Management Plan</td>
<td>No</td>
<td>9</td>
<td>Ongoing operations</td>
</tr>
</table>

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
		See nested table below	WCPL's Completion Criteria and monitoring program has been developed based on the Biometric (Gibbons et al 2009) Biodiversity Management Plan	No	9	Ongoing operations

Plant Community Type (PCT)		NPS	NOS (%)	NMS (%)	NGC G	NGC S	NGC O	EPC	OR	HBT	FL
PCT1604: Narrow leaved Ironbark – Grey Box - Spotted Gum shrub - grass of the central and lower Hunter		35	22.5	7.2	34	8	5.3	0	1	0	35.3
PCT1604: Narrow leaved Ironbark – Grey Box - Spotted Gum shrub - grass of the central and lower Hunter PCT1176: Slaty Box – Grey Gum shrubby woodland on footslopes of the upper Hunter Valley, Sydney Basin Bioregion	Benchmark Value	41	15-40	5-20	30-50	5-10	20-40	<5	1	3	5
	Completion Criteria	**>35**	**15-40**	**5-20**	**30-50**	**5-15**	**5-40**	**<5**	**1**	**-**	**-**
	Average Value	31	12.1	11.6	23.5	3	6	0	1	0	26
PCT1176: Slaty Box – Grey Gum shrubby woodland on footslopes of the upper Hunter Valley, Sydney Basin Bioregion PCT 1584: White Mahogany – Spotted Gum - Grey Myrtle semi-mesic shrubby open forest of the central and lower Hunter Valley	Benchmark Value	21	19-42	6-24	5-20	0-25	2-10	<5	1	1	30
	Completion Criteria	**21**	**15-40**	**5-30**	**5-30**	**0-25**	**2-10**	**<5**	**1**	**-**	**-**
	Average Value	50	10.5	19	70	16	8	0	1	0	25

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP

Plant Community Type (PCT)		NPS	NOS (%)	NMS (%)	NGC G	NGC S	NGC O	EPC	OR	HBT	FL
PCT 1584: White Mahogany – Spotted Gum - Grey Myrtle semi-mesic shrubby open forest of the central and lower Hunter Valley PCT 1603: Narrowleaved Ironbark – Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter *	Benchmark Value	51	22-45	5-40	5-25	10-20	5-20	<5	1	1	20
PCT 1584: White Mahogany – Spotted Gum - Grey Myrtle semi-mesic shrubby open forest of the central and lower Hunter Valley PCT 1603: Narrowleaved Ironbark – Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter * PCT 1603: Narrowleaved Ironbark – Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter *	**Completion Criteria**	**>45**	**15-45**	**5-40**	**5-40**	**10-20**	**5-20**	**0**	**1**	**-**	**-**
	Average Value	39	5.5	25.7	40.7	6.7	12.6	4	1	0	12.6
	Benchmark Value	41	15-40	5-10	30-50	5-10	20-40	<5	1	3	5
PCT 1603: Narrowleaved Ironbark – Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter *	**Completion Criteria**	**>30**	**5-40**	**5-40**	**30-50**	**5-10**	**10-40**	**<5**	**1**	**-**	**-**

<table>
<tr><th>Objectives</th><th>Performance Indicator</th><th>Completion Criteria</th><th>Justification</th><th>Complete (Yes/No)</th><th>TARP Ref No#</th><th>Progress at start of MOP</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th></th><th>NPS</th><th>NOS (%)</th><th>NMS (%)</th><th>NGCG</th><th>NGCS</th><th>NGCO</th><th>EPC</th><th>OR</th><th>FL</th></tr>
<tr><td>Older Woodland Rehabilitation on areas with a canopy of Sugar Gum</td><td>>15</td><td>15-40</td><td>5-40</td><td>5-15</td><td>5-10</td><td>5-15</td><td><20</td><td>1</td><td>5</td></tr>
<tr><td>Rehabilitated areas of Narrow-leaved Ironbark – Bull Oak - Grey Box open forest</td><td>>20</td><td>10-40</td><td>5-10</td><td>15-50</td><td>5-10</td><td>5-40</td><td><20</td><td>1</td><td>-</td></tr>
</table>
</td><td>WCPL's Completion Criteria and monitoring program has been developed based on the Biometric (Gibbons et al 2009)

Biodiversity Management Plan</td><td>No</td><td>9</td><td>Ongoing operations</td></tr>
<tr><td></td><td>Exotic cover</td><td>Biometric monitoring confirms exotic cover <20%.</td><td>Flora and Fauna Management Plan</td><td>No</td><td>11</td><td>Ongoing operations</td></tr>
<tr><td></td><td>Management of mine water</td><td>Water runoff is contained and managed within internal water management system. No water discharged from site, unless relevant volumes and quality as specified by Environmental Protection Licence (EPL) No. 529 can be achieved.</td><td>Erosion and Sediment Control Plan (ESCP)

EPL 529</td><td>No</td><td>13</td><td>Ongoing operations</td></tr>
<tr><td></td><td>Water quality</td><td>Water quality discharged from diversion meets water quality trigger values for North Wambo Creek under normal flow conditions, as provided in the SWMP.</td><td>Surface Water Monitoring Program</td><td>No</td><td>13</td><td>Ongoing operations</td></tr>
<tr><td></td><td>Spontaneous combustion</td><td>No spontaneous combustion evident.</td><td>Section 6.3 Conceptual Mine Closure Plan</td><td>No</td><td>6</td><td>Ongoing Operations</td></tr>
<tr><td></td><td>Erosion control</td><td>No tunnel erosion evident.
No gully erosion evident.
No rill erosion >200mm deep and/or >200mm wide.
Appropriate erosion controls are in place and effective.</td><td>Section 5.6.2 Conceptual Mine Closure Plan</td><td>No</td><td>13</td><td>Ongoing operations</td></tr>
</table>

Objectives	Performance Indicator	Completion Criteria	Justification	Complete (Yes/No)	TARP Ref No#	Progress at start of MOP
			Erosion and Sedimentation Control Plan			
	Terrestrial fauna	Fauna monitoring will be used to qualitatively validate BioMetric and LFA monitoring results (i.e. self-sustaining stable landforms and vegetation structure have been successfully recreated or reintroduced and are being inhabited or frequented by local fauna).	Flora and Fauna Management Plan	No	17	Ongoing operations
	Feral animals	Annual feral animal control program implemented. Ecological monitoring confirms t feral animal control program effective.	Flora and Fauna Management Plan	No	17	Ongoing operations
	Bushfire management	Mitigation actions have been implemented as required by the Bushfire Management Plan.	Bush Fire Management Plan	No	18	Ongoing operations
	Sustainable Grazing	Monitoring confirms established pasture is able to sustain grazing activities comparable to that of the surrounding remnant pasture areas.	Section 8.4	No	TBA	Ongoing operations

7.0 REHABILITATION IMPLEMENTATION

7.1 STATUS OF MOP COMMENCEMENT

This section describes the status of each domain at the start of this MOP period. This information is also presented graphically in **Plan 2**. The rehabilitation status of domains which are currently active (areas subject to on-going mining operations), are not described in detail.

Mine waste rock emplacements have been progressively re-shaped behind the active mining areas to construct landforms generally consistent with the pre-mining landform surface. Other Project components including areas of tailings emplacements have also been progressively rehabilitated as the area has become available.

Revegetation of completed landforms has been progressively undertaken and has included establishing both woodland and grassland vegetation communities, consistent with the rehabilitation objectives (**Section 4.3**) and post-mining land use (**Section 4.2**). As at 31 December 2014 approximately 446.5ha of completed landforms have been rehabilitated (**Table 29**).

Table 29 Cumulative Rehabilitation Areas

Revegetation	Final Land Use	Area (Ha)	Performance Criteria Achieved at MOP Commencement
Pasture	Grazing	397.07	No - ongoing
Woodland	Woodland Corridor	49.43	No – ongoing
	Total Areas	**446.5**	

Table 30 provides a summary of the status of activities for the Primary Domains at the commencement of the MOP period. The activity status of the domains include:

- **Active:** Domains subject to on-going mining operations and associated mining activities;
- **Not Active:** Domains not subject to proposed mining operations; and
- **Maintenance*:** Domains subject to rehabilitation monitoring, ecological monitoring and rehabilitation maintenance activities.

Note: There are no domains at the commencement of this MOP term that have met their respective completion criteria. Therefore ongoing management, monitoring and maintenance activities will be ongoing during this MOP term.

Table 30 Primary Domain Mining Activity Status

Domain	Domain Status	Domain Activities
Domain 1 Mine Infrastructure Areas	Active	**Table 7** provides a summary of key assets within Domain 1. The infrastructure in this domain, includes but not limited to haul roads, mine entry road, main workshop, car park, mine administration and bathhouse facilities.
Domain 2 Water Management	Active	**Table 7** provides a summary of assets within Domain 2. This domain is a made up of a number of clean and dirty water dams used by the Mine for operational purposes.
Domain 3 Tailings Emplacement	Active	This domain is a made up of active and decommissioned tailings storage facilities. At the commencement of the MOP period there were two tailing facilities in various life stages, including: • North East Tailings Dam (NETD) - Progressive capping of tailings of the NETD has occurred and will continue through the MOP term. • Hunter Pit Tailings Dam - Active at the commencement of the MOP until 2016 when the tailings dam is scheduled to be decommissioned.
Domain 4 Waste Rock Emplacement Areas	Active	This domain is a made up of a number of out of pit and in pit waste rock emplacement areas. Progressive rehabilitation of waste emplacement areas has occurred during the mine life.
Domain 5 Subsidence Areas	Maintenance	Each relevant Extraction Plan outlines the proposed management, mitigation, monitoring and reporting of potential subsidence impacts and environmental consequences from the secondary extraction of Longwalls 7 to 10a at the NWU Mine and Longwalls LW11 to LW13 and LW14 to LW16 at the SBU Mine.
Domain 6 Rehabilitation (Pre MOP)	Maintenance	Revegetation of completed landforms has been progressively undertaken and has included establishing both woodland and grassland vegetation communities, consistent with the rehabilitation objectives and post-mining land use. Rehabilitation activities within this domain during the MOP term will primarily be associated with Ecosystem and Land Use Sustainability.
Domain 7 North Wambo Creek Diversion	Maintenance	Revegetation of completed landforms has been progressively undertaken and has included establishing both woodland and grassland vegetation communities, consistent with the rehabilitation objectives and post-mining land use. Rehabilitation activities within this domain during the MOP term will primarily be associated with Ecosystem and Land Use Sustainability.
Domain 8 Active Mining Area	Active	At the commencement of the MOP active mining in the open cut was undertaken as described in **Section 2.3.3**. The Open Cut mine has been divided into a number of pits. These pits comprise the Bates South Pit, Bates South Extended, Montrose West Pit and Montrose East Pit
Domain 9 Future Mining	Active	This domain is made up from a number of proposed mining areas that have not commenced at the beginning of the MOP term.
Domain 10 Coal Handling and Preparation Plant	Active	This domain contains the CHPP, rail load out facility, surface conveyors, product stockpile, ROM stockpiles, ROM crusher, reject bin, workshop, offices, bathhouse and employee car park.

7.2 PROPOSED REHABILITATION ACTIVITIES THIS MOP PERIOD

Mining and progressive rehabilitation activities over the term of this MOP are shown in **Plans 3A – 3F**. A description of proposed rehabilitation activities for each domain is provided in **Sections 7.2.1** to **7.2.16**. Final landform shaping of overburden emplacement areas will be progressively completed during the MOP term and rehabilitated.

As outlined in **Section 2.3.4**, reshaping results in a stable landform incorporating slopes and drainage which blend in with the surrounding natural topography. Slope stability is integral to rehabilitation design and the objective during rehabilitation planning is to design all slopes to a gradient of 10° or less (1V:5.7H). Slopes steeper than 10° may be necessary in some locations to ensure rehabilitation merges seamlessly with adjacent undisturbed land.

Mine waste rock emplacements would cover an area of approximately 1,300 ha and be rehabilitated to a final landform up to 160m AHD. Where long slopes are present, contour drains or deep staggered rips would be established. Waster rock emplacements will be constructed in 15 to 20 metre lifts and shaped to the final landform profile when completed.

Following shaping of the landform the mine waste rock emplacements would be covered with approximately 100 mm of topsoil sourced from soil stockpiles or freshly stripped open cut mining areas. Site preparation works following the placement of topsoil would include chisel ploughing or deep ripping along contour, depending on the vegetation type to be established.

Mine waste rock emplacements would be progressively revegetated with a pasture cover crop and endemic woodland shrubs and trees planted on ridgelines and other selected areas, consistent with the proposed revegetation strategy as described in **Section 5.3.7.**

Table 31 summarises the disturbance areas and where rehabilitation activities during the MOP period will be undertaken.

Revegetation will be progressive, commencing soon after the completion of landform shaping. Species to be planted in the rehabilitated landforms will be a mixture of native and introduced locally successful tree, native and exotic grasses and legume species. Locally collected tree and shrub seed will be used where practical.

Table 17 provides the list of species to be used in revegetation of woodland corridor areas. **Table 17** and **Table 18** provide the list of species to be used in revegetation pasture/woodland areas. Areas nominated for temporary rehabilitation, will use species as identified in **Table 18**.

In previously rehabilitated areas, ongoing maintenance activities will include controlling weeds and pests, repairing landforms, re-seeding and application of maintenance fertilisers as required. The requirement of these activities will be based on the annual rehabilitation monitoring program (**Section 8.0**) and opportunistic inspections of rehabilitated areas.

In RWEP areas, ongoing activities will include controlling weeds and animal pests as required. The requirement of these activities will be based on the annual monitoring program, opportunistic inspections (**Section 8.0**) and as required by the FFMP.

Table 31 Rehabilitation and Disturbance Progression during the term of the MOP

Year	Total Disturbances (ha)	Total Rehabilitation (ha)	Cumulative Rehabilitation (ha)
2015	55.2	0	446.5
2016	101.4	103.4	549.9
2017	63.6	52.9	602.8
2018	49.6	43.5	646.3
2019	45.3	44.3	690.6
2020*	26.6	42.4	733.0
At end of MOP	**341.7**	**286.5**	**733.0**

Notes*: Refers to end of 2020

Sections 7.2.1 to **7.2.16** provide a summary of rehabilitation activities scheduled for each domain during the MOP term, including the appropriate rehabilitation phase to be undertaken, with respect to the following rehabilitation activities, including:

- Timing and activities involved in decommissioning;
- Physical and chemical characteristics of mining and process waste of emplaced material relevant to rehabilitation;
- Method of landform establishment;
- Final landform profile and slopes;
- Characteristics of all cover material including sealing/drainage layers, subsoil/topsoil;
- Thicknesses of cover layers and methods of laying and compaction including topsoil, imported substrate material;
- Drainage and erosion control methods;
- Soil amelioration/treatment methods;
- Vegetation species and establishment techniques;
- Management of cleared vegetation;
- Habitat establishment techniques; and
- Maintenance activities/requirements.

7.2.1 Domain 1 – Mine Infrastructure Areas

No rehabilitation activities are scheduled for this domain during the MOP term. **Plan 3E** illustrates the infrastructure areas that will be remaining at the end of the MOP term.

This domain will remain active during the MOP term. At mine closure the infrastructure in this domain that is not required as part of a post closure land use will be decommission and removed. Interim rehabilitation measures, including the establishment of cover crops and dust management controls on incomplete landforms and other inactive disturbance areas, will be implemented where they may remain inactive for an extended period. These measures will provide initial stabilisation of mine landforms, reduce the visual impact of the mine and minimise the potential for generation of windblown dust and sediment laden runoff during decommission activities. Temporary rehabilitation using pasture species as provided in **Table 17** will be used to stabilise these areas.

7.2.2 Domain 2 – Water Management

No rehabilitation activities are scheduled for this domain during the MOP term. **Plan 3E** illustrates the water management dams that will be remaining at the end of the MOP term.

This domain will remain active during the MOP term. At mine closure selected dams may be retained and transferred to regional landholders for use following mine closure, where agreed in consultation with relevant authorities and local landholders.

Domain 3 – Tailings Emplacement Areas

Rehabilitation activities, including decommissioning and consolidating are scheduled for this domain during the MOP term. **Plan 3E** illustrates the tailings emplacement areas that will be remaining at the end of the MOP term.

Currently there are a number of tailing facilities in various life stages at the commencement of this MOP term, including:

- North East Tailings Dam (Decommissioned and under care and maintenance until alternate capping method trial is completed;
- Hunter Pit Tailings Dam (Currently active but scheduled for decommissioning in 2016 and followed by consolidation of the tailings); and
- Homestead and In Pit Tailings Dams (Not developed. Commissioning expected in late 2016 subject to relevant approvals and decommissioning of infrastructure associated with the current NWU mine)

The engineered capping design would consider site topography, prevailing climatic conditions and the availability of suitable fine textures material (i.e. highly weathered mine water rock) as a cover material. The capping process creates a final landform that is stable and can be rehabilitated using the same rehabilitation concepts and methods as for the mine waste rock emplacements. Final rehabilitation of the tailings emplacement areas will occur when the dams have been capped and deemed stable and suitable for rehabilitation to occur.

7.2.3 Domain 4 – Waste Rock Emplacement Areas

Portions of waste rock emplacement areas (**Plans 3A – 3F**) are scheduled for progressive rehabilitation during the MOP term. Overburden emplacement areas progressively rehabilitated during the MOP term will transfer to rehabilitated areas. The following rehabilitation phases identified within this domain during the MOP term include:

Decommissioning

No decommissioning activities required to rehabilitate overburden emplacement areas.

Material Characterisation

Material and soil characterisation will be undertaken at an appropriate scale across the site, prior to re-handling of topsoil and waste rock material.

Representative samples will be taken to characterise the nature of the soil material (e.g. sodicity, acid-generating potential, etc.) to determine the potential limitations to rehabilitation and sustainable plant growth.

The results will be used to determine specific ameliorant techniques that may be applied to the soil material in order for rehabilitation to be sustainable.

Some ameliorates may need to be added to rehabilitated areas, with these possibly including gypsum, lime, fertiliser and organic growth material (OGM). The use of soil ameliorants is designed to prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination.

Landform Establishment

As outlined in **Section 2.3.4**, landform reshaping consists of re-contouring overburden dumps to the designed shape for final rehabilitation to a final landform up to 160m AHD.

Reshaping results in a stable landform incorporating slopes and drainage which blend in with the surrounding natural topography. Slope stability is integral to rehabilitation design and the objective during rehabilitation planning is to design all slopes to a gradient of 10° or less (1V:5.7H). Slopes steeper than 10° may be necessary in some locations to ensure rehabilitation merges seamlessly with adjacent undisturbed land.

Once bulk reshaping is completed, the landform is ripped to approximately 200-300 mm and then the final trim and rock raking are undertaken. The ripping loosens up any near surface strata within the landform that have been compacted during placement, aiding root penetration during vegetation establishment. The final trim smooths out any washouts, rough edges, temporary access tracks, local steep topography and prepares the surface for revegetation.

Rock-raking removes exposed surface rock greater than 200 mm in diameter. This raking is usually done along the contour, leaving a textured surface that assists with erosion minimisation until vegetation can be established.

Growth Medium Development

Topsoil stripped ahead of mining is applied to the reshaped surface in an even layer generally not less than 100 mm. Topsoil is placed using rear dump haul trucks and spread with dozers or graders. Once spread, the topsoil surface is disc or chisel cultivated to create a textured surface which assists in trapping surface runoff, provides seed entrapments and creates microclimates favourable for seed germination.

Where topsoil stockpiles are significantly weed infested, the top layer of the stockpile may require scalping before underlying material is used for topdressing.

If the pre-rehabilitation assessment determines the stockpiled material is sodic, gypsum should be applied at a standard rate of 5 - 10 t/ha, depending on material sodicity. If gypsum is required, it should be mixed in with the topsoil as part of the stripping operation (ameliorants applied to topsoil surface prior to stripping), irrespective of whether the topsoil is to be placed in storage or directly applied to a rehabilitation area. Application of ameliorants as part of the topsoil stripping process is cost effective, and – in the case of gypsum in particular - gives the ameliorants additional time to react and modify the soil to ensure it is a stable growing medium.

Although low pH soil has not historically been a concern at Wambo, a lime requirement test should be undertaken to determine the lime application rate, if low pH material is identified during the pre-rehabilitation assessment.

Addition of organic supplements is recommended for high and low pH, sodic (dispersive) and low fertility soils. Such supplements can also assist in returning favourable soil microorganisms to sterile long-stockpiled material.

Erosion and Sediment Control

The surface of mine waste rock emplacements would be constructed to form a pattern of ridges and valleys. The valley areas would be shaped into a network of constructed drainage structures. Mine waste rock emplacement surfaces would be formed to maximise rainfall absorption and to minimise the requirement for artificial drainage structures. Mine waste rock emplacement berms would generally be reverse graded with perimeter bunds constructed as necessary.

Natural slopes commonly evolve to form an ‘S’ shape as a result of natural erosion and deposition processes. Mine waste rock emplacement slopes would generally be constructed in profile to form an ‘S’ shape with the upper 20 to 30% being convex and the lower 70 to 80% being concave.

Until an adequate vegetation cover is established, heavy rainfall may cause erosion, resulting in a dissected land surface, resource loss and the need for expensive remedial treatment. Therefore, slope length is reduced by fit for purpose designed structures such as contour drains, to intercept and divert water off the slopes. The structure(s) principle aim is to drain water safely from the landform,

via a sediment detention structure if the water is to be discharged from the mine water management footprint.

Ecosystem Establishment:

The revegetation strategy includes the revegetation of disturbance areas with areas of woodland (corridors), areas which contain a mixture of woodland and pasture, and riparian vegetation, as described **Section 3.3.7.4.**

Vegetation may be established by the following methods:

- Sowing or direct seeding;
- Propagules (seeds, lignotubers, corms, bulbs, rhizomes and roots) stored in the topsoil;
- Spreading harvested plants with bradysporous seed (seed retained on the plant in persistent woody capsules) onto areas being rehabilitated;
- Planting nursery-raised seedlings (tubestock); and
- Invasion from surrounding areas through vectors including birds, animals and wind.

The most common method of vegetation establishment at Wambo is broadcast seeding of selected pasture or tree seed mixes.

Seed sowing is usually supplemented by the concurrent application of granulated fertiliser. Sowing is undertaken shortly after topsoil spreading to avoid loss of topsoil due to wind and rain action. Tubestock is generally only used to establish vegetation where rapid growth or specific species establishment is required, such as remedial revegetation, erosion control or visual bunding.

Fertiliser application is beneficial to vegetation establishment to replenish any nutrient deficiencies. The type of fertiliser and application rate varies according to the specific site, soil type and post-mining use of the area. When applying any additional chemical or products to the soil, the effects of runoff and leaching will be considered, as rapid leaching from organic wastes are known to provide ideal conditions for algal blooms and exacerbate weed growth and infestation.

Timing for initial vegetation establishment is an important factor for successful revegetation. Where possible, sowing and planting are planned to occur as soon as possible prior to the expected onset of reliable rains or after a break of the season (i.e. Autumn and Spring).

Following the changes in topography, drainage and soil conditions that results from open cut mining, some local provenance species may not be suitable for revegetation and seed sourced from outside the immediate district may be required. The most appropriate species to use to rehabilitate the area are those most suited to the soil types, drainage status, aspect and climate of the site. The biodiversity values of the surrounding native vegetation communities are considered during rehabilitation planning.

Distribution of vegetation type and species selection will be designed to enhance these values, whilst ensuring that weed and fire hazards are not increased for surrounding local agricultural areas. In recognition of the importance of vegetation corridors to regional biodiversity, rehabilitation initiatives aim to increase the connectivity of vegetation in the region through the establishment of woodland corridors. Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park. In doing so, WCPL will address the issue of discontinuity in remnant vegetation across the Hunter Valley floor.

Revegetation will include the use of native species with the potential to offer habitat resources for native wildlife (e.g. breeding, roosting/nesting or foraging resources), including threatened fauna species. The revegetation program will include the use of food tree species for the Glossy Black-cockatoo (e.g. *Allocasuarina* sp.).

Ecosystem Development

At the ecosystem and land use sustainability phase, rehabilitation monitoring results would be used to confirm rehabilitation areas are on a trajectory towards a self-sustaining ecosystem and towards meeting the rehabilitation completion criteria. Monitoring results would also be used to determine the requirement for maintenance and/or contingency measures (e.g. supplementary plantings) to improve rehabilitation performance. Contingency measures are described further in **Section 8.3**.

It is expected that at this phase, the need for maintenance/intervention would be no greater than that required for the surrounding lands whether it be for grazed lands or for existing remnant vegetation areas such as the RWEP areas.

One rehabilitation objective is the establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park Creation of post-mining landforms that enhance the amenity of the local landscape and contribute to local and regional habitat corridors as presented in the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (NSW Department of Mineral Resources, 1999).

Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park (WCPL, 2003).

Maintenance Activities

Key rehabilitation maintenance requirements include:

- Weed and feral animal control of rehabilitation;
- Erosion control works;
- Re-seeding/planting of rehabilitation areas that may have failed;
- Maintenance fertilising; and
- Repair of fence lines, access tracks and other general related land management activities.

The requirement of these rehabilitation maintenance activities will be based on the annual rehabilitation monitoring program (**Section 8.0**) and opportunistic inspections of rehabilitated areas as described in the FFMP. The rehabilitation maintenance activities are described in **Section 9.0**.

7.2.4 Domain 5 – Subsidence Area

Rehabilitation activities in this domain will be accordance with each relevant approved SMP/Extraction Plan, these activities generally include:

Visual monitoring of remediated subsidence areas will be conducted monthly to identify any requirement for maintenance measures and/or remedial works.

Any installed sediment control structures will be inspected on a monthly basis, or following rainfall events of equal to or greater than 20 mm/day (midnight to midnight) as recorded by the Wambo Meteorological Station.

Details of any subsidence impacts observed will be recorded in the Subsidence Impact Register with visual observations documented in the Subsidence Impact Register. Visual inspections will be undertaken in accordance with an inspection checklist as provided in the Subsidence Monitoring Program.

Subsidence impacts (mainly surface cracking) within areas of existing pasture (Domain C) utilised for grazing and previously rehabilitated areas in the open cut (Domain 6) will be remediated. The implementation of the program to remediate these areas will be carried out in the MOP term. The results of the subsidence remediation activities will be provided in the AR. Subsidence repairs on private property to be carried out in accordance with Section **3.3.4**.

7.2.5 Domain 6 – Rehabilitation (Pre MOP)

Ecosystem Development

At the ecosystem and land use sustainability phase, rehabilitation monitoring results would be used to confirm rehabilitation areas are on a trajectory towards a self-sustaining ecosystem and towards meeting the rehabilitation completion criteria. Monitoring results would also be used to determine the requirement for maintenance and/or contingency measures (e.g. supplementary plantings) to improve rehabilitation performance. Contingency measures are described further in **Section 8.3**.

It is expected that at this phase, the need for maintenance/intervention would be no greater than that required for the surrounding lands whether it be for grazed lands or for existing remnant vegetation areas such as the RWEP areas.

One rehabilitation objective is the establishment of woodland vegetation linking remnant vegetation to the north and east of the Project with the eastern borders of Wollemi National Park Creation of post-mining landforms that enhance the amenity of the local landscape and contribute to local and regional habitat corridors as presented in the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (NSW Department of Mineral Resources, 1999).

Accordingly, the rehabilitation program has been designed to establish linkages between the rehabilitation areas, existing remnant vegetation and Wollemi National Park (WCPL, 2003).

Maintenance Activities

Key rehabilitation maintenance requirements include:

- Weed and feral animal control of rehabilitation;
- Erosion control works;
- Re-seeding/planting of rehabilitation areas that may have failed;
- Maintenance fertilising; and
- Repair of fence lines, access tracks and other general related land management activities.

The requirement of these rehabilitation maintenance activities will be based on the annual rehabilitation monitoring program (**Section 8.0**) and opportunistic inspections of rehabilitated areas as described in the FFMP. The rehabilitation maintenance activities are described in **Section 9.0**.

7.2.6 Domain 7 – North Wambo Creek Diversion

A section of the North Wambo Creek has been diverted to avoid the Wambo Open Cut Mine. The North Wambo Creek diversion was constructed in accordance with the approved North Wambo Creek Diversion Plan.

Rehabilitation activities within this domain during the MOP term will primarily be associated with Ecosystem and Land Use Sustainability phase, including the following rehabilitation maintenance activities:

- Controlling weeds;
- Repairing landforms and the creek channel (as a result of mine induce subsidence);
- Revegetation (i.e. replanting and/or reseeding); and
- Application of maintenance fertilisers as required.

A selection of pasture/cover crops have been utilised in the revegetation of the North Wambo Creek diversion riparian zone. The revegetation strategy includes the planting of the riparian corridor with River Oak (*Casuarina cunninghamia*) and Rough-barked Apple (*Angophora floribunda*).

The requirement of these rehabilitation maintenance activities will be based on the annual rehabilitation monitoring program (**Section 8.0**) and opportunistic inspections of rehabilitated areas as described in the FFMP. The rehabilitation maintenance activities are described in **Section 9.0**.

7.2.7 Domain 8 – Active Mining Areas

No rehabilitation activities are scheduled for this domain during the MOP term. Some areas of the active mining area will transfer to overburden emplacement areas during the MOP term as identified on **Plans 3A – 3F**.

7.2.8 Domain 9 – Future Mining Areas

No rehabilitation activities are scheduled for this domain during the MOP term, however some areas of the future mining area will transfer to active mining areas during the MOP term as identified on **Plans 3A – 3F**.

Surface Disturbance Permit Procedure

WCPL has implemented a Surface Disturbance Permit (SDP) procedure and checklist. The SDP requires the approval of WCPL's Environmental Department prior to any land disturbance and clearing activities taking place. The SDP aims to identify any environmental issues such as cultural heritage sites, flora and fauna communities, threatened species, surface drainage and the identification of any seed or timber resources that can be salvaged.

Where required, The following requirements must be addressed by the SDP prior to WCPL Environment and Community Manager granting approval:

- A plan with proposed area for disturbance delineated;
- Pre clearance surveys completed for both ecological and heritage assessments;
- An erosion and sediment control plan;
- Topsoil management measures;
- Noise management measures;
- Dust management measures; and
- Light management measures.

Salvage and Re-use of Materials

Where practicable, clearing operations will be managed to maximise the re-use of cleared vegetative material. Any seed or timber resources that can be salvaged will be identified as part of the SDP procedure. Unsuitable vegetative material will be mulched and stockpiled.

Cleared vegetation suitable for fence posts and habitat for fauna will be set aside and salvaged. Habitat features such as logs and hollows collected during a clearance campaign may be utilised in WCPL's existing rehabilitated areas or to augment habitat features for fauna in the RWEP areas.

Topsoil Stockpile Management

Where possible, direct placement of excavated topsoil onto re-shaped areas is preferred to stockpiling, in order to avoid rehandling and reduce the potential for further topsoil degradation or loss. If a re-shaped surface is not available, topsoil will stockpiled in accordance with **Section 3.3.6**.

Ideally topsoil will be stockpiled for no more than 12 months. Where practicable, the topsoil that has been stockpiled for the longest period of time will be used first on available rehabilitation areas.

The location for topsoil stockpiles will determined in consideration of where the soil is to be used for rehabilitation, the haul length and the fleet required in order to minimise rehandling of the topsoil as much as possible prior to it being used for rehabilitation.

Topsoil stockpiles will be stabilised to reduce their susceptibility to wind erosion and constructed to avoid drainage lines. Stockpiles will also be sited as far as possible from mining activities to reduce any further potential for degradation. The stockpile will be shaped/rounded and seeded to reduce the potential for erosion. The seed mix used would be consistent with the pasture species mix used for rehabilitation of pasture areas (**Section 3.3.**7)

Prior to the placement of topsoil, the ground surface will be levelled and cleared. Stockpiles will be limited to approximate heights of 3m to minimise the potential for compaction and will be constructed to be free draining.

Once constructed, the topsoil stockpiles will be signposted to minimise the potential for disturbance. Access barriers will also be constructed if necessary.

Once constructed, stockpiles will be surveyed and their location and volumes recorded in a Topsoil Stockpile Register along with other relevant data pertaining to each stockpile. On a quarterly basis, stockpiles will be assessed for erosion, vegetation coverage and weed infestation.

If weed infestations are significant, appropriate maintenance/control measures will be undertaken (e.g. spraying or manual removal).

Sampling of soil stockpiles and laboratory analysis of the samples may also be undertaken to determine the requirement for or rate of ameliorant required to improve the condition of stockpiled soils.

The Topsoil Stockpile Register (and site soil balance) will be revised/updated as soon as practicable following the replacement of soil on an available rehabilitation area and the register reviewed annually to track soil availability and soil demand.

7.2.9 Domain 10 – Coal Handling and Preparation Plant

No rehabilitation activities are scheduled for this domain during the MOP term. No rehabilitation activities are scheduled for this domain during the MOP term. **Plan 3E** illustrates the infrastructure areas that will be remaining at the end of the MOP term.

This domain will remain active during the MOP term. At mine closure the infrastructure in this domain that is not required as part of a post closure land use will be decommission and removed. Interim rehabilitation measures, including the establishment of cover crops and dust management controls on incomplete landforms and other inactive disturbance areas, will be implemented where they may remain inactive for an extended period. These measures will provide initial stabilisation of mine landforms, reduce the visual impact of the mine and minimise the potential for generation of windblown dust and sediment laden runoff during decommission activities. Temporary rehabilitation using pasture species as provided in **Table 17** will be used to stabilise these areas.

7.3 SUMMARY OF REHABILITATION AREAS DURING THE MOP

Table 32 outlines the proposed rehabilitation activities within primary and secondary domains during the MOP term. Shaded cells indicate rehabilitation phases are not applicable during the MOP term as the domains will remain Active.

Table 32 Summary of Rehabilitation Proposed during the MOP Period

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area (ha) at start of MOP	Area (ha) at end of MOP
Mine Infrastructure Area (Domain 1)	Rehabilitation (Mixed Pasture/Woodland)	1D Ref: Plan 2	Active	268.0	220.8
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Water Management (Domain 2)	Water Management	2A Ref: Plan 2	Active	49.1	77.6
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Tailings Emplacement Areas (Domain 3)	Rehabilitation (Mixed Pasture/Woodland)	3D Ref: Plan 2	Active	56.2	75.1
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Waste Rock Emplacement Area (Domain 4)	Rehabilitation (Mixed Pasture/Woodland) Rehabilitation (Woodland Corridors)	4D/4E Ref: Plan 2	Active	528.4	690.6
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Subsidence Area (Domain 5)	Existing Native Existing Pasture	5B/5E Ref: Plan 2	Active	951.3	1322.9
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	As required	
			Relinquished Lands	0	0
Rehabilitation Area (Domain 6)	Existing Pasture Rehabilitation (Mixed Pasture/Woodland)	6C/6D Ref: Plan 2	Active	387.8	632
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	387.8	632

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area (ha) at start of MOP	Area (ha) at end of MOP
			Relinquished Lands	0	0
North Wambo Creek Diversion (Domain 7)	Rehabilitation (Pasture and selected woodland species)	7D Ref: Plan 2	Active	90.0	90.0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	90.0	90.0
			Relinquished Lands	0	0
Active Mining Area (Domain 8)	Rehabilitation (Mixed Pasture/Woodland) Rehabilitation (Woodland Corridors) Final Void	4D/4E/8F Ref: Plan 2	Active	152.4	99.8
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Future Mining (Domain 9)	Rehabilitation (Mixed Pasture/Woodland) Rehabilitation (Woodland Corridors)	9D/9E Ref: Plan 2	Active	475.1	225.4
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
Coal Handling And Preparation Plant (Domain 10)	Rehabilitation (Mixed Pasture/Woodland) Rehabilitation (Woodland Corridors) Mine Infrastructure Decommissioned	10D/10E 10G Ref: Plan 2	Active	28.6	28.6
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0

Note: The mining process at WCPL does not provide for areas of landform establishment at the year end or at the end of the MOP term. However, the mining process continually transitions from active mining, overburden emplacement, landform establishment, to growth medium establishment through the year.

7.4 Relinquishment Phase Achieved during MOP Period

As mining activities at WCPL are scheduled to continue past the MOP period and the Mine has an approved 21 year mine life until the year 2025, there will be no areas subject for lease relinquishment at the end of this MOP term.

8.0 REHABILITATION MONITORING AND RESEARCH

8.1 REHABILITATION MONITORING

Rehabilitation performance, in accordance with the BMP, is currently monitored to ensure vegetation is establishing and to determine the need for any maintenance and/or contingency measures. The BMP was issued to the DP&E on the 28 October 2016 after extensive consultation with NSW Office of Environment and Heritage (OEH) and the Department of the Environment and Energy (DoEE). On the 17 November 2016 the DoEE approved the BMP. On the 1 November 2016 the OEH endorsed the BMP. Although the BMP has not received final approval by the DP&E, key elements of the BMP applicable to this MOP including completion criteria, biodiversity management and monitoring programs have been implemented since late 2016. A copy of the BMP is provided in **Appendix 5**.

The two main components of the Biodiversity Monitoring Programme include:

- Monitoring of mine rehabilitation areas; and
- Monitoring of the Remnant Woodland Enhancement Areas (RWEA).

8.2 MONITORING OF REHABILITATION & RWEP AREAS

8.2.1 Monitoring Methodologies

8.2.1.1 Landscape Function Analysis

The LFA component of the WCPL monitoring program focuses on monitoring and providing quantitative assessment of the success of newly rehabilitated landscape establishment. Two separate assessments consisting of a varieties of measured site attributes make contribute to LFA as provided in Tongway and Hindley (2004), these are:

- Landscape Organisation Index (LOI); and
- Soil Surface Assessment.

Landscape Organisation Index is the initial LFA data acquisition step and collects information at the hill slope scale .It relates to the proportion of the transect occupied by patches of landscape elements that are relatively permanent and provide stable, resource accumulating structures, such as grassy tussocks and other ground cover, leaf litter and logs. LOI can vary from 0.0 (a totally bare site) to 1.0 (a site totally covered by vegetation).

Soil Surface Assessment results provide an index on stability, infiltration and nutrient cycling for all patch and inter-patch types for the whole of landscape (transect). The combined score from each patch type provides a stability, infiltration and nutrient cycling index.

Eleven Soil Surface Condition Indicators (SSCIs) (**Table 33**), each focusing on specific biological and/or physical processes, are used to develop three LFA indices: Stability Index (SI), Soil Infiltration (INFI) and Nutrient Cycling (NI).

Table 33: Soil Surface Condition Indicators

SSCI	Description	Relevant LFA Index		
		SI	INFI	NI
Soil Cover	Percentage cover of perennial vegetation to a height of 0.5 m. plus rocks > 2 cm and woody material > 1 cm in diameter or other long-lived, immoveable objects.	X		
Perennial Vegetation Cover	Percentage perennial vegetation cover.		X	X
Litter Cover	Percentage cover of annual grasses and ephemeral herbage (both standing and detached) as well as detached leaves, stems, twigs, fruit, dung, etc.	X	X	X
Cryptogam Cover	Percentage cover of algae, fungi, lichens, mosses, liverworts and fruiting bodies of mycorrhizas.	X		X
Crust Brokenness	Categorises soil crusts from 0-4 where 0 refers to 'no crust present' and 4 refers to an 'intact and smooth' soil crust.	X		
Erosion Type and Severity	Categorises the aerial extent and severity of various erosion types from 'Insignificant' to 'Severe'.	X		
Deposited Materials	Categorises the extent and depth of deposited alluvial material.			
Surface Roughness	Categorises the depth of surface depressions from 'smooth' to 'deep depressions'.	X	X	X
Surface Resistance to Disturbance	Categorises the soils capacity to resist disturbance based on the soils 'hardness' or 'brittleness'.	X	X	
Slake Test	Categorises the soils stability when exposed to water.		X	
Soil Texture	Categorises the soils water infiltration capacity from 'very slow' to 'high'.		X	

8.2.1.2 Biometric Vegetation Assessment

The BioMetric method (Gibbons et al 2009) is proposed as the model for determining meaningful, quantitative, biodiversity focused Completion Criteria. BioMetric, a NSW Government endorsed biodiversity assessment method (developed for the NSW BioBanking Assessment Methodology), provides a useful decision making framework founded on a standardised repeatable measurement method readily applicable to a monitoring program.

Management measures can be performance tested through the BioMetric process, thereby providing an appropriate evidence-based mechanism for optimising future management decisions. Evidence-based adjustments made to a predefined management regime are central to maximising the likelihood of a successful outcome.

BioMetric is a quantitative method developed to comparatively assess the condition of vegetation and habitat values of native vegetation against pre-defined benchmarks (i.e. pre European settlement). Vegetation and habitat condition is quantitatively evaluated by ten readily measurable 'site attributes' considered to reflect the relative health or level of disturbance of a specific vegetation class. These site attributes when measured against relative performance criteria provide meaningful ecological information used to inform management decisions. Site attributes measured in a BioMetric assessment are listed in **Table 34.**

Table 34: Biometric Site Attributes and Measurement Parameters

Site Attribute	Measurement parameter
Native Plant Species Richness (NPS)	Number of native plant Species within 400 m2 plot (count)
Native Over-storey Cover (NOS)	Projected foliage cover above 10 m height along a 50 m transect (%) – measured every 5 m
Native Mid-storey Cover (NMS)	Projected foliage cover between 1 and 10 m height along a 50 m transect (%) – measured every 5 m
Native Ground Cover (grasses) (NGCG)	Cover below 1 m along a 50 m transect (%) – measured every metre
Native Ground Cover (shrubs) (NGCS)	Cover below 1 m along a 50 m transect (%) – measured every metre
Native Ground Cover (other) (NGCO)	Cover below 1 m along a 50 m transect (%) – measured every metre
Exotic Plant Cover (EPC)	Cover along a 50 m transect (%) – measured every metre
Over-storey Regeneration (OR) within vegetation zone	Overstorey canopy species <5 cm diameter at breast height (DBH) within a 1,000 m2 plot (score 0 to 1)
Number Of Trees With Hollows (HBT)	Number of trees containing hollows within a 1,000 m2 plot (count)
Total Length of Fallen Logs (FL)	Log length touching ground >10 cm diameter and >0.5 m in length within a 1,000 m2 plot (metres)

8.2.2 Monitoring Program

A summary of WCPL's Biodiversity Monitoring Program is provided in **Table 35 35**. Monitoring locations are shown on **Figures 9 and 10.** Details on the monitoring program requirements and timing are provided in the following sections.

Table 35: Biodiversity Monitoring Program

Monitoring Type	Area	Site	Monitoring Frequency and Timing	Details
Biometric	RWEA A	V1-B1, V1-B2, V1-B3, V2-B1, V2-B2, V3-B1, V5-B1, V5-B2, V5-B3, V6-B1, V6-B2, V6-B3	Annually (Spring)	A number of permanent flora survey quadrats have been established in RWEAs to obtain quantitative data on plant species diversity and abundance. Quadrat data will be collected at each of the floristic quadrat monitoring sites. Note: Biometric monitoring in the Woodland Rehabilitation Areas will be undertaken at the same time as the LFA monitoring in the Woodland Rehabilitation Areas
	RWEA B	V9-B1, V9-B2, V10-B1, V13-B1, V14-B1, V14-B2		
	RWEA C	V6-A1c, V6-B1c, V6-B2c, V11-B1, V11-B2		
	RWEA D	V10-A1, V10-B3		
	Rail Loop	V5-B4, V6-B4		
	Reference Sites	V1-A1, V1-A2, V2-A1, V6-A3, V9-A1, V10-A2, V14-A1		
	Woodland Rehabilitation	3R, 4R, 6R & 8R		
LFA	Woodland Rehabilitation	3R, 4R, 6R & 8R	Annually (Autumn or Spring)	LFA consists of a number of permanent transects being established in areas of revegetation, along with corresponding transects in adjacent undisturbed areas to provide reference/ analogue sites. LFA transects are monitored annually either in autumn or spring following the commencement of revegetation
	Pasture Rehabilitation	1R, 2R, 5R, 7R, 9R, 10R, 16R, 33R & 34R		
	NWCD	17R, 19R, 21R, 23R, 25R, 26R, 27R & 28R		
	Wambo Creek	14R		

Figure 9 Floristic Monitoring Sites

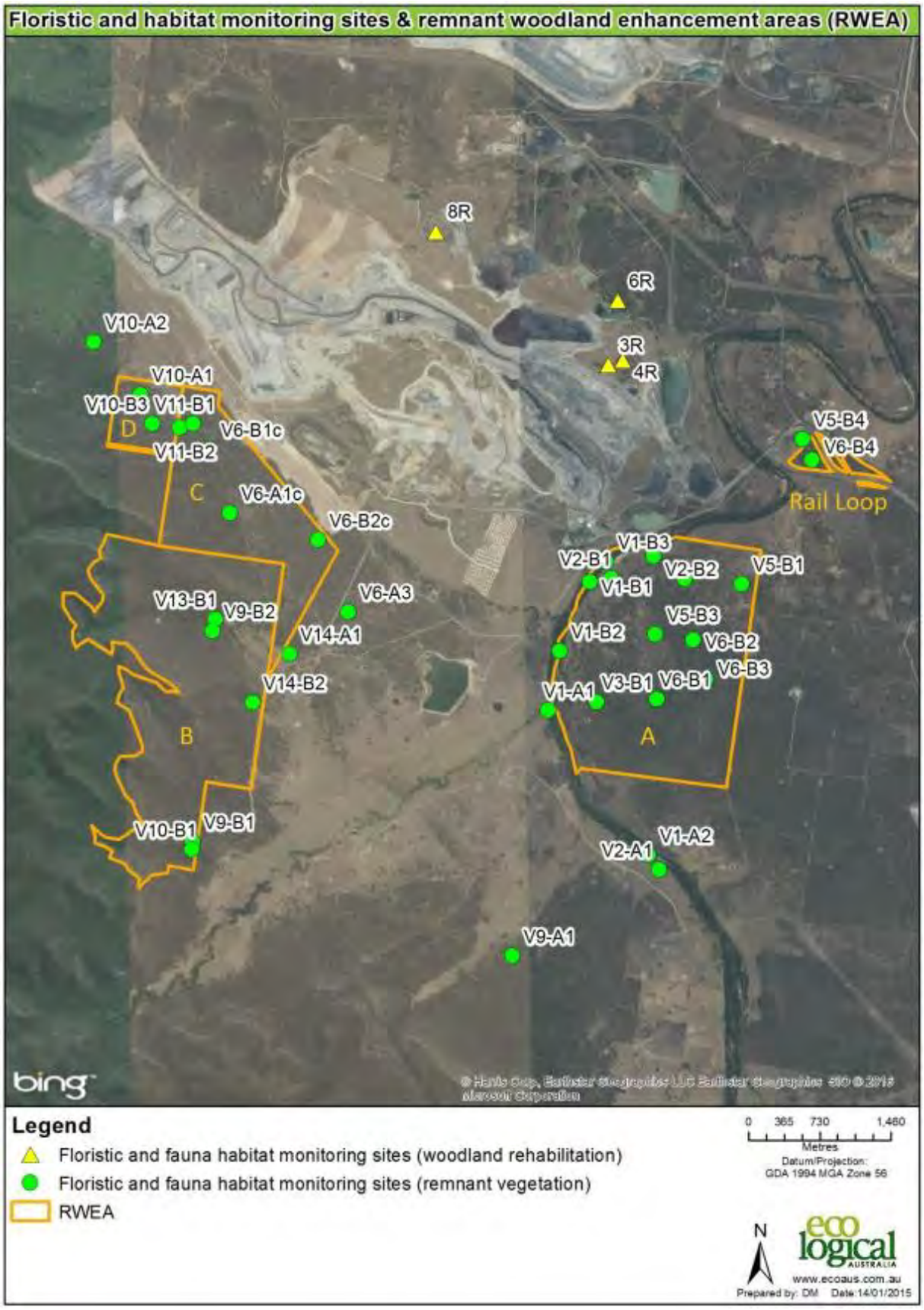


Figure 10 LFA Monitoring Sites

8.2.3 Visual Monitoring

Visual monitoring of revegetation will be undertaken to ensure vegetation is establishing and to determine the need for any maintenance and/or contingency measures (such as the requirement for supplementary plantings, erosion control and weed and animal pest control). Visual assessments allow for the rapid application of remedial actions where necessary.

8.2.4 Mine Closure Monitoring

WCPL are revising the conceptual Mine Closure Plan (CMCP) to undertake life of mine closure planning for mining operations, although the Mine is not planned for closure until 2025. The revision of the CMCP in 2016 will incorporate a review of the constraints and opportunities to identify potential sustainable land-use options, in consultation with relevant stakeholders in order to obtain feedback of any issues that need to be considered as part of the final land use analysis. The revised CMCP will be submitted to the DRE and other relevant stakeholders for approval in 2016.

The MCP will outline the mine closure goals for Wambo and describe the proposed mine closure concepts and proposed decommissioning management measures. As required by Condition 94, Schedule 4 of the Development Consent (DA 305-7-2003), the MCP will include measures to minimise the adverse socio-economic effects associated with mine closure.

Mine closure concepts and management measures will be developed in consultation with the DRE and other relevant regulatory agencies.

At mine closure, the existing environmental monitoring program will be maintained until all decommissioning and rehabilitation works have been completed in accordance with the relevant rehabilitation criteria and objectives. In consultation with regulatory authorities, there may be the need to remove redundant and/or establish additional monitoring sites to complement existing programs at mine closure, for example establishing water quality monitoring sites at final void locations.

Capped tailings dams will be monitored during the life of the Mine and post mining to determine the success of the capping and rehabilitation process.

Approaching mine closure, contaminated assessments will be carried out to identify areas of potential contamination and develop appropriate remedial measures and monitoring requirements as the mine transfers into the closure phase.

The post closure monitoring and measurement program will be similar to that undertaken during the active mining operation, however the monitoring program may be prioritised to focus on potential environmental aspects that are likely to cause pollution and/or verify the success or failure of the rehabilitated post mining landforms.

Post closure monitoring will be conducted for up to five years after decommissioning and final rehabilitation has been completed, or until such time as monitoring records demonstrate that the site is no longer contributing, nor has the potential to contribute, pollutants to the surrounding environment, and that rehabilitation has achieved in accordance with the relevant rehabilitation criteria. Monitoring and reporting of biodiversity areas post mine closure will continue in accordance with the requirements of the FFMP.

8.3 RESEARCH AND REHABILITATION TRIALS AND USE OF ANALOGUE SITES

A number of rehabilitation trials and studies have been conducted at WCPL to date and include:

- Capping studies on the North East Tailings Dam to identify a safe and viable method of capping the tailings dam surface;
- Large scale biosolid application trials to improve soil structure and effectiveness of the soil as plant growth medium (**Plate 1**);
- Trialling the application of tree mulch on the surface of rehabilitation areas to assist with dust suppression and erosion control, as well as providing a source of organic matter in the stripped topsoil;
- Incorporation of Organic Growth Medium (OGM) with topsoil material;
- A trial to assess tree establishment and development on waste rock emplacements.
- Undertake detailed soil characterisation program of waste rock emplacement areas and topsoil;
- Rationalise and improve LFA monitoring program;
- Revise rehabilitation monitoring program to address knowledge gaps, develop appropriate quantifiable criteria and revise triggers and responses in TARP.

WCPL is committed to researching collaborative opportunities with external research institutions to partner in possible rehabilitation trials and studies conducted at WCPL to enable continued improvements in the rehabilitation practice.

Plate 1 – Biosolid Application on Re-profiled Waste Rock Emplacement

8.4 GRAZING MANAGEMENT

WCPL have engaged a specialist agronomist to prepare a grazing management strategy to assist the Mine with a grazing capacity trial of mine rehabilitated pasture species. The grazing trial is expected to commence subject to:

- Mine rehabilitated pasture areas being made available outside mining access areas;
- Agriculture infrastructure in place including fencing and water; and
- Considered by WCPL's agronomist the proposed area of mine rehabilitated pasture is ready to carry livestock.

WCPL have identified two mine rehabilitated areas including The Backfill Project and Montrose East as potential sites for the grazing trial.

A sustainable stocking rate is one which does not degrade the natural resources or permanently reduce pasture productivity as a result of over-grazing, species loss and weed growth. The grazing trial would consider the various methods of grazing management such as rotational grazing, strategic grazing and even cell grazing, use variations in stocking density to manage the pastures. WCPL livestock preference for the grazing trial is beef cattle.

Locally in the Hunter Valley beef cattle grazing is more common than sheep, stocking rates are often expressed as the number of livestock (head) per hectare. In an 'average' year the rehabilitated pastures on mine sites have an estimated carrying capacity of 3 dry sheep equivalent per ha. This is equivalent to 1 breeding cattle unit per 4.7 ha or 1 dry growing beast (e.g. steer) to 3.0 ha. The aim of the grazing trial will determine if WCPL's mine rehabilitated land can achieve a similar carrying capacity. The results of the grazing trial (when commenced) will be provided in the Annual Review.

9.0 INTERVENTION AND ADAPTIVE MANAGEMENT

9.4 THREATS TO REHABILITATION

Table 36 outlines potential risks and consequences associated with rehabilitation activities. A Trigger Action Response Plan (TARP) has been developed (**Section 9.2**) to identify appropriate response measures to manage any potential rehabilitation risk.

Table 36 Rehabilitation Risks

Rehabilitation Risk	Potential Consequence/Hazard
Topsoil	Insufficient depth/volume, compromise topsoil stockpile Soil chemistry limits plant growth Loss of topsoil material from erosion
Spoil	Soils not within the preferred pH, sodicity, salinity ranges Hostile waste rock material in final landform
Surface	Insufficient depth of inert material, large rocks on surface Land contamination
Landform and Land Use	Excessive slope length, slope gradient not consistent with pre-mining topography Subsidence impacts
Vegetation	Poor establishment, excessive weeds, low species composition, mono-culture Native tree and shrub seed resource not available to complete revegetation Native pasture seed not available to complete revegetation
Erosion & sediment control	Landform not stable, failure of water management structures and ability to freely drain.
Bushfire	Risk of fire within establishing ecosystems.
Tailings Dam	Current technologies unable to provide effective capping solutions for NETD
Performance Criteria	Current rehabilitation monitoring program and available data (to date) insufficient to develop quantifiable criteria for mine closure and relinquishment

The processes outlined in this MOP will be implemented to control or eliminate these rehabilitation risks. Where necessary, rehabilitation procedures will be amended accordingly during the MOP term with the aim of continually improving rehabilitation standards.

9.5 TRIGGER ACTION RESPONSE PLAN

WCPL have prepared a Trigger Action Response Plan (TARP) for rehabilitation to identify appropriate response measures in the event rehabilitation outcomes are not achieved.

Table 37 illustrates how the various rehabilitation risks, management measures and responsibilities are structured to achieve compliance with the relevant statutory requirements, and the framework for management and contingency actions.

A revision of the TARP will be undertaken as a result of the revised rehabilitation monitoring program and capping trials proposed to allow for the development of appropriate criteria and triggers. A revised TARP will be provided in consecutive MOP amendments as soon as the data is available from the respective programs.

Table 37 Rehabilitation Trigger Action Response Plan

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
1.	Topsoil	Insufficient topsoil depths Topsoil ripping not effective	**Trigger**	• Monitoring confirms average topsoil replacement at depths <100mm. • Monitoring confirms topsoil has not been ripped appropriately.
			Action	• Topsoil is to be re-applied at a minimum of 100mm. • Topsoil ripped to a depth of 300mm to 500mm. • Review topsoil application procedure and topsoil balance. • Review topsoil stripping methods. • Increase application of topsoil (and/or application with appropriate humus material) to achieve average minimum depth of 100mm.
			Responsible Persons	E&C Manager
2.		Loss of topsoil due to erosion, poor vegetation establishment and interaction with vehicles.	**Trigger**	• Monitoring of topsoil stockpiles identifies significant erosion and loss of topsoil resource. • Establishment of stabilising cover crop has failed. • No signage to identify topsoil stockpiles. • Evidence of unauthorised removal of material or access of topsoil material.
			Action	• Remediate affected areas, fertilise and re-seed to stabilise as necessary. • Install/repair silt fencing as required. • Installation of signage. • Continue to monitor. • Reshape stockpile with a rough surface to reduce erosion hazard, improve drainage and promote vegetation. • Re-seed and fertiliser as necessary.
			Responsible Persons	E&C Manager
3.		Topsoil characterisation determines soil parameters not within preferred range	**Trigger**	• Topsoil characterisation confirms: - Soil pH (H_2O) range is out side the preferred range of pH 5.5 – pH 7.8; - Soil EC (H_20) is greater than 1200 µS/cm; - Soil Phosphorus: Colwell Method (Pasture: 20-40 mg/kg) (Native: 10-20 mg/kg) Bray Method (Pasture: 12-22 mg/kg) (Native: 6-12 mg/kg) - Soil Organic Matter <3%
			Action	• Application of appropriate soil ameliorants at rates per hectare as specified by laboratory results. • Undertake further investigations to determine potential factors contributing to conditions. • Consider removing unsuitable material and replace with suitable material and retest to determine soil within preferred ranges.
			Responsible Persons	E&C Manager

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
4.	Waste rock	Waste rock characterisation determines soil parameters not within preferred range	**Trigger**	• Representative sampling of final surface material characterisation confirms: - Soil pH (H_2O) range is out side pH 5.5 – pH 7.8; - Soil EC (H_20) is greater than 1200 µS/cm.
			Action	• Application of appropriate soil ameliorants at rates per hectare as specified by laboratory results. • Undertake further investigations to determine potential factors contributing to conditions. • Consider removing unsuitable material and replace with suitable material and retest to determine soil within preferred ranges.
			Responsible Persons	E&C Manager and Open Cut Mine Manager
5.	Tailings capping layer	Insufficient inert material cover of tailings emplacement areas	**Trigger**	• Monitoring confirms inert material of >2m coverage over tailings is not being achieved. • Final landform slope grades are >1%. • Capping layer final landform shape is not compatible with surrounding landscape.
			Action	• Increase volume of compacted inert minimum coverage of 2m when creating final landform (or greater if required by final capping design specifications). • Continue monitoring to confirm compacted inert material coverage of 2m (or greater) is being achieved. • Re-profile final landform to achieve drainage grades of <1% and compatibility with surrounding landscape. • Review tailings capping application procedure.
			Responsible Persons	E&C Manager, Project Capital Engineer and Open Cut Mine Manager
6.	Final landform surface	Insufficient inert material cover of coarse reject emplacements Spontaneous combustion Landform slumping Acid mine drainage (AMD) Drainage	**Trigger**	• Monitoring confirms compacted inert material over coarse reject emplacement areas is not achieving minimum coverage of 2m in some areas when creating final landform. • Monitoring confirms spontaneous combustion evidence. • Monitoring confirms slumping has occurred in the final landform. • Monitoring confirms possible AMD issues. • Drainage with >3% fall are not appropriately armoured to prevent scouring.
			Action	• Increase volume of compacted inert minimum coverage of 2m over carbonaceous material when creating final landform. • Continue monitoring to confirm compacted inert material coverage of 2m is being achieved. • Review inert material application procedure to ensure sufficient inert material is available to achieve the minimum coverage of 2m. • Remove material with spontaneous combustion propensity, replace with inert material, compact and re-profile to final land form. • Repair slumped area with additional material, compact and re-profile to final land form. • If testing identifies AMD issues, remove potential AMD material with acid generating propensity, and replace with inert material, compact and re-profile to final land form. • Seek further advice from WCPL rehabilitation specialist to design appropriate drainage structures and install /construct

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
				as required.
			Responsible Persons	E&C Manager and Open Cut Mine Manager
7	Final landform surface	Excessive slope lengths	**Trigger**	• Slope lengths >80m limit at slope angles of 10^0.
			Action	• If possible, undertake rectification works to reduce average slope lengths to approximately 50m to 70m when slope angles of 10^0. • Seek further advice from WCPL rehabilitation specialist to: - Review final landform design and stability performance; and - Determine if additional measures are necessary to manage surface water flows to ensure slope stability can be maintained.
			Responsible Persons	E&C Manager and Open Cut Mine Manager
8		Steep slope gradients Maximum height of final landforms no greater than RL160 AHD.	**Trigger**	• Final slope angle above >10^0 and may be considered inconsistent with pre-mining topography. • Final dump height survey greater than RL 160 AHD.
			Action	• Regrade slopes to achieve <10^0. • Reduce dump height to RL 160 AHD. • Resurvey to confirm correct slope angle and dump height. • Seek further advice from WCPL rehabilitation specialist to review final landform design and performance if slope grades cannot be achieved; and • Seek consultation with DRE if landform is at risk of not achieving pre-mining topography as identified within the EIS.
			Responsible Persons	E&C Manager and Open Cut Mine Manager
9.	Woodland rehabilitation Pasture rehabilitation Riparian rehabilitation	Low biometric vegetation scores	**Trigger**	• Score obtained during annual monitoring round is less than Interim Performance Targets
			Action	• Check and validate the data to ensure correct/accurate. • Review site attribute scores to determine which attributes are contributing to the lower than expected score • Review management actions undertaken during previous 12 months (applicable to relevant management period) to determine if actions have contributed to the lower than expected score • Review previous monitoring scores and climatic conditions to establish whether external factors could be contributing to the lower than expected score. • Develop remedial actions to address declining biodiversity values. • Review LFA monitoring to examine for potential casual factors OR start LFA monitoring if landform instability is detected. • Expand monitoring program to include additional treatment and reference sites.

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
			Responsible Persons	E&C Manager
10.		Low LFA scores	**Trigger**	• <5% annual improvement or significant decline in LFA Score (from previous monitoring round)
			Action	• Check and validate the data to ensure correct/accurate. • Review individual LFA Index results to determine which index result is contributing to the lower than expected score • Review management actions undertaken during previous 12 months (applicable to relevant Management Period) to determine if actions have contributed to the lower than expected score • Review previous monitoring scores and climatic conditions to establish whether external factors could be contributing to the lower than expected score • Develop remedial actions to address stagnant or declining landscape stability, if stagnant or declining score not caused by external factors. • Maintain monitoring of affected site until first LFA score ≥50 (i.e. stable landform) and • Review monitoring program and consider expanding to include additional treatment and reference sites.
			Responsible Persons	E&C Manager
11.		Ground cover Exotic cover	**Trigger**	• Monitoring identifies vegetative coverage <70% and/or individual bare areas >20m^2 • Biometric monitoring confirms exotic cover <33%.
			Action	• Review seed viability, seasonal conditions and other influences e.g. soil preparation, seed application procedures etc. • Re-test soil chemistry and ameliorate as necessary. • Re-seed affected areas. • Maintain monitoring program for presence of weeds in accordance with the FFMP. • Maintain seasonal weed spraying control measures as required by FFMP. • Review FFMP to determine if existing weed control measures are adequate. • Increase monitoring frequency for presence of weeds.
			Responsible Persons	E&C Manager
12.	Water management	Pollution of downstream watercourses.	**Trigger**	• Water runoff from rehabilitation areas exceeds EPL water quality limits. • Water quality in the NWCD exceeds SWMP trigger values.
			Action	• Refer to Surface and Groundwater Response Plan (for appropriate actions and responses).
			Responsible Persons	E&C Manager
13.	Erosion/sediment	Unstable landforms	**Trigger**	• Monitoring indicates gully and tunnel erosion present.

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
	control			• Monitoring identifies rilling erosion approximately >200mm deep and/or >200mm wide. • Groundcover is <60%. • No erosion ad sediment control are in place. • Erosion and sediment controls in place but are no effective.
			Action	• Undertake appropriate remediation works to address erosion. • Install appropriate erosion and sedimentation controls. • Maintain monitoring program to determine effectives of repairs. • Investigate potential causes contributing to erosion. • Review ESCP for adequacy. • Review existing erosion controls for adequacy.
			Responsible Persons	E&C Manager
14.	Subsidence	Presenting an immediate safety, environmental hazard Presents hazard to ling term final land use Creek stability and hydraulic losses.	**Trigger**	• Surface cracking presents either an immediate safety, environmental hazard (e.g. an erosion hazard or hazard to grazing stock) or risk to final land use. • Visual inspections have identified increased cracking, scouring and ponding in NWCD. • Visual inspections have identified cracking with widths >50mm. • Increased leakage into SBU mine from NWCD.
			Action	• Repaired and rehabilitated as identified in **Section 3.3.4** • Carry out repairs to NWCD in accordance with Extraction Plan – South Bates(Whybrow Seam) Underground Mine Longwalls LW11 to 13 • Creeks affected by subsidence have been repaired and their functionality and stability has been confirmed by a hydrological engineer (or equivalent).
			Responsible Persons	E&C Manager and Project Capital Engineer
15.	Decommissioning	Decommissioning activities is not consistent with Conceptual Mine Closure Plan (CMCP).	**Trigger**	• Removal of all redundant services, infrastructure, carbonaceous material, wastes hazardous materials, sealing of mine and ventilation shafts etc. post mine closures has not been completed as required by the CMCP. • Identification of possible contaminates at mine closures and either removal or treatment has not be carried out as required by the CMP. • Dewatering and removal of possible contaminates from selected mine water dams post mine closure has not been carried out as required by CMCP. • Decommissioning activities of tailings emplacement areas has not been carried out as required by the CMCP. • The site at post mine closures presents an immediate risk to the environment and public safety.
			Action	• Undertake a review of the closure strategies to ensure the site at post closure does not present an immediate risk to the environment and public safety. • Complete all mine closure activities as required by the CMCP • Review CMCP for adequacy • Seek consultation with the DRE if changes to the CMCP are required.

Ref# No.	Rehabilitation Risk	Consequence/ Hazard	TARP Code	Contingency Reponses
			Responsible Persons	E&C Manager and Project Capital Engineer
16.	Final Voids		**Trigger**	**Triggers to be revised in accordance with revised Final Void Management Plan (FVMP).**
			Action	**Actions to be revised in accordance with FVMP**
			Responsible Persons	E&C Manager
17.	Terrestrial fauna	Native species diversity Feral animals	**Trigger**	• Fauna monitoring identifies a trend of low native species diversity inhabiting rehabilitated woodland areas. • Fauna monitoring identifies high number of feral animals present within rehabilitation areas.
			Action	• Review biometric scores as identified in TARP Ref. 9 to consider if management actions consider improving biodiversity outcomes. • Seek ecologist advice on improving biodiversity outcomes in rehabilitation areas. • Consider further habitat augmentation with hollow logs etc. to improve biodiversity outcomes. • Review feral animal controls in the FFMP. • Continue monitoring as required by FFMP
			Responsible Persons	E&C Manager
18.	Bushfire	Fire	**Trigger**	• Bushfire outbreak in rehabilitation areas.
			Action	• Review Bushfire Management Plan. • Implement actions as required by Bushfire Management Plan. • Review affected areas to determine bushfire resilience of species. • Seek ecologist advice and monitor for plant rejuvenation • Re-plant, re-seed affected areas if no plant rejuvenation is evidence (on the advice of ecological specialist). • Monitor re-plantings/seeded areas as required by FFMP.
			Responsible Persons	E&C Manager

10.0 REPORTING & REVIEW

10.4 REPORTING

WCPL is required to prepare and submit an AR, formally known as Annual Environmental Management Report (AEMR), as required under Development Applications DA305-7-2003. The AR also satisfies the NSW Trade & Investment – Division of Resources and Energy (DRE), *Guidelines to the Mining, Rehabilitation and Environmental Management Process (Guidelines No. EDG03)*.

The AR provides an annual review of monitoring results, performance measures/criteria, relevant predictions in the EA, indentifies non-compliances and corrective actions, provides rehabilitation progress and disturbance area report, rehabilitated areas and areas undergoing rehabilitation to demonstrate that progressive rehabilitation objectives are being achieved.

The AR also satisfy's the reporting requirements for Environment Protection Licence (EPL). **Table 38** provides a summary of the reporting mechanisms applicable to the WCPL, including which stakeholders will receive copies of each report and distribution.

Table 38 Reporting Framework

Report	Frequency	Distribution	Responsibility for Report Preparation
Incident Report	Provide detailed report within 7 days on notification	• DP&E (Manager, Mining Projects) • DRE (Director – Environmental Sustainability) • OEH/EPA (General Contact)	Environment and Community Manager
Annual Review (AR)	Annually (end of March each year)	• DP&E (Manager, Mining Projects) • DRE (Director – Environmental Sustainability) • OEH/EPA (General Contact) • DPI-Water (Mines Assessment and Planning) • Singleton Shire Council (General Manager) • CCC Members • On line via the Peabody Energy Australia website	Environment and Community Manager

10.5 REVIEW & IMPLEMENTATION

Reviews of the MOP will be undertaken by Environment and Community Manager and Technical Services Manager as required during the MOP term to assess the effectiveness of the procedures against the objectives of MOP. The MOP may also be reviewed, and if necessary amended, for example, to incorporate modifications of DA305-7-2003 and any proposed activities that are not in accordance with the MOP. The MOP may also be reviewed and revised due to changes in environmental requirements, risk assessments, monitoring results, completion criteria, technologies and legislation. Any proposed amendment to the MOP would be completed in accordance with the MOP Guidelines and in consultation with the DRE and other relevant stakeholders.

The General Manager and each respective Mine Manager will ensure appropriate resources are provided to implement the MOP. The implementation of this MOP will be the responsibility of the Environment and Community Manager and Technical Services Manager.

11.0 REHABILITATION PLANS (A3)

12.0 REFERENCES

Australian and New Zealand Minerals and Energy Council and Mineral Resources Council of Australia (2000) *Strategic Framework for Mine Closure*.

Department of Mineral Resources (1999) *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales.*

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Department of Trade and Investment, regional Infrastructure and Services – Mine Safety Operations (2012) *Mine Design Guideline 6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams*.

Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy (2013) *ESG3: Mining Operations Plan (MOP) Guidelines*.

Global Soil Systems (2009) *Rehabilitation Standards for Wambo Coal Pty Limited.*

Wambo Coal Pty Limited (2003) *Wambo Development Project Environmental Impact Statement*.

Wambo Coal Pty Limited (2007) *Topsoil Stockpile Management Procedure.*

Wambo Coal Pty Limited (2009) *Restoration Procedure*.

Wambo Coal Pty Limited (2013) *North Wambo Creek Diversion Plan*.

Wambo Coal Pty Limited (2014a) *Flora & Fauna Management Plan.*

Wambo Coal Pty Limited (2016) Biodiversity Management Plan (DRAFT)

Wambo Coal Pty Limited (2014b) *Extraction Plan for North Wambo Underground Mine Longwalls 7 to 10*.

Wambo Coal Pty Limited (2014b) *Extraction Plan for North Wambo Underground Mine Longwalls 7 to 10*a

Secondary Flocculation Capping Assessment for Wambo Tailings Storages (May 2017), Fitton Tailings Consultants Pty Ltd

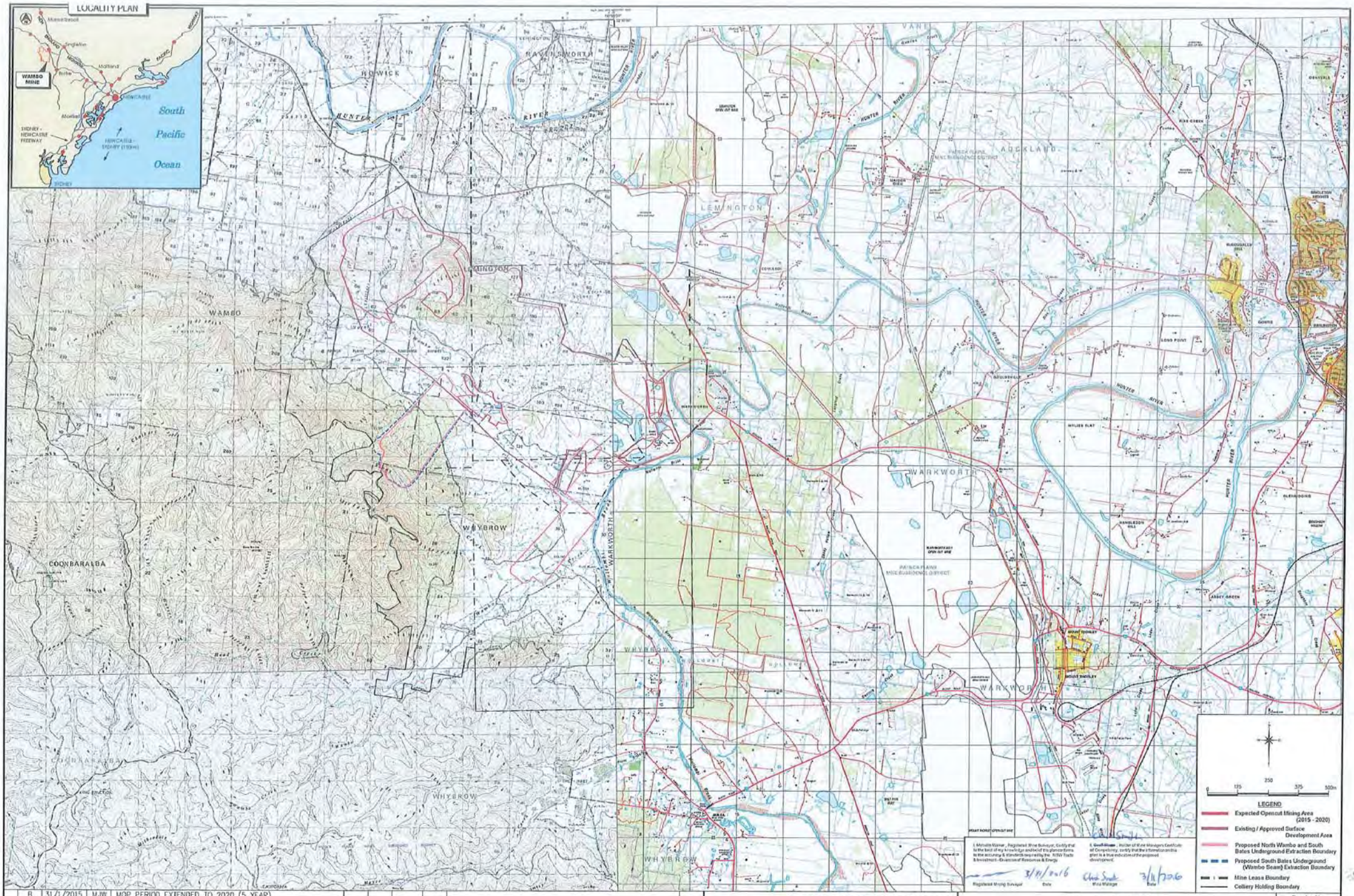
13.0 ABBREVIATIONS

AR	Annual Environmental Management Report (now Annual Review)
BMP	Biodiversity Management Plan
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CL	Coal Lease
DMR	NSW Department of Mineral Resources (now DRE)
DP&E	NSW Department of Planning & Environment (DP&E)
DP&I	NSW Department of Planning and Infrastructure (now DP&E)
DPI	NSW Department of Primary Industries
DRE	Division of Resources and Energy
DSC	NSW Dams Safety Committee
EEC	Endangered ecological community
Project EIS	*Wambo Coal Project Environmental Impact Statement 2003*
EPA	NSW Environment Protection Authority
EP&A Act	NSW *Environmental Planning and Assessment Act, 1979*
EPL	Environment Protection Licence
FFMP	Flora and Fauna Management Plan
MOP	Mining Operations Plan
NOW	NSW Office of Water
RMP	Rehabilitation Management Plan
TARP	Trigger Action Response Plan
VCP	Vegetation Clearance Protocol
WCPL	Wambo Coal Pty Limited

APPENDIX 1

Rehabilitation Plans (A0)

Volumes 2 & 3



REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)	
	E	31/12/2015	MJW	MOP AMENDMENT B	
	F	31/3/2016	MJW	MOP AMENDMENT C	
	G	31/10/2016	MJW	MOP AMENDMENT D	

REV.	DATE	BY	DESCRIPTION	CHK.

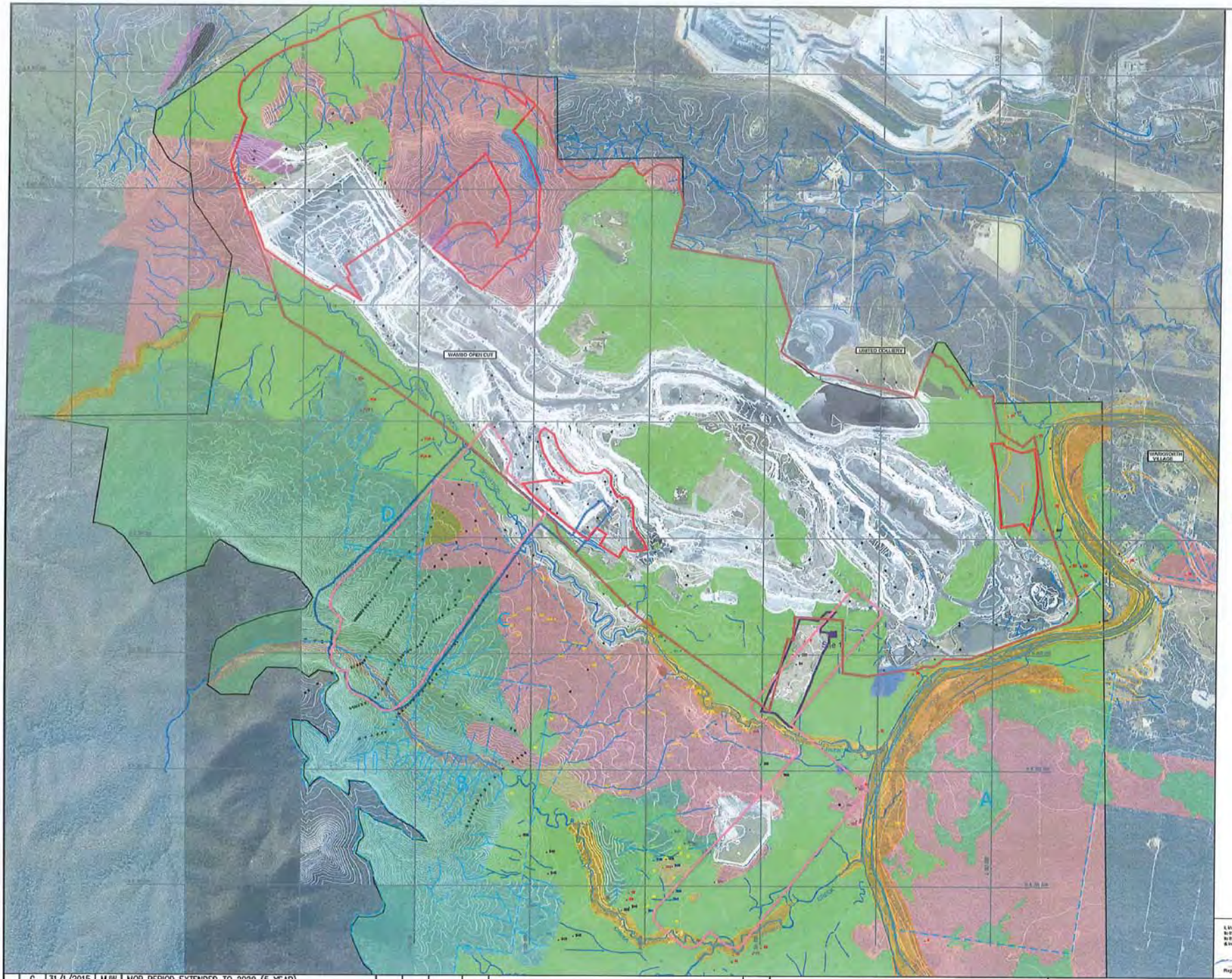
WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth
Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Peabody ENERGY

Wambo Coal Mine
Mining Operations Plan (MOP Amendment C)
Plan 1A - Project Locality

Drawing No.	Revision No.	Sheet Size
1991	G	A0

Date	Scale:	Drawn	Checked	Approved
31/10/2016	1:25,000	MJW	SP	CM, MW



0 125 250 375 500m

LEGEND

- Expected Opencut Mining Area
- Existing / Approved Surface Development Area
- Proposed North Wambo and South Bates Underground Extraction Boundary
- Proposed South Bates Underground (Wambo Seam) Extraction Boundary
- Colliery Holding Boundary
- Opencut Rehabilitation Existing
- Existing Natural Pasture
- RWEP Areas
- 1 in 100 Year Flood Level
- Water Course
- 25 Contours (5m)

ARCHAEOLOGICAL SITES

- Extant Site Permit 2222
- Extant Site No Permit
- United Recorded Site
- Additional Wambo Recorded Site
- Salvaged Site
- Partially Salvaged Site
- European Heritage Site

VEGETATION COMMUNITIES

- River Oak
- River Red Gum
- Forest Red Gum
- Coast Banksia
- Narrow-leaved Ironbark
- Spotted Gum
- Slaty Gum
- Grey Gum
- White Mahogany
- Weeping Myall

I, Malcolm Maher, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith

Mine Manager — Date 7/11/2016

REVISIONS									
REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
C	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
E	31/12/2015	MJW	MOP AMENDMENT B						
F	31/03/2016	MJW	MOP AMENDMENT C						
G	31/10/2016	MJW	MOP AMENDMENT D						

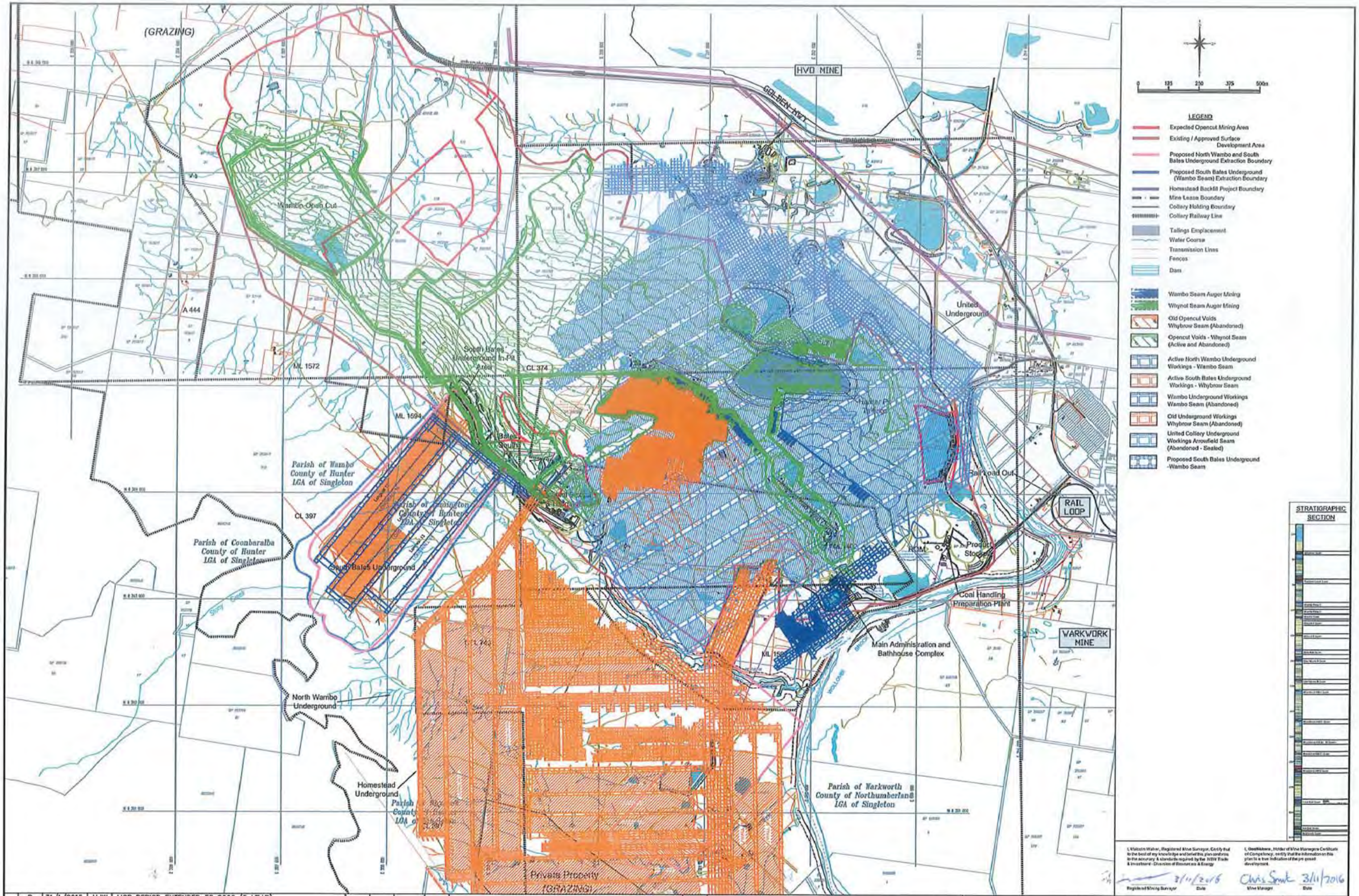
WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth Via Singleton, NSW, 2330
Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Peabody ENERGY

Wambo Coal Mine
Mining Operations Plan - Plan 1B (Amendment D)
Pre Mining Environment - Natural Environment

Drawing No.	Revision No.	Sheet Size
1992	G	A0

Date	Scale:	Drawn	Checked	Approved
31/10/2016	1:11,000	MJW	SP	GM, MW



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E	31/12/2015	MJW	MOP AMENDMENT B					
F	31/03/2016	MJW	MOP AMENDMENT C					
G	31/10/2016	MJW	MOP AMENDMENT D					

WAMBO COAL PTY LIMITED
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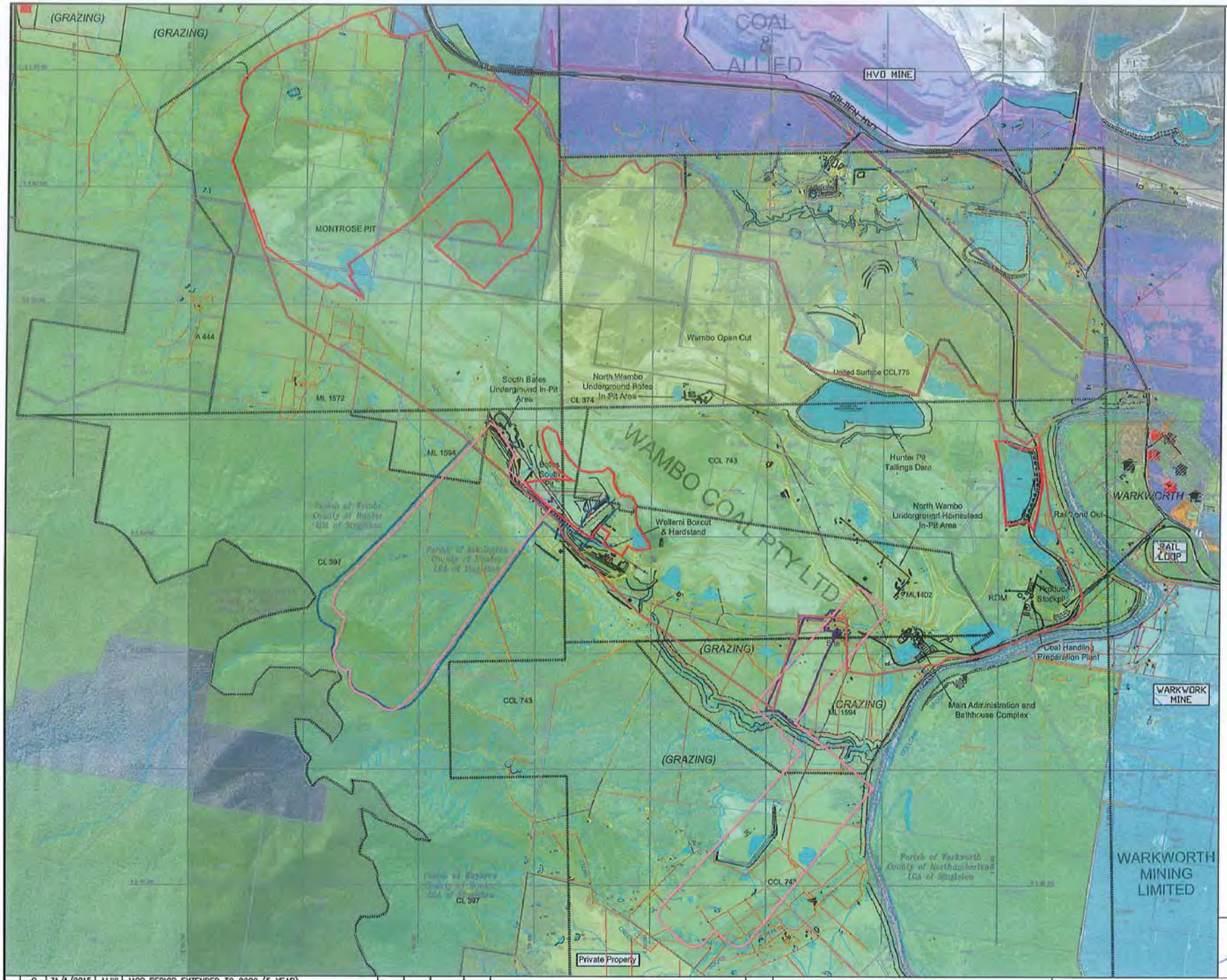
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine
Mining Operations Plan - Plan 1C (2) (Amendment D)
Pre Mining Environment (Historical Mine Workings)

Date	Scale:	Drawn	Checked	Approved	Drawing No.	Revision No.	Sheet Size
31/10/2016	1:7500	MJW	SP	GM, MW	1993	G	A0

3/11/2016 Registered Mining Surveyor
3/11/2016 Mine Manager



I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith

Mine Manager — Date 3/11/2016

REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	C	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)	
	E	31/12/2015	MJW	MOP AMENDMENT B	
	F	31/03/2016	MJW	MOP AMENDMENT C	
	G	31/10/2016	MJW	MOP AMENDMENT D	

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
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Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine

Mining Operations Plan - Plan 1C (Amendment D)

Pre Mining Environment - Built Environment

Drawing No.	Revision No.	Sheet Size
1994	G	A0

Date	Scale:	Drawn	Checked	Approved
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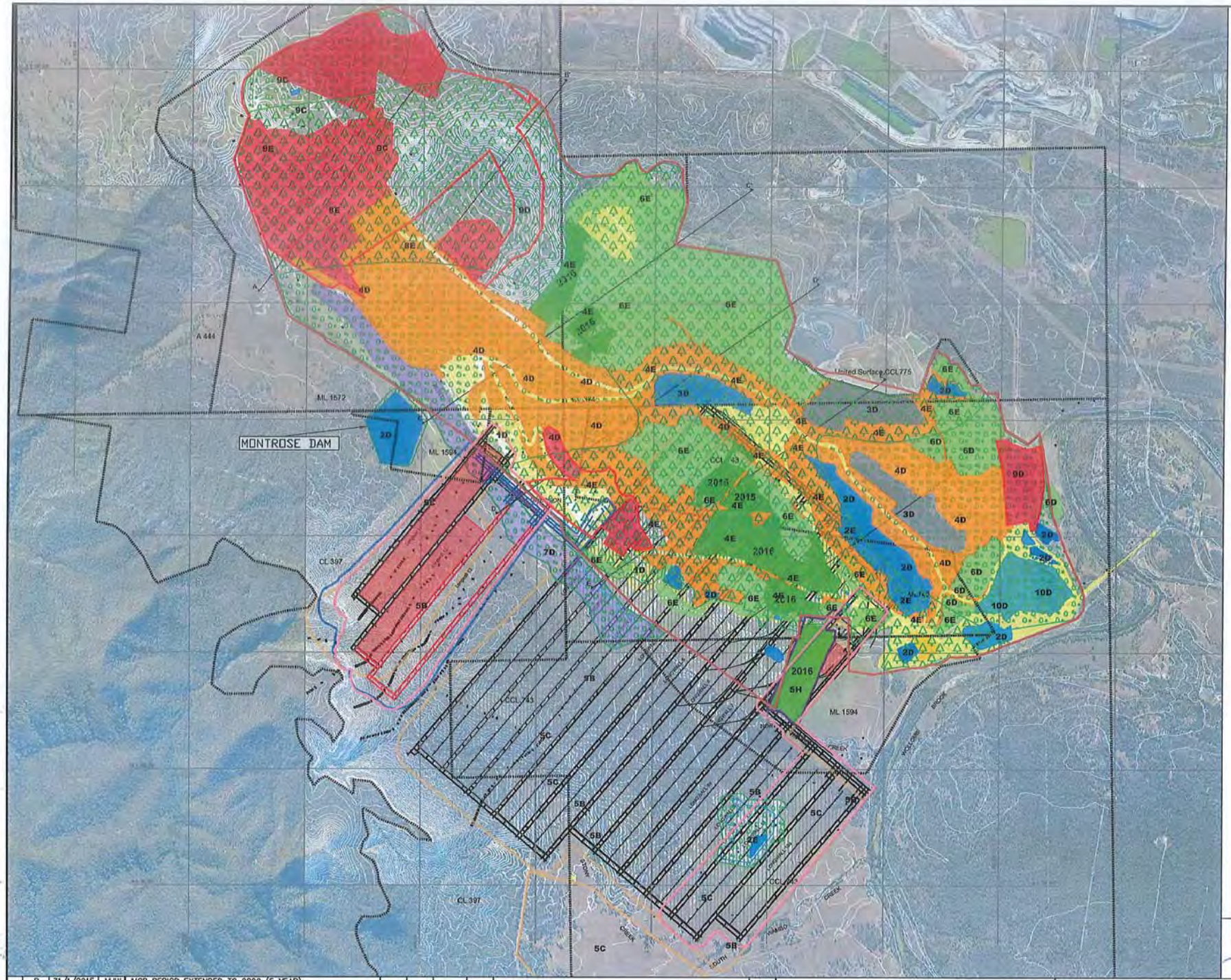

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 31/10/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

Mine Manager — Date 31/10/2016

REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)	
	E	31/12/2015	MJW	MOP AMENDMENT B	
	F	31/03/2016	MJW	MOP AMENDMENT C	
	G	31/10/2016	MJW	MOP AMENDMENT D	

REV.	DATE	BY	DESCRIPTION	CHK.

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth
Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine
Mining Operations Plan - Plan 3B (Amendment D)
Mining & Rehabilitation 2016

Drawing No.	Revision No.	Sheet Size
1997	G	A0

Date	Scale	Drawn	Checked	Approved
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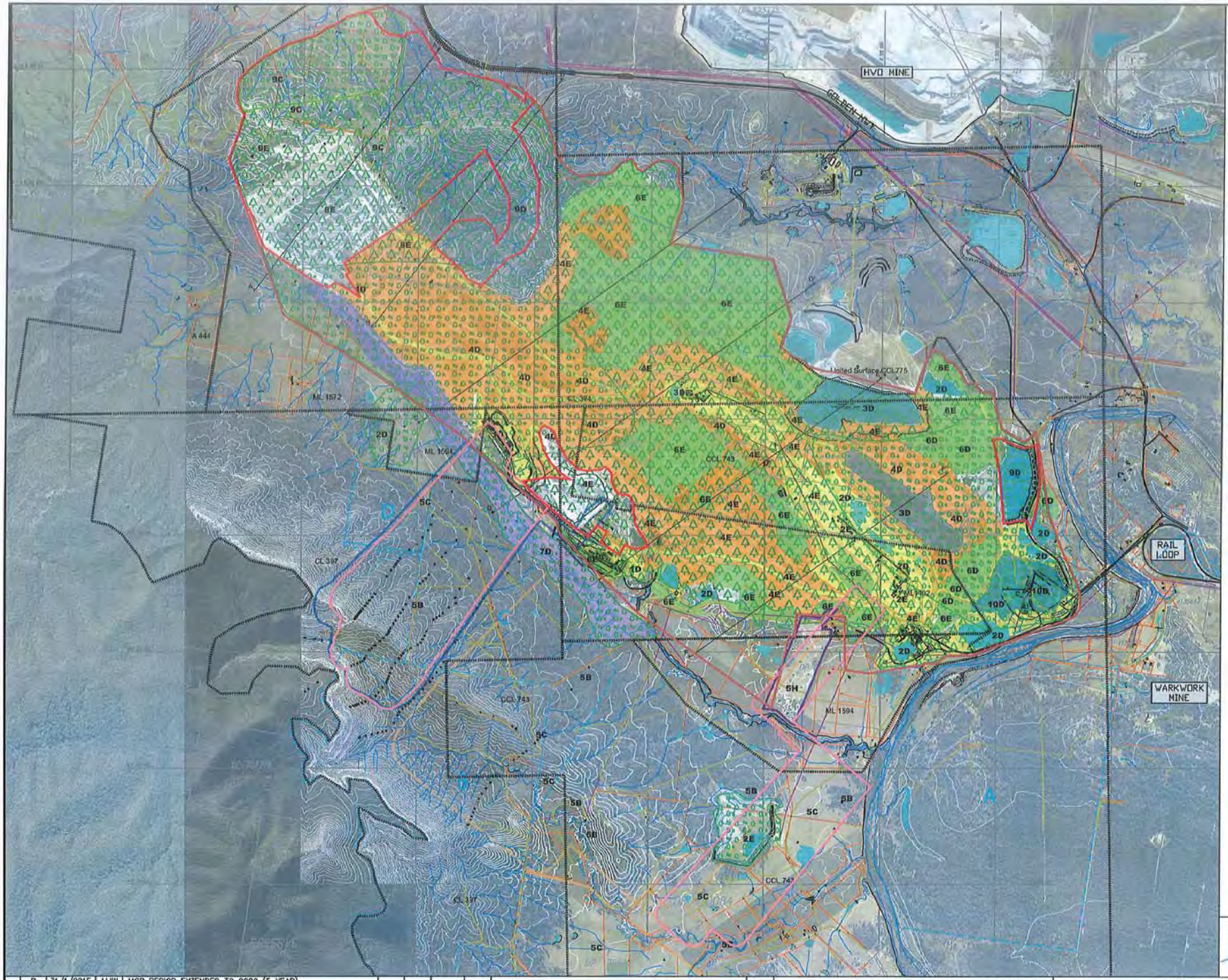

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, Geoff Moore, Holder of Mine Manager Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Mine Manager — Date 3/11/2016

REVISIONS									
B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
E	31/12/2015	MJW	MOP AMENDMENT B						
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G	31/10/2016	MJW	MOP AMENDMENT D						
REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
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Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine

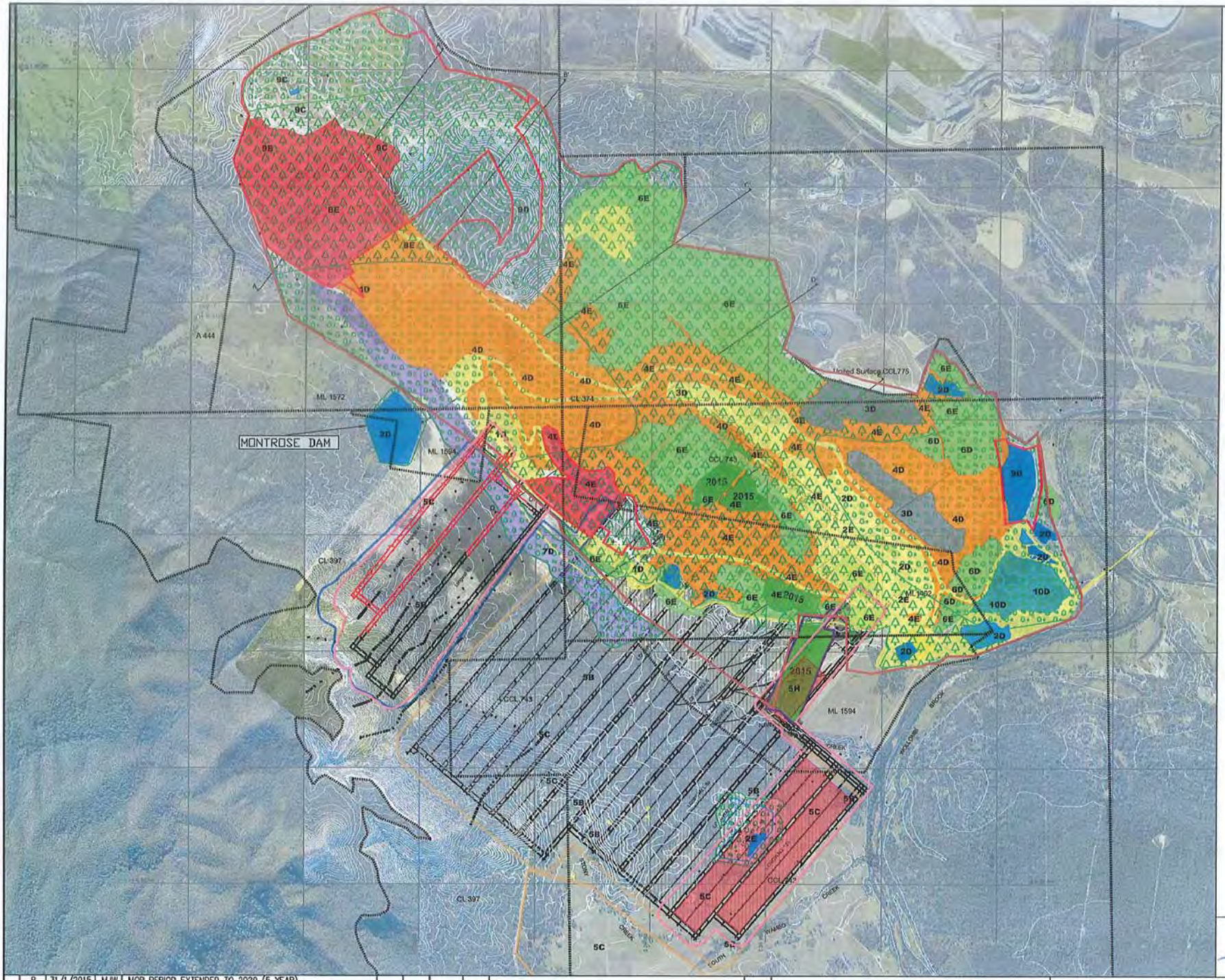
Mining Operations Plan - Plan 2 (Amendment D)

Mine Domains - At Commencement of MOP

Date	Scale:	Drawn	Checked	Approved	Sheet Size
31/10/2016	1:11,000	MJW	SP	GM, MW	A0

Drawing No. 1995

Revision No. G



I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 7/11/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith — Mine Manager — Date 3/11/2016

REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
	B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
	E	31/12/2015	MJW	MOP AMENDMENT B						
	E	31/03/2016	MJW	MOP AMENDMENT C						
	F	31/10/2016	MJW	MOP AMENDMENT D						

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
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Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine
Mining Operations Plan - Plan 3A (Amendent D)
Mining & Rehabilitation 2015

Drawing No.	Revision No.	Sheet Size
1996	F	A0

Date	Scale:	Drawn	Checked	Approved
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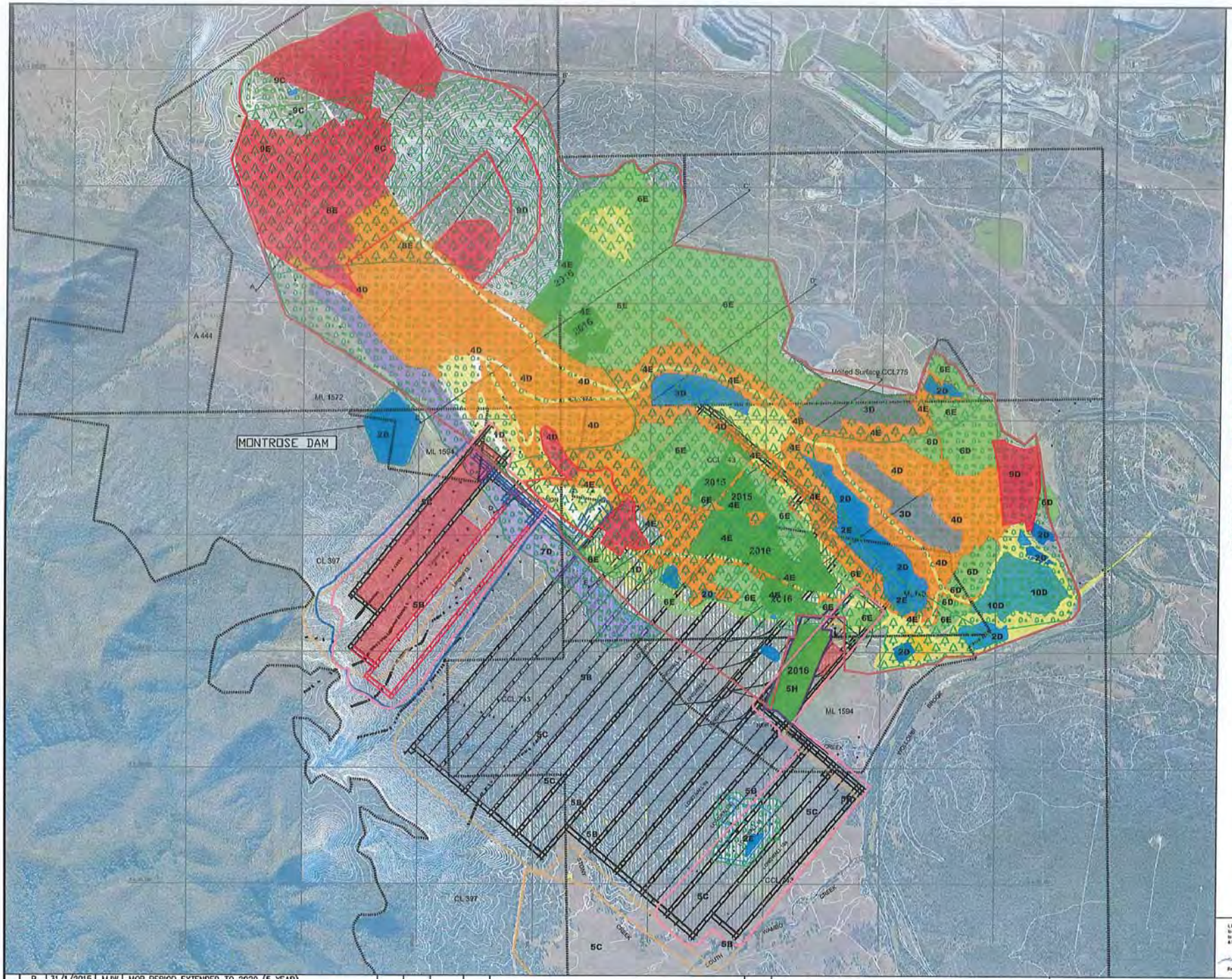

I Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief the plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, David Moore, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the pre-posed development

Chris Smith

Mine Manager — Date 3/11/2016

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)	
E	31/12/2015	MJW	MOP AMENDMENT B	
F	31/03/2016	MJW	MOP AMENDMENT C	
G	31/10/2016	MJW	MOP AMENDMENT D	

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth Via Singleton, NSW, 2330
Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine

Mining Operations Plan - Plan 3B (Amendment D)
Mining & Rehabilitation 2016

Drawing No.	Revision No.	Sheet Size
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Date	Scale:	Drawn	Checked	Approved
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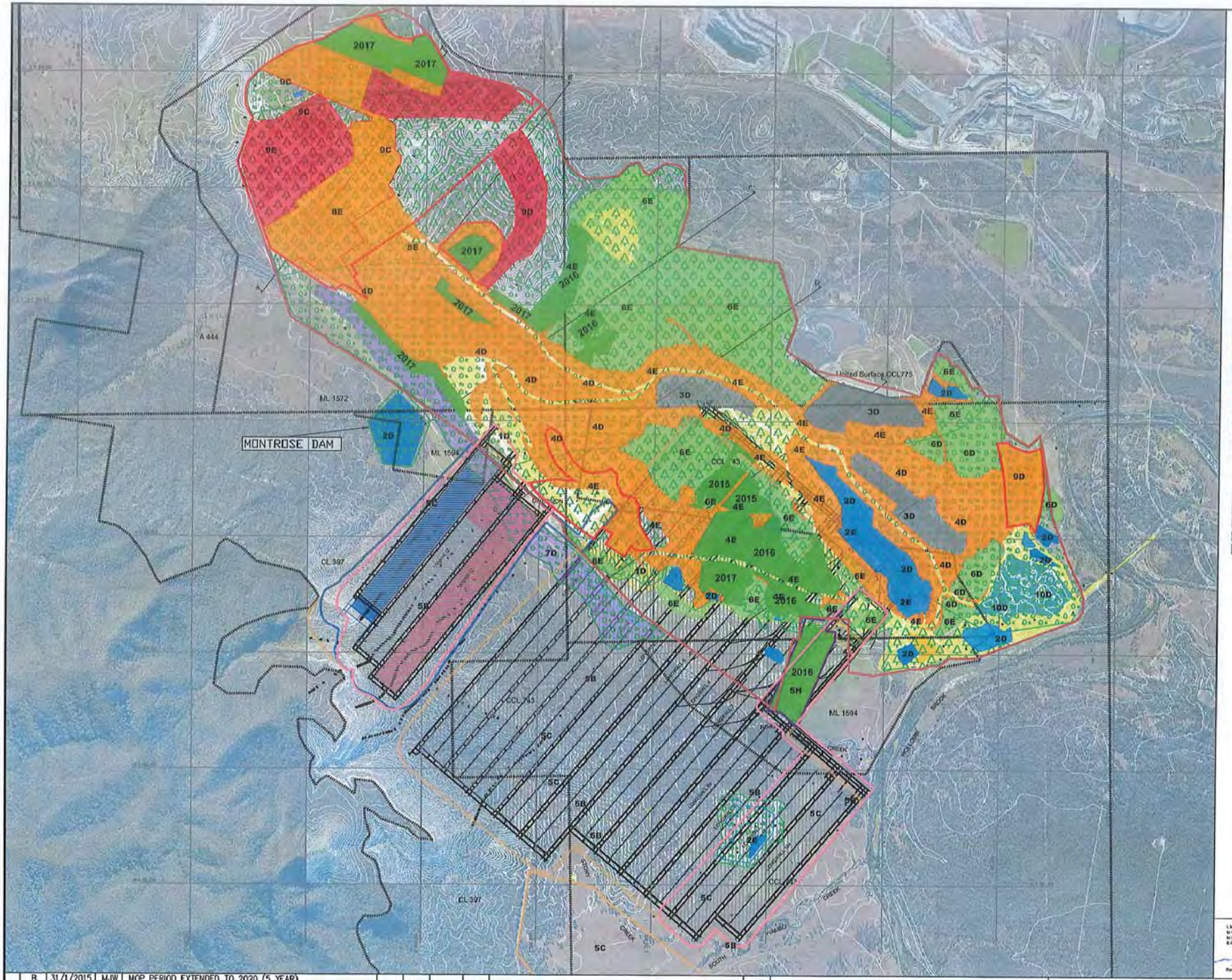

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, Geoff Allnes, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith — Mine Manager — Date 3/11/2016

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
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F	31/03/2016	MJW	MOP AMENDMENT C						
G	31/10/2016	MJW	MOP AMENDMENT D						

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth
Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine
Mining Operations Plan - Plan 3C (Amendment D)
Mining & Rehabilitation 2017

Drawing No.	Revision No.	Sheet Size
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Date	Scale	Drawn	Checked	Approved
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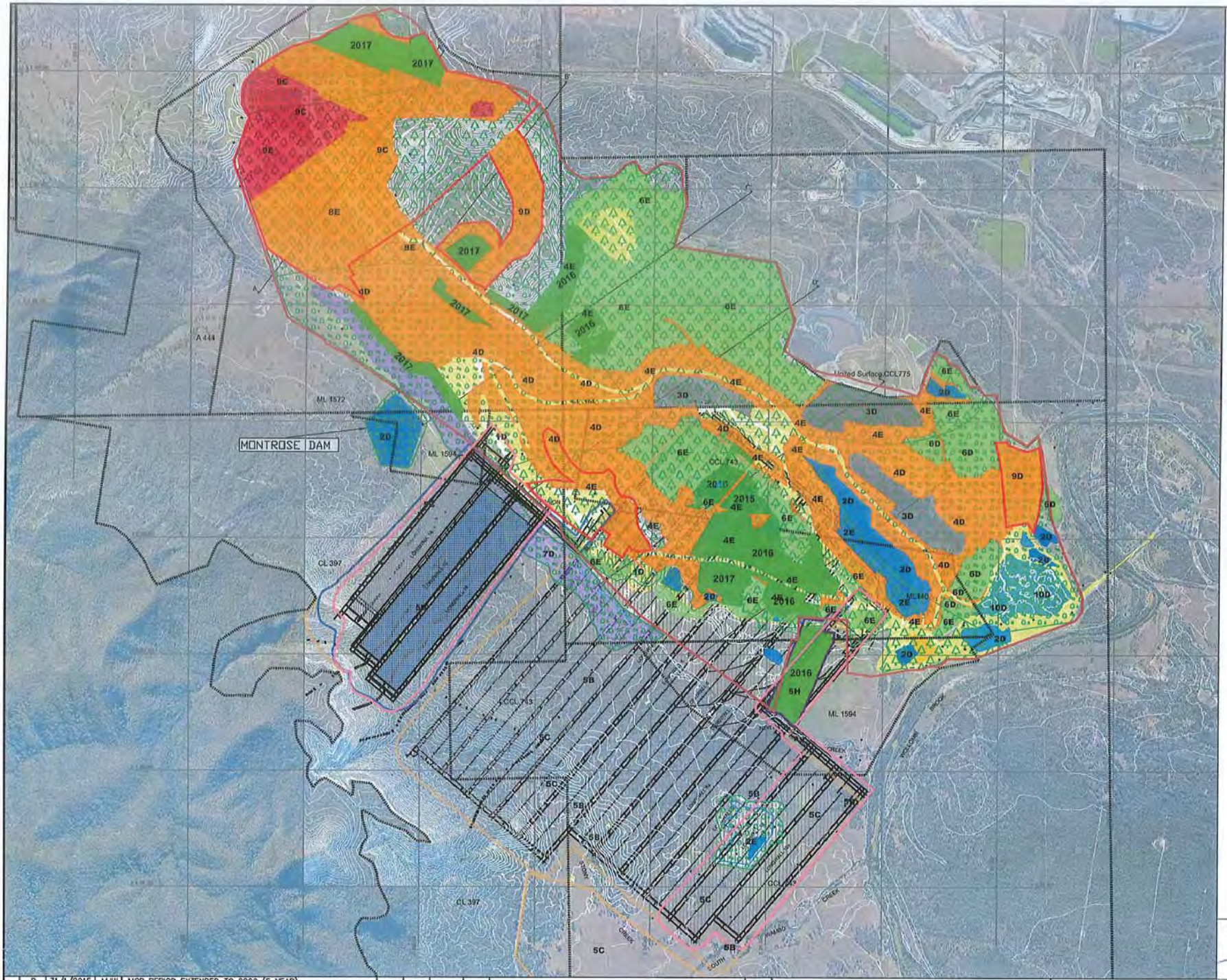

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy.

Registered Mining Surveyor — Date 3/11/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

Chris Smith — Mine Manager — Date 3/11/2016

REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)	
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	G	31/10/2016	MJW	MOP AMENDMENT D	

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
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Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Peabody ENERGY

Wambo Coal Mine
Mining Operations Plan - Plan 3D (Amendment D)
Mining & Rehabilitation 2018

Drawing No.	Revision No.	Sheet Size
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Date	Scale:	Drawn	Checked	Approved
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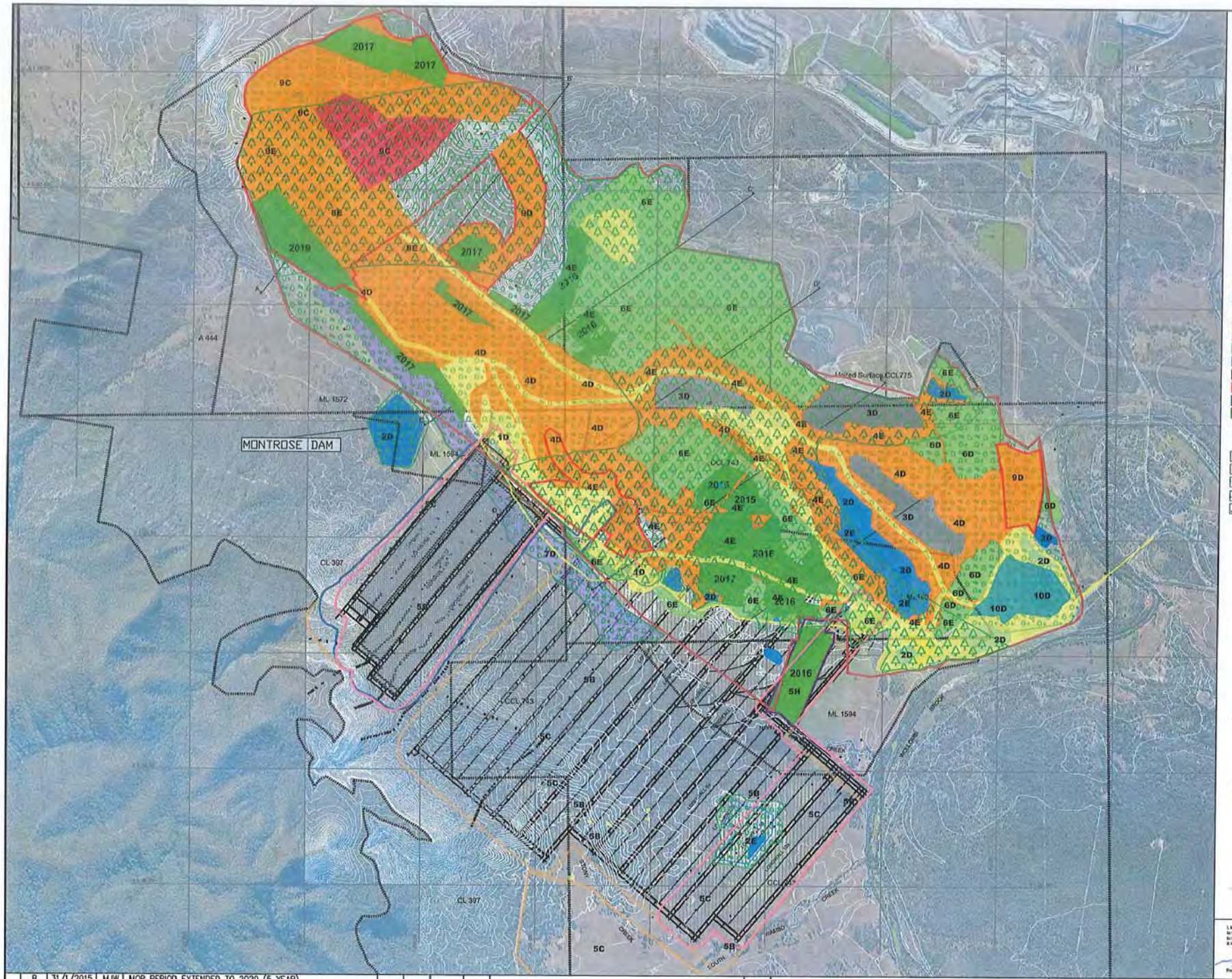

CHRIS SMITH

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy.

Registered Mining Surveyor — Date 3/11/2016

I, Chris Williams, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Mine Manager — Date 3/11/2016

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
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F	31/3/2016	MJW	MOP AMENDMENT C						
G	31/10/2016	MJW	MOP AMENDMENT D						

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth Via Singleton, NSW, 2330
Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Peabody ENERGY

Wambo Coal Mine
Mining Operations Plan - Plan 3E (Amendment D)
Mining & Rehabilitation 2019

Drawing No.	Revision No.	Sheet Size
2000	G	A0

Date	Scale	Drawn	Checked	Approved
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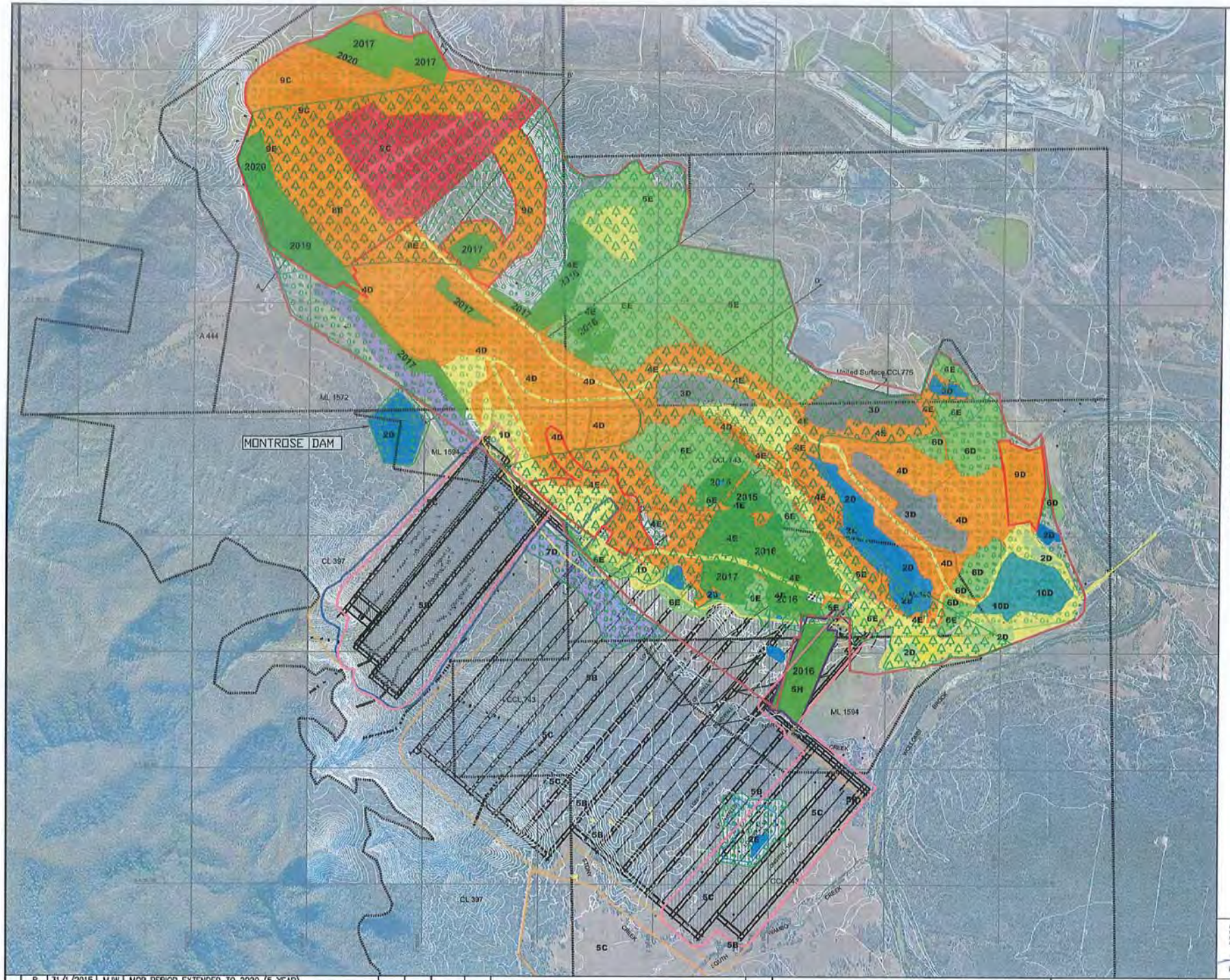

I, Vincent Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor — Date 3/11/2016

I, Chris Smith, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith — Mine Manager — Date 3/11/2016

REVISIONS									
B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
E	31/12/2015	MJW	MOP AMENDMENT B						
F	31/3/2016	MJW	MOP AMENDMENT C						
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REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth Via Singleton, NSW, 2330
Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine
Mining Operations Plan - Plan 3F (Amendment D)
Mining & Rehabilitation 2020

Drawing No.	Revision No.	Sheet Size
2001	G	A0

Date	Scale:	Drawn	Checked	Approved
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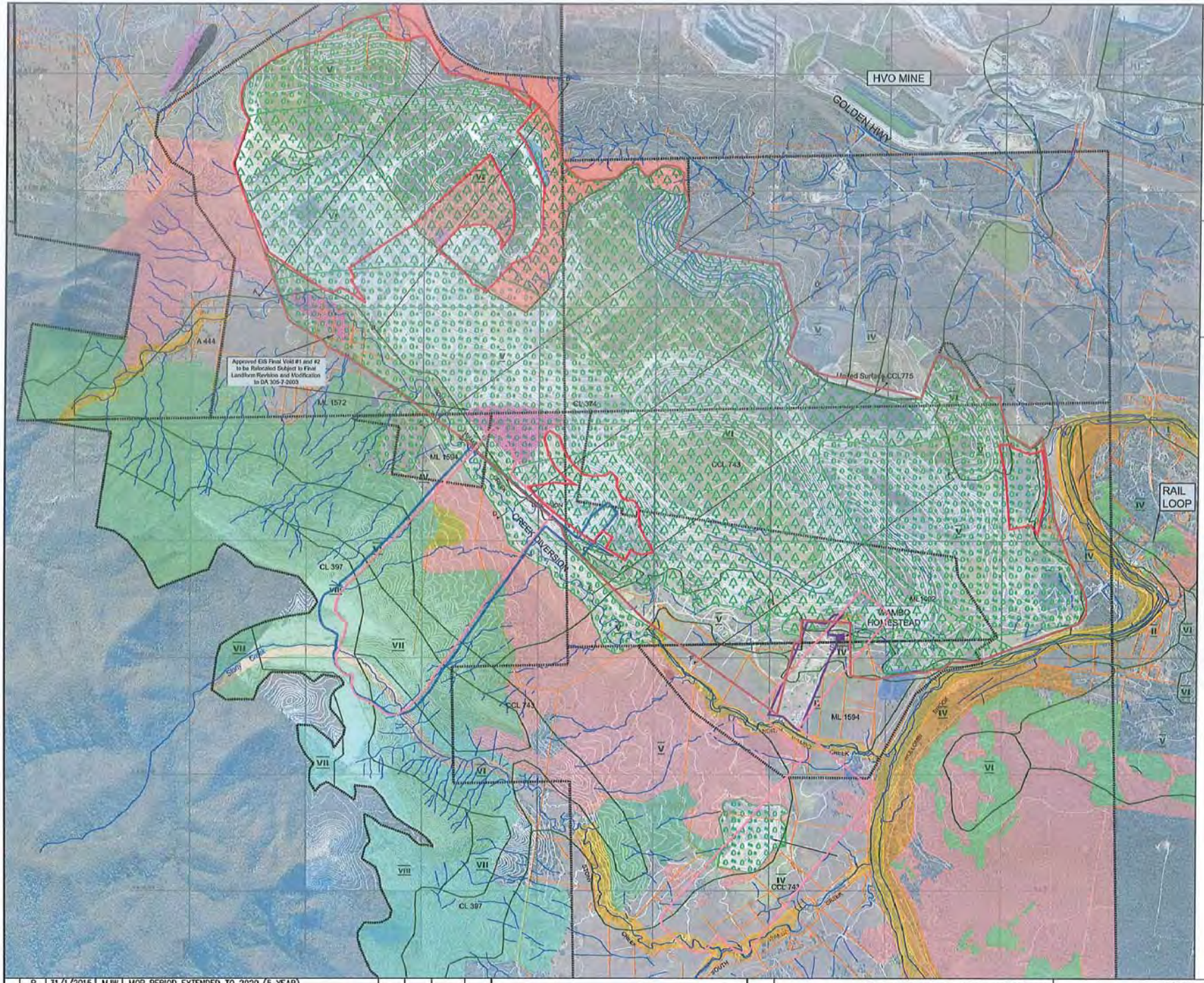

Chris Smith

I, Malcolm Walker, Registered Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the NSW Trade & Investment - Division of Resources & Energy

Registered Mining Surveyor 31/10/2016 Date

I, Chris Moore, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development

Chris Smith 3/11/2016
Mine Manager Date

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
B	31/1/2015	MJW	MOP PERIOD EXTENDED TO 2020 (5 YEAR)						
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F	31/3/2016	MJW	MOP AMENDMENT C						
G	31/10/2016	MJW	MOP AMENDMENT D						

WAMBO COAL PTY LIMITED
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Phone: 02 65 702200 Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

Wambo Coal Mine

Mining Operations Plan - Plan 4 (Amendment D)

Final Rehabilitation and Post Mining Land Use

Drawing No.	Revision No.	Sheet Size
2002	G	A0

Date	Scale:	Drawn	Checked	Approved
31/10/2016	1:7500	MJW	SP	GM, MW

APPENDIX 2

DA305-7-2003

Development Consent

Section 80 of the *Environmental Planning & Assessment Act 1979*

I, the Minister Assisting the Minister for Infrastructure and Planning (Planning Administration), approve the Development Application referred to in schedule 1, subject to the conditions in schedules 3 to 6.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the on-going environmental management of the development.

SIGNED

Diane Beamer MP
Minister Assisting the
Minister for Infrastructure and Planning
(Planning Administration)

Sydney 4 February 2004 File No: S02/02197

Blue type represents 2004 modification
Red type represents May 2005 modification
Green represents January 2006 modification
Pink represents April 2006 Modification
Orange represents October 2006 Modification
Violet represents January 2007 Modification
Brown represents June 2009 Modification
Lime represents August 2009 Modification
Blue with yellow background represents February 2011 Modification
Taupe represents January 2013 Modification
Light Blue represents July 2013 Modification
Blue with grey background represents April 2015 Modification
Purple represents October 2015 Modification

SCHEDULE 1

Development Application:	DA 305-7-2003
Applicant	Wambo Coal Pty Limited;
Consent Authority:	Minister for Infrastructure and Planning;
Land:	See Appendix 1;
Proposed Development:	The development of open cut and underground mining operations at the Wambo coal mine, which includes: • continued development of open cut and underground mining operations within existing Wambo Coal Pty Limited (WCPL) mining and coal leases and into new mining lease application area; • selective auger mining of the Whybrow, Redbank Creek, Wambo and Whynot seams up to 200 m beyond the open cut limits within WCPL owned land; • continued placement of waste rock and coarse rejects within mine waste rock emplacements;

- continued placement of tailings within open cut voids and capping with waste rock and coarse rejects;
- an extension to the existing Wollemi Underground Mine Box Cut (within the limits of the development open cut mining area) to provide direct access for three underground longwall panels in the Whybrow Seam;
- longwall mining of the Wambo Seam via the open cut highwall;
- construction of a portal and drift access to facilitate longwall mining of the Arrowfield and Bowfield Seams;
- an upgrade of the existing Coal Handling and Preparation Plant (CHPP) to facilitate increased coal production;
- development of a water control structure across North Wambo Creek at the north-western limit of the open cut operation, and a channel to allow the passage of flows to the lower reaches of North Wambo Creek around the open cut development;
- degazettal and physical closure of Pinegrove Road;
- development of new access roads and internal haul roads;
- relocation of the existing explosives magazine and construction of additional hydrocarbon storage facilities;
- relocation of the administration area and site offices;
- extraction of up to 14.7 million tonnes of run-of-mine (ROM) coal a year;
- operation of the mine 24 hours a day, 7 days a week;
- continued haulage of coal by road from Wambo Coal Mine to Mt Thorley Coal Loader prior to the commissioning of the Wambo "Rail and Train Loading Infrastructure" (which is the subject of a separate development application: DA 177-8-2004); and
- haulage of coal by the Wambo "Rail and Train Loading Infrastructure".

State Significant Development:

The proposal is classified as State significant development, under section 76A(7) of the *Environmental Planning & Assessment Act 1979*, because it involves coal-mining related development that requires a new mining lease under section 63 of the *Mining Act 1992*.

Integrated Development:

The proposal is classified as integrated development, under section 91 of the *Environmental Planning & Assessment Act 1979*, because it requires additional approvals under the:

- *Protection of the Environment Operations Act 1997;*
- *National Parks & Wildlife Act 1974*;
- *Water Act 1912;*
- *Fisheries Management Act 1994*;
- *Heritage Act 1977*;
- *Roads Act 1993*; and
- *Mine Subsidence Compensation Act 1961*.

Designated Development:

The proposal is classified as designated development, under section 77A of the *Environmental Planning & Assessment Act 1979*, because it is for a coal mine that would "produce or process more than 500 tonnes of coal a day", and consequently meets the criteria for designated development in schedule 3 of the *Environmental Planning & Assessment Regulation 2000*.

BCA Classification:

Class 5:	Office upgrade
Class 9b:	Bathhouse
Class 10a:	Car park
	Heavy vehicle wash station
	Gas drainage bores
	De-watering bores
Class 10b:	Coal conveyor

Note:

1) *To find out when this consent becomes effective, see section 83 of the Environmental Planning & Assessment Act 1979 (EP&A Act);*
2) *To find out when this consent is liable to lapse, see section 95 of the EP&A Act; and*

3) *To find out about appeal rights, see section 97 of the EP&A Act.*

SCHEDULE 2
DEFINITIONS

Adaptive management	Adaptive management includes monitoring subsidence impacts and subsidence effects and, based on the results, modifying the mining plan as mining proceeds to ensure that the effects, impacts and/or associated environmental consequences remain within predicted and designated ranges and in compliance with the conditions of this consent
Annual Review	The review required by Condition 5 of Schedule 6
Applicant	Wambo Coal Pty Limited
Associated surface development	Includes ventilation shafts, gas drainage and gas flaring infrastructure, pit top facilities, access road, offices, car park, electrical sub-station, and associated services and easements such as powerlines, water supply, fire control, communications and waste water
BCA	Building Code of Australia
Bore	Any bore or well or excavation or other work connected or proposed to be connected with sources of sub-surface water, and used or proposed to be used or capable of being used to obtain supplies of such water whether the water flows naturally at all times or has to be raised whether wholly or at times by pumping or other artificial means
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; any pipeline, water, sewer, telephone, gas or other service main
CCC	Community Consultative Committee
Conditions of this consent	Conditions contained in schedules 2 to 6 inclusive
Construction	The demolition of buildings or works, carrying out of works and erection of buildings covered by this consent
Council	Singleton Shire Council
DA	Development Application
Day	Day is defined as the period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning and Environment
DPI-Water	Department of Primary Industries - Water
DRE	Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services
DSC	Dams Safety Committee
EA	Environmental Assessment
EIS	Environmental Impact Statement
Environmental consequences	The environmental consequences of subsidence impacts, including: damage to infrastructure, buildings and residential dwellings; loss of surface flows to the subsurface; loss of standing pools; adverse water quality impacts; development of iron bacterial mats; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts on aquatic ecology; ponding
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the POEO Act
Evening	Evening is defined as the period from 6pm to 10pm
Feasible	Feasible relates to engineering considerations and what is practical to build or to implement
First Workings	Underground workings which establish access to the coal resource area
GTA	General Term of Approval
Heritage item	An item as defined under the *Heritage Act 1977* and/or an Aboriginal object or Aboriginal place as defined under the *National Parks and Wildlife Act 1974*
Incident	A set of circumstances that: • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this consent
Land	Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mining operations	Includes the removal of overburden and extraction, processing, handling, storage and transportation of coal at the Wambo Mining Complex
Minister	Minister for Planning, or delegate
Minor	Not very large, important or serious

Mitigation	Activities associated with reducing the impacts of the development prior to or during those impacts occurring
MOP	Mining Operations Plan
MSB	Mine Subsidence Board
Negligible	Small and unimportant, such as to be not worth considering
Night	Night is defined as the period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
OEH	Office of Environment and Heritage
Offset Strategy	The revegetation and enhancement program described in the EIS for the Wambo Development Project, dated July 2003
PCA	Principal Certifying Authority appointed under Section 109E of the Act
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land excluding land owned by a mining company, where: • A private agreement does not exist between the Applicant and the land owner; and • There are no land acquisition provisions requiring the Applicant to purchase the land upon request from the land owner.
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Reasonable costs	The costs agreed between the Department and the Applicant for obtaining independent experts to review the adequacy of any aspects of the extraction plan, or where such costs cannot be agreed, the costs determined by a dispute resolution process
Rehabilitation	The treatment or management of land disturbed by the development for the purpose of establishing a safe, stable and non-polluting environment, including the remediation of impacts
Remediation	Activities associated with partially or fully repairing or rehabilitating the impacts of the development or controlling the environmental consequences of this impact
ROM Coal	Run-of-mine coal
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
SEE	Statement of Environmental Effects
Safe, serviceable & repairable	Safe means no danger to users who are present, serviceable means available for its intended use, and repairable means damaged components can be repaired economically
Southern Area	See Figure HA-5 in Appendix HA of Volume 4 of the EIS for the Wambo Development Project
Second workings	Extraction of coal from longwall panels, mini-wall panels or pillar extraction
Site	Land to which the DA applies (see schedule 1 and Appendix 1)
SMP	Subsidence Management Plan
Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences of subsidence impacts
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, such as vertical and horizontal displacement, tilt, strain and curvature
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs
Vacant land	Vacant land is defined as the whole of the lot in a current plan registered at the Land Titles Office that does not have a dwelling situated on the lot and is permitted to have a dwelling on that lot at the date of this consent.
Wambo Mining Complex	The development approved under this consent, together with the development approved under the consent for the Wambo rail and coal loading infrastructure (177-8-2004) considered collectively

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SCHEDULE 3
ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

Terms of Approval

2. The Applicant shall carry out the development generally in accordance with the:
   (a) DA 305-7-2003;
   (b) EIS titled *Wambo Development Project*, volumes 1-5, dated July 2003, and prepared by Resource Strategies Pty. Ltd.;
   (c) letter from Holmes Air Sciences to the Department, dated 3 September 2003, and titled *Wambo Development Project - Response Air Quality Assessment*;
   (d) letter from Wambo Coal Pty. Ltd. to the Department, dated 24 October 2003, and titled *Wambo Development Project – Development Application Amendment (DA 305-7-2003-i)*;
   (e) Statement of Environmental Effects titled *Wambo Development project – Wambo Seam Underground Mine Modification*, dated January 2005, and prepared by Wambo Coal Pty Ltd;
   (f) document titled *Wambo Development Project – Modification of DA 305-7-2003-I*, dated 24 October 2005;
   (g) document titled *Wambo Development Project – Modification of DA 305-7-2003-I;* dated 23 January 2006;
   (h) document titled *Wambo Development Project – Modification of DA 305-7-2003-I;* dated 27 July 2006;
   (i) document titled *Wambo Coal Mine Modification Statement of Environmental Effects*; dated September 2006;
   (j) document titled *Wambo Coal Mine Statement of Environmental Effects on Proposed Modification*, dated March 2009;
   (k) document titled *Wambo Coal Mine Modification Statement of Environmental Effects*, dated June 2009 and the response to submissions dated July 2009;
   (l) the modification application DA 305-7-2003 MOD 9 and accompanying letter prepared by Wambo Coal Pty Ltd;
   (m) the modification application DA 305-7-2003 MOD 11 and accompanying documents titled *Wambo Montrose Water Storage Modification Environmental Assessment* dated June 2012 and *Wambo Montrose Water Storage Modification Response to Submissions* dated 4 September 2012;
   (n) the modification application DA 305-7-2003 MOD 13 and accompanying documents entitled *North Wambo Mine Modification Environmental Assessment - The addition of North Wambo Underground Mine Longwalls 9 and 10* dated December 2012 and *North Wambo Underground Mine Modification - Response to Submissions* dated April 2013;
   (o) the modification application DA 305-7-2003 MOD 14 and accompanying documents entitled North Wambo Underground Mine Longwall 10A Modification Environmental Assessment - The addition of North Wambo Underground Mine Longwall 10A, dated September 2014, and associated Response to Submissions dated December 2014; and
   (p) the modification application DA 305-7-2003 MOD 15 and accompanying documents entitled South Bates (Wambo Seam) Underground Mine Modification Environmental Assessment – The addition of South Bates (Wambo Seam) Underground Mine Longwalls 14 to 16, dated August 2015, and associated Response to Submissions dated September 2015.

2A. The Applicant shall carry out the development in accordance with the:
   (a) conditions of this consent; and
   (b) Approved Layout – North Wambo Underground Mine, shown in Appendix 5.

Note: With the approval of the Secretary, longwall panels may be shortened or narrowed, providing that the proposed variations do not result in increased subsidence impacts or environmental consequences.

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.

4. The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
   (a) any reports, plans or correspondence that are submitted in accordance with this consent; and
   (b) the implementation of any actions or measures contained in these reports, plans or correspondence.

Deferred Commencement

5. This consent shall only commence when the Applicant has surrendered all previous development consents for the Wambo coal mine, excluding DA No. 108/91 issued by Singleton Shire Council, to the satisfaction of the Secretary.

Limits on Approval

6. The Applicant may carry out mining operations at the Wambo Mining Complex until 1 March 2025.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Secretary and DRE. Consequently, this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and those additional undertakings have been carried out satisfactorily.

7. The Applicant shall not extract more than 14.7 million tonnes of ROM coal a year from the development.

Staged Submission of any Strategy, Plan or Program

7A. With the approval of the Secretary, the Applicant may:
(a) submit any strategy, plan or program required by this consent on a progressive basis; and
(b) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required under DA 177-8-2004.

Notes:
- *While any strategy, plan or program may be submitted on a progressive basis, the Applicant will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times; and*
- *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

Structural Adequacy

8. The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:
- *Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of development.*
- *The development is located in the Patrick Plains Mine Subsidence District. Under section 15 of the Mine Subsidence Compensation Act 1961, the Applicant is required to obtain the Mine Subsidence Board's approval before constructing or relocating any improvements on the site.*

Demolition

9. The Applicant shall ensure that all demolition work is carried out in accordance with *AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

10. The Applicant shall ensure that all plant and equipment used at the site, or to transport coal off-site, are:
(a) maintained in a proper and efficient condition; and
(b) operated in a proper and efficient manner.

Section 94 Contribution

11. Before carrying out any development, or as agreed otherwise by Council, the Applicant shall pay Council $60,000 in accordance with Council's Section 94 Contribution Plan.

Community Enhancement Contribution

12. Before carrying out any development, or as agreed otherwise by Council, the Applicant shall pay Council $15,000 for the enhancement of community infrastructure or services in the Warkworth/Jerrys Plains area.

SCHEDULE 4
SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 9-11 of schedule 5:

Table 1: Land subject to acquisition upon request

2 – Lambkin	23A & B - Kannar
13C - Skinner	31A,B,C & D - Fisher
19A & B – Kelly	51 – Hawkes
22 – Henderson	56 - Haynes

Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1 of the EIS for the Wambo Development Project.

AIR QUALITY

Odour

2. The Applicant shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the Wambo Mining Complex.

Greenhouse Gas Emissions

3. The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the Wambo Mining Complex to the satisfaction of the Secretary.

Air Quality Criteria

4. Except for the air quality affected land in Table 1, the Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Wambo Mining Complex do not exceed the criteria listed in Tables 2, 3 and 4 at any residence on privately owned land, or on more than 25 percent of any privately owned land.

Table 2: Long term impact assessment criteria for particulate matter

Pollutant	***Averaging period***	***[d] Criterion***
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3: Short term impact assessment criterion for particulate matter

Pollutant	***Averaging period***	***[d]Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4: Long term impact assessment criteria for deposited dust

Pollutant	***Averaging period***	***Maximum increase[2] in deposited dust level***	***Maximum total[1] deposited dust level***
[c]Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 2-4

[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

[b] Incremental impact (i.e. incremental increase in concentrations due to the development on its own);

[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Air Quality Acquisition Criteria

5. If particulate matter emissions generated by the Wambo Mining Complex exceed the criteria in Tables 5, 6, and 7 at any residence on privately-owned land, or on more than 25 percent of any privately owned land, then upon written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in conditions 9 - 11 of schedule 5.

Table 5: Long term land acquisition criteria for particulate matter

Pollutant	***Averaging period***	***[d] Criterion***
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 6: Short term land acquisition criteria for particulate matter

Pollutant	***Averaging period***	***[da] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 150 µg/m^3
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3

Table 7: Long term land acquisition criteria for deposited dust

Pollutant	***Averaging period***	***Maximum increase[2] in deposited dust level***	***Maximum total[1] deposited dust level***
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 5-7

[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

[b] Incremental impact (i.e. incremental increase in concentrations due to the development on its own);

[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Mine-owned Land

5A. The Applicant shall ensure that particulate matter emissions generated by the Wambo Mining Complex do not exceed the criteria listed in Tables 2, 3 and 4 at any occupied residence on any mine-owned land (including land owned by adjacent mines) unless:

(a) the tenant and landowner has been notified of health risks in accordance with the notification requirements under schedule 5 of this consent;

(b) the tenant on land owned by the Applicant can terminate their tenancy agreement without penalty, subject to giving reasonable notice, and the Applicant uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;

(c) air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Applicant);

(d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and

(e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property,

to the satisfaction of the Secretary.

Air Quality Operating Conditions

5B. The Applicant shall:

(a) implement best management practice to minimise the off-site odour, fume and dust emissions from the Wambo Mining Complex, including best practice coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail;

(b) operate a comprehensive air quality management system at the Wambo Mining Complex that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this consent;

(c) manage PM2.5 levels in accordance with any requirements of any EPL;

(d) minimise the air quality impacts of the Wambo Mining Complex during adverse meteorological conditions and extraordinary events (see note d above under Tables 5-7);

(e) minimise any visible off-site air pollution;

(f) minimise the surface disturbance of the site generated by the Wambo Mining Complex; and

(g) co-ordinate air quality management at the Wambo Mining Complex with the air quality management at nearby mines (HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative air quality impacts of these mines and the Wambo Mining Complex,

to the satisfaction of the Secretary.

Air Quality and Greenhouse Gas Management Plan

5C. The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the Wambo Mining Complex to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of June 2013;

(b) describe the measures that would be implemented to ensure:

- best management practice is being employed;
- the air quality impacts of the Wambo Mining Complex are minimised during adverse meteorological conditions and extraordinary events; and
- compliance with the relevant conditions of this consent.

(c) describe the proposed air quality management system;

(d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities;

(e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring;

(f) include an air quality monitoring program that:

- uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development;
- adequately supports the proactive and reactive air quality management system;
- includes PM2.5 monitoring;
- includes monitoring of occupied development-related residences and residences on air quality-affected land listed in Table 1, subject to the agreement of the tenant;
- evaluates and reports on the effectiveness of the air quality management system; and
- includes a protocol for determining any exceedances of the relevant conditions in this consent; and

(g) include a protocol that has been prepared in consultation with the owners of nearby mines (HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative air quality impacts of these mines and the Wambo Mining Complex.

[1]NOISE

Noise Impact Assessment Criteria

6. The Applicant shall ensure that the noise generated by the Wambo Mining Complex does not exceed the noise impact assessment criteria presented in Table 9.

Table 9: Noise impact assessment criteria dB(A))

Day $L_{Aeq(15\ minute)}$	***Evening/Night*** $L_{Aeq(15\ minute)}$	***Night*** $L_{A1(1\ minute)}$	***Land Number***
35	*41*	*50*	*94 – Curlewis*
			3 – Birrell
			4B – Circosta
			15B - McGowen/Caslick

[1] Incorporates EPA GTAs

Day $L_{Aeq(15\ minute)}$	Evening/Night $L_{Aeq(15\ minute)}$	Night $L_{A1(1\ minute)}$	Land Number
35	40	50	16 – Cooper
			23C – Kannar
			25 – Fenwick
			28A & B – Garland
			33 -Thelander/O'Neill
			39 – Northcote
			40 – Muller
			254A – Algie
35	39	50	5 – Strachan
			6 - Merrick
			7 - Maizey
			37 - Lawry
			48 - Ponder
35	38	50	1 - Brosi
			17 - Carter
			18 - Denney
			38 - Williams
			49 - Oliver
			63 - Abrocuff
			75 - Barnes
			91 - Bailey
35	37	50	27 - Birralee
			43 - Carmody
			137 - Woodruff
			163 - Rodger/Williams
			246 - Bailey
35	36	50	13B - Skinner
			178 - Smith
			188 - Fuller
			262A, B & C - Moses
35	35	50	All other residential or sensitive receptors, excluding the receptors listed in condition 1 above

Notes:

- *Noise generated by the Wambo Mining Complex is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy*

Land Acquisition Criteria

7. If the noise generated by the Wambo Mining Complex exceeds the criteria in Table 10, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 5.

Table 10: Land acquisition criteria dB(A)

Day/Evening/Night $L_{Aeq(15\ minute)}$	Property
43	94 - Curlewis
	23C – Kannar
	254A - Algie
40	All other residential or sensitive receptor, excluding the receptors listed in condition 1 above

Note: Noise generated by the Wambo Mining Complex is to be measured in accordance with the notes presented below Table 9 above.

Operating Conditions

8. The Applicant shall:
   (a) implement best management practice to minimise the operational, low frequency and traffic noise of the Wambo Mining Complex;
   (b) operate a comprehensive noise management system for the Wambo Mining Complex that uses a combination of predictive meteorological forecasting and real-time noise monitoring

data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;

(c) maintain the effectiveness of noise suppression equipment (if fitted) on plant at all times and ensure defective plant is not used operationally until fully repaired;

(d) ensure that noise attenuated plant (if used) is deployed preferentially in locations relevant to sensitive receivers;

(e) minimise the noise impacts of the Wambo Mining Complex during meteorological conditions when the noise limits in this consent do not apply;

(f) co-ordinate the noise management for the Wambo Mining Complex with the noise management at nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex,

to the satisfaction of the Secretary.

Noise Management Plan

9. The Applicant shall prepare and implement a Noise Management Plan for the Wambo Mining Complex to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of June 2013;

(b) describe the measures that would be implemented to ensure:
- best management practice is being employed;
- the noise impacts of the Wambo Mining Complex are minimised during meteorological conditions when the noise limits in this consent do not apply; and
- compliance with the relevant conditions of this consent;

(c) describe the proposed noise management system in detail;

(d) include a monitoring program that:
- uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the Wambo Mining Complex;
- adequately supports the proactive and reactive noise management system for the Wambo Mining Complex;
- includes a protocol for determining exceedances of the relevant conditions in this consent;
- evaluates and reports on the effectiveness of the noise management system for the Wambo Mining Complex;
- provides for the annual validation of the noise model for the Wambo Mining Complex; and

(e) include a protocol that has been prepared in consultation with the owners of nearby mines (including HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex.

[2]METEOROLOGICAL MONITORING

10. The Applicant shall establish a permanent meteorological station at a location approved by the EPA, and to the satisfaction of the Secretary, to monitor the parameters specified in Table 11, using the specified units of measure, averaging period, frequency, and sampling method in the table.

Table 11: Meteorological monitoring

Parameter	***Units of measure***	***Averaging period***	**Frequency**	***Sampling method[1]***
Lapse rate	*^{o}C/100m*	*1 hour*	Continuous	*Note[2]*
Rainfall	*mm/hr*	*1 hour*	Continuous	*AM-4*
Sigma Theta @ 10 m	*°*	*1 hour*	*Continuous*	*AM-2*
Siting	*-*	*-*	*-*	*AM-1*
Temperature @ 10 m	*K*	*1 hour*	*Continuous*	*AM-4*
Temperature @ 2 m	*K*	*1 hour*	*Continuous*	*AM-4*
Total Solar Radiation @ 10m	*W/m^2*	*1 hour*	*Continuous*	*AM-4*
Wind Direction @ 10 m	*°*	*1 hour*	*Continuous*	*AM-2*
Wind Speed @ 10 m	*m/s*	*1 hour*	Continuous	*AM-2*

[1] NSW EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.
[2]The Applicant shall calculate lapse rate from measurements made at 2m and 10m.

[2] Incorporates EPA GTA

[3]BLASTING & VIBRATION

Airblast Overpressure Limits

11. The Applicant shall ensure that the airblast overpressure level from blasting at the Wambo Mining Complex does not exceed the criteria in Table 12 at any residence on privately-owned land with the exception of property 13C (Skinner) (see condition 20 below).

Table 12: Airblast overpressure impact assessment criteria

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%

Ground Vibration Impact Assessment Criteria

12. The Applicant shall ensure that the ground vibration level from blasting at the Wambo Mining Complex does not exceed the criteria in Table 13 at any residence on privately-owned land with the exception of property 13C (Skinner) (see condition 20 below).

Table 13: Ground vibration impact assessment criteria

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

Blasting Hours

13. The Applicant shall only carry out blasting at the Wambo Mining Complex between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays or any other time without the written approval of EPA.

Blasting Frequency

13A. The Applicant may carry out a maximum of:
(a) 3 blasts a day, unless an additional blast is required following a blast misfire; and
(b) 15 blasts a week,
for all operations at the Wambo Mining Complex.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Public Notice

14. During the life of the Wambo Mining Complex, the Applicant shall:
(a) operate a Blasting Hotline, or alternate system agreed to by the Secretary, to enable the public to get up-to-date information on blasting operations at the Wambo Mining Complex; and
(a) notify the occupants of any land within 2 km of the site about this hotline or system on an annual basis.

Property Inspection

15. Before carrying out any blasting, the Applicant shall advise all landowners within 2 km of the site that they are entitled to a property inspection.

16. If the Applicant receives a written request for a property inspection from any landowner within 2 km of the site, the Applicant shall:

[3] Incorporates EPA GTA

(a) within 28 days of receiving the request, commission a suitably qualified person, whose appointment has been approved by the Secretary, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
(b) give the landowner a copy of this property inspection report within 14 days of receiving the report.

Cumulative Impacts

17. The Applicant shall undertake all reasonable steps to co-ordinate blasting at the Wambo Mining Complex with the blasting at surrounding mines – such as Bulga, Mount Thorley, Warkworth, and Hunter Valley Operations – to minimise the cumulative impacts of blasting in the region.

Operating Conditions

18. During mining operations at the Wambo Mining Complex, the Applicant shall:
(a) implement best management practice to:
- protect the safety of people and livestock in the surrounding area;
- protect public or private infrastructure/property in the surrounding area from any damage; and
- minimise the dust and fume emissions of any blasting;

(b) minimise the frequency and duration of any road closures, and avoid road closures during peak traffic periods;
(c) co-ordinate the timing of blasting at the Wambo Mining Complex with the timing of blasting at nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative blasting impacts of these mines and the Wambo Mining Complex; and
(d) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule at the Wambo Mining Complex,
to the satisfaction of the Secretary.

19. The Applicant shall not undertake blasting within 500 metres of:
(a) any public road without the approval of the appropriate road authority; or
(b) any land outside the site that is not owned by the Applicant, unless:
- the Applicant has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Applicant has advised the Department in writing of the terms of this agreement, or
- the Applicant has:
  - demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and
  - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land.

Blast Management Plan

20. The Applicant shall prepare and implement a Blast Management Plan for the Wambo Mining Complex to the satisfaction of the Secretary. This plan must:
(a) be submitted to the Secretary for approval by the end of June 2013;
(b) propose and justify any alternative ground vibration limits for any public infrastructure in the vicinity of the Wambo Mining Complex;
(c) describe the measures that would be implemented to ensure:
- best management practice is being employed;
- compliance with the relevant conditions of this consent;

(d) include a road closure management plan for blasting within 500 metres of a public road, that has been prepared in consultation with the RMS and Council;
(e) include measures to minimise, mitigate, and if necessary remediate the blasting impacts on property 13C (Skinner);
(f) address the requirements of conditions 63 – 68 of schedule 4;
(g) include a monitoring program for evaluating the performance of the Wambo Mining Complex, including:
- compliance with the applicable criteria; and
- minimising the fume emissions from the Wambo Mining Complex; and

(h) include a protocol that has been prepared in consultation with the owners of nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative blasting impacts of these mines and the Wambo Mining Complex.

20A. The Applicant shall not carry out more than 1 blast a day within 500 metres of Wallaby Scrub Road or the Golden Highway.

Property Investigations

21. If any landowner within a 2 km radius of the site claims that his/her property has been damaged as a result of blasting at the development, the Applicant shall:

(a) within 28 days of receiving this claim in writing, commission a suitably qualified person whose appointment has been approved by the Secretary to investigate the claim; and

(b) give the landowner a copy of the property investigation report within 14 days of receiving the report.

If this independent investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damages to the satisfaction of the Secretary.

If the Applicant or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (See Appendix 2).

SUBSIDENCE

Performance Measures – Natural and Heritage Features, etc

22. The Applicant shall ensure that the development does not cause any exceedances of the performance measures in Table 14A, to the satisfaction of the Secretary.

Table 14A: Subsidence Impact Performance Measures

Water	
Wollombi Brook	Negligible impact. Controlled release of excess site water only in accordance with EPL requirements
Biodiversity	
Wollemi National Park	Negligible subsidence impacts. Negligible environmental consequences.
Warkworth Sands Woodland Community	Minor cracking and ponding of the land surface or other impact. Negligible environmental consequences
White Box, Yellow Box, Blakely's Red Gum Woodland/Grassy White Box Woodland Community	Minor cracking and ponding of the land surface or other impact. Negligible environmental consequences
Other threatened species, populations or communities	Minor cracking and ponding of the land surface or other impact. Negligible environmental consequences
Heritage	
Wambo Homestead Complex	Negligible impact on heritage values, unless approval has been granted by the Heritage Branch and/or the Minister

Notes:

1) The Applicant will be required to define more detailed performance indicators for each of these performance measures in the various management plans that are required under this consent (see condition 22C below).

2) The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of approval of modification 9.

If the Applicant exceeds the performance measures in Table 14A and the Secretary determines that:

(a) it is not reasonable or feasible to remediate the impact or environmental consequences; or

(b) remediation measures implemented by the Applicant have failed to satisfactorily remediate the impact or environmental consequence,

then the Applicant shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

Note: An offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Performance Measures – Built Features

22A. The Applicant shall ensure that the development does not cause any exceedances of the performance measures in Table 14B, to the satisfaction of DRE.

Table 14B: Subsidence Impact Performance Measures

Built Features	
All built features	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Public Safety	
Public Safety	No additional risk

Notes:
1) The Applicant will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 22C below).
2) The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of modification 9.
3) Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.
4) Compensation required under this condition includes any compensation payable under the Mine Subsidence Compensation Act 1961 and/or the Mining Act 1992.

22B. Any dispute between the Applicant and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 14B is to be settled by DRE. DRE may seek the advice of the MSB on the matter. Any decision by DRE shall be final and not subject to further dispute resolution under this consent.

Extraction Plan

22C. The Applicant shall prepare and implement an Extraction Plan for the second workings within each seam to be mined to the satisfaction of the Secretary. Each Extraction Plan must:

(a) be prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
(b) be approved by the Secretary before the Applicant carries out any of the second workings covered by the plan;
(c) include detailed plans of the proposed first and second workings and any associated surface development;
(d) include detailed performance indicators for each of the performance measures in Tables 14A and 14B;
(e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this consent;
(f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 14A and 14B, and manage or remediate any impacts and/or environmental consequences;
(g) include the following to the satisfaction of DRE:
- a coal resource recovery plan that demonstrates effective recovery of the available resource;
- a subsidence monitoring program to:
  - provide data to assist with the management of the risks associated with subsidence;
  - validate the subsidence predictions; and
  - analyse the relationship between the subsidence effects and impacts under the plan and any ensuing environmental consequences;
- a Built Features Management Plan to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:
  - addresses in appropriate detail all items of public infrastructure and all classes of other built features; and
  - has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;
- a Public Safety Management Plan to ensure public safety in the mining area; and
- appropriate revisions to the Rehabilitation Management Plan required under condition 94C; and

(h) include a:
- Water Management Plan, which has been prepared in consultation with EPA and DPI-Water, which provides for the management of the potential impacts and/or environmental

consequences of the proposed second workings on surface water resources, groundwater resources and flooding, and which includes:
- surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;
- a program to monitor and report groundwater inflows to underground workings; and
- a program to manage and monitor impacts on groundwater bores on privately-owned land;

- Biodiversity Management Plan, which has been prepared in consultation with the OEH, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna;
- Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;
- Heritage Management Plan, which has been prepared in consultation with OEH and relevant stakeholders for Aboriginal and non-Aboriginal heritage, to manage the potential environmental consequences of the proposed second workings on heritage sites or values; and

(i) include a program to collect sufficient baseline data for future Extraction Plans.

Notes:
1) An SMP approved by DRE prior to 30 July 2011 is taken to satisfy the requirements of this condition for the workings covered by this plan.
2) Management plans prepared under condition 22C(h) should address all potential impacts of proposed underground coal extraction on the relevant features. Other similar management plans required under this consent (eg under conditions 30 - 35 and 44 - 48) are not required to duplicate these plans or to otherwise address the impacts associated with underground coal extraction.

22D. The Applicant shall ensure that the management plans required under condition 22C(h) above include:
(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this consent;
(b) a detailed description of the measures that would be implemented to remediate predicted impacts; and
(c) a contingency plan that expressly provides for adaptive management.

First Workings

22E. The Applicant may carry out first workings within the underground mining area, other than in accordance with an approved extraction plan, provided that DRE is satisfied that the first workings are designed to remain stable and non-subsiding in the long term, except insofar as they may be impacted by approved second workings.

Note: The intent of this condition is not to require an additional approval for first workings, but to ensure that first workings are built to geotechnical and engineering standards sufficient to ensure long term stability, with negligible resulting direct subsidence impacts.

Payment of Reasonable Costs

22F. The Applicant shall pay all reasonable costs incurred by the Department to engage independent experts to review the adequacy of any aspect of an Extraction Plan.

REJECTS EMPLACEMENT STRATEGY

22G. Within 6 months of this consent commencing, the Applicant shall prepare a Life of Mine Rejects Emplacement Strategy for the development, to the satisfaction of DRE.

[4]SURFACE & GROUND WATER

Water Supply

23. The Applicant shall ensure that it has sufficient water during each stage of the development, and if necessary, adjust the scale of mining operations to match its available water supply.

Note: The Applicant is required to obtain necessary licences for the development under the Water Act 1912 and Water Management Act 2000.

[4] Incorporates EPA GTA

Pollution of Waters

23A. Except as may be expressly provided by an EPA licence, the Applicant shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.

Discharge Limits

24. Except as may be expressly provided by a EPA licence or the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*, the Applicant shall:
(a) not discharge more than 250 ML/day from the licenced discharge point/s at the development;
(b) ensure that the discharges from any licenced discharge point comply with the limits in Table 15:

Table 15: Discharge Limits

Pollutant	Units of measure	100 percentile concentration limit
pH	pH	6.5 to 9.5
Total suspended solids	mg/litre	120

Note: This condition does not authorise the pollution of waters by any other pollutants.

Site Water Balance

25. [5]Each year, the Applicant shall:
(a) review the site water balance for the development against the predictions in the EIS;
(b) re-calculate the site water balance for the development;
(c) assess current and forecast compliance with the rules of the Hunter River Salinity Trading Scheme; and
(d) report the results in the Annual Review.

North Wambo Creek Diversion

26. The Applicant shall design, construct, maintain, and rehabilitate the temporary North Wambo Creek Bypass, the temporary North Wambo Creek Pipeline, and the North Wambo Creek Diversion in consultation with DRE, DPI-Water and to the satisfaction of the Secretary.

Note: The Department accepts that the Applicant is not required to "rehabilitate" the temporary North Wambo Creek Bypass.

27. Within one month of completing the construction of the temporary North Wambo Creek Bypass, the temporary North Wambo Creek Pipeline, and the North Wambo Creek Diversion, the Applicant shall submit an as-executed report, certified by a practising registered engineer, to the Secretary.

28. Prior to destroying the original creek line by open cut mining, the Applicant shall demonstrate that the relevant stage of the North Wambo Creek Diversion is operating successfully from a hydrological and biological point of view to the satisfaction of DRE and the Secretary.

Note: This condition does not apply to the temporary North Wambo Creek Bypass.

Chitter Dump Dam

28A. The Applicant shall design and construct the Chitter Dump Dam in consultation with United Collieries Pty Ltd, and to the satisfaction of the DSC and DRE. The design of the dam must be accompanied by a detailed assessment of the potential operational and environmental risks associated with the dam, particularly in relation to potential subsidence-related impacts.

South Wambo Dam

28B. The Applicant shall design, construct and operate the South Wambo Dam to the satisfaction of the DSC and DRE. The design of the dam must be accompanied by a detailed assessment of the potential operational and environmental risks associated with the dam, particularly in relation to potential subsidence-related impacts.

[5] These calculations must exclude the clean water system, including any sediment control structures, and any dams in the mine lease area which fall under the Maximum Harvestable Right Dam Capacity; include any dams that are licensable under Section 205 of the Water Act 1912, and water harvested from any non-harvestable rights dam on the mine lease area; address balances of inflows, licenced water extractions, and transfers of water from the site to other sites; include an accounting system for water budgets; and include a salt budget.

28C. The South Wambo Dam shall be fully, or substantially, drained prior to the commencement of mining in the underlying longwalls to minimise the risk of operational or environmental impacts from subsidence.

Monitoring

29. The Applicant shall:
(a) measure:
- the volume of water discharged from the site;
- water use on the site;
- dam and water structure storage levels,
- water transfers across the site; and
- water transfers between the site and surrounding mines;

(b) monitor the quality of the surface water:
- discharged from the licenced discharge point/s at the development; and
- upstream and downstream of the development;

(c) monitor flows in the Wollombi Brook; and North Wambo, South Wambo, and Stony Creeks;
(d) monitor the volume and quality of water inflows from each separate source to the underground and open cut workings; and
(e) monitor regional ground water levels and quality in the alluvial and overburden aquifers during the development and at least 10 years after mining; and
(f) periodically assess groundwater pressure response in the coal measures;
to the satisfaction of EPA, DPI-Water and the Secretary.

Site Water Management Plan

30. Before carrying out any development, the Applicant shall prepare a Site Water Management Plan for the development in consultation with DRE and DPI-Water, and to the satisfaction of the Secretary. This plan must include:
(a) the predicted site water balance;
(b) the predicted salt balance for the site;
(c) the North Wambo Creek Diversion Plan;
(d) an Erosion and Sediment Control Plan;
(e) a Surface Water Monitoring Program;
(f) a Ground Water Monitoring Program;
(g) a Surface and Ground Water Response Plan; and
(h) a strategy for the decommissioning water management structures on the site.

By the end of October 2009, the Applicant shall revise the Site Water Management Plan in consultation with DRE, EPA and DPI-Water, and to the satisfaction of the Secretary.

Note: The North Wambo Creek Diversion Plan must also be prepared in consultation with NSW Fisheries.

30A. The predicted salt balance for the site shall:
(a) include details of:
- the sources of saline material on the site;
- saline material and saline water management on site;
- reporting procedures, including the preparation of an annual salt balance; and

(b) describe the measures that would be implemented to minimise short term and long term discharge of saline water from the site.

31. The North Wambo Creek Diversion Plan shall include:
(a) the detailed design and specifications of the creek diversion, including the flow control bund, cut off wall, and channel;
(b) a revegetation program for the channel using a range of suitable native riparian and floodplain species;
(c) the detailed design of the system that would return intercepted ground water to the alluvial aquifer downstream of the open cut;
(d) a construction program for the creek diversion, describing how the work would be staged, and progressively integrated with the mining operations and the mine waste emplacement drainage system;
(e) water quality, ecological and geomorphic performance criteria for the creek diversion;
(f) a program to monitor water quality, ecological, and geomorphic integrity of the creek diversion; and
(g) a program to inspect and maintain the creek diversion and revegetation works during the development.

Note: The Applicant may prepare and submit the North Wambo Diversion Plan on a progressive basis to reflect the relevant stages of the proposed diversion.

32. The Erosion and Sediment Control Plan shall:
    (a) be consistent with the requirements of the Department of Housing's *Managing Urban Stormwater: Soils and Construction* manual;
    (b) identify activities that could cause soil erosion and generate sediment;
    (c) describe the location, function, and capacity of erosion and sediment control structures; and
    (d) describe measures to minimise soil erosion and the potential for the migration of sediments to downstream waters.

33. [6]The Surface Water Monitoring Program shall include:
    (a) detailed baseline data on surface water flows and quality in the Wollombi Brook, and North Wambo, South Wambo, and Stony Creeks;
    (b) surface water impact assessment criteria;
    (c) a detailed program to monitor surface water flows and quality in the Wollombi Brook; and North Wambo, South Wambo, and Stony Creeks;
    (d) a detailed program to monitor bank and bed stability in North Wambo, South Wambo, and Stony Creeks;
    (e) a detailed program to monitor the quantity and quality of the vegetation in the riparian zones adjacent to North Wambo, South Wambo, and Stony Creeks; and
    (f) a program to monitor the effectiveness of the Erosion and Sediment Control Plan.

34. The Ground Water Monitoring Program shall include:
    (a) detailed baseline data on ground water levels and quality, based on statistical analysis, to benchmark the pre-mining natural variation in groundwater levels and quality;
    (b) ground water impact assessment criteria;
    (c) a comprehensive and detailed program to monitor the volume and quality of ground water seeping into the open cut and underground mining workings;
    (d) a detailed program to monitor regional ground water levels and quality in the alluvial and overburden aquifers; and
    (e) a program to investigate and monitor potential water loss from the Chitter Dump Dam and South Wambo Dam, and Montrose East Dam, including potential migration of stored water toward Wollombi Brook.

35. The Surface and Ground Water Response Plan shall include:
    (a) measures to mitigate any adverse impacts on existing water supply bores or wells, including trigger levels for the provision of suitable compensatory water supplies;
    (b) measures to mitigate the loss of surface water flows in the surface water streams or channel on the site;
    (c) deleted;
    (d) measures to mitigate the long term direct hydraulic connection between the backfilled open cut and the North Wambo Creek alluvium if the potential for an downstream adverse impact is detected;
    (e) measures to address the decrease in throughflow rates caused by the development within the Wollombi Brook alluvium downstream of the open cut;
    (f) measures to address any reduction in the stability or ecological quality of the North Wambo Creek Diversion below the established performance criteria;
    (g) measures to minimise and/or offset potential groundwater leakage from Wollombi Brook and associated alluvial aquifers; and
    (h) measures to mitigate adverse impacts on groundwater dependent ecosystems or riparian vegetation and offset any impacts above the predicted impacts;
    (i) trigger levels for the relinquishment of water extraction rights to compensate for surface and groundwater losses from streams, channels or alluvials to open cut and underground mining workings;
    (j) the procedures that would be followed if any unforeseen impacts are detected during the development; and
    (k) response times for undertaking the above measures.

Surface & Sub-surface Investigation Program

36. Deleted

[6] Incorporates EPA GTA

Independent Audit

37. Prior to seeking approval from the Department for each extraction plan, unless the Secretary directs otherwise, the Applicant shall commission a suitably qualified person, whose appointment has been approved by the Secretary, to conduct an independent audit of the subsidence, surface water, and ground water impacts of the development. This audit shall:
    (a) review the monitoring data for the development;
    (b) identify any trends in the monitoring data;
    (c) examine the subsidence, surface water, and ground water impacts of the development;
    (d) compare these impacts against the relevant impact assessment criteria and predictions in the EIS; and, if necessary;
    (e) recommend measures to reduce, mitigate, or remediate these impacts.

38. If the independent audit determines that the subsidence, surface water, and/or ground water impacts resulting from the underground mining operations are greater than those predicted in the EIS, the Applicant shall:
    (a) assess the significance of these impacts;
    (b) investigate measures to minimise these impacts, including modifying subsequent mine plans; and
    (c) describe what measures would be implemented to reduce, minimise, mitigate or remedite these impacts in the future;
    to the satisfaction of the Secretary.

Final Void Strategy

39. At the end of Year 7 of the development, or as directed otherwise by the Secretary, the Applicant shall prepare a Final Void Management Plan for the development, in consultation with the DRE, the Secretary and Council, and to the satisfaction of the Secretary. This Plan must:
    (a) investigate options for the future use of the final void;
    (b) re-assess the potential groundwater impacts of the development; and
    (c) describe what actions and measures would be implemented to:
        - minimise any potential adverse impacts associated with the final void; and
        - manage, and monitor the potential impacts of, the final void over time.

FAUNA & FLORA

Offset Strategy

40. Within the limits of current technology and best practice flora and fauna management, the Applicant shall implement the biodiversity offset strategy summarised in Table 16 (including any subsequent revisions approved in writing by the Secretary), to the satisfaction of the Secretary.

Table 16: Biodiversity Offset Strategy

Area	Size
Remnant Woodland Enhancement Area A	424 ha
Remnant Woodland Enhancement Area B	454 ha
Remnant Woodland Enhancement Area C	211 ha
Open Cut Woodland Revegetation	1,570ha
Remnant Woodland Enhancement Area D	46 ha
Remnant Woodland Enhancement Area D Extension	2 ha
Remnant Woodland Enhancement Area for the Wambo Coal Terminal	As shown in Appendix 4
Other Areas	As identified under Condition 47(b) and/or as required under Condition 22

Notes:
(a) The areas specified in table 16 are shown in Appendix 4.
(b) The area of Open Cut Woodland Revegetation in Table 16 is based on the establishment of 50% woodland within the mixed woodland/pasture areas shown in the EIS, and with the agreement of the Secretary, may vary depending on the shape of the final landform and the approved mine closure plan.
(c) Should the Secretary determine that an additional offset is required under Condition 22, the Applicant will be required to provide this offset in addition to the specified offsets in Table 16. The size of any additional offset required shall be determined in consultation with OEH and to the satisfaction of the Secretary.

Conservation Agreement

41. By the end of June 2015, unless otherwise agreed by the Secretary, the Applicant shall:
    (a) enter into a conservation agreement/s pursuant to section 69B of the *National Parks and Wildlife Act 1974* covering all offset areas listed in Table 16 (see condition 40) and which records the Applicant's obligations under the conditions of this consent in relation to the management of these areas, and register the agreement/s pursuant to section 69F of the *National Parks and Wildlife Act 1974*; or
    (b) where OEH has advised in writing that it is of the view that any such offset area or part of such an area should not be subject to a conservation agreement for a period of time, then the Applicant shall by the same date cause to be registered against the land title(s) of the area/s a public positive covenant and/or restriction on the use of the land, in favour of the Secretary, requiring the Applicant to implement and observe all obligations under the conditions of this consent in relation to the management of these areas.

    The conservation agreement or the public positive covenant and/or restriction on the use of land, as the case may be, shall remain in force in perpetuity in relation to the area.

    Note: Should the Secretary determine that the specified conservation mechanism is no longer appropriate, the Secretary may approve an alternative conservation mechanism to satisfy this condition, in consultation with OEH.

Offset Conservation

41A. The Applicant shall not undertake any mining operations (except approved underground mining operations) or other activities within the offset areas listed in Table 16, other than:
    (a) activities under an approved Biodiversity Management Plan, Flora & Fauna Management Plan or Heritage Management Plan;
    (b) environmental management, environmental monitoring or other monitoring required under this consent or under an approved management plan or monitoring program; and
    (c) rehabilitation activities under an approved Extraction Plan.

42. Deleted.

Strategic Study Contribution

43. If, during the development, the Department commissions a strategic study into the regional vegetation corridor stretching from the Wollemi National park to the Barrington Tops National Park, then the Applicant shall contribute a reasonable amount, up to $20,000, towards the completion of this study.

Flora & Fauna Management Plan

44. Before carrying out any development, the Applicant shall prepare a Flora and Fauna Management Plan for the development, in consultation with the Hunter Coalfield Flora and Fauna Advisory Committee (when established), and to the satisfaction of the Secretary. This plan must include:
    (a) a Vegetation Clearance Protocol;
    (b) a Threatened Species Management Protocol;
    (c) a Remnant Woodland Enhancement Program;
    (d) a Flora and Fauna Monitoring Program;
    (e) strategies to manage any subsidence impacts in the Remnant Woodland Enhancement Areas;
    (f) strategies to avoid clearing of Warkworth Sands Endangered Ecological Community and minimise the extent of clearing in other ecological communities for gas drainage infrastructure in the Remnant Woodland Enhancement Areas, to the satisfaction of the Secretary;
    (g) strategies for the minimisation of impacts of exploration activity in the Remnant Woodland Enhancement Areas; and
    (h) a description of who would be responsible for monitoring, reviewing, and implementing the plan.

    By the end of March 2013, the applicant shall revise the Flora and Fauna Management Plan for the development to the satisfaction of the Secretary.

45. The Vegetation Clearance Protocol shall include:
    (a) the delineation of areas of remnant vegetation to be cleared;
    (b) progressive clearing;
    (c) pre-clearance surveys;
    (d) identification of fauna management strategies;
    (e) collection of seed from the local area;
    (f) salvage and reuse of material from the site; and
    (g) control of weeds during clearing activities.

46. The key components of the Threatened Species Management Protocol shall include:
    (a) observations/surveys for threatened species (facilitated by the vegetation clearance surveys and Flora and Fauna Monitoring Program);
    (b) consultation with regulatory authorities; and
    (c) threatened species management strategies and reporting.

47. The Remnant Woodland Enhancement Program shall include:
    (a) a habitat assessment of all areas listed in Table 16, to obtain additional information on existing habitat resources and characteristics of each area;
    (b) investigation of other areas to be included in the Program, including the *Acacia anuera* Community (Community 15) and the Southern Area;
    (c) appropriate enhancement strategies to be implemented based on the habitat assessment including:
        - the fencing of remnants to exclude livestock;
        - control measures to minimise the occurrence of weeds;
        - control measures to minimise the occurrence of feral pests;
        - limiting vehicular traffic;
        - selective planting of native vegetation; and
        - the provision of roosting/nesting resources for fauna.

48. The Flora and Fauna Monitoring Program shall include:
    (a) a program to monitor revegetation of disturbance areas including:
        - visual monitoring to determine the need for maintenance and/or contingency measures; and
        - monitoring of the quality of rehabilitation using Ecosystem Function Analysis (or a similar systems based approach) through the assessment of landscape function, vegetation dynamics and habitat complexity; and
    (b) a program to monitor the effectiveness of offset strategy in accordance with the description in Table 17.

Table 17: Flora & Fauna Monitoring Program

Monitoring Component	***Monitoring Description***
Flora	*A number of permanent flora survey quadrats (of varying sizes to survey tree, shrubs and ground cover) should be established in woodland enhancement areas to obtain quantitative data on plant species diversity and abundance.*
Habitat Complexity	*Habitat complexity should be monitored using a number of permanent transects established within woodland enhancement areas. Habitat complexity parameters such as canopy cover, shrub cover, ground vegetation cover, the amount of litter, fallen logs and rocks should be surveyed.*
Terrestrial Fauna	*Terrestrial fauna surveys should be conducted to monitor the usage of enhancement areas by vertebrate fauna. Monitoring may include fauna species diversity and abundance or, alternatively, the use of indicator species to measure the effectiveness of enhancement measures.*
Aquatic Fauna	*Freshwater macro-invertebrate monitoring, including an assessment of SIGNAL A values and water quality (e.g. temperature, pH, and salinity).*
Specific Enhancement Initiatives	*Monitoring of specific enhancement initiatives (e.g. the provision of nesting/roosting boxes, weed control or feral animal control).*

Annual Review

49. The Applicant shall:
    (a) review the performance of the Flora and Fauna Management Plan annually, in consultation with the Hunter Coalfield Flora & Fauna Advisory Committee (when established); and
    (b) revise the document as necessary to take into account any recommendations from the annual review.

Independent Audit

50. Within 5 years of the date of this consent, and every 5 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission, and pay the full cost of, an Independent Audit of the offset strategy. This audit must:
    (a) be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Secretary;
    (b) assess the performance of the offset strategy;

(c) review the adequacy of the Flora & Fauna Management Plan; and, if necessary,
(d) recommend actions or measures to improve the performance of the offset strategy, and the adequacy of the Flora & Fauna Management Plan.

[7]ABORIGINAL CULTURAL HERITAGE

Note: The Applicant is required to obtain consent from OEH under the National Parks Wildlife Act 1974 to destroy Aboriginal sites and objects on the site.

Conservation Agreement

51. Within 12 months of the commencement of this consent, the Applicant shall develop a conservation agreement (as part of the Deed of Agreement with the Minister referred to in condition 41 above) for the management of Aboriginal cultural heritage in Remnant Woodland Enhancement Area A in consultation with the Aboriginal Communities and OEH.

Salvage

52. Before making application for section 90 consents under *the National Parks & Wildlife Act 1974,* the Applicant shall develop a targeted, strategic salvage program for the development in consultation with OEH and the Aboriginal communities.

53. Before the commencement of salvage operations, the Applicant shall ensure that a keeping place is established to house objects recovered from the salvage program.

54. The Applicant shall house the objects recovered during the salvage program in the keeping place established for the purpose.

Further Investigations

55. The Applicant shall:
(a) investigate the cultural significance of the corridors A – Southern and B – Middle (see map in appendix 3) in consultation with the Aboriginal Communities;
(b) examine the possible pathways between Remnant Woodland Enhancement Area A (which includes the camp ground associated with the bora) and Wollemi National Park to the east; and
(c) investigate the feasibility of reserving from future mining operations, those areas identified as being of cultural significance to the Aboriginal Communities in consultation with OEH.

Trust Fund Contribution

56. Before carrying out the development, or as agreed otherwise by the Secretary, the Applicant shall contribute $50,000 to the Hunter Aboriginal Cultural Heritage Trust Fund for further investigations into Aboriginal cultural heritage, as defined by the Trust Deed.

Aboriginal Cultural Heritage Management

56A. The Applicant shall continue to consult with and involve all the registered local Aboriginal representatives in the ongoing management of the Aboriginal Cultural Heritage values at the Wambo Mining Complex. Evidence of this consultation must be collated and provided to the Secretary on request.

56B. In the event that surface disturbance reveals a new Aboriginal object(s) at the Wambo Mining Complex, all work shall halt in the immediate area to prevent any further impacts to the object(s). The Applicant shall contact a suitably qualified archaeologist and the registered Aboriginal representatives to determine the significance of the object(s) and to develop an appropriate management strategy. The management strategy shall be developed in accordance with the *National Parks and Wildlife Act 1974.* Management may include avoiding impact, additional investigations and/or submission of an Aboriginal Heritage Impact Permit application. The Applicant shall register the site in the Aboriginal Heritage Information Management System (AHIMS) (managed by the OEH). The management outcome for the site shall be included in the information provided to the AHIMS.

56C. In the event that surface disturbance reveals human remains at the Wambo Mining Complex, all works shall halt in the immediate area to prevent any further impacts to the remains. The Applicant shall immediately notify Police. No further work shall be undertaken until Police provide written authorisation. If the remains are Aboriginal, the Applicant shall also notify the OEH and the registered

[7] Incorporates EPA GTAs

Aboriginal representatives. In the case of Aboriginal remains, no further work shall be undertaken until Police and the OEH provide written authorisation.

56D. The Applicant must prepare and implement an Aboriginal Cultural Education Program in consultation with the registered Aboriginal representatives for the induction of all personnel and contractors involved in construction at the Wambo Mining Complex. The Applicant shall keep a register of personnel and contractors that have been inducted according to the program.

[8]WAMBO HOMESTEAD COMPLEX

Section 60 Approval

57. An application under section 60 of the Heritage Act must be submitted to and approved by the Heritage Council prior to the commencement of any development on land within the State Heritage Register listing boundary for the Wambo Homestead Complex. In this regard a mine management plan shall be required to accompany the application which demonstrates that the proposed underground mining shall not have adverse heritage impacts on the WHC due to land subsidence.

Conservation Measures

58. Within 12 months of the commencement of this consent, the Applicant shall prepare a conservation management plan for the Wambo Homestead Complex in accordance with Heritage Office guidelines for the consideration of the Heritage Council of NSW.

59. The conservation policies and an interpretation strategy contained in the conservation management plan are to be implemented in accordance with a timetable to be contained in the a conservation management plan.

60. A suitably qualified and experienced consultant is to be engaged by the applicant to record an oral history of the Wambo Homestead Complex having regard to the strong associations of members of the local community with the site.

61. In circumstances where safe access to the Wambo Homestead Complex is able to be provided, opportunities are to be offered to the local community to visit the site during and after its conservation.

62. Prior to the commencement of mining operations, and then at yearly intervals prior to the approved structural engineer's inspections, a photographic record is to be prepared of all elevations of all structures within the Wambo Homestead Complex. The photographs are to be of archival quality in accordance with the Heritage Office guidelines, *How to Prepare Archival Records of Heritage Items 1994*, and *Guidelines for Photographic Recording of Heritage Items, 1994*. The photographic record is to be lodged with NSW Heritage Office, and a copy is to be submitted to the Department and the Council.

Blasting

63. Ground vibration and air blast levels are to be monitored and recorded at a blast monitoring station to be established within the Wambo Homestead Complex for each blast within 2 km of the Wambo Homestead Complex.

64. A suitably qualified and experienced structural engineer, with expertise in vibration and blast monitoring is to be appointed to examine all monitoring records from the Wambo Homestead Complex blast monitoring station. The appointment of the structural engineer is to be approved in writing by the Director of the NSW Heritage Office.

65. Ground vibration and air blast levels experienced at the Wambo Homestead Complex blast monitoring station are not to exceed the structural damage assessment criteria prescribed by *Australian Standard AS 2187.2-1993 (or its latest version) "Explosives – Storage Transport and Use" for Sensitive and Heritage Structures* to prevent damage to the heritage items.

66. The approved structural engineer is to report to the Applicant on the monitoring results each month for blasting within 2 km of the Wambo Homestead Complex and 6 monthly for the remainder of the open cut mining operation and make recommendations to ensure the conservation and prevention of damage to the significant heritage structures. Copies of these reports are to be forwarded to the NSW Heritage Office.

[8] Incorporates NSW Heritage Council GTA

67. The approved structural engineer is to inspect the Wambo Homestead Complex structures annually and as soon as practical, but no later than 3 days after blasting monitoring which exceeds the structural damage assessment criteria prescribed by AS 2187.2-1993 (or its latest version). During the period between blasting monitoring being recorded which exceeds the criteria in AS 2187.2-1993 (or its latest version) and the engineer's inspection, ground vibration from blasting is to be limited to a level which will prevent further blasting damage. The structural engineer is to advise the applicant and the NSW Heritage Office of any action required to repair the damage.

68. The approved structural engineer is to make an assessment of whether blasting within 2km of the Wambo Homestead Complex is to cease or be managed in order to stabilise or repair the damage, and so advise the applicant and the Director of the NSW Heritage Office. If blasting has been required to cease, it is not to resume until the damage has been stabilised or repaired, and the written approval for resumption has been issued by the Director of the NSW Heritage Office.

Rehabilitation

69. Following the cessation of the use of the coal haulage road which traverses the Wambo Homestead Complex property, the land is to be returned to its former condition (pre1999) and the half palisade fence on the southern alignment of the mounting yard, which was removed, is to be reinstated as required by the approval of the Heritage Council for the construction of the road on 12 February 1999.

Movable Heritage Items

70. The Applicant shall liaise with the Power House Museum and Museums and Galleries Foundation regarding the significance of movable heritage which shall be displaced by the proposed open cut mining and suitable repositories for the conservation and storage of any significant items.

TRAFFIC & TRANSPORT

New Access Intersection

Note: The Applicant requires RMS approval under the Roads Act 1993 for the new intersection.

71. [9]The Applicant shall design and construct the proposed new access intersection with the Golden Highway to the satisfaction of the RMS.

[10]Road Closure

Note: The Applicant requires Council approval under the Roads Act 1993 prior to closing Pinegrove Road.

72. Prior to closing Pinegrove Road, the Applicant shall prepare and implement a Road Closure Management Plan in consultation with the affected landowners, and to the satisfaction of Council. This plan must describe the alternate access arrangements for any affected landowners.

Parking

73. The Applicant shall provide sufficient parking on-site for all mine-related traffic to the satisfaction of the Secretary.

Coal Haulage

74. The Applicant shall not transport more than 3 million tonnes of product coal a year from the site until a rail coal loader is commissioned in the vicinity of the site.

Note: The Applicant has submitted a separate development application to the Minister for the Wambo "Rail and Train Loading Infrastructure" (DA 306-7-2003).

75. The Applicant shall cease all coal haulage on public roads as soon as a rail coal loader is commissioned in the vicinity of the site, except in an emergency, and as agreed by the Secretary in consultation with Council.

76. If no rail loader is commissioned in the vicinity of the site within 2 years of the commencement of this consent, the Applicant shall submit a report to the Secretary outlining the alternatives to road haulage, and describing the proposed arrangements for transporting coal from the site.

[9] Incorporates RMS GTA
[10] Incorporates Council GTA

77. The Applicant shall ensure that all loaded coal haulage vehicles entering or leaving the site are covered.

78. The Applicant shall pay Council 0.5 cents for each tonne of product coal hauled along Council roads to the Mount Thorley Coal Loader, in accordance with Council's Section 94 Contribution Plan.

Note: This contribution is subject to indexation by the Implicit Price Deflator, as published by the Australian Bureau of Statistics.

Monitoring

79. The Applicant shall:
(a) keep records of the
- amount of coal transported from the site each year; and
- number of coal haulage truck movements generated each day by the development; and

(b) include these records in the Annual Review.

Traffic Management Plan

80. The Applicant shall prepare and implement a Traffic Management Plan in consultation with Council, and to the satisfaction of the RMS for the proposed blasting activities that require the temporary periodic closure of the Golden Highway. This plan shall ensure that adequate warning is given to road users prior to blasting, and that follow up inspections are made to ensure that public roads are safe and clear of debris.

VISUAL IMPACT

Visual Amenity

81. The Applicant shall implement measures to mitigate visual impacts including:
(a) design and construction of development infrastructure in a manner that minimises visual contrasts; and
(b) progressive rehabilitation of mine waste rock emplacements (particularly outer batters), including partial rehabilitation of temporarily inactive areas.

82. The Applicant shall investigate and where feasible implement the following measures at locations assessed in the EIS as having a high potential visual impact:
(a) implement landscaping works in consultation with affected rural residents (see Condition 83); and/or
(b) place and maintain visual screens between development infrastructure and the viewing location.

83. If a landowner of any dwelling assessed in the EIS as having a high potential visual impact requests the Applicant in writing to investigate ways to minimise the visual impact of the development on his/her dwelling, the Applicant shall:
(a) within 28 days of receiving this request, commission a suitably qualified person whose appointment has been approved by the Secretary, to investigate ways to minimise the visual impacts of the development on the landowner's dwelling; and
(b) give the landowner a copy of the visual impact mitigation report within 14 days of receiving this report.

If both parties agree on the measures that should be implemented to minimise the visual impact of the development, then the Applicant shall implement these measures to the satisfaction of the Secretary.

If the Applicant and the landowner disagree on the measures that should be implemented to minimise the visual impact of the development, then either party may refer the matter to the Secretary for resolution.

If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (see Appendix 2).

Overburden Dumps

84. The Applicant shall construct the overburden emplacements generally in accordance with the EIS, and to the satisfaction of DRE.

Lighting Emissions

85. The Applicant shall take all practicable measures to mitigate off-site lighting impacts from the development.

86. Unless otherwise agreed to by the Secretary, all external lighting associated with the development shall comply with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*.

GREENHOUSE GAS

87. For the life of the development, the Applicant shall:
(a) monitor the greenhouse gas emissions generated by the development;
(b) investigate ways to reduce greenhouse gas emissions generated by the development; and
(c) report on greenhouse gas monitoring and abatement measures in the Annual Review,
to the satisfaction of the Secretary.

WASTE MINIMISATION

88. For the life of the development, the Applicant shall:
(a) monitor the amount of waste generated by the development;
(b) investigate ways to minimise waste generated by the development;
(c) implement reasonable and feasible measures to minimise waste generated by the development; and
(d) report on waste management and minimisation in the Annual Review,
to the satisfaction of the Secretary.

HAZARDS MANAGEMENT

Spontaneous Combustion

89. The Applicant shall:
(a) take the necessary measures to prevent, as far as is practical, spontaneous combustion on the site; and
(b) manage any spontaneous combustion on-site to the satisfaction of DRE.

Dangerous Goods

90. The Applicant shall ensure that the storage, handling, and transport of:
(a) dangerous goods is done in accordance with the relevant *Australian Standards*, particularly *AS1940* and *AS1596*, and the *Dangerous Goods Code*; and
(b) explosives are managed in accordance with the requirements of DRE.

91. Before carrying out any development, the Applicant shall update the Safety Management System covering all operations on the site, including the safe storage of ammonium nitrate, to the satisfaction of the Secretary.

BUSHFIRE MANAGEMENT

92. The Applicant shall:
(a) ensure that the development is suitably equipped to respond to any fires on-site; and
(b) assist the Rural Fire Service and emergency services as much as possible if there is a fire on-site during the development.

93. Before carrying out any development, the Applicant shall prepare a Bushfire Management Plan for the site, to the satisfaction of Council and the Rural Fire Service.

REHABILITATION

Rehabilitation Objectives

94. The Applicant shall rehabilitate the Wambo Mining Complex to the satisfaction of DRE. The rehabilitation must be generally in accordance with the proposed rehabilitation strategy described by the documents listed in Condition 2 of Schedule 3 and the objectives in Table 18.

Table 18: Rehabilitation Objectives

Area/Domain	***Rehabilitation Objectives***
Mine site (as a whole), including the final void	Safe, stable & non-polluting
Surface infrastructure	To be decommissioned and removed, unless DRE agrees otherwise
Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure
Landforms	Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landforms in the post mining landscape
All watercourses subject to subsidence impacts	Hydraulically and geomorphologically stable, with riparian vegetation established that is the same or better than prior to commencement of mining

Operating Conditions

94A. The Applicant shall:

(a) develop a detailed soil management protocol that identifies procedures for:
- comprehensive soil surveys prior to soil stripping;
- assessment of top-soil and sub-soil suitability for mine rehabilitation; and
- annual soil balances to manage soil handling including direct respreading and stockpiling;

(b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within Wambo Mining Complex and for enhancement of biodiversity offset areas;

(c) ensure that coal reject or any potentially acid forming interburden materials must not be emplaced at elevations within the pit shell or out of pit emplacement areas where they may promote acid or sulphate species generation and migration beyond the pit shell or out of pit emplacement areas; and

(d) ensure that no dirty water can drain from an out of pit emplacement area to any offsite watercourse or to any land beyond the lease boundary.

Progressive Rehabilitation

94B. The Applicant shall rehabilitate the Wambo Mining Complex progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.

Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the project.

Rehabilitation Management Plan

94C. The Applicant shall prepare and implement a Rehabilitation Management Plan for the Wambo Mining Complex to the satisfaction of DRE. This plan must:

(a) be prepared in consultation with the Department, DPI-Water, OEH, Council and the CCC;

(b) be submitted to DRE by the end of June 2013;

(c) be prepared in accordance with any relevant DRE guideline;

(d) describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy;

(e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);

(f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform, and final land use;

(g) include interim rehabilitation where necessary to minimise the area exposed for dust generation;

(h) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and

(i) build to the maximum extent practicable on the other management plans required under this consent.

MINE EXIT STRATEGY

95. The Applicant shall work with the Council to investigate the minimisation of adverse socio-economic effects of a significant reduction in local employment levels and closure of the Wambo Mining Complex at the end of its life.

SCHEDULE 5
ADDITIONAL PROCEDURES FOR AIR QUALITY & NOISE MANAGEMENT

Notify Landowners

1. If the air dispersion and/or noise model predictions in the documents listed in condition 2 of schedule 3 identify that the air pollution and/or noise generated by the development are likely to be greater than the air quality and/or noise impact assessment criteria in conditions 2 and 6 of schedule 4, then the Applicant shall notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly before it carries out any development.

2. If the results of the air quality and/or noise monitoring required in schedule 4 identify that the air pollution and/or noise generated by the development are greater than the air quality and/or noise impact assessment criteria in schedule 4, then the Applicant shall notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) as soon as practicable after identifying the exceedence.

3. Before carrying out any development, the Applicant shall develop a procedure in consultation with EPA and NSW Health and approved by the Secretary, for notifying landowners and tenants referred to in condition 1. This procedure must ensure that:
   (a) all existing and future tenants are advised in writing about:
      - air quality impacts likely to occur at the residence during the operational life of the mine; and
      - likely health and amenity impacts associated with exposure to particulate matter;
   (b) the written advice in (a) is based on current air quality monitoring data, dispersion modelling results, research and literature; and
   (c) there is an ongoing process for providing current air quality monitoring data, dispersion modelling results, research and literature to the tenants.

Independent Review

4. If a landowner considers the development to be exceeding the air quality and/or noise impact assessment criteria listed in schedule 4 at his/her dwelling, or at any proposed dwelling on his/her vacant land, then he/she may ask the Applicant for an independent review of the air pollution and/or noise impacts of the development on his/her dwelling, or proposed dwelling.

   If the Secretary is satisfied that an independent review is warranted, the Applicant shall:
   (a) consult with the landowner to determine his/her concerns; and
   (b) commission a suitably qualified person – whose appointment has been approved by the Secretary – to conduct air quality and/or noise monitoring at the relevant dwelling to determine whether the development is complying with the relevant impact assessment criteria, and identify the source(s) and scale of any air quality and/or noise impact at the dwelling, and the development's contribution to this impact.

   Within 14 days of receiving the results of this independent review, the Applicant shall give a copy of these results to the Secretary and landowner.

5. If the independent review (referred to in condition 4) determines that the development is complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, then the Applicant may discontinue the independent review with the approval of the Secretary.

6. If the independent review (referred to in condition 4) determines that the development is not complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, and that the development is primarily responsible for this non-compliance, then the Applicant shall:
   (a) take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant impact assessment criteria; and conduct further air quality and/or noise monitoring at the dwelling to determine whether these measures ensure compliance; or
   (b) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise impact assessment criteria listed in schedule 4.

   If the additional monitoring referred to above subsequently determines that the development is complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, then the Applicant may discontinue the independent review with the approval of the Secretary.

If the measures referred to in (a) do not ensure compliance with the air quality and/or noise land acquisition criteria listed in schedule 4 at the dwelling, and the Applicant cannot secure a written agreement with the landowner to allow exceedances of the air quality and/or noise impact assessment criteria listed in schedule 4, then the Applicant shall, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 9-11 below.

7. If the independent review determines that the development is not complying with the air quality and/or noise impact assessment criteria listed in schedule 4 at the dwelling, but that several mines are responsible for this non-compliance, then the Applicant shall, with the agreement of the landowner and other mine(s) prepare and implement a Cumulative Air Quality and/or Noise Impact Management Plan for the land to the satisfaction of the Secretary. This plan must provide the joint approach to be adopted by the Applicant and other mine(s) to manage cumulative air quality and/or noise impacts at the landowner's dwelling, and the acquisition of any land.

   If the Applicant is unable to finalise an agreement with the landowner and/or other mine(s), and/or prepare a Cumulative Air Quality and Noise Impact Management Plan, then the Applicant or landowner may refer the matter to the Secretary for resolution.

   If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.

   If, following the Independent Dispute Resolution Process, the Secretary decides that the Applicant shall acquire all or part of the landowner's land, then the Applicant shall acquire this land in accordance with the procedures in conditions 9-11 below.

8. If the landowner disputes the results of the independent review (referred to in condition 4), either the Applicant or the landowner may refer the matter to the Secretary for resolution.

   If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.

Land Acquisition

9. Within 6 months of receiving a written request from the landowner, the Applicant shall pay the landowner:
   (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the development the subject of the DA, having regard to the:
      - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
      - presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date;
   (b) the reasonable costs associated with:
      - relocating within the Singleton local government area, or to any other local government area determined by the Secretary;
      - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and
   (c) reasonable compensation for any disturbance caused by the land acquisition process.

   However, if within 6 months of receiving this written request, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.

   Upon receiving such a request, the Secretary shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired.

   If either party disputes the independent valuer's determination, then the independent valuer must refer the matter back to the Secretary.

   Upon receiving such a referral, the Secretary shall appoint a panel to determine a fair and reasonable acquisition price for the land, and/or the terms upon which the land is to be acquired, comprising the:
   (i) appointed independent valuer,
   (ii) Secretary or nominee, and
   (iii) President of the Law Society of NSW or nominee.

Within 14 days of receiving the panel's determination, the Applicant shall make a written offer to purchase the land at a price not less than the panel's determination.

If the landowner refuses to accept this offer within 6 months of the date of the Applicant's offer, the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Secretary.

10. The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Secretary and the costs of determination referred to in Condition 9.

11. If the Applicant and landowner agree that only part of the land should be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision, and registration of the plan at the Office of the Registrar-General.

SCHEDULE 6
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING & REPORTING

ENVIRONMENTAL MANAGEMENT STRATEGY

1. Before carrying out any development, the Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
   (a) provide the strategic context for environmental management of the development;
   (b) identify the statutory requirements that apply to the development;
   (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
   (d) describe the procedures that would be implemented to:
   - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
   - receive, handle, respond to, and record complaints;
   - resolve any disputes that may arise during the course of the development;
   - respond to any non-compliance;
   - manage cumulative impacts; and
   - respond to emergencies; and

   (e) describe the role, responsibility, authority, and accountability of all the key personnel involved in environmental management of the development.

2. Within 14 days of the Secretary's approval, the Applicant shall:
   (a) send copies of the approved strategy to the relevant agencies, Council, and the CCC; and
   (b) ensure the approved strategy is publicly available during the development.

Adaptive Management

3. The Applicant must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

   Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:
   (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
   (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
   (c) implement remediation measures as directed by the Secretary,

   to the satisfaction of the Secretary.

Management Plan Requirements

4. The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
   - the relevant statutory requirements (including any relevant consent, licence or lease conditions);
   - any relevant limits or performance measures/criteria;
   - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;

   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
   - impacts and environmental performance of the Wambo Mining Complex;
   - effectiveness of any management measures (see c above);

   (e) a contingency plan to manage any unpredicted impacts and their consequences;
   (f) a program to investigate and implement ways to improve the environmental performance of the Wambo Mining Complex over time;
   (g) a protocol for managing and reporting any:
   - incidents;
   - complaints;
   - non-compliances with statutory requirements; and
   - exceedances of the impact assessment criteria and/or performance criteria; and

   (h) a protocol for periodic review of the plan.

ANNUAL REVIEW

5. By the end of March each year, the Applicant shall submit an annual review of the environmental performance of the development to the satisfaction of the Secretary. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;
   (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against:
      - the relevant statutory requirements, limits or performance measures/criteria;
      - the monitoring results of previous years; and
      - the relevant predictions in the EIS;
   (c) identify any non-compliance over the previous calendar year, and describe what actions were (or are being) taken to ensure compliance;
   (d) identify any trends in the monitoring data over the life of the development;
   (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
   (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.

REVISION OF STRATEGIES, PLANS AND PROGRAMS

6. Within 3 months of:
   (a) the submission of an annual review under Condition 5 above;
   (b) the submission of an audit report under Condition 7 below;
   (c) the submission of an incident report under Condition 10 below; or
   (d) any modification to the conditions of this consent, (unless the conditions require otherwise),

   the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

   Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

INDEPENDENT ENVIRONMENTAL AUDIT

7. Every 3 years, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
   (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
   (b) include consultation with the relevant agencies;
   (c) assess the environmental performance of the development and assess whether it is complying with the requirements in this consent and any relevant EPL or Mining Lease (including any assessment, plan or program required under these consents/approvals);
   (d) review the adequacy of strategies, plans or programs required under the abovementioned consents/approvals; and
   (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned consents.

   Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.

   Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

COMMUNITY CONSULTATIVE COMMITTEE

8. Before carrying out any development, the Applicant shall establish a new Community Consultative Committee to oversee the environmental performance of the development. This committee shall:
   (a) be comprised of:
      - 2 representatives from the Applicant, including the person responsible for environmental management at the mine;
      - 1 representative from Council; and
      - at least 3 representatives from the local community,

      whose appointment has been approved by the Secretary in consultation with the Council;
   (b) be chaired by the representative from Council or by a third party as approved by the Secretary;

(c) meet at least twice a year; and
(d) review and provide advice on the environmental performance of the development, including any construction or environmental management plans, monitoring results, audit reports, or complaints.

9. The Applicant shall, at its own expense:
(a) ensure that 2 of its representatives attend the Committee's meetings;
(b) provide the Committee with regular information on the environmental performance and management of the development;
(c) provide meeting facilities for the Committee;
(d) arrange site inspections for the Committee, if necessary;
(e) take minutes of the Committee's meetings;
(f) make these minutes available to the public for inspection within 14 days of the Committee meeting, or as agreed to by the Committee;
(g) respond to any advice or recommendations the Committee may have in relation to the environmental management or performance of the development;
(h) forward a copy of the minutes of each Committee meeting, and any responses to the Committee's recommendations to the Secretary within a month of the Committee meeting.

REPORTING

Incident Reporting

10. The Applicant shall notify at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Applicant shall notify the Secretary and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

11. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.

ACCESS TO INFORMATION

12. From the end of June 2011, the Applicant shall:
(a) make copies of the following publicly available on its website:
- the documents referred to in Condition 2 of Schedule 3;
- all current statutory consents for the development;
- all approved strategies, plans and programs required under the conditions of this consent;
- a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
- a complaints register, updated on a monthly basis;
- minutes of CCC meetings;
- the annual reviews of the development;
- any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit;
- any other matter required by the Secretary; and

(b) keep this information up-to-date,
to the satisfaction of the Secretary.

Online Communication of Operational Responses and Noise and Air Quality Monitoring

13. The Applicant shall, by the end of June 2013:
(a) make the following information for the Wambo Mining Complex publicly available on its website, on a daily basis and in a clearly understandable form:
- daily weather forecasts for the coming week;
- proposed operational responses to these weather forecasts;
- real-time noise and air quality monitoring data (subject to any necessary caveats); and
- any operational responses that were taken in response to the noise and air quality monitoring data, and

(b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information,
to the satisfaction of the Secretary.

APPENDIX 1
SCHEDULE OF LAND

Freehold Land

DESCRIPTION	
Lot 79 DP753792	Lot 181 DP823775
Lot 57 DP753817	Lot 177 DP823775
Lot 160 DP753817	Lot 118 DP753792
Lot 18 DP753817	Lot 95 DP753792
Lot 71 DP753817	Lot 2 DP709722
Lot 161 DP753817	Por 131 DP753792
Lot 49 DP753792	Lot 2 DP616303
Lot 50 DP753792	Lot 1 DP720705
Lot 51 DP753792	Lot 2 DP720705
Lot 52 DP753792	Lot 3 DP720705
Lot 58 DP753792	Lot 4 DP720705
Lot 66 DP753792	Lot 45 DP753792
Lot 67 DP753792	Lot 46 DP753792
Lot 62 DP753792	Lot 4 DP542226
Lot 63 DP753792	Lot 5 DP542226
Lot 64 DP753792	Lot 1 DP241316
Lot C DP33149	Lot 7 DP3030
Lot 22 DP753817	Lot 23 DP3030
Lot A DP33149	Lot 92 DP755267
Lot 79 DP753821	Lot 109 DP753792
Lot 19 DP3030	Lot 110 DP753792
Lot 129 DP755267	Lot 111 DP753792
Lot 22 DP755267	Lot 112 DP753792
Lot 1 DP616303	Lot 103 DP753792
Lot 100 DP753792	Lot 104 DP753792
Lot 101 DP753792	Lot 82 DP548749
Lot 38 DP753792	Lot 83 DP548749
Lot 39 DP753792	Lot 1 DP110084
Lot 60 DP753792	Lot 2 DP110084
Lot 61 DP753792	Lot B DP33149
Lot 1 DP709722	Lot 113 DP753817
Lot 55 DP753792	Lot 2 DP617852

Crown Land Descriptions

Crown lands have been identified and numbered on the attached plan (PD003). Council controlled roads have been identified using geographical names where possible. Council and Crown roads and sections of Wollombi Brook with no real property identifier have their location described relative to adjoining lots.

Crown Land

1. Lot 170 DP 823775
2. Lot 208 DP 753817

Travelling Stock and Camping Reserve No. 5294

3. Lot 175 DP 823775

Council Roads

4. Wambo Mine Road
5. Road within Lot 1 DP 616303

6. Pine Grove Road
7. Road bounded by Lots 7,19 & 23 DP 3030, Lots 22 & 129 DP755267, Lot 83 DP548749 and Lot 1 DP 110084

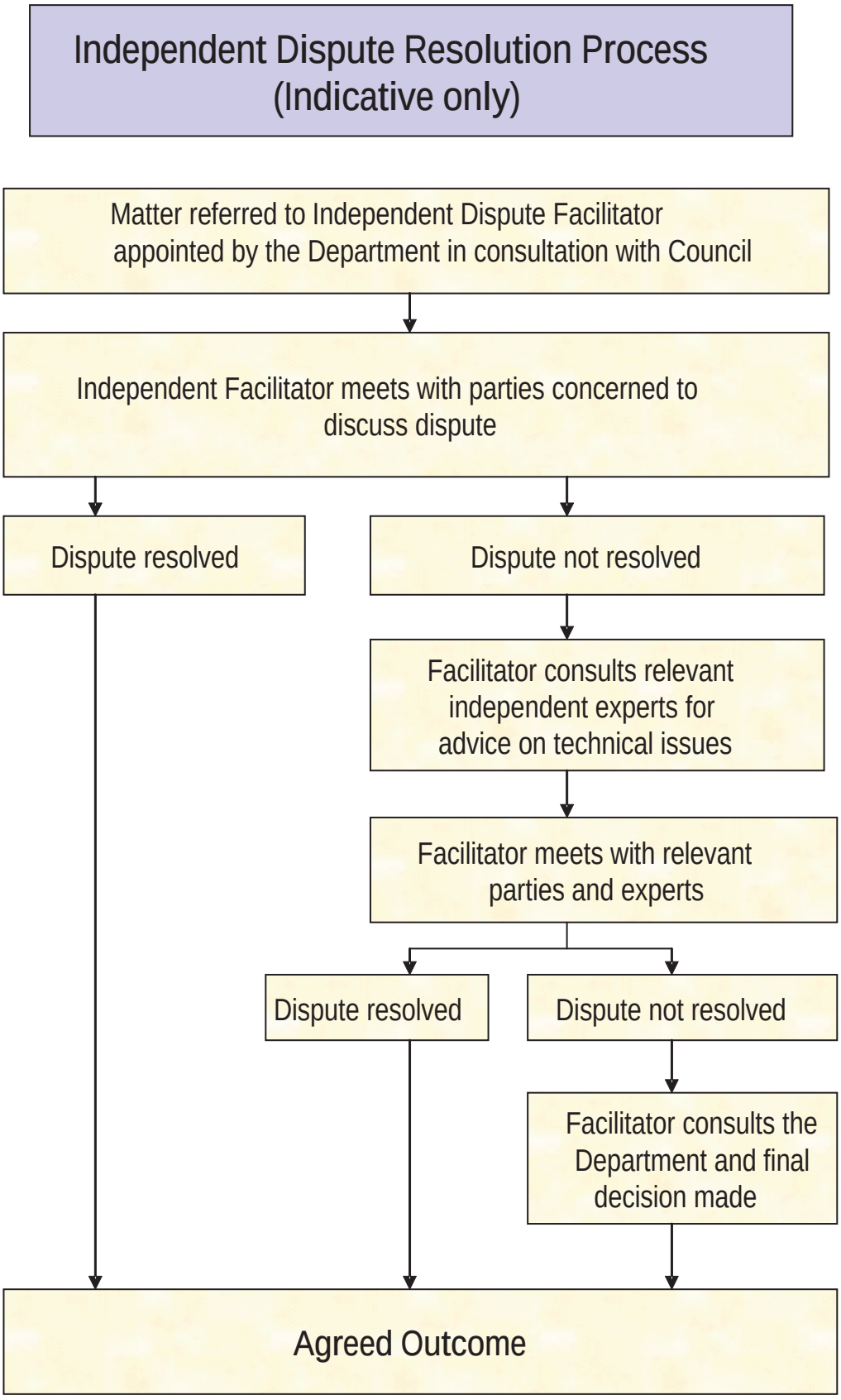
Crown Roads

8. Bounded by Lots 92 & 129 DP 755267
9. Bounded by Lots 4 & 5 DP 542226, Lots 2 &3 DP720705 and Lot 2 DP 616303
10. Bounded by Lots 38, 55, 61, 100, 101, 149 DP 753792, Lot 2 DP617852 and Lot 1 DP 616303
11. Within Lot 2 DP617852
12. Bounded by Lots 175, 177, 181 DP 823775
13. Bounded by Lot 177 DP 823775, 60, 62-64, 95, 118 DP 753792, Lot 2 DP617852
14. Bounded by Lots 170, 177 DP 823775, 49-51, 58, 118 DP 753792
15. Bounded by Lots 170 DP 823775, 49, 50, 52, 79 DP 753792, 18, 160, 161 DP753817
16. Bounded by Lots A & B DP 33149, 22, 66, 67, 71 DP 753817
17. Adjoining to the East and North Lot 79 DP753821

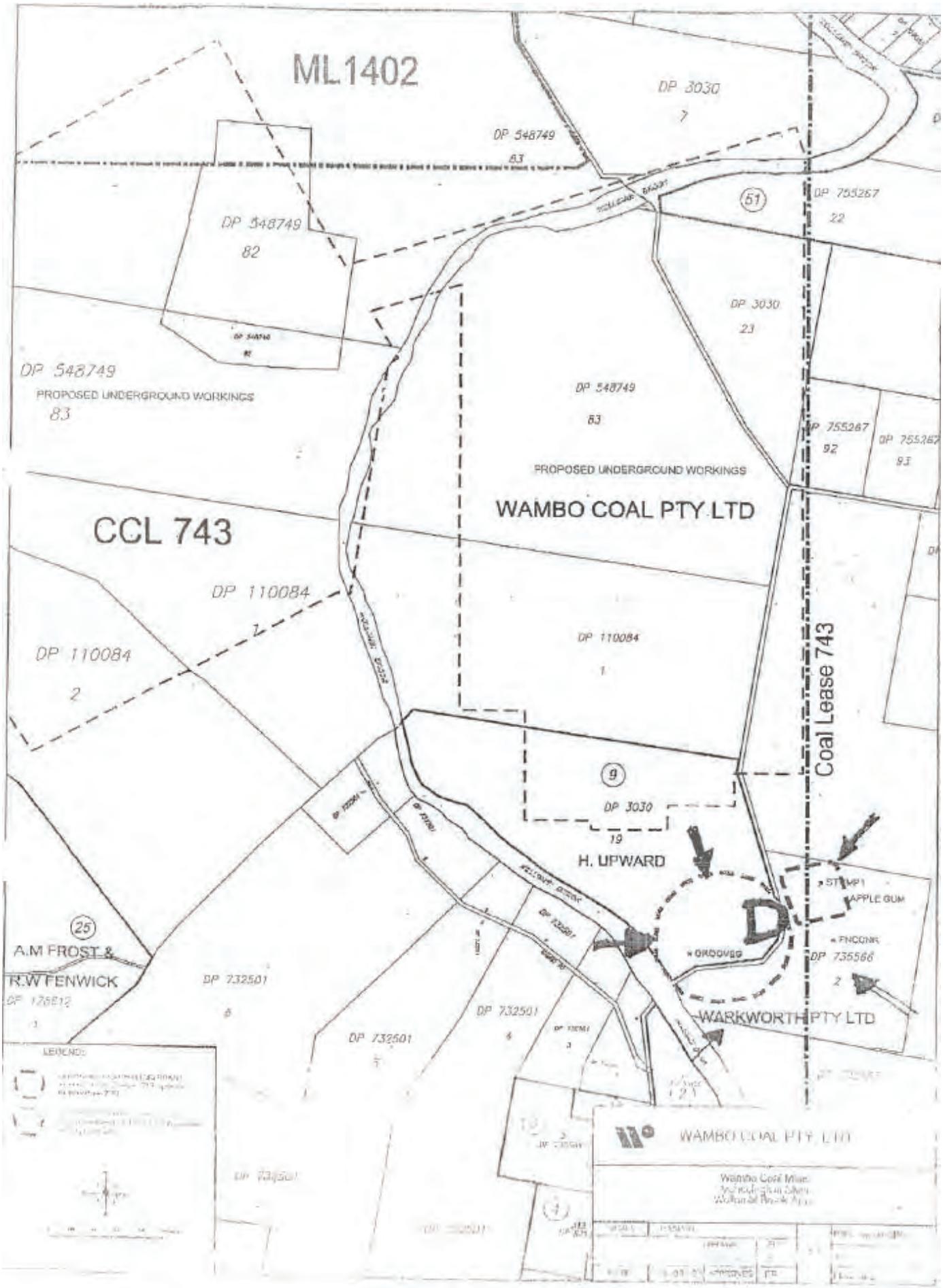
Wollombi Brook

18. Bounded by Lots 22 DP 755267, Lot 83 DP 548749, Lot 1 DP 110084, Lot 1 DP 241316, Lot 7 DP 3030

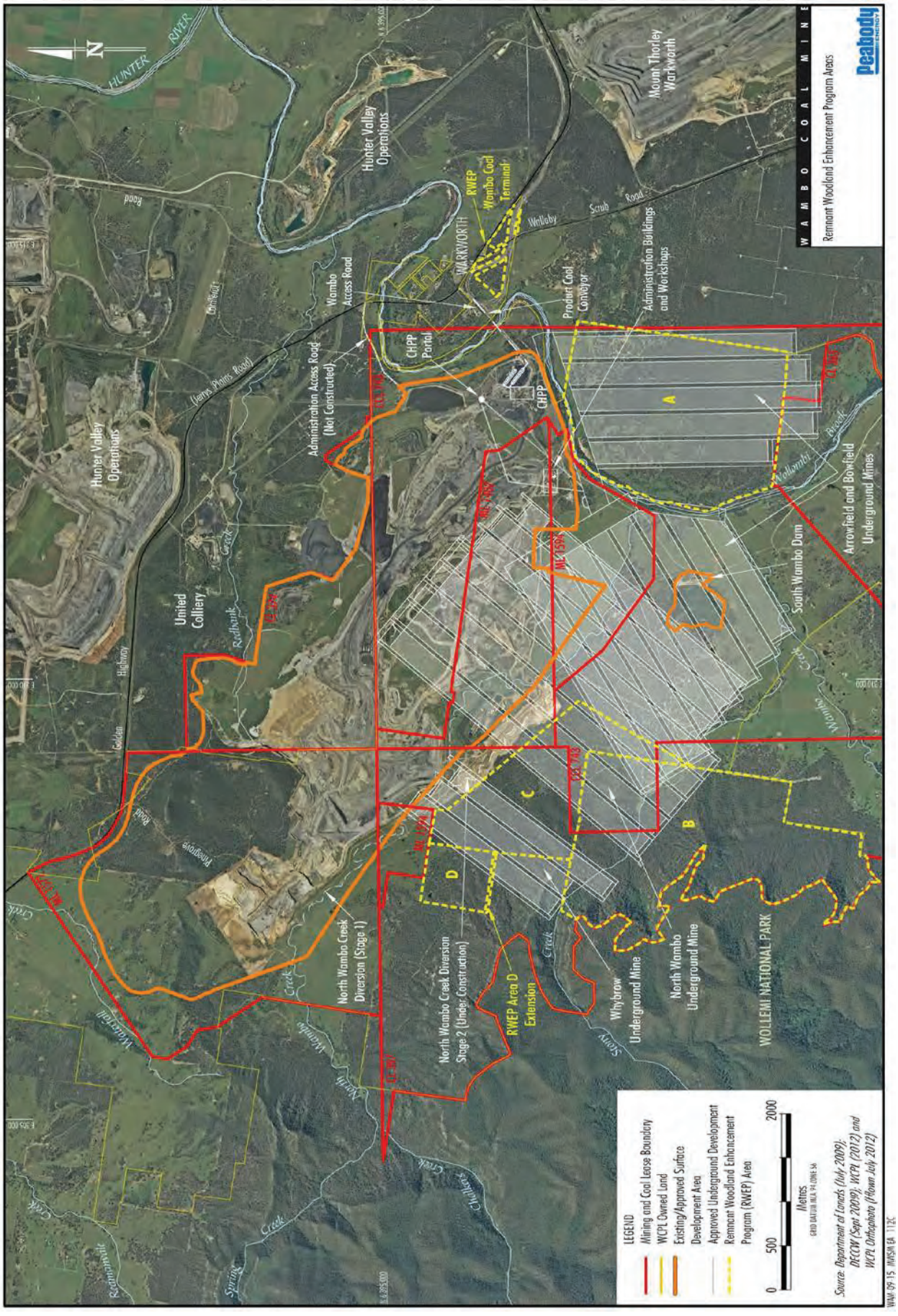
APPENDIX 2
INDEPENDENT DISPUTE RESOLUTION PROCESS

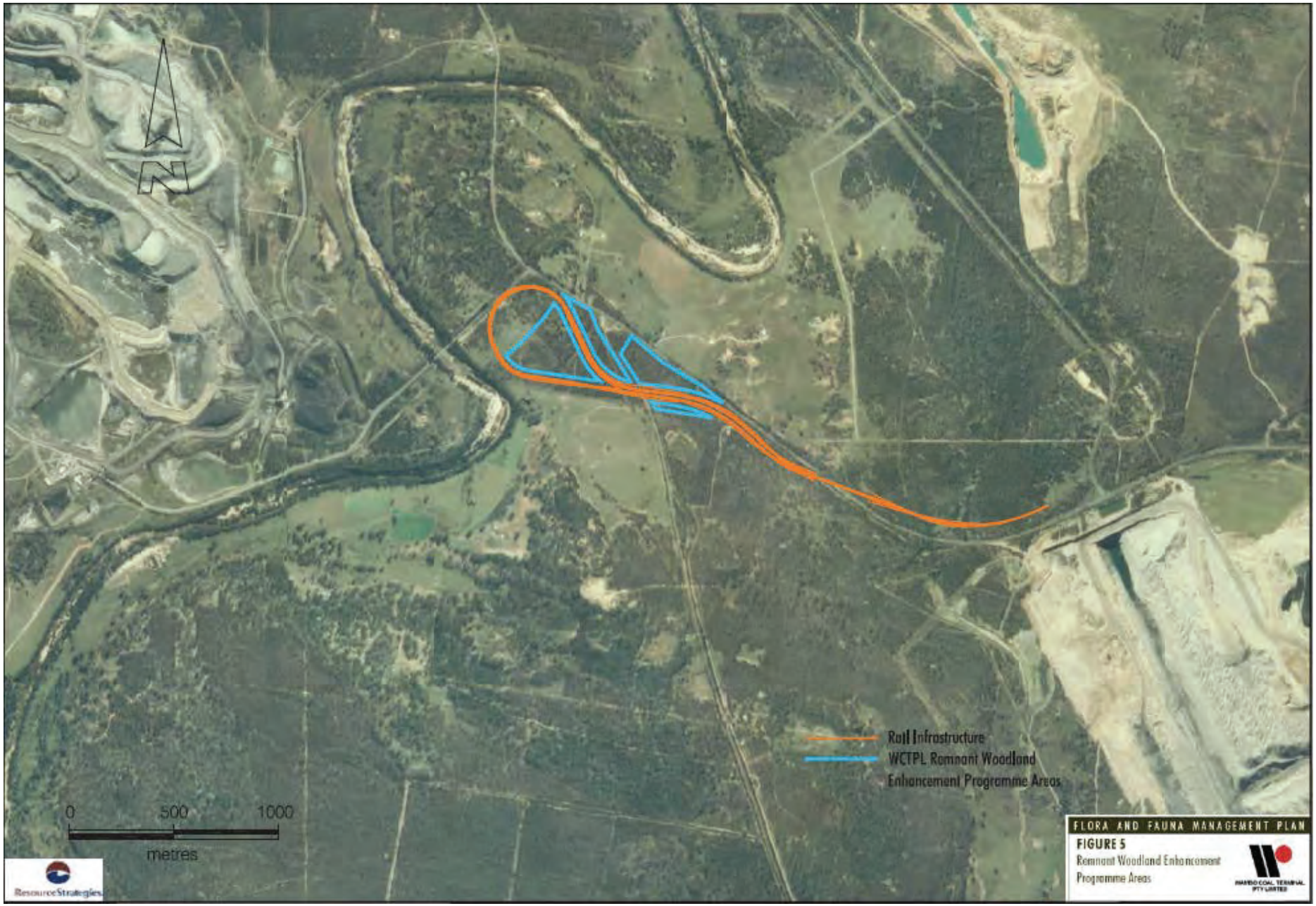


APPENDIX 3
MAP FOR ABORIGINAL CULTURAL HERITAGE INVESTIGATIONS
(See Condition 55)

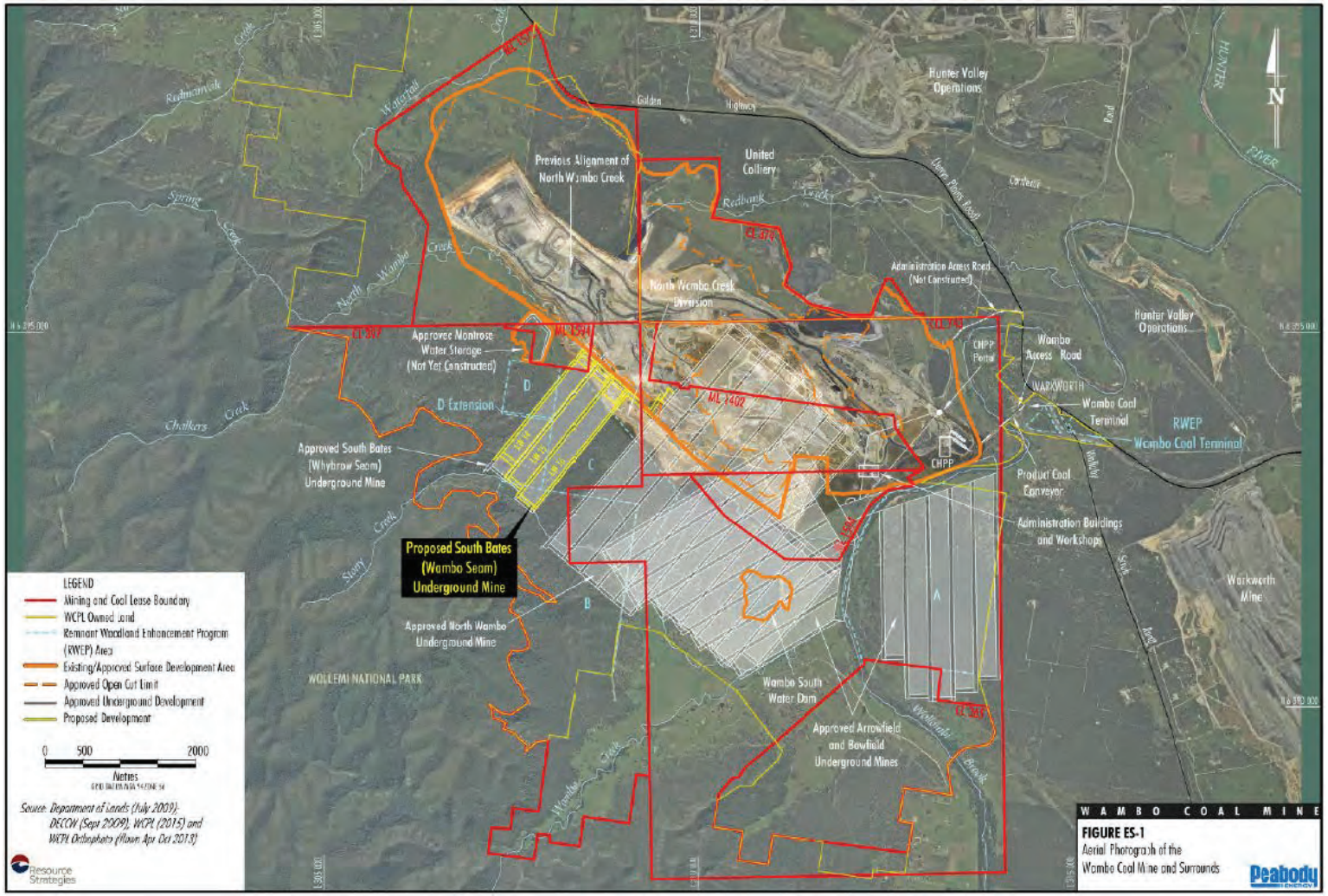

ML1402
DP 548749
83
DP 548749
82
DP 548749
PROPOSED UNDERGROUND WORKINGS
83
DP 3030
7
DP 755267
22
51
DP 3030
23
DP 548749
53
PROPOSED UNDERGROUND WORKINGS
WAMBO COAL PTY LTD
DP 755267
92
DP 755267
93
CCL 743
DP 110084
2
DP 110084
2
DP 110084
1
Coal Lease 743
9
DP 3030
19
H. UPWARD
STUMP 1
APPLE GUM
GROOVED
FNCONR
DP 735566
2
25
A.M FROST &
R.W FENWICK
DP 126812
3
DP 732501
6
DP 732501
4
DP 732501
5
WARKWORTH PTY LTD
LEGEND:
WAMBO COAL PTY LTD

APPENDIX 4
BIODIVERSITY OFFSET AREAS
(See Condition 40)




Rail Infrastructure
WCTPL Remnant Woodland
Enhancement Programme Areas
0
500
1000
metres
ResourceStrategies
FLORA AND FAUNA MANAGEMENT PLAN
FIGURE 5
Remnant Woodland Enhancement
Programme Areas

APPENDIX 5
APPROVED LAYOUT – NORTH WAMBO UNDERGROUND MINE



APPENDIX 3

Correspondence

NSW GOVERNMENT | Trade & Investment Resources & Energy

OUT15/13693
MCV15/151#1

Micheal Alexander
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Micheal,

APPROVAL FOR WAMBO COAL MINE MINING OPERATIONS PLAN (CCL 743, MINING ACT 1973 *et.al.*)

The NSW Trade & Investment - Division of Resources and Energy (DRE) acknowledges receipt of the **"Wambo Coal Mine Mining Operations Plan (MOP) 2015-2020"** (DRE Reference: INW15/18479) that was submitted on 22 May 2015.

DRE have reviewed the MOP and in accordance with the relevant conditions of authority, it has been accepted by the Director General. The MOP has been endorsed, with a copy held by the Department and one copy to be returned for your records.

The proposed operations are to be carried out in accordance with the MOP, subject to the following provisions:

1. No mining operations are to be undertaken over areas where development consent or mining title has not been granted.
2. The term of acceptance for this MOP is for the period from 4 June 2015 to 30 March 2015. 2020 NOT 5 JUNE 2020)
3. The review of the performance of the mine against the commitments outlined in the MOP shall be incorporated in the existing Annual Environmental Management Report (AEMR).

Rehabilitation Calculation Estimate (RCE)
A Rehabilitation Calculation Estimate (RCE) was not calculated for the MOP as an RCE was submitted in late 2014 at the request of the Department and security lodged in January 2015.

Mineral Resources – Environmental Sustainability Unit
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High St MAITLAND NSW 2320
Tel: 02 4931 6666 Fax: 02 4931 6790 www.resourcesandenergy.nsw.gov.au
ABN 72189919072

You are required to submit a RCE with the submission of the next MOP, or by 31 January 2016, whichever is sooner. The RCE is to be calculated for the maximum disturbance of the MOP that is current at the time of RCE submission.

You are reminded that the security deposit amount must be re-calculated whenever a potential change in rehabilitation liabilities occurs and may be varied at the Department's discretion based on rehabilitation performance.

It is pointed out that notwithstanding the acceptance of this MOP, your company is still required to obtain any consent, licence or approval which may be necessary from the relevant Shire Council or any other Government Department or Instrumentality.

If you have any queries, please contact Neil McElhinney on 4931 6522.

C. Lewis

Catherine Lewis
A / Manager Northern Region
Environmental Sustainability Unit
Date: 4 June 2015

Department of Industry
Resources & Energy

OUT16/11190
MCV13/293#25

6 April 2016

Steven Peart
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Steven,

CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992), Wambo Coal Pty Limited, Approval of Mining Operations Plan (Amendment A)

NOTICE OF APPROVAL

Pursuant to Condition 2 of CL397 (Mining Act 1973), Condition 3 of CCL743 (Mining Act 1973), Condition 3 of CL365 (Mining Act 1973), Condition 2 of CL374 (Mining Act 1973) , Condition 3 of ML1402 (Mining Act 1992), Condition 2 of ML1572 (Mining Act 1992), Condition 2 of ML1594 (Mining Act 1992), the Mining Operations Plan Amendment A (MOP) that was submitted to the Department on 1 March 2016 (DRE Reference: INW16/8796) is approved for the period from the date of this approval until to 30 March 2020.

This MOP approved by DRE is limited to:

- the rehabilitation objectives and completion criteria; and,
- the schedule of rehabilitation activities proposed for the MOP period.

In addition, this approval is conditional upon the conditions set out below. These conditions relate to this approval and are in addition to those attached to Mining Authorisation Number(s) CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992). A breach of conditions is an offence under the *Mining Act 1992*.

- Wambo Coal Pty Limited is required to submit by **1 June 2016** a revised Rehabilitation Cost Estimate for the fulfilment of obligations under the authorisations/titles, including those related to rehabilitation, and for obligations under the authorisations/titles that may arise in the future.

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

Environmental Sustainability Unit
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High St MAITLAND NSW 2320
Email: minres.environment@industry.nsw.gov.au
Tel: 02 4931 6605 **Fax:** 02 4931 6790 **Web:** www.resourcesandenergy.nsw.gov.au
ABN 72189919072

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

SECURITY DEPOSIT

As previously advised, approval of "**Wambo Coal Pty Limited, Mining Operations Plan (Amendment A)"** has triggered assessment of the security deposit required to secure funding for the fulfilment of obligations under CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572.

The Assessed Deposit is determined to be **$74,349.00.00** which equals the Security Deposit currently held by the Department. Accordingly there will be no change to the Security Deposit at this time.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

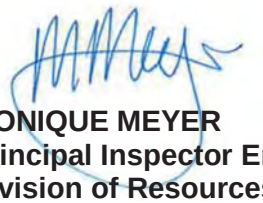
Department means NSW Department of Industry, Skills and Regional Development.

Authorisation Holder means the holder of the relevant authorisation(s).

Mining Operations Plan means the project, mining and mining related operations described in the "Wambo Coal Mining Operations Plan 2015-2020" prepared by Wambo Coal Pty Limited and dated 21 May 2015, as amended by:

(a) "Wambo Coal Mining Operations Plan 2015-2020 Amendment A" prepared by Wambo Coal Pty Limited and dated 16 January 2015

If you have any questions about this Notice, please contact Neil McElhinney directly on 4931 6522.



MONIQUE MEYER
Principal Inspector Environment / Manager Northern Region
Division of Resources and Energy
Signed under delegation by the Minister for Industry, Resources & Energy.
Signed under delegation from the Secretary of the Department of Industry, Skills and Regional Development.

Department of Industry
Resources & Energy

OUT16/15824
MCV13/293#27

14 April 2016

Steven Peart
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Steven,

CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992), Wambo Coal Pty Limited, Approval of Mining Operations Plan (Amendment B)

NOTICE OF APPROVAL

Pursuant to Condition 2 of CL397 (Mining Act 1973), Condition 3 of CCL743 (Mining Act 1973), Condition 3 of CL365 (Mining Act 1973), Condition 2 of CL374 (Mining Act 1973) , Condition 3 of ML1402 (Mining Act 1992), Condition 2 of ML1572 (Mining Act 1992), Condition 2 of ML1594 (Mining Act 1992), the Mining Operations Plan Amendment B (MOP) that was submitted to the Department on 11 April 2016 (DRE Reference: INW16/15199 & INW16/15200) is approved for the period from the date of this approval until to 30 March 2020.

This MOP approved by DRE is limited to:

- the rehabilitation objectives and completion criteria; and,
- the schedule of rehabilitation activities proposed for the MOP period.

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

SECURITY DEPOSIT

As previously advised, approval of "**Wambo Coal Pty Limited, Mining Operations Plan (Amendment B)"** has triggered assessment of the security deposit required to secure funding for the fulfilment of obligations under CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594 and ML1572 (Mining Act 1992).

Environmental Sustainability Unit
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High St MAITLAND NSW 2320
Email: minres.environment@industry.nsw.gov.au
Tel: 02 4931 6605 **Fax:** 02 4931 6790 **Web:** www.resourcesandenergy.nsw.gov.au
ABN 72189919072

The Assessed Deposit is determined to be **$74,349,000.00** which equals the Security Deposit currently held by the Department. Accordingly there will be no change to the Security Deposit at this time.

Wambo Coal Pty Ltd is advised that a Rehabilitation Cost Estimate will be required to be lodged the next MOP Amendment or new MOP Application.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

Department means NSW Department of Industry, Skills and Regional Development.

Authorisation Holder means the holder of the relevant authorisation(s).

Mining Operations Plan means the project, mining and mining related operations described in the "Wambo Coal Mining Operations Plan 2015-2020" prepared by Wambo Coal Pty Limited and dated 21 May 2015, as amended by:

(a) "Wambo Coal Mining Operations Plan 2015-2020 Amendment A" prepared by Wambo Coal Pty Limited and dated 16 January 2016
(b) "Wambo Coal Mining Operations Plan 2015-2020 Amendment B" prepared by Wambo Coal Pty Limited and dated 7 April 2016

If you have any questions about this Notice, please contact Neil McElhinney directly on 4931 6522.

C. Lewis

Catherine Lewis
A/Principal Inspector & Manager Environment, Northern Region
Division of Resources and Energy
Signed under delegation by the Minister for Industry, Resources & Energy.
Signed under delegation from the Secretary of the Department of Industry, Skills and Regional Development.

Department of Industry
Resources & Energy

OUT16/24390
MCV13/293#30

27 June 2016

Michael Alexander
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Michael,

CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992), Wambo Coal Pty Limited, Approval of Mining Operations Plan (Amendment C)

NOTICE OF APPROVAL

Pursuant to Condition 2 of CL397 (Mining Act 1973), Condition 3 of CCL743 (Mining Act 1973), Condition 3 of CL365 (Mining Act 1973), Condition 2 of CL374 (Mining Act 1973), Condition 3 of ML1402 (Mining Act 1992), Condition 2 of ML1572 (Mining Act 1992), Condition 2 of ML1594 (Mining Act 1992), the Wambo Coal Mining Operations Plan 2015-2020 Amendment C (MOP) that was submitted to the Department on 9 June 2016 (DRE Reference: INW16/27207) is approved for the period from the date of this approval until 30 March 2020.

This MOP approved by DRE is limited to:

- the rehabilitation objectives and completion criteria; and,
- the schedule of rehabilitation activities proposed for the MOP period.

In addition, this approval is conditional upon the conditions set out below. These conditions relate to this approval and are in addition to those attached to Mining Authorisation Numbers CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992). A breach of conditions is an offence under the *Mining Act 1992*.

- Development for inclusion in a Mining Operations Plan of a rehabilitation strategy to the satisfaction of the Minister for Industry, Resources & Energy for the North East Tailings Dam by 21 November 2016.

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

Environmental Sustainability Unit
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High St MAITLAND NSW 2320
Email: minres.environment@industry.nsw.gov.au
Tel: 02 4931 6605 **Fax:** 02 4931 6790 **Web:** www.resourcesandenergy.nsw.gov.au
ABN 72189919072

ASSESSED DEPOSIT

Approval of this MOP has triggered a review of the assessment of the security deposit required to secure funding for the fulfilment of rehabilitation obligations under **Mining Authorisation Numbers CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992)**.

Notice of the change in the security deposit condition related to this MOP approval will be provided separately.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

Department means NSW Department of Industry, Skills and Regional Development.

Authorisation Holder means the holder of the relevant authorisation(s).

Mining Operations Plan means the project, mining and mining related operations described in the Wambo Coal Mining Operations Plan 2015-2020 Amendment C prepared by Wambo Coal Pty Limited and dated 11 May 2016.

If you have any questions about this Notice, please contact Monique Meyer directly on (02) 4931 6429.

MONIQUE MEYER
Principal Inspector & Manager Environment, Northern Region
Division of Resources and Energy
Signed under delegation by the Minister for Industry, Resources & Energy.
Signed under delegation from the Secretary of the Department of Industry, Skills and Regional Development.

Department of Industry
Resources & Energy

OUT16/42156
MCV13/293#39

24 November 2016

Michael Alexander
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Michael,

CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992), Wambo Coal Pty Limited, Approval of Mining Operations Plan (Amendment D)

NOTICE OF APPROVAL

Pursuant to Condition 2 of CL397 (Mining Act 1973), Condition 3 of CCL743 (Mining Act 1973), Condition 3 of CL365 (Mining Act 1973), Condition 2 of CL374 (Mining Act 1973), Condition 3 of ML1402 (Mining Act 1992), Condition 2 of ML1572 (Mining Act 1992), Condition 2 of ML1594 (Mining Act 1992), the Wambo Coal Mining Operations Plan 2015-2020 Amendment D (MOP) that was submitted to the Department on 4 November 2016 (DRE Reference: INW16/59271 and INW16/59272 respectively) is approved for the period from the date of this approval until 30 March 2020.

This MOP approved by DRE is limited to:

- the rehabilitation objectives and completion criteria; and,
- the schedule of rehabilitation activities proposed for the MOP period.

In addition, this approval is conditional upon the conditions set out below. These conditions relate to this approval and are in addition to those attached to Mining Authorisations CL397, CCL743, CL365, CL374 (Mining Act 1973), ML1402, ML1594, ML1572 (Mining Act 1992). A breach of conditions is an offence under the *Mining Act 1992*.

- A detailed rehabilitation strategy, to the satisfaction of the Minister for Industry, Resources & Energy for the North East Tailings Dam, is to be included in an approved MOP by 1 July 2017.

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved

Environmental Sustainability Unit
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High St MAITLAND NSW 2320
Email: minres.environment@industry.nsw.gov.au
Tel: 02 4931 6605 **Fax:** 02 4931 6790 **Web:** www.resourcesandenergy.nsw.gov.au
ABN 72189919072

by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

Department means NSW Department of Industry, Skills and Regional Development.

Authorisation Holder means the holder of the relevant authorisation(s).

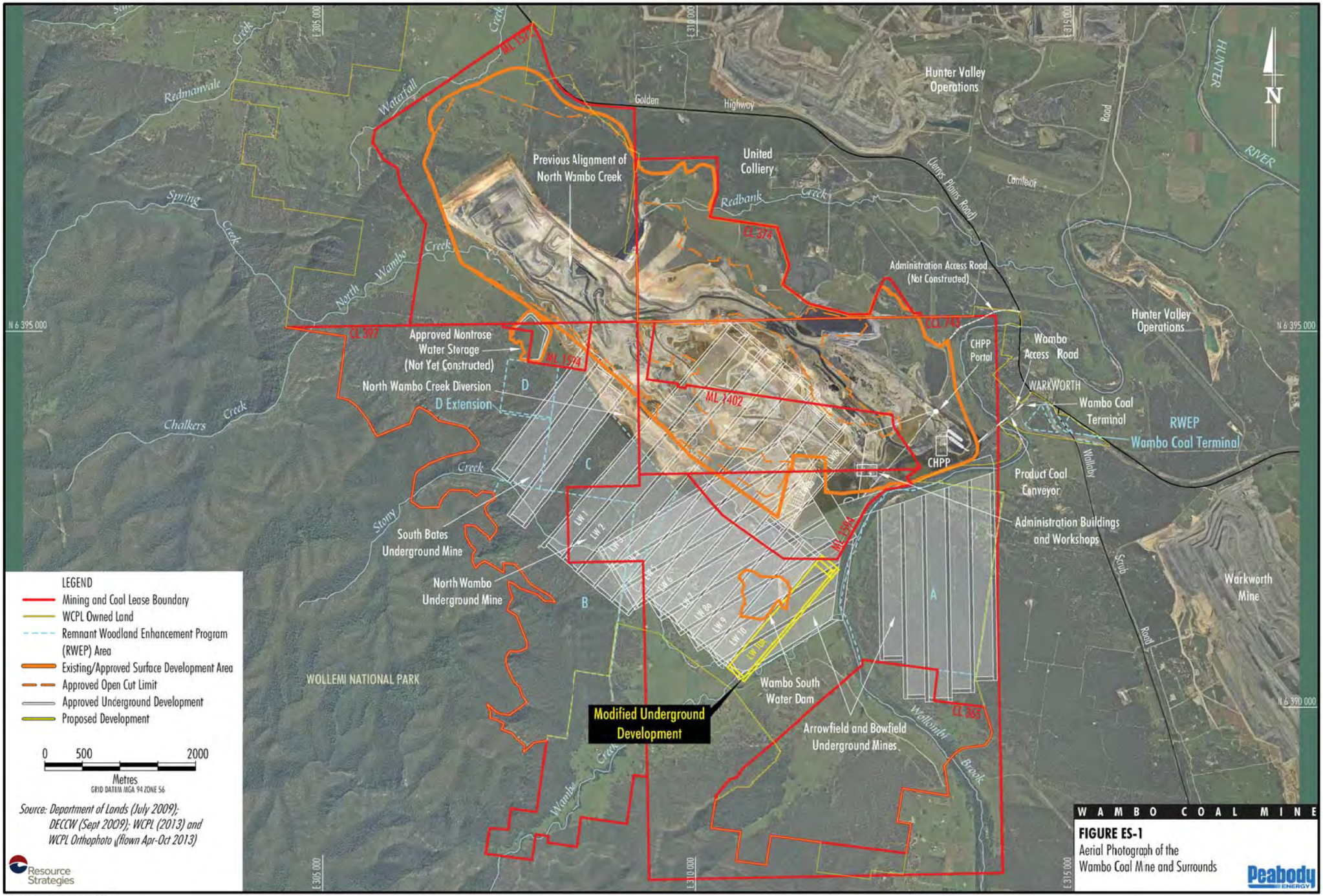
Mining Operations Plan means the project, mining and mining related operations described in the "Wambo Coal Mining Operations Plan 2015-2020 Amendment D" prepared by Wambo Coal Pty Limited and dated 3 November 2016.

If you have any questions about this Notice, please contact Neil McElhinney directly on 49316522.

John Trotter
Acting Principal Inspector & Manager Environment, Northern Region
Division of Resources and Energy
Signed under delegation by the Minister for Industry, Resources & Energy.
Signed under delegation from the Secretary of the Department of Industry, Skills and Regional Development.

APPENDIX 4

Figures



WAMBO COAL MINE

FIGURE ES-1
Aerial Photograph of the Wambo Coal Mine and Surrounds

Peabody ENERGY

WAM-09-15_EP LW 10a_ES_101A

SUPERGROUP	GROUP	SUBGROUP	FORMATION	SEAM
SINGLETON SUPERGROUP	NARRABEEN GROUP	WIDDEN BROOK CONGLOMERATE		
	NEWCASTLE COAL MEASURES [1]	GLEN GALLIC SUBGROUP	Greigs Creek Coal	
			Redmanvale Creek Formation	
			Dights Creek Coal	
		DOYLES CREEK SUBGROUP	Waterfall Gully Formation	
			Pinegrove Formation	
		HORSESHOE CREEK SUBGROUP	Lucernia Coal	
			Strathmore Formation	
			Alcheringa Coal	
			Clifford Formation	
		APPLETREE FLAT SUBGROUP	Charlton Formation	
			Abbey Green Coal	
		WATTS SANDSTONE		
	WITTINGHAM COAL MEASURES	DENMAN FORMATION		
		JERRYS PLAINS SUBGROUP	Mount Leonard Formation	***Whybrow Seam*** [2]
			Althorpe Formation	
			Malabar Formation	***Redbank Creek Seam*** [2]
				Wambo Seam [2]
				Whynot Seam [2]
				Blakefield Seam
			Mount Ogilvie Formation	*Glen Munro Seam*
				Woodlands Hill Seam
			Milbrodale Formation	
			Mount Thorley Formation	***Arrowfield Seam*** [2]
				Bowfield Seam [2]
				Warkworth Seam [3]
			Fairford Formation	
			Burnamwood Formation	*Mount Arthur Seam*
				Piercefield Seam
				Vaux Seam
				Broonie Seam
				Bayswater Seam
		ARCHERFIELD SANDSTONE		
		VANE SUBGROUP	Bulga Formation	
			Foybrook Formation	
			Saltwater Creek Formation	

[1] Previously known as the Wollombi Coal Measures.
[2] Coal reserves currently, previously and proposed to be mined at the Wambo Coal Mine.
[3] Coal reserves to be mined by the Wambo Coal Mine where the upper three plies of the Warkworth Seam combine with the two plies of the Bowfield Seam.

After: DMR (1993)

WAMBO COAL MINE

FIGURE 3
Stratigraphy of the
Wambo Coal Mine Area

Resource Strategies

Peabody ENERGY

WAM-09-15_EP LW10A_001A

APPENDIX 5

(CD) Environmental Management Plans &Asset Register

APPENDIX 6

Surface Disturbance Permit

Surface Disturbance Permit

SDP Number: (Env. Services only)	

Section 1 - Area of Operations

Open Cut	☐	Rail	☐
Underground	☐	CHPP	☐
Wambo General	☐	Other (e.g. RWEP Areas)	☐

Section 2 – SDP Proponent

Job Coordinator / Proponent:				
Proponent's Manager:				
Area Manager *(The Manger for the area of operation where the works will be undertaken):*				
Project Name/ Type / Description & Location:				
How long will the project take (including any rehabilitation works)	Start Date:		End Date:	
Plan or Map Attached: *(If available, please provide Environmental Personnel with electronic data)*				
GIS Coordinates (Provide Coordinates for disturbance)	E:		N:	

Section 4 – Environment and Approvals

(*to be completed by Environmental Personnel)*

Is the proposed activity within Wambo Land Ownership and Property Boundaries:	Yes/ No
Have all the required project approvals been obtained for proposed activity. *(If yes please attached to this SDP)*	Yes/ No
Does the proposed activity require approval from government departments?	Yes/ No
Is the proposed activity consistent with Wambo's:	
• Land Management Practices	Yes/ No
• Mining Tenements	Yes/ No
• Development Consent (DA305-7-2003 &DA177-8-2004)	Yes/ No
• EPA Licence Premise Boundary (EPL 529):	Yes/ No
• Mining Operations Plan Limits:	Yes/ No

• Relevant Environmental Management Plans: **E.g. Flora & Fauna Management Plan (FFMP), Erosion and Sediment Control Management Plan (ESCP)**	Yes/ No
Has a site inspection been completed by Environmental Personnel *(If Yes please add comments/findings at the end of this section)*:	Yes/ No
Flora/fauna restriction (described within EMP, Licence or Development Consent) **E.g. All proposed activities with WCPL RWEP Areas must be in accordance with WCPL Flora & Faun Management Plan**	Yes/ No
Is a pre clearance flora and fauna survey required? (If yes, please attach to this document).	Yes/ No
Have all likely drainage impacts been identified? **An appropriate erosion and sediment control plan must be supplied**	Yes/ No
Are there any monitoring sites within the area (eg. blast, groundwater, surface water, dust, noise, flora/fauna, Aboriginal and European heritage)	Yes/ No
Is the proposed activity within a Rehabilitated area (If Yes, the Rehabilitation specialist is to be notified):	Yes/ No
Are there any Services (electricity easements, pipelines, etc):	Yes/ No
Are there likely to be dust impacts:	Yes/ No
Are there likely to be noise impacts:	Yes/ No
Are there other known issues such as lighting:	Yes/ No
Will fencing or pegging be required:	Yes/ No
Has the WCPL Archaeological database been consulted	Yes/No
Will the proposed activity be within 40m of a riparian zone? **No disturbance shall be allowed within 40m from the top of the upper bank of a defined Creek line, stream or defined natural water course, unless otherwise authorised by a Peabody Wambo Coal Environmental representative –**	Yes/No

General
Comments/ Conditions

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Special
Comments/ Conditions

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Section 5 – SDP Approval

This SDP is valid until:			
	Name:	**Signature:**	**Date:**
Job Coordinator / Proponent:			
Environmental Personnel			
Manager *(The Manger responsible for the area of the operation where the works will be undertaken)*:			

Section 6– SDP Completion *(to be completed by the Proponent)*

Works associated with this SDP were completed on:

Project Coordinator/Advocate: (Please return a signed copy of the completed SDP to Environmental Services)	**Name:**	**Signature:**	**Date:**

Section 7– SDP Compliance Report

(to be completed by the Environmental Personnel)

During Project *(the project may be audited against conditions detailed within this SDP)*			
SDP compliance inspection undertaken By: *(Name & Role)*		Date:	

Project Completion *(at the end of the project a compliance inspection may be undertaken)*			
	Name:	**Signature:**	**Date:**
The Final SDP Compliance Report Completed:			

Please attach any additional SDP Compliance Inspection documentation (e.g photos) to this document.

Section 8 - Figure

Section 8 – Attach Pre - clearance survey here *(if required as part of the SDP application)*

Surface Disturbance Procedure

Purpose

The purpose of this procedure is to detail the environmental controls that need to be addressed prior to any surface disturbance being permitted on:

- Wambo owned land.
- United owned land covered by Wambo's mining lease.
- Privately owned land where the disturbance is subject to agreement with the landowner.

Surface disturbance includes:

- Felling trees on undisturbed or rehabilitated land.
- Pushing up or removing topsoil on any land whether undisturbed or rehabilitated.
- Dumping over any undisturbed or rehabilitated land.
- Construction of any earthworks across undisturbed or rehabilitated land.

Surface disturbance does not include the following:

- Maintenance of existing infrastructure.
- Maintenance of bushfire trails.
- Maintenance of drains.
- Maintenance of garden and car park areas.
- Maintenance of clearance for existing powerlines.
- Activities on un-rehabilitated previously disturbed areas.

This procedure will be a checklist of items that need some management to ensure that minimal environmental impact will occur from mining or disturbance on site. Further detail on the background to this procedure can be obtained from the Environmental Management Plans that have been developed by Wambo.

Areas to be Addressed

The person managing the task needs to ensure each of the following areas is addressed and adequate controls are put in place. This will assist in the processing of the permit.

While the person managing this disturbance is responsible for addressing each of these areas, the Environmental Department is available to provide assistance and advice.

Application can be made for a staged approach to the disturbance. However, surface disturbance should not occur more than 6 months prior to the area being required.

- ### Area Description

The area to be disturbed needs to be delineated. The level of delineation needs to be proportional to the environmental risk. Survey controls needs to be placed in the field and a plan of the proposed disturbed area has to be attached to the checklist. A copy of the plan must be held in the office for audit purposes and a copy has to

be provided to the personnel undertaking the work in the field. This should reduce the potential for disturbance to be carried out in a non approved area. Should any disturbance occur outside of the approved area, an incident form and corresponding investigation will be required.

- **Statutory Requirements**

All statutory requirements need to be met. This should include reference to MOP boundaries, DC boundaries, lease and authorisation conditions, land ownership, management plans. If required, relevant government agencies need to be notified. For example DPI and DoP must be notified of exploration activities in EL's.

- **Pre Disturbance Flora and Fauna Assessments**

No disturbance of RWEP Areas can proceed until consultation with appropriate government authority has been undertaken (refer to FFMP). Flora and fauna assessment is required prior to any disturbance. The level of the assessment required will be determined after initial investigations of the area that needs to be disturbed are undertaken. These assessments may be comprehensive and may need to be undertaken by external consultants. Consequently, there may be a number of weeks between an application to disturb being lodged and an approval to disturb being granted.

During pre-disturbance surveys, habitat trees and seed collection trees may be identified. These trees will be handled differently to the normal clearing process. Habitat trees potentially house native fauna and also provide a source of habitat features (hollows) which have to be collected for use on rehabilitated surfaces. Seed collection trees provide a source of seed for natural rehabilitation.

The area should be cleared initially of all vegetation except for the habitat trees. Once the non habitat vegetation has been cleared and removed from the area, the habitat trees should be felled. They should be left where they fall. At that time, recovery of features such as hollows should commence. After the hollows have been recovered, the remaining parts of the habitat trees can be treated as normal vegetation and pushed up with the other material. These surveys may identify threatened flora and fauna species, which will need to be managed and may restrict disturbance to certain months of the year.

- **Archaeological and European Heritage Assessment**

Archaeological and European Heritage surveys were completed during EIS development. Aboriginal artefacts have been salvaged for all areas of the open cut in the five year MOP foot print. However, mining or disturbance outside those areas cannot begin until the possible artefact recovery has been completed. There are requirements for handling European Heritage items prior to any disturbance taking place. As with the pre-disturbance flora and fauna surveys, these steps will add time to the process and can be in the order of 3 months.

- **Water Management and Erosion and Sedimentation Control**

Once the area is cleared, any rain / water that comes in contact with or is captured in the area must be treated. Generally, the water falling into the pit cannot leave site.

Plans will be developed to manage erosion and sediment control, surface water and groundwater. The water management strategy for this area will be discussed with Wambo personnel to ensure they fit with site water management plans.

- **Topsoil Removal**

The MOP defines topsoil stripping depths. All topsoil must be recovered for Wambo to accomplish rehabilitation to the agreed standards. Thus, every endeavour should be made to ensure that topsoil is recovered. Direction should be obtained from Wambo as to where the topsoil, once moved, should be placed. Preference should be given to placing topsoil on areas available for rehabilitation. Topsoil depths will be determined at the time of removal.

- **Noise**

Noise management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by considering location of neighbours, reducing the area disturbed, managing tree cover near the disturbed area and disturbing areas at an appropriate time during the day / year. A strategy to manage noise must be developed.

- **Dust Generation**

Dust management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by reducing the area disturbed, managing tree cover near the disturbed area, disturbing areas at an appropriate time during the year and under favourable weather conditions, and utilising water carts as appropriate. A strategy to manage dust must be developed.

- **Lighting**

Light management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by clearing during daylight hours only. A strategy to manage lighting must be developed.

- **Other Issues**

Other issues may need to be considered as part of the disturbance work that are outside the scope and purpose of this checklist. These may include but not limited to power lines, pipe lines, underground services and working on steep grades. Approval of this documentation does not negate the requirement to complete other work permits if applicable. Should there be any potential for underground services to be impacted by the work being done, a “Permit to Dig” may need to be established.

- **Rehabilitation of Disturbed Areas**

All disturbed areas of the mine have to be rehabilitated. Depending on the area there may be considerable time between disturbance and rehabilitation. When and how the rehabilitation is to be performed needs to be addressed.

APPENDIX 7

WA-S&H-TEM-305.1 Formal Risk Assessment

Reference	**Activity** Step in task/ Energy Source/ Group (PEEPO)	**Hazard** What are the potential hazards that may cause harm or loss?	**Inherent Risk** Risk involved in task without any controls? Or **Potential Risk** What could go wrong?	**Known Controls** What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	**Risk Ranking** Remaining level of risk with known controls in place?			
					Area	**C**	**L**	**R**
1	**Mine Plan (Open Cut & Underground)**	• Current approvals & known LOM	• MOP • Life of Mine (LOM) • Regulatory Uncertainty	• Approved DA to 2025 for Mine Complex • Revised MOP and RMP	A	5	D	H
2	**Approvals**	• SM /Extraction Plan Approval (Whybrow) • MOP Approvals	• Tight Timeframe • Escarpment • Not approved • Regulatory Uncertainty	• SMP/Extraction Plan approved for LW7to 10 • MOP Submission process	A	5	E	M
3	**Aboriginal Cultural Heritage**	• Artifact Salvages • Finding unknown sites • Scar Tree	• Delay operations • Not getting approval to remove scar tree • Unknown timeframe for consultation with local Aboriginal representatives • Requirement to get a new s90 permit (AHIP)	• SDP Process • Current approved AHIP permit • Due Diligence (SDP) • Cultural Heritage Database	AR	3	D	M
4	**Subsidence (NWU)**	• RWEA – Ponding Potential • NWCD • ROW • Stony Creek • South Wambo Creek • Old Workings	• EP not approved for South Bates • Rehab Management Plan is currently not approved • Regulatory response to NWCD unknown given recent NWCD incident • Reactivate old workings in overlying seams	• Approved SMP/EP for LW7 & LW10 • Homestead Backfill Project • RWEA – Annual Flora and Fauna Monitoring program • Bed and Bank Stability Monitoring • SWM/GWM • Subsidence Inspections/Monitoring • End of Panel Reports (EOP) • Subsidence Assessments	ER	2	C	M

Reference	Activity Step in task/ Energy Source/ Group (PEEPO)	Hazard What are the potential hazards that may cause harm or loss?	Inherent Risk Risk involved in task without any controls? Or Potential Risk What could go wrong?	Known Controls What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	Risk Ranking Remaining level of risk with known controls in place?			
					Area	C	L	R
5	**Visual Impact**	• Highly visible to community – greater level of scrutiny • Greater level of scrutiny from DOPI compliance officers (dust) • Not in general compliance with EIS	• Restricted operations • Capital requirements for fleet additions and/or modifications • Montrose Tree Screen has not been completed • Establishment of visual bund – capital requirements • Approvals for establishment of visual bund outside the approved disturbance boundaries	• General direction/commitments in EIS • Lighting Plant procedure • Scheduling mining operations to minimise visual impact • Compliance with MOP and RMP • Implement Montrose Tree Screen Project in 2015	R	2	B	M
6	**Rehabilitation**	• Design criteria and final landform/use	• Noncompliance with current approved MOP or EIS • Failure to release bond requirements	• Compliance with EIS • Compliance with MOP • Compliance with RMP	EAR	5	D	H
	Mine Closure Plan	• Update Mine Closure Plan	• DRE requires MCP for this MOP period • Legacy Items (NETD, NWCD)	• EIS • LOM Planning • DRE Gov't Guidelines for MCP • Draft Peabody RMP/Guideline • MCP submission 2015	A	4	C	H
	Final Void Plan	• Final Void Plan has not been approved by regulators	• LOM status • To be submitted with MCP	• EIS guidelines • ARO Costings/Guidelines • Draft FVP to be submitted in MCP 2015	A	3	C	M
	Rehabilitation Management Plan (RMP)	• RMP requires revision and resubmission	• LOM status • MOP approval • RMP review underway in 2014	• EIS guidelines • ARO Costings/Guidelines • Draft RMP to be finalised in Q1 2015 post comments from regulators	A	3	C	M

Reference	Activity Step in task/ Energy Source/ Group (PEEPO)	Hazard What are the potential hazards that may cause harm or loss?	Inherent Risk Risk involved in task without any controls? Or Potential Risk What could go wrong?	Known Controls What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	Risk Ranking Remaining level of risk with known controls in place?			
					Area	C	L	R
	Relinquishment Criteria	• Relinquishment Criteria based on current approved LOM/MOP	• Failure to relinquish Bond • Gov't guidelines are currently been established • Completion of MOP to standard required lead to delay in MOP approval	• Compliance with MOP and RMP • Monitoring data from Rehab etc	A	3	C	M
	Final Landform	• Non-compliance with Technical Standards Eg RL160 Limit	• Landform that is not stable/performing and/or inconsistent with Gov't expectations/standards • Not integrating with existing landforms • LOM plan changes/uncertainty - JV • Achieving Standards • Water Management (see below) • Capital constraints • NETD – Practicalities • Above the RL160	• Industry Best Practice • Compliance with approved MOP • Compliance with RMP • Compliance with EIS guidelines	A	3	C	M
	Geochemistry (Overburden Analysis) – RMP	• Unknown chemical & physical properties and suitability of overburden material for final landform	• Failure of rehab due to poor material • Failure of Relinquishment criteria • Failure to relinquish Bond • Costs involved in reshaping/remediation works • No known Geochemical issues • No formal testing of current run-off material • Non-compliance with DA conditions	• Baseline information in EIS • Compliance with MOP and RMP i.e. material characterisation • Low risk of AMD and spon comb in rehab areas • Reject handing and management in compliance with MOP	EA	3	C	M
	Spon Comb	• Rehab Hot Spots • Heating	• Remove/Rework / Revegetation / Reshape / Replace	• OCE Inspections • Rejects emplacement strategy • Low numbers of spon comb events recorded in rehab to date	EA	3	D	M

Reference	Activity Step in task/ Energy Source/ Group (PEEPO)	Hazard What are the potential hazards that may cause harm or loss?	Inherent Risk Risk involved in task without any controls? Or Potential Risk What could go wrong?	Known Controls What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	Risk Ranking Remaining level of risk with known controls in place?			
					Area	C	L	R
	Topsoil	• Insufficient quantities • Management of Topsoil • Handling of Topsoil • Insufficient cover of topsoil in accordance with EIS	• Import alternate sources / types of Topsoil • Failure to achieve quality Rehab requirements • Failure to meet relinquishment criteria • Increase costs in importing alternate materials • 100mm topsoil cover	• Current Approved MOP • Compliance with MOP and RMP • Purchase soil alternatives including Organic material • Mulch from site • Topsoil Management Procedure	EA	3	D	M
	Tailing Mgt / Coarse Rejects Mgt	• Spon Comb • Acid Mine drainage • Uncertainty LOM Plan for Tailings and Coarse Rejects • Rehab of Hunter Tailings Pit	• Remove/Rework / Reveg / Rehape / Replace & Costs • Contamination which leads to failure of Rehab (ie water runoff causing EC, pH issues) • Hunter Pit – decant/cap/rehab • Rehab of Hunter Tailings – process? • 2m of cover required as per EIS	• Blended into waste dumps • Mine Planning – Slope Stability Mgt Plan (Coarse rejects) • OCE Inspections • Mine planning - dumping at pit floor • s101 (DRE) Decommissioning • ARO calculation • Compliance with MOP and RMP	AE	4	D	M
	Waste Rock / Overburden Mgt	• Inconsistent Quantities/Volume to establish final landform/capping	• Final landform design (NETD capping, Hunter Pit capping material)	• Known quantities to cap (need to be revised to achieve final landform – HP /Sarah's Sister Dump – known quantities available)	A	2	D	L
	Surface Water Management	• Erosion and Sediment Control • Unstable Landforms • Offsite Contamination (runoff not meeting EPL requirements)	• Not meeting DA criteria • Failure of landforms due to insufficient water Mgt & landform design • Failure to meet Rehab criteria • Failure to relinquish Bond • Non-compliance with EPL license • Costs in reshaping/rework/remediation	• Erosion and Sediment Control Plan • Monthly Environmental Inspections(Erosion & Sediment) • Monthly Monitoring of Surface Waters • Progressive Rehab • Design drainage (clean water & dirty water diversions)	EAR	3	C	M

Reference	Activity Step in task/ Energy Source/ Group (PEEPO)	Hazard What are the potential hazards that may cause harm or loss?	Inherent Risk Risk involved in task without any controls? Or Potential Risk What could go wrong?	Known Controls What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	Risk Ranking Remaining level of risk with known controls in place?			
					Area	C	L	R
	Groundwater Management	• Recovery of Groundwater • Final void behavior	• Recovery of Groundwater within Rehab mine spoil which results in discharge of contaminated water (consider influences on final voids) • Rising water table jeopardies the integrity if final land form & vegetation	• Groundwater Monitoring program	EAR	3	C	M
	Post Mining Landuse	• Conceptual Post mining land use	• Can you achieve Post mining land use concepts	• Compliance with the MOP and RMP • EIS guidelines • Final Landform Design/Concept	EAR	5	D	H
	North East Tailings Dam (NETD)	• Unable to create final landform	• Failure to relinquish bond • Failure to meet DC criteria • Failure to relinquish lands • Water Mgt (contamination) • Capital constraints • Failure to meet Mine closure	• NETD Closure Plan • Partial capping has commenced • Monitoring & Inspections DSC approved • Inpit footprint	EAR	5	C	E
	Homestead Buildings	• Noncompliance with CMP / DC • Noncompliance with s60's	• DoPI Compliance officers do not support MOP • PIN/Prosecution from non-compliance	• CMP • Mine Plan (offset areas) • Monthly Inspections • Pest Control • Subsidence Monitoring • Fire suppression system • Blast Monitoring • Fencing • Independent Audits • Engaged Cultural Heritage Expert to assist Mgt	AR	3	C	M

WA-S&H-TEM-305.1 Formal Risk Assessment

Reference	**Activity** Step in task/ Energy Source/ Group (PEEPO)	**Hazard** What are the potential hazards that may cause harm or loss?	**Inherent Risk** Risk involved in task without any controls? Or **Potential Risk** What could go wrong?	**Known Controls** What controls have been fully implemented and are effective in eliminating the hazard or reducing the risk?	**Risk Ranking** Remaining level of risk with known controls in place?			
					Area	**C**	**L**	**R**
	Remote Site Rehab Rehab Sites (Infrastructure – boreholes etc etc)	• Unstable landforms • Relinquishment • Private landowner • Failure to Rehab sites	• Not meeting relinquishment criteria • Not releasing bond • Personnel injury (subsidence) • Unauthorised water discharge • Groundwater recovery of goaf – leading to surface water make/contamination • Recurring subsidence	• SMP and Extraction Plan • Subsidence inspections • Borehole register • Asset register • Surface & Groundwater Monitoring Program • Access & Compensation Agreement with private landowner • RMP	PEAR	2	C	M

APPENDIX 8

2016 South Wambo Drilling Program (ESF4 Exploration Activity Application)

WAMBO COAL MINE

2016 SOUTH WAMBO DRILLING PROGRAM

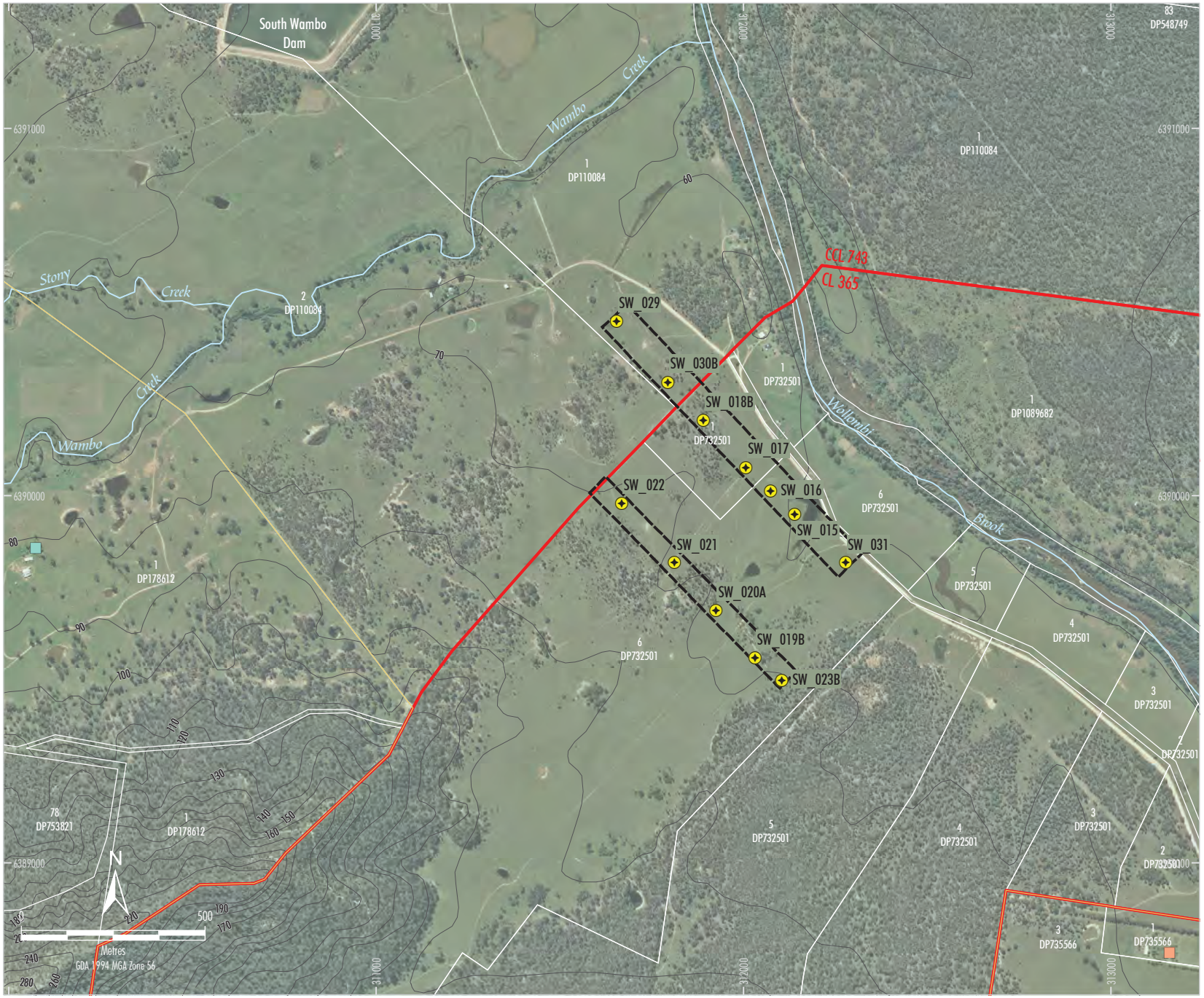
ATTACHMENTS

MARCH 2016
Project No. WAM-09-15
Document No. 00733922

LIST OF ATTACHMENTS

ATTACHMENT A

FIGURES



LEGEND

- Mining and Coal Lease Boundary
- WCPL Owned Land
- Indicative Drill Site
- Drilling Program Area

Sensitive Receptors

- Private Dwelling
- Other Resource Company Owned Dwelling

Source: Department of Lands (July 2009); WCPL (2016); WCPL Orthophoto (Apr-Oct 2013)

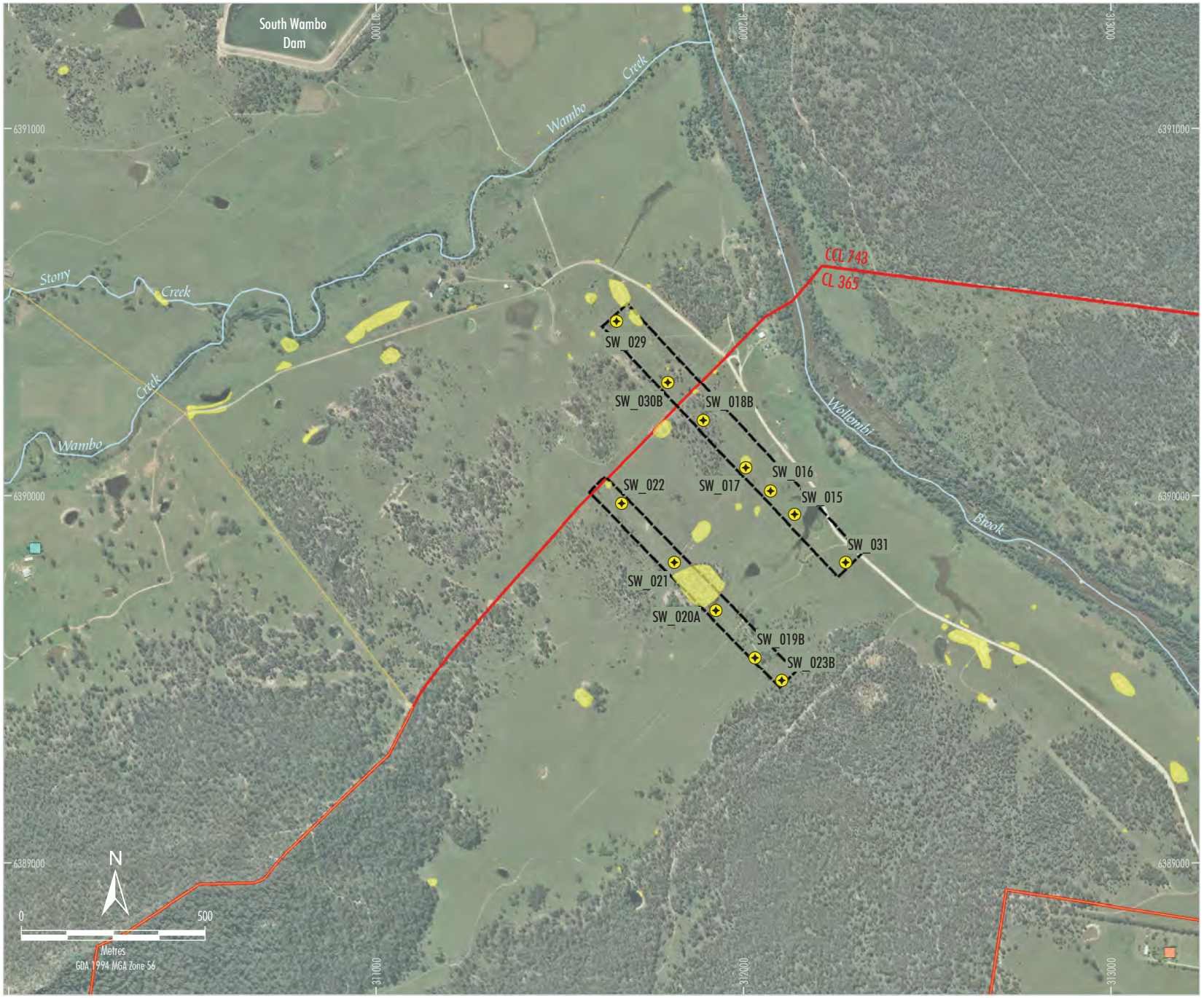
Peabody ENERGY

WAMBO COAL MINE

Drilling Program Area and Indicative Drill Sites

Figure 1

WAM-09-15_SWUMM_2016 Exploration_201C



LEGEND

- Mining and Coal Lease Boundary
- WCPL Owned Land
- Indicative Drill Site
- Extent of Aboriginal Heritage Site
- Drilling Program Area

Sensitive Receptors

- Private Dwelling
- Other Resource Company Owned Dwelling

Source: Department of Lands (July 2009); WCPL (2016); WCPL Orthophoto (Apr-Oct 2013)

Peabody ENERGY

WAMBO COAL MINE

Aboriginal Heritage Due Diligence for the Drilling Program Area

Figure 2

WAM-09-15_SWUMM_2016 Exploration_202D

ATTACHMENT B

INDICATIVE LOCATIONS OF THE DRILL SITES AND PHOTOGRAPHS OF THE EXISTING LOCATIONS

Table B-1
Indicative Locations of the Drill Sites

Drill Site	Easting	Northing
SW_015	312139.3	6389950
SW_016	312073	6390013
SW_017	312006.6	6390077
SW_018B	311891.1	6390205
SW_019B	312031	6389558
SW_020A	311924.4	6389687
SW_021	311812	6389818
SW_022	311668.3	6389979
SW_023B	312103.4	6389496
SW_029	311655.2	6390474
SW_030B	311793.9	6390309
SW_031	312278	6389817

Plate 1 SW_015 Facing North

Plate 2 SW_015 Facing East

Plate 3 SW_015 Facing South

Plate 4 SW_015 Facing West

WAM-09-15_SWUMM_2016 Exploration_002A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_015

Figure B1

Plate 1 SW_016 Facing North

Plate 2 SW_016 Facing East

Plate 3 SW_016 Facing South

Plate 4 SW_016 Facing West

WAM-09-15_SWUMM_2016 Exploration_001B

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_016

Figure B2

Plate 1 SW_017 Facing North

Plate 2 SW_017 Facing East

Plate 3 SW_017 Facing South

Plate 4 SW_017 Facing West

WAM-09-15_SWUMM_2016 Exploration_003A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_017

Figure B3

Plate 1 SW_018B Facing North

Plate 2 SW_018B Facing East

Plate 3 SW_018B Facing South

Plate 4 SW_018B Facing West

WAM-09-15_SWUMM_2016 Exploration_004A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_018B

Figure B4

Plate 1 SW_019B Facing North

Plate 2 SW_019B Facing East

Plate 3 SW_019B Facing South

Plate 4 SW_019B Facing West

WAM-09-15_SWUMM_2016 Exploration_005A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_019B

Figure B5

Plate 1 SW_020A Facing North

Plate 2 SW_020A Facing East

Plate 3 SW_020A Facing South

Plate 4 SW_020A Facing West

WAM-09-15_SWUMM_2016 Exploration_006A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_020A

Figure B6

Plate 1 SW_021 Facing North

Plate 2 SW_021 Facing East

Plate 3 SW_021 Facing South

Plate 4 SW_021 Facing West

WAM-09-15_SWUMM_2016 Exploration_007A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_021

Figure B7

Plate 1 SW_022 Facing North

Plate 2 SW_022 Facing East

Plate 3 SW_022 Facing South

Plate 4 SW_022 Facing West

WAM-09-15_SWUMM_2016 Exploration_008A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_022

Figure B8

Plate 1 SW_023B Facing North

Plate 2 SW_023B Facing East

Plate 3 SW_023B Facing South

Plate 4 SW_023B Facing West

WAM-09-15_SWUMM_2016 Exploration_009A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_023B

Figure B9

Plate 1 SW_029 Facing North

Plate 2 SW_029 Facing East

Plate 3 SW_029 Facing South

Plate 4 SW_029 Facing West

WAM-09-15_SWUMM_2016 Exploration_010A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_029

Figure B10

Plate 1 SW_030B Facing North

Plate 2 SW_030B Facing East

Plate 3 SW_030B Facing South

Plate 4 SW_030B Facing West

WAM-09-15_SWUMM_2016 Exploration_011A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_030B

Figure B11

Plate 1 SW_031 Facing North

Plate 2 SW_031 Facing East

Plate 3 SW_031 Facing South

Plate 4 SW_031 Facing West

WAM-09-15_SWUMM_2016 Exploration_012A

Peabody ENERGY

WAMBO COAL MINE

Photographs of Proposed Drill Site
SW_031

Figure B12

ATTACHMENT C

DESCRIPTION OF THE DRILLING PROGRAM STAGES

Overview

Wambo Coal Pty Ltd (WCPL) proposes to undertake prospecting activities involving the drilling of 12 exploration drill holes to assist in delineating a fault above proposed underground workings in Coal Lease (CL) 365 and Consolidated Coal Lease (CCL) 743. The indicative locations of the drill sites are shown in Attachment A and provided in Attachment B. The final locations of the drill sites would be determined through the drill site and access track selection process outlined below.

A description of the activities associated with the pre-construction, construction, operation, decommissioning and rehabilitation stages of the drilling program are provided throughout the following subsections.

Drill Site and Access Track Selection Process

Prior to commencing the drilling program, a comprehensive site selection process would be undertaken to locate drill sites and new temporary access tracks within areas of lower potential impact, as outlined below.

The final locations of the drill sites and any required temporary access tracks would be selected based on the following requirements:

- All drill sites would be located within the extent of the drilling area shown on Figure 1 of Attachment A.
- Drill sites and new temporary access tracks would be preferentially located on previously disturbed/cleared grassland areas which would avoid the clearing of trees (including dead trees) and shrubs if practical.
- Where clearance of vegetation is required, drill sites and new temporary access tracks would be located to minimise clearance (based on the advice of a suitably qualified person) and avoid any impacts on any threatened ecological communities, threatened flora species or threatened fauna species listed under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). (refer to Attachment E).
- Drill sites and new temporary access tracks would be located to avoid Aboriginal heritage sites identified in the Aboriginal due diligence assessment (i.e. AHIMS search and archaeological investigation) as shown on Figure 2 of Attachment A.

Site Access

Drill sites would be accessed by existing tracks where possible. Some maintenance upgrades to existing tracks may be required to facilitate access (e.g. slashing or trimming), along with the development of new temporary tracks where no alternative is practical.

New temporary access tracks would be approximately 3 to 4 metres (m) wide and located in previously disturbed or grassland areas wherever practical. Where clearance of vegetation is required, clearance would be limited (based on the advice of a suitably qualified person) to avoid any impacts on any threatened ecological communities, threatened flora species or threatened fauna species listed under the TSC Act or the EPBC Act.

No earthworks for access track construction are proposed as part of the drilling program.

Before being used on-site, all machinery would be inspected and cleaned to minimise the spread of weeds.

Drill Site Locations

The locations of the drill sites shown in Attachments A and B are indicative and subject to the drill site and access tack selection process outlined above.

Drill sites would be located in previously disturbed or grassland areas wherever possible. Where clearance of trees is required, clearance would be limited (based on the advice of a suitably qualified person) to avoid any impacts on any threatened ecological communities, threatened flora species or threatened fauna species listed under the TSC Act or the EPBC Act.

Drill Site Establishment

Each drill hole would require site preparation, including:

- use of a slasher to prepare the drill site and associated access track where required;
- installation of an above ground sump and any ancillary equipment;
- implementation of barriers to prevent stock accessing the drill sites where required;
- implementation of suitable erosion and sediment control measures prior to drilling commencing; and
- demarcation of nearby Aboriginal heritage items to avoid any impacts during the drilling activities.

Drilling

The drilling program would be conducted using air-core drilling methods and would require a standard truck mounted air-core drill rig. Any auxiliary equipment would be transported using separate vehicles and would include a truck mounted compressor, a rod truck, a light vehicle and trailer, an all-terrain forklift, two support light vehicles including a fire fighting unit trailer and a mobile toilet trailer.

The proposed prospecting activities would not extract water from any surface or groundwater systems. Water required for the drilling program would be sourced from existing WCPL water access licences and would be transported to the drill site by internal access roads.

It is anticipated that approximately nine days of drilling would be required for each drill hole.

Decommissioning and Rehabilitation

Decommissioning at each site would involve the complete removal of all equipment and rehabilitation of the site with native, local flora species (where appropriate).

Drill holes would be appropriately sealed to prevent cross contamination of aquifers intersected by the drill holes in accordance with the *EDG01 Borehole Sealing Requirements on Land: Coal Exploration* (DRE, 2012) and rehabilitated in accordance with the *Wambo Coal Mine Mining Operations Plan 2015 – 2020* (WCPL, 2015a).

The general aim of rehabilitation would be to return sites to their original form. Erosion and sediment controls would remain in place at all sites until the risk of erosion has been reduced to negligible by on site rehabilitation. WCPL personnel would monitor the progress of rehabilitation at the sites until a stable landform has been achieved and ground vegetation has been successfully re-established.

ATTACHMENT D

ASSESSMENT OF SIGNIFICANCE

WAMBO COAL MINE

2016 SOUTH WAMBO DRILLING PROGRAM

ATTACHMENT D - ASSESSMENT OF SIGNIFICANCE

MARCH 2016
Project No. WAM-09-15
Document No. 00734109

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1 INTRODUCTION

1.1 SCOPE

Wambo Coal Pty Ltd (WCPL) proposes to undertake prospecting activities involving the drilling of 12 exploration drill holes to assist in delineating a fault above proposed underground workings in Coal Lease (CL) 365 and Consolidated Coal Lease (CCL) 743.

1.2 DRILLING ACTIVITIES

The indicative locations of the drill sites are shown Table 1 and Figure 1. The final locations of the drill sites would be determined through a drill site and access track selection process in order to locate drill sites and new temporary access tracks within areas of lower potential impact (refer to Section 1.4).

Table 1
Indicative Locations of the Drill Sites

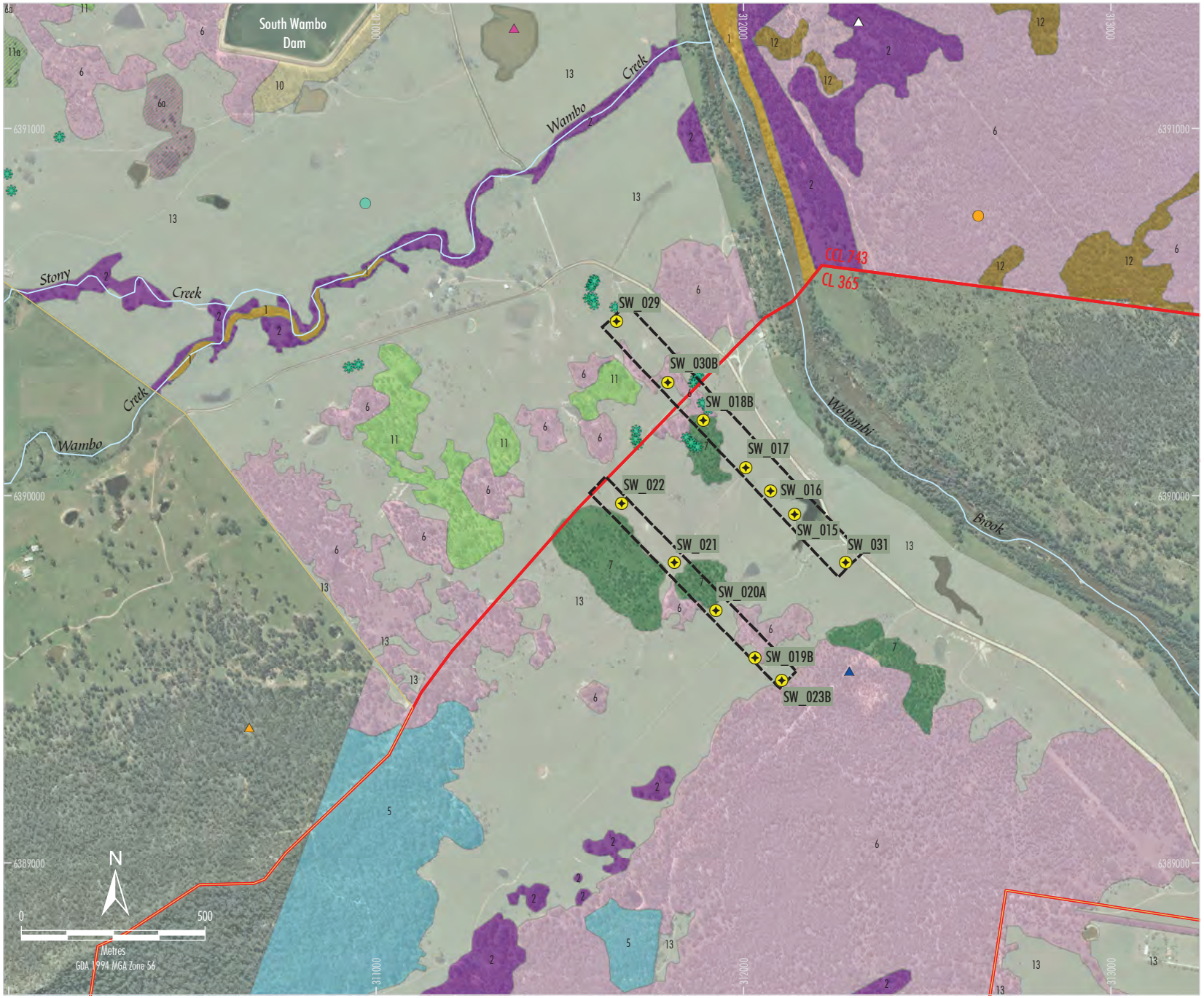
Drill Site	Easting	Northing
SW_015	312139.3	6389950
SW_016	312073	6390013
SW_017	312006.6	6390077
SW_018B	311891.1	6390205
SW_019B	312031	6389558
SW_020A	311924.4	6389687
SW_021	311812	6389818
SW_022	311668.3	6389979
SW_023B	312103.4	6389496
SW_029	311655.2	6390474
SW_030B	311793.9	6390309
SW_031	312278	6389817

Ground disturbance at each drill site would be limited to the extent of the drill hole and an associated lined sump/drainage line (approximately 1 square metre) used to collect return from the bore and pump into the above ground sump. Drill holes would be located within previously disturbed/cleared grassland areas where practical to minimise clearance in accordance with the drill site and access track selection process outlined in Attachment C. In total, the ground disturbance associated with the 12 drill holes would be approximately 0.0012 hectares (ha).

Existing tracks would be used to access drill sites where practical. Where new temporary access tracks are required (approximately 3 to 4 metres [m] wide), vegetation clearance would be minimised in accordance with the drill site and access track selection process (Attachment C). In total, up to 0.0120 ha of vegetation clearance may be required for new temporary access tracks.

Some slashing or trimming may be required to prepare drill pad areas (30 m x 30 m) and access tracks, however, this would not involve the removal of vegetation or require any ground disturbance.

Drilling activities at each drill site would be undertaken for a period of up to 9 days. Upon completion of drilling activities at each site, rehabilitation would be undertaken to restore the site to its previous condition.



LEGEND

- Mining and Coal Lease Boundary
- WCPL Owned Land
- Indicative Drill Site
- Drilling Program Area

Threatened Fauna Species

- Brown Treecreeper (eastern subspecies)
- Glossy Black-Cockatoo
- Speckled Warbler
- Turquoise Parrot
- Eastern Freetail-bat
- Large-eared Pied Bat

Threatened Flora Population

- *Acacia pendula* population in the Hunter Catchment

Vegetation Communities

- Community 1 - River Oak Riparian Woodland
- Community 2 - Forest Red Gum Floodplain Forest
- Community 5 - Spotted Gum - Narrow-leaved Ironbark - Grey Box Woodland
- Community 6 - Narrow-leaved Ironbark - Grey Box Woodland*
- Community 6a - Narrow-leaved Ironbark - Grey Box Woodland (Disturbed)
- Community 7 - Bull Oak Grassy Woodland
- Community 10 - *Melaleuca decora* Low Forest
- Community 11 - Grey Box - Slaty Box Woodland
- Community 11a - Grey Box - Slaty Box Woodland (Disturbed)
- Community 12 - Rough-barked Apple - Coast Banksia Woodland
- Community 13 - Derived Grassland

*Note: * Listed as a Threatened Ecological Community under the TSC Act*

Source: Department of Lands (July 2009); WCPL (2016); WCPL Orthophoto (Apr-Oct 2013)

Peabody ENERGY

WAMBO COAL MINE

Vegetation Mapping and Threatened Flora and Fauna Records in the Drilling Program Area

Figure 1

WAM-09-15_SWUMM_2016 Exploration_AppD_201A

1.3 THREATENED SPECIES, POPULATIONS AND ECOLOGICAL COMMUNITIES IN THE DRILLING PROGRAM AREA

The following subsections describe the threatened species, populations and ecological communities, and their habitat that could potentially occur within the drilling program area.

Threatened Flora Species and Populations

Several *Acacia pendula* individuals forming part of the threatened *Acacia pendula population in the Hunter Catchment* have been recorded within the drilling program area (Figure 1). The final locations of the drill sites and any new temporary access tracks would be selected to avoid these individuals.

No other threatened flora species or populations have been recorded in the drilling program area.

Threatened Endangered Communities

The vegetation communities mapped within the drilling program area include (Figure 1):

- Narrow-leaved Ironbark – Grey Box Woodland;
- Bull Oak Grassy Woodland; and
- Grey Box – Slaty Box Woodland.

Narrow-leaved Ironbark – Grey Box Woodland forms part of the Central Hunter Grey Box-Ironbark Woodland Endangered Ecological Community (EEC) under the NSW *Threatened Species Conservation Act, 1995* (TSC Act).

The final locations of the drill sites and any new temporary access tracks would be selected to avoid any Central Hunter Grey Box-Ironbark Woodland EEC.

Threatened Fauna Species and Populations

No threatened fauna species or populations have been recorded in the drilling program area, however the drilling program would involve the temporary removal of potential habitat associated with some threatened fauna species.

Based on a review of potentially occurring threatened fauna species, the threatened species that are the subject of the *Threatened Species Assessment Guidelines – The Assessment of Significance* (New South Wales [NSW] Department of Environment and Climate Change [DECC], 2007) for the drilling program are:

- Square-tailed Kite (*Lophoictinia isura*);
- Spotted Harrier (*Circus assimilis*);
- Little Eagle (*Hieraaetus morphnoides*);
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- Gang-gang Cockatoo (*Callocephalon fimbriatum*);
- Little Lorikeet (*Glossopsitta pusilla*);
- Turquoise Parrot (*Neophema pulchella*);
- Swift Parrot (*Lathamus discolor*);

- Masked Owl (*Tyto novaehollandiae*);
- Powerful Owl (*Ninox strenua*);
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*);
- Speckled Warbler (*Chthonicola sagittata*);
- Regent Honeyeater (*Anthochaera phrygia*);
- Painted Honeyeater (*Grantiella picta*);
- Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*);
- Flame Robin (*Petroica phoenicea*);
- Scarlet Robin (*Petroica boodang*);
- Grey-crowned Babbler (eastern subspecies) (*Pomastomus temporalis temporalis*);
- Varied Sittella (*Daphoenositta chrysoptera*);
- Diamond Firetail (*Stagonopleura guttata*);
- Koala (*Phascolarctos cinereus*);
- Brush-tailed Rock-Wallaby (*Petrogale penicillata*);
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Little Bentwing-bat (*Miniopterus australis*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*);
- Corben's Long-eared Bat (*Nyctophilus corbeni*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*);
- Little Pied Bat (*Chalinolobus picatus*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);
- Southern Myotis (*Myotis macropus*);
- Greater Broad-nosed Bat (*Scoteanax rueppellii*);
- Eastern Cave Bat (*Vespadelus troughtoni*);
- New Holland Mouse (*Pseudomys novaehollandiae*); and
- Hastings River Mouse (*Pseudomys oralis*).

Potential impacts to these threatened species would be minimised with the mitigation measures described in Section 1.4.

1.4 MITIGATION MEASURES

A range of measures are proposed to minimise potential impacts of the drilling program on native fauna within the drilling program area, including:

- Drill sites would be preferentially located on previously disturbed/cleared grassland areas which would avoid the clearing of trees (including dead trees and hollow bearing trees) and shrubs if practical.
- Existing access tracks would be used wherever possible, and any new temporary access tracks required would be preferentially located on previously disturbed/cleared grassland areas.
- Where clearance of vegetation is required, drill sites and new temporary access tracks would be located to minimise clearance (based on the advice of a suitably qualified person) and therefore minimise impacts to potential habitat of threatened fauna species.
- Slashing or trimming would be restricted to the drill pad area (30 m x 30 m) and access tracks where required.
- All machinery would be inspected and cleaned prior to use to minimise the spread of weeds.
- Decommissioning and rehabilitation would be conducted as soon as practical upon completion of the drilling activities at each site including sealing drill holes, removal of all equipment and ongoing monitoring to confirm that rehabilitation has been successful.

2 ASSESSMENT OF SIGNIFICANCE

In accordance with the *Threatened Species Assessment Guidelines – The Assessment of Significance* (DECC, 2007), an assessment of the possibility of a 'significant effect on threatened species, populations or ecological communities, or their habitats' has been provided in the subsections below.

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The drilling program would not have any adverse effects on threatened flora species, communities or populations.

The primary potential adverse effect on threatened fauna species associated with the drilling program would be the temporary removal of potential habitat. The drilling program would result in the removal/modification of potential foraging habitat resources for these species consisting of up to approximately 0.0121 ha of Bull Oak Grassy Woodland and 0.0011 ha of Derived Native Grassland (i.e. total clearance of up to approximately 0.0132 ha).

Removal of potential breeding/roosting habitat would be minimal (if any) given that drill sites would be preferentially located on previously disturbed/cleared grassland areas which would avoid the clearing of trees (including dead trees and hollow bearing trees) and shrubs if practical. In addition, no caves, cliffs or gullies would be disturbed.

Threatened fauna species are unlikely to be indirectly impacted as a result of the drilling program. Potential indirect impacts on these species have been considered, including:

- increased noise, dust and artificial lighting;
- increase in abundance of exotic flora and fauna;
- disease; and
- increased bushfire risk.

The drilling program is unlikely to have an adverse impact on the lifecycle of any threatened fauna species such that a viable population of these species is likely to be placed at risk of extinction because:

- None of these species have been previously recorded in the drilling program area.
- Potential habitat for these species would be removed for the drilling program, however the area of potential habitat that would remain outside the drilling program area is relatively large and would remain available to these species.
- Potential habitat removal would be temporary and rehabilitation would be undertaken progressively over the drilling program duration.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Endangered flora populations would be avoided during the drilling program.

No endangered fauna populations have been recorded in the drilling program area.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be places at risk of extinction.

Threatened ecological communities (TECs) would be avoided during the drilling program.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

The extent of habitat removal by the drilling program would be up to approximately 0.0121 ha of Bull Oak Grassy Woodland and 0.0011 ha of Native Derived Grassland. However, significant areas of both these habitats are present in the wider area and any habitat removal associated with the drilling program would be temporary.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

While very minor habitat removal (0.0132 ha) would occur as a result of the drilling program, the nature of clearing would not result in fragmentation or isolation of habitats.

The potential impact would not result in additional habitat fragmented at a local or regional scale.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No threatened fauna species have been recorded within the drilling program area. In addition, potential foraging and breeding/roosting habitat for these species does occur within the drilling program area.

Temporary habitat removal is likely to have an insignificant impact on any threatened fauna species, if at all, as the area to be cleared is very small (0.0132 ha) and significant areas of woodland and grassland habitat would continue to be available in the wider area.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat is present within the drilling program area according to any databases or registers, including the Register of Critical Habitat kept by the Office of Environment and Heritage (OEH) (2016).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

The drilling program would not be inconsistent with any relevant NSW and Commonwealth recovery plans available for threatened fauna species, including the following:

- *The Action Plan for Australian Bats* (Duncan *et al.*, 1999);
- *The Action Plan for Australian Birds 2010* (Garnett *et al.*, 2010);
- *National Recovery Plan for the Swift Parrot Lathamus discolour* (Birds Australia, 2011);
- *Recovery Plan for the Large Forest Owls* (Department of Environment and Conservation, 2006);
- *Draft National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)* (Commonwealth of Australia, 2015);
- *Recovery Plan for the Koala (Phascolarctos cinereus)* (DECC, 2008a);
- *Recovery Plan for the Brush-tailed Rock-Wallaby* (*Petrogale penicillata)* (DECC, 2008b);
- *National Recovery Plan for the Brush-tailed Rock-Wallaby (Petrogale penicillata)* (Menkorst and Hynes, 2010);
- *Draft National Recovery Plan for the South-eastern Long-eared Bat* (Schulz and Lumsden, 2010);
- *National Recovery Plan for the Large-eared Pied Bat Chalinolobus dwyeri* (Department of Environment and Resource Management, 2011);
- *Draft National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus* (Department of Environment, Climate Change and Water, 2010); and
- *Recovery Plan for the Hastings River Mouse (Pseudomys oralis)* (DECC, 2005).

The Project would not be inconsistent with the *NSW Threat Abatement Plan for Predation by the Red Fox* (OEH, 2011).

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The *clearing of native vegetation* is a relevant key threatening process listed under Schedule 3 of the TSC Act. Although the drilling program would involve clearance of native vegetation (0.0132 ha), the scale of clearance is such that an impact on any threatened fauna species potentially occurring in the drilling program area would be negligible.

Given the minimal impact to fauna species associated with the drilling program, it is unlikely that there would be any increase in impact for any other key threatening processes identified by the OEH.

3 OUTCOME

The drilling program would result in the temporary removal of up to approximately 0.0121 ha of Bull Oak Grassy Woodland and 0.0011 ha of Derived Native Grassland.

Although there may be a negligible localised impact on individuals of threatened fauna species in the short-term due to the temporary loss of habitat, there is unlikely to be any net impact on threatened fauna species in the region over the medium to long-term since:

- no threatened fauna species have previously been recorded within the drilling program area;
- the area of habitat to be cleared for the drilling program is very small (0.0132 ha);
- clearing for the program is staged progressively and rehabilitation would occur as soon as practical following completion of the drilling activities at each site; and
- significant areas of woodland and grassland habitat would continue to be available in the surrounds.

No impacts would occur to any TECs or threatened flora species.

4 REFERENCES

Birds Australia (2011) *National Recovery Plan for the Swift Parrot Lathamus discolour.*

Commonwealth of Australia (2015) *Draft National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia).*

Department of Environment and Climate Change (2005) *Recovery Plan for the Hastings River Mouse.*

Department of Environment and Climate Change (2007) *Threatened Species Assessment Guidelines – The Assessment of Significance*.

Department of Environment and Climate Change (2008a) *Recovery Plan for the Koala (Phascolarctos cinereus).*

Department of Environment and Climate Change (2008b) *Recovery Plan for the Brush-tailed Rock-Wallaby (Petrogale penicillata).*

Department of Environment and Conservation (2006) *Recovery Plan for the Large Forest Owls.*

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Duncan, A., Baker, G.B. and Montgomery, N. (1999) *The Action Plan for Australian Bats*. Environment Australia, Australia.

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Menkorst, P. & Hynes, E. (2010) *National Recovery Plan for the Brush-tailed Rock-wallaby Petrogale penicillata*. Prepared for Department of Sustainability and Environment, East Melbourne.

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Date Accessed: February 2016.

Schulz and Lumsden (2010) *Draft National Recovery Plan for the South-eastern Long-eared Bat*.

ATTACHMENT E

REHABILITATION COST ESTIMATE
(REFER TO SEPARATE SPREADSHEET)

ATTACHMENT F

REFERENCES

Division of Resources and Energy (2012) *EDG01 Borehole Sealing Requirements on Land: Coal Exploration.*

NSW Minerals Council (2010) *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects.*

Wambo Coal Pty Ltd (2014a) *Noise Management Plan.*

Wambo Coal Pty Ltd (2014b) *Air Quality and Greenhouse Gas Management Plan.*

Wambo Coal Pty Ltd (2015a) *Wambo Coal Mine Mining Operations Plan 2015 – 2020.*

Wambo Coal Pty Ltd (2015b) *Erosion and Sediment Control Plan.*