

WAMBO COAL PTY LIMITED



SOUTH BATES UNDERGROUND MINE

EXTRACTION PLAN LONGWALLS 11 TO 16

APPENDIX G COAL RESOURCE RECOVERY PLAN

WAMBO COAL PTY LIMITED
SOUTH BATES UNDERGROUND MINE

COAL RESOURCE RECOVERY PLAN
LONGWALLS 11 - 16



PREPARED BY
WAMBO COAL PTY LIMITED

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Document No.	CRRP LW11-16
Title	Coal Resource Recovery Plan for South Bates Underground Mine Longwalls 11 to 16
General Description	A plan demonstrating the effective recovery of the available resource from the mining of Longwalls 11 to 16 at the South Bates Underground Mine
Key Support Documents	Wambo Coal Extraction Plan for South Bates Underground Mine Longwalls 11 to 16

Revisions

Rev No	Date	Description	By	Checked
A	October 2015	Final for Submission	WCPL and Resource Strategies	T. Britten
B	January 2016	Incorporation of Addendum	WCPL and Resource Strategies	T. Britten
C	January 2017	Update to include Longwalls 14 to 16	WCPL and Resource Strategies	T. Britten

The nominated Coordinator for this document is	Technical Services Manager
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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1 INTRODUCTION	1
1.1 PURPOSE AND SCOPE	1
2 RESOURCE DESCRIPTION	4
2.1 SITE GEOLOGY OVERVIEW	4
2.2 OVERBURDEN LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS	6
2.3 LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS (ROOF AND FLOOR STRATA)	6
2.4 EXISTENCE AND CHARACTERISTICS OF GEOLOGICAL STRUCTURE	7
2.5 STABILITY OF UNDERGROUND WORKINGS	7
2.6 HISTORICAL MINING	8
3 RESOURCE RECOVERY	8
3.1 MINING GEOMETRY	8
3.2 COVER DEPTH	8
3.3 MINING METHOD	9
3.4 MINING SCHEDULE	9
3.5 FUTURE MINING	9
3.6 RESOURCE RECOVERY	10
3.7 MINE PLAN JUSTIFICATION	10
4 REFERENCES	11

LIST OF TABLES

Table 1	Strength Property Estimates for Lithology in the Vicinity of the South Bates Underground Mine
Table 2	Key Longwall Panel Dimensions
Table 3	Proposed Mining Schedule (Secondary Extraction)
Table 4	Estimated Resource Recovery from Longwalls 11 to 16

LIST OF FIGURES

Figure 1	Aerial Photograph of Longwalls 11 to 16
Figure 2	Longwalls 11 to 16 Layout
Figure 3	Stratigraphy of the Wambo Coal Mine Area

LIST OF ATTACHMENTS

Attachment 1	Longwalls 11 to 16 Plans 1 to 7
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1 INTRODUCTION

The Wambo Coal Mine is an open cut and underground coal mining operation located approximately 15 kilometres (km) west of Singleton, near the village of Warkworth, New South Wales (NSW) (**Figure 1**). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

The South Bates Underground Mine is a component of the approved Wambo Coal Mine. The South Bates Underground Mine commenced in Longwall 11 in February 2016 and involves extraction of coal by longwall mining methods from the Whybrow Seam and Wambo Seam within Coal Lease (CL) 397 and Mining Lease (ML) 1594 (**Figure 2**).

The potential environmental impacts of the existing Wambo Coal Mine (including the approved South Bates [Whybrow Seam] Underground Mine) were assessed in the *Wambo Development Project Environmental Impact Statement* (the Wambo Development Project EIS) (WCPL, 2003). Development Consent DA 305-7-2003 for the Wambo Coal Mine was granted on 4 February 2004 by the then NSW Minister for Urban Affairs and Planning under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

An application to modify the Development Consent (DA 305-7-2003 MOD 15) was lodged in July 2015 to allow an extension to the South Bates Underground Mine to include three additional longwalls (Longwalls 14 to 16) in the Wambo Seam and was approved on 10 November 2015. The application was accompanied by the *South Bates (Wambo Seam) Underground Mine Modification Environmental Assessment* (WCPL, 2015).

An Extraction Plan for Longwalls 11 to 13 was approved by the NSW Department of Planning and Environment (DP&E) on 9 February 2016. The approved Extraction Plan for Longwalls 11 to 13 has been revised to include Longwalls 14 to 16 within the South Bates Underground Mine for a consolidated Extraction Plan for Longwalls 11 to 16.

This Coal Resource Recovery Plan (CRRP) has been updated from the previous revision (Revision B) to incorporate Longwalls 14 to 16 in the Wambo Seam.

1.1 PURPOSE AND SCOPE

Purpose: This CRRP for Longwalls 11 to 16 has been prepared to demonstrate the effective recovery of the available resource at the South Bates Underground Mine.

Scope: This CRRP includes Longwalls 11 to 16 of the South Bates Underground Mine.

This CRRP has been prepared in accordance with Condition 22C(g) of Schedule 4 of the Development Consent (DA 305-7-2003) as a component of the South Bates Underground Mine Longwalls 11 to 16 Extraction Plan. Condition 22C(g) of Schedule 4 of the Development Consent (DA 305-7-2003) requires:

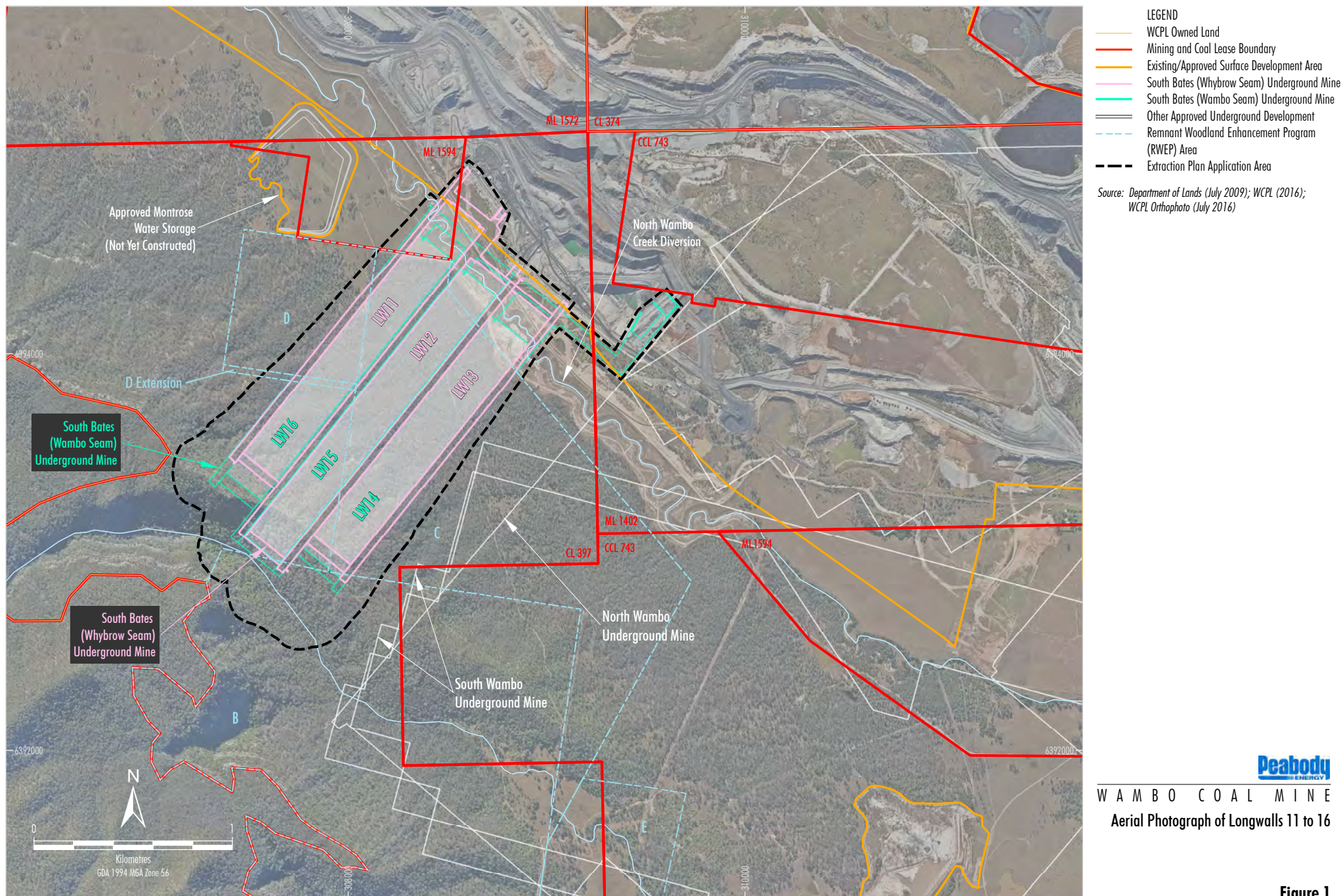
22C. *The Applicant must prepare and implement an Extraction Plan for the second workings within each seam to be mined to the satisfaction of the Secretary. Each Extraction Plan must:*

...

(g) *include the following to the satisfaction of the DRE:*

- *a coal resource recovery plan that demonstrates effective recovery of the available resource;*

...



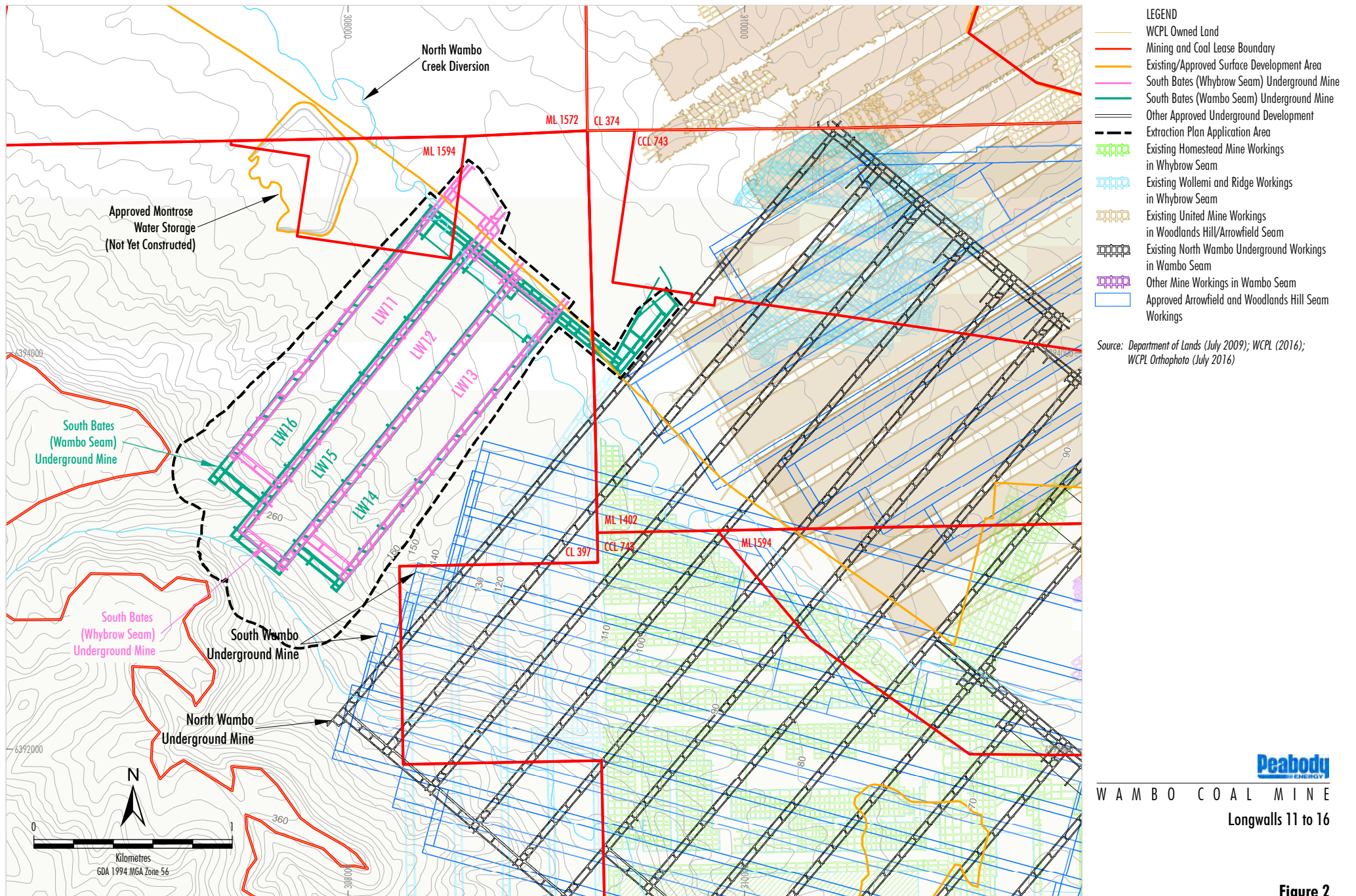
WAM-09-15_Sth Bates EP_Longwalls11-16_CRRP_2018

Peabody
ENERGY

WAMBO COAL MINE

Aerial Photograph of Longwalls 11 to 16

Figure 1



Plans 1 to 7 as described in the Draft *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining* (Version 5) (DP&E and NSW Trade & Investment – Division of Resources and Energy, 2015) are provided in **Attachment 1**. **Plan 1**, **Plan 2** and **Plan 7 (Attachment 1)** present the proposed mine plan, Longwalls 11 to 16 Application Area and surface features overlying Longwalls 11 to 16. **Plan 5** presents the current WCPL mining tenements and details land ownership.

This CRRP forms part of WCPL's Environmental Management System for the Wambo Coal Mine. The relationship of this CRRP to the Wambo Coal Mine Environmental Management System is described in Section 1.2 of the Extraction Plan.

2 RESOURCE DESCRIPTION

2.1 SITE GEOLOGY OVERVIEW

The Wambo Coal Mine is situated within the Hunter Coalfield subdivision of the Sydney Basin, which forms the southern part of the Sydney-Gunnedah-Bowen Basin (WCPL, 2003). The coal bearing rocks of the Sydney Basin are Permian in age and are typically associated with low-lying gentle topography (WCPL, 2003). The overlying rocks of Triassic age cover large parts of the Sydney Basin and tend to form prominent escarpments where they outcrop (WCPL, 2003).

Mining activities at the Wambo Coal Mine include both open cut and underground mining of several coal seams from the Wittingham Coal Measures, which combine with the Newcastle Coal Measures to form the Singleton Supergroup (**Figure 3**). A summary of the coal measure stratigraphy underlying the Wambo Coal Mine area is provided in **Figure 3**.

Wittingham Coal Measures are divided into the Jerrys Plains Subgroup, Vane Subgroup, Denman Formation and Archerfield Sandstone (WCPL, 2003). The Jerrys Plains Subgroup contains eight formations with 15 named coal seams (WCPL, 2003). The Jerrys Plains Subgroup is up to 800 metres (m) thick and generally consists of relatively coarse clastic sediments (Department of Mineral Resources, 1993). The sedimentary rock layers above and between coal seams are typically lithic sandstone, siltstone and conglomerate, while minor carbonaceous claystone and tuff occurs throughout the sequence (WCPL, 2003).

Coal seams previously, currently and proposed to be mined at the Wambo Coal Mine include (**Figure 3**):

- Whybrow Seam;
- Redbank Creek Seam;
- Wambo Seam;
- Whynot Seam;
- Arrowfield Seam; and
- Woodlands Hill Seam.

These seams dip gently to the south-west at approximately 2 to 3 degrees with minor local variations due to varying thicknesses of inter-seam sediments and fault zones (WCPL, 2003). Faulting usually trends north or north-east to south-west with normal throws of up to 10 m with some low angle thrusts (i.e. reverse faults) of variable throw (MineConsult, 2001).

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		
				Blakesfield Seam		
			Mount Ogilvie Formation	Glen Munro Seam		
				Woodlands Hill Seam ²		
			Milbrodale Formation			
			Mount Thorley Formation	Arrowfield Seam ²		
				Bowfield Seam ³		
				Warkworth Seam ³		
			Fairford Formation			
			Burnamwood Formation	Mount Arthur Seam ³		
				Piercefield Seam ³		
				Vaux Seam ³		
				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 approved to be mined at the Wambo Coal Mine.

³ Coal reserves proposed to be mined by the United Wambo Open Cut Coal Mine Project (SSD 7142).

After: DMR (1993)

The South Bates Underground Mine will mine the Whybrow Seam and Wambo Seam which produce a low ash thermal coal (WCPL, 2003). Run-of-mine (ROM) coal will be crushed and washed at the Wambo Coal Mine Coal Handling and Preparation Plant. Product coal from the South Bates Underground Mine will be considered suitable for export and domestic markets.

2.2 OVERBURDEN LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS

The overburden of the Longwalls 11 to 16 Application Area consists predominately of interbedded sandstone and siltstone layers, with minor claystone, mudstone, shale, tuffaceous and coal layers throughout the overburden (Mine Subsidence Engineering Consultants [MSEC], 2017).

The typical stratigraphy of larger layers over the longwalls indicates the presence of a 25 m thick conglomerate unit near the surface and a number of 10 m to 20 m thick sandstone units located up to around 60 m above the Whybrow Seam. Other boreholes within the mining area indicate the presence of some larger sandstone units with thicknesses up to 20 m located at depths of cover typically between 50 m and 100 m (MSEC, 2017).

No adjustment factors have been applied in the subsidence prediction model for any massive strata units or for softer floor conditions, as the longwalls are generally supercritical in width and therefore are predicted to achieve the maximum subsidence for single-seam mining conditions (MSEC, 2017).

Estimates of the range of material strength and stiffness properties present in the overburden materials are summarised in **Table 1**.

Table 1
Strength Property Estimates for Lithology in the Vicinity of the
South Bates Underground Mine

Unit Lithology	Unit Thickness Range (m)	UCS Range (MPa)	Laboratory Elastic Modulus* Range (GPa)	Poisson's Ratio
Roof Material above Whybrow Seam	0 – 20	45 – 72 [67.5 mean]	15.5	0.175
Interburden between Whybrow Seam and Wambo Seam	130 – 150	7 – 60	0.6 – 18	0.25 – 0.35

* Young's Modulus (E) derived from laboratory and sonic UCS data, $E = 300 \times \text{UCS}$ (units are in GPa).

Note: UCS = unconfined compressive strength.

MPa = megapascal.

GPa = gigapascal.

2.3 LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS (ROOF AND FLOOR STRATA)

The overburden to the Whybrow Seam and Wambo Seam predominately comprises of interbedded sandstone and siltstone layers, with minor claystone, mudstone, shale, tuffaceous and coal layers throughout the overburden (MSEC, 2017). There are no previously mined seams in the vicinity of the South Bates Underground Mine. The proposed Longwalls 11 to 16 will mine the Whybrow Seam and Wambo Seam, approximately 300 m north-west of the North Wambo Underground Mine at its closest point.

Historical workings are discussed further in **Section 2.6**.

Estimates of the range of material strength and stiffness properties present in the roof of the mine workings coal seams are summarised in **Table 1**.

2.4 EXISTENCE AND CHARACTERISTICS OF GEOLOGICAL STRUCTURE

Regional geological structure in the study area consists of several faults. The largest structure in the area is the *Redmanvale Fault* which has a throw greater than 20 m. However, this fault is located more than 750 m south-west of the longwalls and is therefore unlikely to have any significant effect on the mine, including subsidence (MSEC, 2017).

There is a series of north-northeast to south-southwest trending faults within and adjacent to the mining area with throws between 0.5 m and 1 m. Some larger faults have been identified to the north-west and to the south-east of the longwalls with throws between 3 m and 12 m (MSEC, 2017).

2.5 STABILITY OF UNDERGROUND WORKINGS

The design intent of the workings and method of extraction is such that the first workings provide long-term stable access to the longwall blocks or pillar panels, and the second workings are mined such that the overburden collapses (i.e. "goafs") in a controlled manner as the coal is removed. All of the subsidence movements that occur at the surface are generally the result of a new equilibrium being achieved (i.e. chain pillars and overlying strata compress elastically and overburden caves and eventually 're-supports' itself on bulked and broken ground).

The Division of Resources and Energy indicated it was satisfied WCPL would achieve the required outcomes of the first workings condition of the Development Consent (DA 305-7-2003, Condition 22E of Schedule 4) for Longwalls 11 to 13 on 30 September 2014, subject to the following condition:

The Mine Manager must undertake adequate monitoring of the stability of first workings in the subject area and to implement appropriate ground support of roadways in accordance with the results of the said monitoring, to ensure compliance with the outcome requirements of DA 305-7-2003 condition 22E of Schedule 4.

Subsequently, the Division of Resources and Energy indicated it was satisfied WCPL would achieve the required outcomes of the first workings condition of the Development Consent (DA 305-7-2003, Condition 22E of Schedule 4) for Longwalls 14 to 16 on 22 December 2015, subject to the following condition:

The Mine Manager must undertake adequate monitoring of the stability of first workings in the subject area and to implement appropriate ground support of roadways in accordance with the results of the said monitoring, to ensure compliance with the outcome requirements of DA 305-7-2003 condition 22E of Schedule 4.

The longwall blocks are also designed with barrier pillars at the ends of the blocks to protect the adjacent first workings pillars and remnant pillars left between the augered areas from any abutment loading. Adequate set-back from highwall crests is also provided.

The chain pillars are designed to provide serviceable gate roads for access and ventilation and may yield or crush out after mining is completed.

2.6 HISTORICAL MINING

Extraction of Longwall 11 was completed in July 2016, extraction of Longwall 12 was completed in December 2016 and extraction of Longwall 13 is underway. There are no other currently existing longwalls immediately above or below the proposed Longwalls 11 to 16. The closest extracted longwalls are at the North Wambo Underground Mine in the Wambo Seam and the Wollemi Mine in the Whybrow Seam. The nearest workings are approximately 300 m to the south-east of the proposed Longwalls 11 to 16.

3 RESOURCE RECOVERY

3.1 MINING GEOMETRY

The currently approved orientation and footprint of the South Bates Underground Mine was assessed as part of the Wambo Development Project EIS (2003) and the *South Bates (Wambo Seam) Underground Mine Modification Environmental Assessment*.

Longwalls 11 to 16 are the six longwalls at the South Bates Underground Mine.

The layout of Longwalls 11 to 16 is presented in **Plan 1 (Attachment 1)** and a summary of the key panel dimensions for Longwalls 11 to 16 is presented in **Table 2**.

Table 2
Key Longwall Panel Dimensions

Dimension	Longwall 11	Longwall 12	Longwall 13	Longwall 14	Longwall 15	Longwall 16
Gate Road Width (m)	5.4	5.4	5.4	5.4	5.4	5.4
Gate Road Height (m)	2.5 – 2.8	2.5 – 2.8	2.5 – 2.8	2.5 – 2.8	2.5 – 2.8	2.5 – 2.8
Maingate Chain Pillar Width (m)	26.6	24.6	26.2	29.3	33.2	22.5
Tailgate Chain Pillar Width (m)	29.1	26.6	24.6	22.7	29.3	33.2
Longwall Void Width (m)	248	238	251	251	238	233
Longwall Void Length (m)	1,653	1,784	1,599	1,521	1,749	1,557
Extraction Height (m)	3.0	3.0	3.0	2.1	2.1	2.1

3.2 COVER DEPTH

The depth of cover above the proposed Longwalls 11 to 13 in the Whybrow Seam ranges from 55 m above the finishing (north-eastern) end of Longwall 13 to 375 m above the commencing (south-western) end of Longwall 12. The depth of cover above the proposed Longwalls 14 to 16 in the Wambo Seam ranges from 130 m above the finishing (north-eastern) end of Longwall 14 to 480 m above the commencing (south-western) end of Longwall 16.

The cover depth increases to the south-west, consistent with the seam dip and topography.

3.3 MINING METHOD

Longwalls 11 to 16 will be extracted using retreating longwall mining methods for secondary extraction of panels ranging between 233 m and 251 m void width. Construction of development main headings, maingates and tailgates are undertaken using continuous miners.

3.4 MINING SCHEDULE

WCPL operates its mines seven days per week, 24 hours per day on a rotating shift basis. WCPL is currently mining at the South Bates Underground Mine with the extraction of Longwall 13. The proposed sequence of mining for Longwalls 11 to 16 at the South Bates Underground Mine under the Extraction Plan and anticipated/actual start and completion dates are summarised in **Table 3**.

Table 3
Proposed Mining Schedule (Secondary Extraction)

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
Longwall 11	17 February 2016 (actual)	5 months	2 July 2016 (actual)
Longwall 12	4 August 2016 (actual)	5 months	19 December 2016 (actual)
Longwall 13	January 2017	5 months	May 2017
Longwall 14	June 2017	5 months	October 2017
Longwall 15	November 2017	5 months	March 2018
Longwall 16	April 2018	4 months	July 2018

3.5 FUTURE MINING

In addition to the approved South Bates Underground Mine, the Development Consent (DA 305-7-2003) provides consent for underground mining by longwall methods in the Arrowfield and Woodlands Hill Seams (**Figure 1**). The future workings in the Arrowfield and Woodlands Hill Seams are located approximately than 100 m south-east of Longwalls 11 to 16 (**Figures 1 and 2**). The approved future underground longwall workings are described in the Wambo Development Project EIS (WCPL, 2003) and *South Wambo Underground Mine Modification Environmental Assessment* (WCPL, 2016) and will be the subject of a future Extraction Plan.

WCPL is also planning to seek approval for additional longwalls in the Whybrow Seam to the north-west of the South Bates Underground Mine. These longwalls would be subject to assessment and approval under the EP&A Act and, if approved, would be the subject of a future Extraction Plan.

Further to underground mining activities, the Development Consent (DA 305-7-2003) provides consent for open cut mining. The seams approved for open cut mining include the Whybrow, Redbank Creek, Wambo and Whynot Seams.

An application to modify the Development Consent (DA 305-7-2003 MOD 16) was lodged in November 2016 to support the proposed United Wambo Open Cut Coal Mine Project. The Modification would allow integrated open cut mining at the United Coal Mine and Wambo Coal Mine.

Mining of the Whybrow and Wambo Seams by open cut mining methods in the South Bates Underground Mine area is not viable due to increasing depth of cover and the presence of Remnant Woodland Enhancement Program (RWEPP) areas.

3.6 RESOURCE RECOVERY

Resource estimates and proposed recovery for Longwalls 11 to 16 are summarised in **Table 4**. The proposed mining layout for Longwalls 11 to 16 maximises resource recovery within the approved layout. The recovery of available resource of the proposed Longwalls 11 to 16 layout is estimated to be approximately 73%.

Table 4
Estimated Resource Recovery from Longwalls 11 to 16

Aspect	Million Tonnes
Available Resource	6.86
Development ROM Coal	0.45
Longwall ROM Coal	4.56
Total ROM Coal Recovered	5.01

The extent of Longwalls 11 to 16 is constrained by faults to the north-west and south-east of the longwalls (Section 2.4), the extent of the approved Bates South open cut pit to the north-east and the Wollemi National Park escarpment to the south-west. The commencing ends of Longwalls 11, 12, 13, 14 and 16 have been adopted based on operational constraints associated with the management of gas levels in the Whybrow and Wambo Seams.

The mine plan design of the South Bates Underground Mine has incorporated consideration of the effects of multi-seam extraction.

3.7 MINE PLAN JUSTIFICATION

The proposed sequence of underground mining at the Wambo Coal Mine has been adopted to minimise the potential for sterilisation of coal reserves. The **Approved Plan (Attachment 1)** presents the Longwalls 11 to 16 layout which has been developed in consideration of detailed exploration drilling and key environmental studies, as described in the Wambo Development Project EIS (WCPL, 2003) and *South Bates (Wambo Seam) Underground Mine Modification Environmental Assessment* (WCPL, 2015).

The monitoring of subsidence impacts associated with the extraction of Longwalls 11 to 16 is described in the Subsidence Monitoring Program for Longwalls 11 to 16 (Appendix H of the Extraction Plan) and the relevant management plans summarised in Section 3 of the Extraction Plan.

4 REFERENCES

Department of Mineral Resources (1993) *Hunter Coalfield Regional Geology 1:100 000 Sheet*. New South Wales.

Department of Planning and Environment and NSW Trade & Investment – Division of Resources and Energy (2015) *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining*. Version 5. Draft.

MineConsult (2001) *Wambo Strategic Mine Plan Vol 1*. Report prepared for Wambo Mining Corporation Ltd.

Mine Subsidence Engineering Consultants (2017) *South Bates Underground Mine Subsidence Assessment – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan for WYLW11 to WYLW13 in the Whybrow Seam and WMLW14 to WMLW16 in the Wambo Seam*. Report prepared for Wambo Coal Pty Limited.

Wambo Coal Pty Limited (2003) *Wambo Development Project Environmental Impact Statement*.

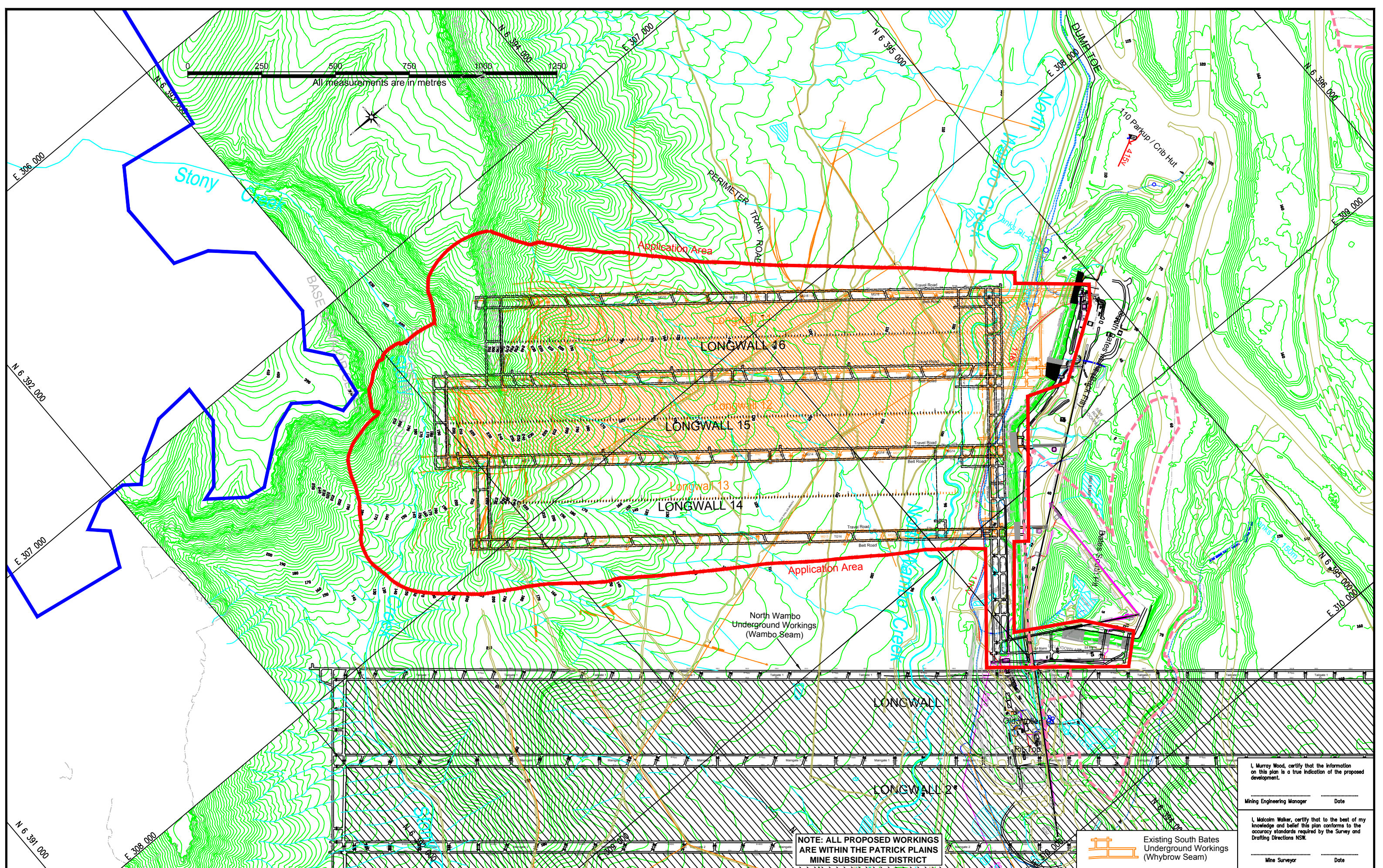
Wambo Coal Pty Limited (2015) *South Bates (Wambo Seam) Underground Mine Modification Environmental Assessment*.

Wambo Coal Pty Limited (2016) *South Wambo Underground Mine Modification Environmental Assessment*.

ATTACHMENT 1

LONGWALLS 11 TO 16 PLANS 1 TO 7

- Plan 1 – Proposed and Existing Workings
- Plan 2 – Surface Features
- Plan 2a – Surface Features (Aerial Photo)
- Plan 3 – Existing and Proposed Wambo Seam Workings
- Plan 4a – Whybrow Seam Structure
- Plan 4b – Proposed Woodlands Hill Seam Workings
- Plan 4c – Proposed Arrowfield Seam Workings
- Plan 5 – Mining Titles and Land Ownership
- Plan 6 – Geological Sections (Boreholes)
- Plan 7 – Proposed and Existing Subsidence Monitoring

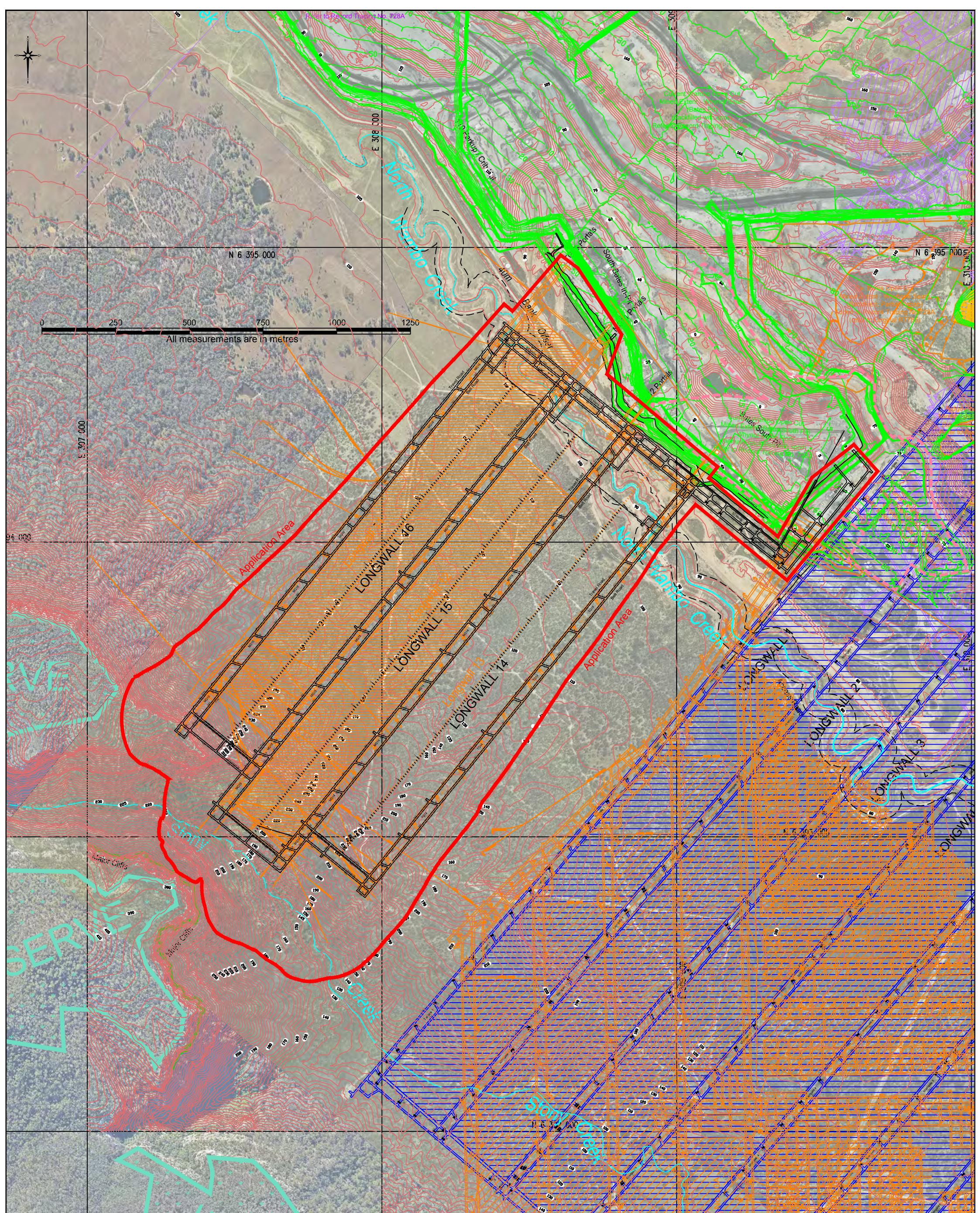


NOTE: ALL PROPOSED WORKINGS ARE WITHIN THE PATRICK PLAINS MINE SUBSIDENCE DISTRICT

I, Murray Wood, certify that the information on this plan is a true indication of the proposed development.
Mining Engineering Manager Date

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.
Mine Surveyor Date

<div><div><div></div></div>Current Open Cut Extraction Approval Area (MOP 2020)</div> <div><div><div></div></div>Full Extraction Boundary Application Area</div> <div><div><div></div></div>Patrick Plains Mine Subsidence District Western Extents</div> <div><div><div></div></div>Existing Underground Workings (Wambo Seam)</div> <div><div><div></div></div>South Bates Underground Proposed Workings (Wambo Seam)</div> <div><div><div></div></div>85 Surface Contours</div> <div><div><div></div></div>Water pipelines</div> <div><div><div></div></div>Buildings</div> <div><div><div></div></div>Tracks</div> <div><div><div></div></div>Fences</div> <div><div><div></div></div>11kV Buried Cables</div> <div><div><div></div></div>Powerlines</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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South Bates Underground Existing Wambo Seam Workings

South Bates Underground Proposed Wambo Seam Workings

United Underground Workings (Arrowfield Seam)

Ridge Underground Workings (Whybrow Seam)

Wolllemi - Homestead & South Bates Underground Workings (Whybrow Seam)

North Wambo Underground Workings (Wambo Seam)

Full Extraction Boundary Application Area

Current Open Cut Extraction Approval Area

Wolllemi National Park Reserve

Creeks

85 Surface Contours

30 Wambo Opencut Void Contours (Generally Whynot Seam Floor)

I, Murray Wood, certify that the information on this plan is a true indication of the proposed development.

.....
Mining Engineering Manager

.....
Date

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

.....
Mine Surveyor

.....
Date

B	MJW	For Submission	TB,SP
Rev.	Drawn	Description	Checked

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

South Bates Underground Mine
Extraction Plan - Longwalls 11 to 16
Plan 2a - Surface Features (Aerial Photo)

Date: 30/11/2016

Scale: 1:4000

Drawn: MJW

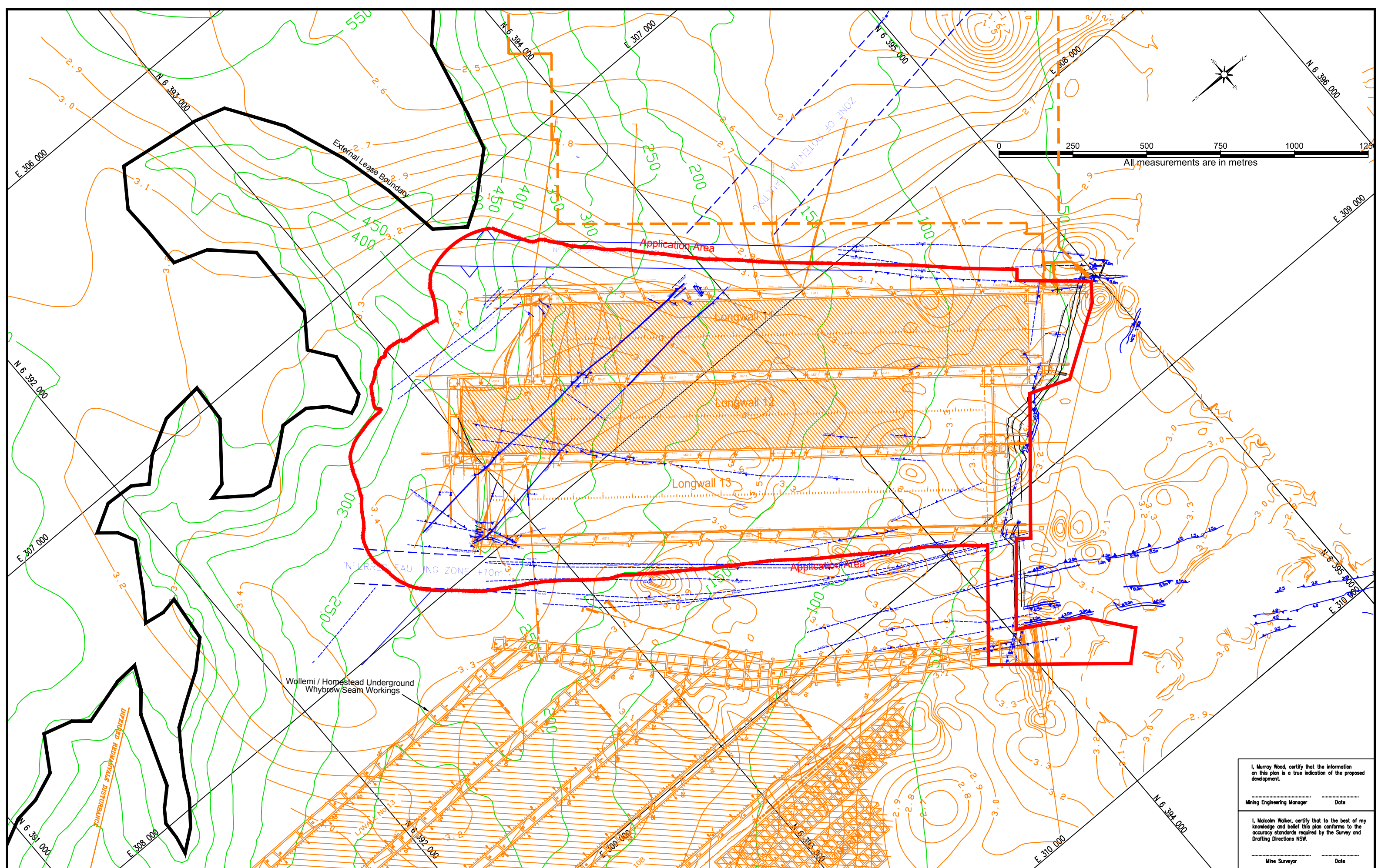
Checked: TB

Approved: MW

Drawing No. 2095

Revision No. B

Sheet Size A0



I, Murray Wood, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager
Date

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

.....
Mine Surveyor **Date**

10/10/2016

Full Extraction Boundary
Application Area

Existing Whybrow Seam Underground Workings



Proposed Whybrow Seam Workings



Whybrow Seam Faults

Whybrow Seam
Dykes220 — Whybrow Seam Overburden
Thickness Isopach

1.8 — Whybrow Seam
Thickness Isopach

~~TG11-14-01~~ Inseam drill holes

Drawing No.

Revision No.

Sheet Size

REVIEWS	B	30/11/2016	MJW	For submission	TB,SP					
	REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.

WAMBO COAL PTY LIMITED

ABN 13 000 668 057

Jerry's Plains Rd, Warkworth Phone: 02 65 702200

Via Singleton, NSW, 2330 Fax: 02 65 702290

Prepared by NWU Survey Ph: 02 65 702318

**South Bates Underground Mine
Extraction Plan - Longwalls 11 to 16
Plan 4a - Whybrow Seam Structure**

Date
30/11/2016

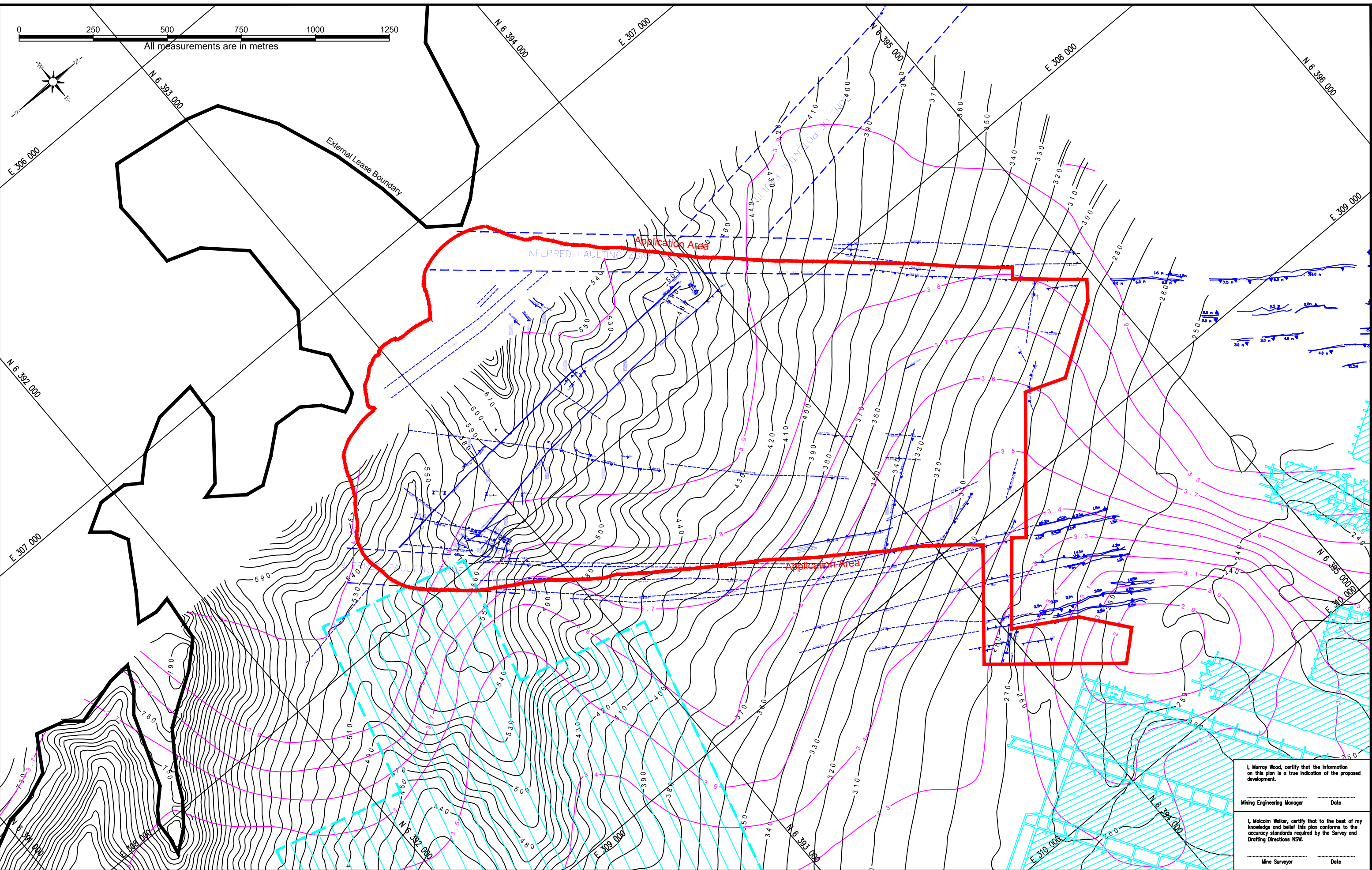
Scale:
1:4000

Drawn
M.IW

Checked
TR

Approved
MW

Peabody



I, Murray Wood, certify that the information on this plan is a true indication of the proposed development.




Training Engineering Manager

Date

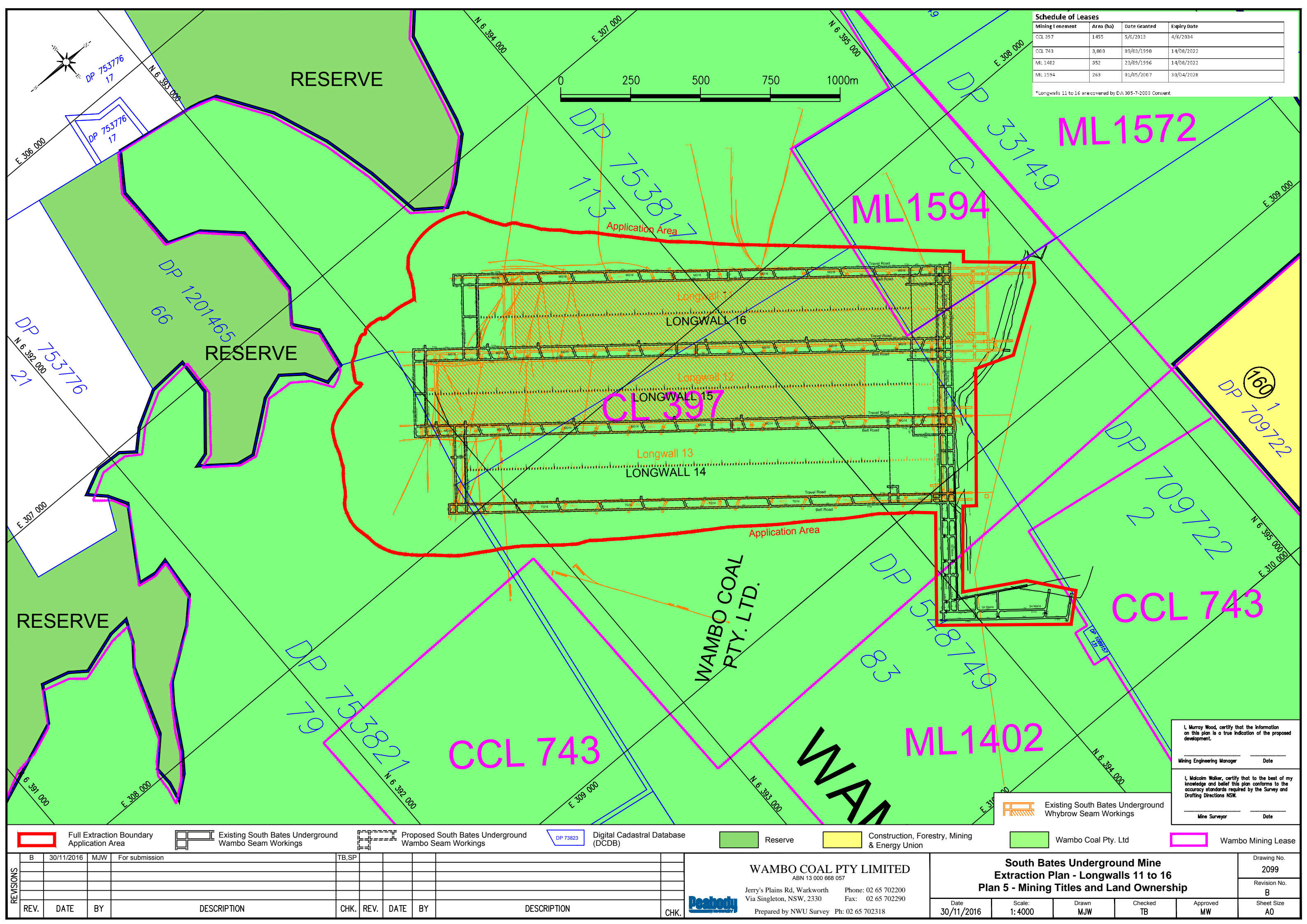
I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor _____ Date _____

Legend

	Full Extraction Boundary Application Area		Proposed Arrowfield Seam Workings (MOD 12)		Existing Arrowfield Seam Workings (United Colliery - Woodlands Hill Seam)		Arrowfield Seam Overburden Thickness Isopach		Arrowfield Seam Thickness Isopach		Faults / Dykes
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[illegible]



Schedule of Leases			
Mining Tenement	Area (ha)	Date Granted	Expiry Date
CCL 397	1455	5/6/2013	4/6/2034
CCL 743	3,000	09/03/1990	14/06/2022
ML 1402	352	23/09/1996	14/06/2022
ML 1594	263	01/05/2007	30/04/2028

*Longwalls 11 to 16 are covered by DA 905-7-2003 Consent.

REVISIONS	B	30/11/2016	MJW	For submission	TB,SP						
	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

Prepared by NWU Survey

Phone: 02 65 702200

Fax: 02 65 702290

Ph: 02 65 702318

Peabody

South Bates Underground Mine

Extraction Plan - Longwalls 11 to 16

Plan 5 - Mining Titles and Land Ownership

Date

30/11/2016

Scale:

1:4000

Drawn

MJW

Checked

TB

Approved

MW

Drawing No.

2099

Revision No.

B

Sheet Size

A0

Full Extraction Boundary Application Area

Existing South Bates Underground Wambo Seam Workings

Proposed South Bates Underground Wambo Seam Workings

DP 73823

Digital Cadastral Database (DCDB)

Reserve

Construction, Forestry, Mining & Energy Union

Wambo Coal Pty. Ltd

Wambo Mining Lease

I, Murray Wood, certify that the information on this plan is a true indication of the proposed development.

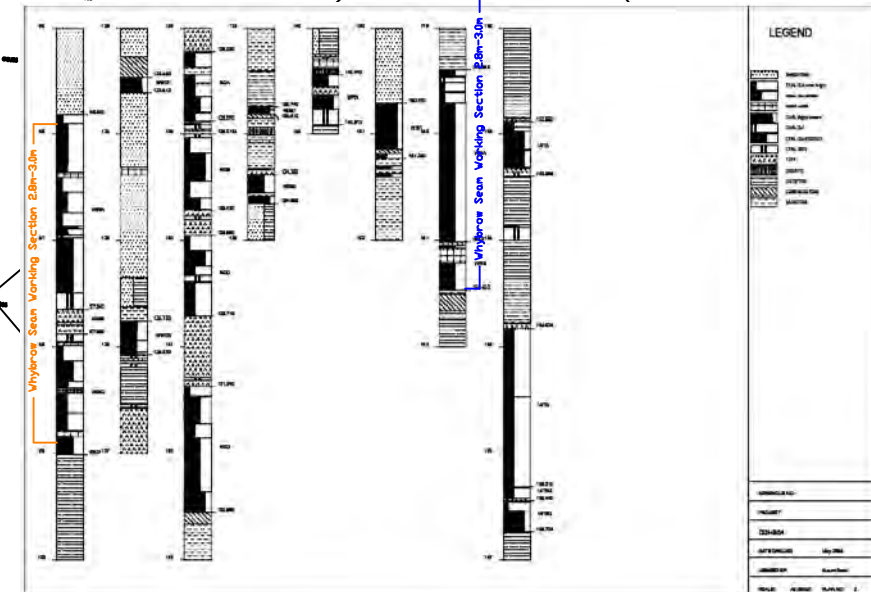
Mining Engineering Manager

Date

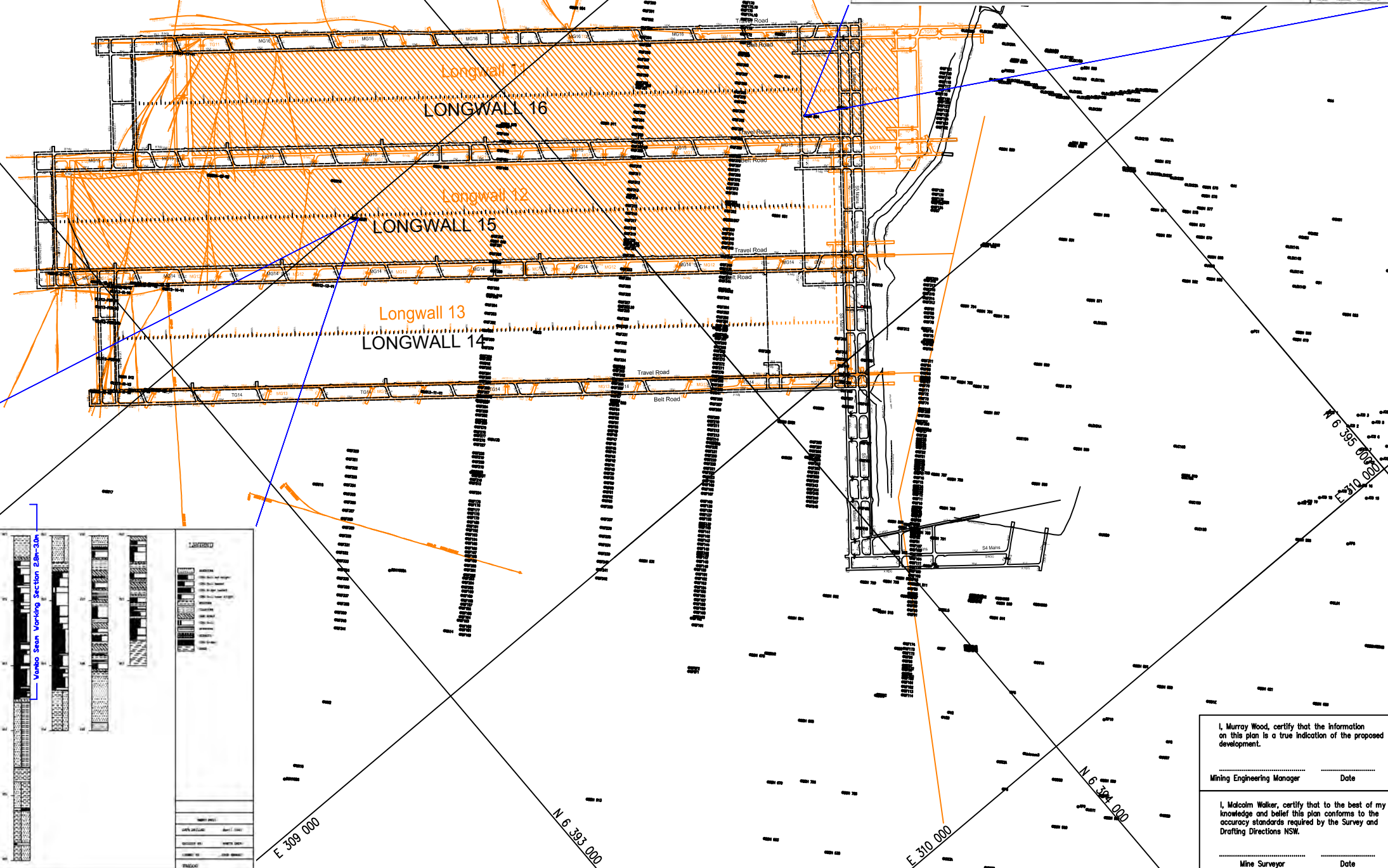
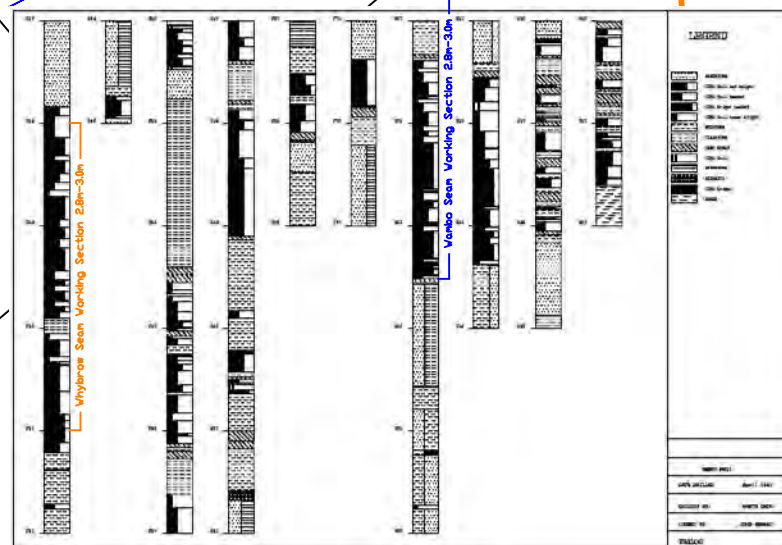
I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor


Date



WAMBO	UNITED	LEMMINGTON	N. VALLEY
Whybrow	Whybrow	Whybrow	Whybrow
Redbank Ck	Redbank Ck	Redbank Ck	Redbank Ck
Wambo	Wambo	Wambo	Wambo
Whymet	Whymet	Whymet	Whymet
Blackfield			Blackfield
			Glen Murre
Glen Murre	Blackfield	Blackfield	Woodlands Hill
Woodlands Hill	Glen Murre	Glen Murre	Arrowfield
Arrowfield	Woodlands Hill	Woodlands Hill	Bouldie
Bouldie			
Warkworth	Warkworth	Warkworth	Warkworth
Mt Arthur	Mt Arthur	Mt Arthur	Mt Arthur
Piercesfield	Piercesfield	Piercesfield	Piercesfield
Vaux	Vaux	Vaux	Vaux
Bronnie	Bronnie	Bronnie	Bronnie
Baywater	Baywater	Baywater	Baywater



.....
Mine Surveyor **Date**

 Existing South Bates Underground Workings (Whybrow Seam)

Date 30/11/2016	Scale: 1:4000	Drawn MJW	Checked TB	Approved MW	Sheet Size A0
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REVISIONS

