

Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

Wongawilli Colliery

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TITLE BLOCK

Name of Mine:	Wongawilli Colliery
MOP Commencement Date:	31 March 2017
MOP Completion Date:	31 December 2021
Mining Authorisations:	ML 1596, ML 1565 and CCL 766
Authorisation Holder:	Wongawilli Coal Pty Limited
Name of Mine Operator:	Wollongong Coal Limited
Name and Contact details of Mine Manager:	Peter Roser: Phone – 0458 301894 Email – proser@wcl.net.au
Name and contact details of Environmental Representative:	Richard Sheehan: Phone – 0404 972 746 Email – richard.sheehan@wcl.net.au
Name of Representative of Authorisation Holder:	Sanjay Sharma
Title of Representative of Authorisation Holder:	Company Secretary
Signature of Representative of Authorisation Holder:	
Date:	27/11/20
Version:	3

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ABBREVIATIONS AND GLOSSARY OF TERMS

Abbreviations	
AR	Annual Review
AHD	Australian Height Datum
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CO ₂ -e	carbon dioxide equivalent
DPIE	NSW Department of Planning Industry and Environment
DRG	NSW Department of Resources and Geoscience
DSC	Dams Safety Committee now Dams Safety NSW
EA	Environmental Assessment
EPA	Environment Protection Agency
EEC	Endangered Ecological Community
EES	Environment, Energy and Science formally OEH
EP	Extraction Plan
EP&A Act	Environmental Planning and Assessment Act, 1979
EP&A Reg.	Environmental Planning and Assessment Regulation, 2000
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act, 1999
EPL	Environment Protection Licence
FY	Financial Year
IWMP	Integrated Wastewater Management Plan
LEP	Local Environment Plan
LGA	Local Government Area
LW	Longwall
km	kilometre
m	metre
mg/L	milligram per litre
ML	Mining Lease
ML/day	megalitre per day
MPL	Mining Purposes Lease
mm/m	millimetres per metre
Mtpa	Million tonnes per annum
NGER	National Greenhouse and Energy Reporting
NMP	Noise Management Plan
NRE	Gujarat NRE Coking Coal Ltd
NSW	New South Wales
OEH	Office of Environment and Heritage now Environment, Energy and Science
PAC	Planning Assessment Commission
PCA	Private Certifying Authority
PKCT	Port Kembla Coal Terminal
PM ₁₀	particulate matter less than 10 microns in size
ROM	run-of-mine
SEPP	State Environmental Planning Policy
SMP	Subsidence Management Plan
TARP	Trigger Action Response Plan
TSC Act	Threatened Species Conservation Act, 1995
UEP	Underground Expansion Project
WC	Wongawilli Colliery

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Abbreviations

WCC	Wollongong City Council
WCL	Wollongong Coal Limited
WNSW	Water NSW
%	percent
°	degree

Glossary of Terms

Term	Definition
Alluvial	A general term for clay, silt, sand and gravel transported by water and deposited, on the bed of a flood plain, river or stream.
Baseline monitoring	Monitoring conducted over time to collect a body of information to define specific characteristics of an area (e.g. species occurrence or noise levels) prior to commencement of a specific activity.
Coking Coal	Self-coking coal with ash of less than 10% and volatile matter of 21-23%, excellent capacity for carrying 'soft' coking coals in a blend.
Continuous miner	A remote-controlled, tracked, electrically powered coal cutting and loading machine used to form mine roadways and extract coal pillars.
Conveyor	Fixed mechanical apparatus consisting of a continuous moving belt used to transport coal from one place to another.
Driveage	A horizontal or inclined heading or roadway in the process of construction. The road way will be used to access a new mining area within the lease.
Dyke	A sheet like vertical intrusion of igneous rock cutting across the strata of older rocks.
Ecosystem	An interacting system of animals, plants, other organisms and non-living parts of the environment.
Fault	Major fracture of the earth's crust caused by the relative movement of the rock masses on either side.
First Workings	Involves the development headings or roadways which will provide access to the coal resource. They are developed using continuous miners with integrated roof and rib bolting rigs. First workings leave the coal pillars intact and the overlying strata fully supported
Gate roads (maingates and tailgates)	An underground roadway (tunnel) that provides access to a working longwall for continuous mining.
Goaf (or goafing)	The space left following extraction of the coal seam where the roof material is allowed to collapse.
Greenhouse gases	Gases with potential to cause climate change (e.g. methane, carbon dioxide and non-methane volatile organic compounds). Usually expressed in terms of carbon dioxide equivalent.
Groundwater	All waters occurring below the land surface; the upper surface of the soils saturated by groundwater in any particular area is called the water table.
Habitat	The particular local environment occupied by an organism.
Infrastructure	The supporting installations and services that supply the needs of the Project.
Longwall	A secondary extraction method of mining coal that continuously removes the coal from the working face onto a series of conveyors that transfer the coal to the surface. As the coal is cut away (a 'shear'), both the longwall machine (known as a 'shearer') and the hydraulic roof supports advance forward ready for the next shear.
Permeability	The ability of a rock or soil to allow fluid to pass through it.
Pillar Extraction	A continuous miner system of mining whereby coal pillars are systematically

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Glossary of Terms	
Term	Definition
	extracted.
Pillar Run	A large scale progressive collapse of coal pillars in a short period of time.
Potable water	Water of quality suitable for human consumption.
Project Approval	Nebo Area Project Approval (MP 09_0161)
Rehabilitation	The restoration of a landscape and especially the vegetation following its disturbance.
Run-of-mine (ROM)	Raw coal that is stockpiled prior to being processed through a coal preparation plant.
Strain	The change in the horizontal distance between two points divided by the original horizontal distance between the points.
Subsidence	The deformation of the ground mass due to the mining activity, including both vertical and horizontal displacement, tilt, strain and curvature.
Terrestrial	Living or growing on the land.
Tilt	The difference in subsidence between two points divided by the horizontal distance between the points.
Upsidence	Relative upward movement, or uplift, created by the horizontal compression and buckling behaviour of the rock strata in the vicinity of a valley floor
Valley closure	A phenomenon whereby one or both sides of a valley move horizontally towards the valley centreline, due to changed stress conditions beneath the valley and its confining land masses



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1 INTRODUCTION

Wongawilli Coal Pty Ltd owns Wongawilli Colliery (WC) in the Southern Coalfield of New South Wales. Wongawilli Coal Pty Ltd is a wholly owned subsidiary of Wollongong Coal Limited (WCL). Wongawilli Colliery is located approximately 14 kilometres (km) south-west of Wollongong (Plan 1A), within the Wollongong and Wingecaribee Local Government Areas (LGAs). The total lease area covered by Wongawilli Colliery is 147.67 square kilometres (km²). WCL operate WC in accordance with the Project Approval for the Wongawilli Colliery – Nebo Project Area Major Project (MP) 09_0161 as modified. The Project Approval was supported by NRE Wongawilli Colliery Nebo Area Project Environmental Assessment (ERM, 2010). In accordance with MP 09_0161 WCL have approval to conduct underground mining operations in the Nebo area in the north east corner of the lease producing up to 2 Million tonnes per annum (Mtpa) of coal utilising the surface infrastructure at the Wongawilli pit top. MP 09_0161 also permits the continued development and construction of the **North Western Mains entries (First Workings)**. Run-of-mine (ROM) coal from the Colliery is transported to Port Kembla Coal Terminal (PKCT) by rail.

The Wongawilli pit top contains the main mine portal and caters for men, mining equipment, vehicle and machinery maintenance, mine supplies, administration, coal transport to the surface, a 100,000 tonne capacity coal stockpiling facility and rail transportation facilities to load and transport coal to the PKCT.

A modification (MOD 1) to Project Approval (PA 09_0161) was obtained to allow mining activities to be undertaken until 31 December 2020. The Project Approval was supported by Section 75W Application for Modification 1 Extension of Life (WCL, 2015) and Nebo Area Modification 1 Response to Submissions (Hansen Bailey, 2015).

Mining operations ceased in the Nebo Area in March 2019 due to deteriorating ground conditions in the outbye old workings. The mining equipment was withdrawn from the active mining area to the surface prior to the power and mine ventilation being removed from the workings in July 2019 with the mine being placed on Care and Maintenance from this time.

A modification (MOD 2) to Project Approval (PA 09_0161) was submitted to the Department for consideration on 17th November 2020. This modification is to seek an extension of time of 5 years to construct the North West Mains entries and access roadways to the Wongawilli Number 1 Shaft for further ventilation requirements.
(See the link <https://emm.mysocialpinpoint.com/colliery> for more information).

This Mining Operations Plan (MOP) describes the arrangements and proposed management of the Wongawilli Colliery during this MOP term, expiring on 31 December 2021. Prior to this date a **new** MOP will be **submitted** for **either** additional mining or for care & maintenance depending upon the **outcome of Mod 2 submission**. This MOP has been compiled in accordance with, the NSW Department of Trade and Investment, Regional Infrastructure and Services (ESG3) Mining Operations Plan (MOP) Guidelines (September 2013).



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This MOP has also been prepared in accordance with ML 1596 section 3 MOP, ML 1765 section 2.1 MOP and CCL 766 section 2 MOP requirements.

The MOP comprises the areas known as Wongawilli Colliery Pit Top, Avondale Pit Top and the remaining Project Approval Area, and is collectively referred to as the Wongawilli Colliery.

1.1 History of Operations

Mining was first proposed in the Wongawilli area in 1906 and commenced in 1912. WC was purchased by Hoskins in 1916 and the coal produced was washed and coked on site before being transported to the Lithgow Iron and Steel Plant. A blast furnace was commissioned by Hoskins at Port Kembla in 1927 and Australian Iron and Steel (AIS) was formed in 1928. Broken Hill Proprietary Company Ltd (BHP) acquired AIS in 1935.

The Elouera Colliery was formed from the merger of the Wongawilli and Nebo Collieries in 1993. These mines operated separately in adjoining reserves and mining had occurred in both the Bulli and Wongawilli seams. BHP became BHP Billiton Pty Ltd in 2000. The Colliery was operated by BHP Billiton Illawarra Coal (BHPBIC) until June 2005 and contract miner Delta commenced mining in October 2005. Gujarat NRE acquired the mining lease in December 2007 and the site was renamed NRE Wongawilli Colliery.

Historically, coal from the Colliery was transported by rail to the Port Kembla Steelworks Coal Preparation Plant. Washed coal was used either in the steelworks or transferred to the Port Kembla Coal Terminal (PKCT) for shipping to both national and international markets. Coal wash reject from the washery was railed back to the Wongawilli emplacement area adjacent to the Wongawilli pit top. The emplacement area ceased its operations in November 2005 and has been rehabilitated. Run of mine (ROM) coal is now transported unprocessed by rail to PKCT.

Mining of the Wongawilli seam (previously known as the No. 3 seam) reserves in the area has been undertaken for more than 80 years. Prior to mining within the No. 3 seam, initial mining in the area was undertaken in the Bulli seam (previously referred to as the No. 1 seam). To date WC has undertaken mining activities in the Wongawilli seam at a depth of cover varying between 100 to 360 m.

In February 2014 the WC Longwall (LW) was buried during extraction of Nebo LW 2 (LWN2). This combined with low coal prices and high Australian dollar at the time, led to WC being placed on Care and Maintenance.

On Saturday 6th July 2016, WCL recommenced mining operations. Due to the abandonment of the LW equipment in LWN2, WCL revised its mining plan to recommence the extraction of previously approved LW blocks N2-N6 by the use of conventional pillar extraction techniques. Mining continued until March 2019 when strata control issues in the old outbye



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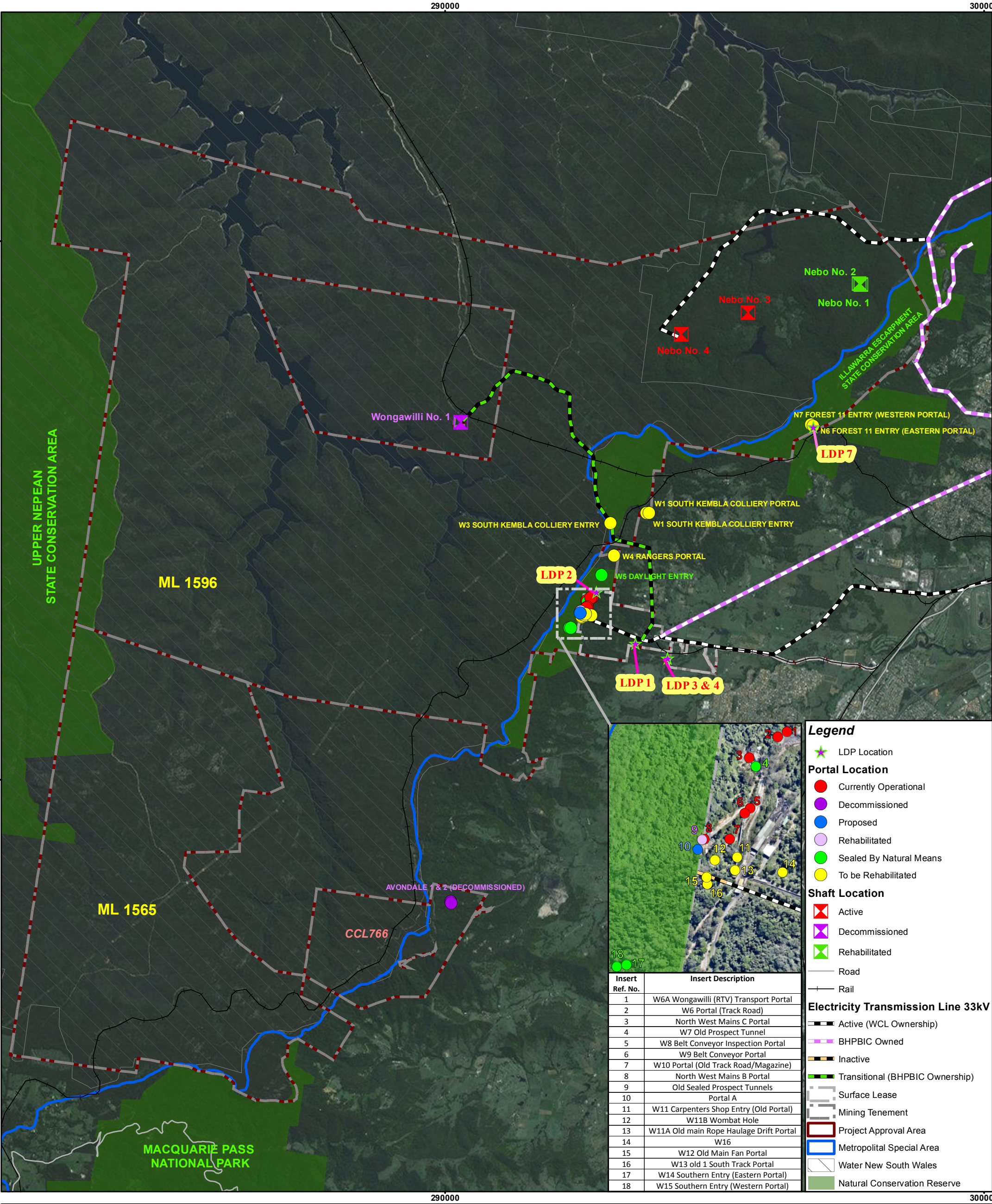
workings resulted in the cessation of mining operations. The mining equipment was recovered, and the old workings shut with power and ventilation being removed.

On May 31st 2019 Wongawilli Colliery notified it was going on care and maintenance and soon after Modification 2 was commenced and submitted on 17th November 2020 to DPIE.

An overview of the Wongawilli Colliery operations and the Mod 2 proposed workings is included in **Figures 1 – 4** below.

1.2 Current Consents, Authorisations & Licences

WC is classified as a State Significant Development and is therefore classified as a Level 1 mine in accordance with the MOP guidelines. The operations of WC are regulated by a range of leases, licenses and approvals from both State and Local authorities. These are outlined in Table 1.1.



I, Neil Marvell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.

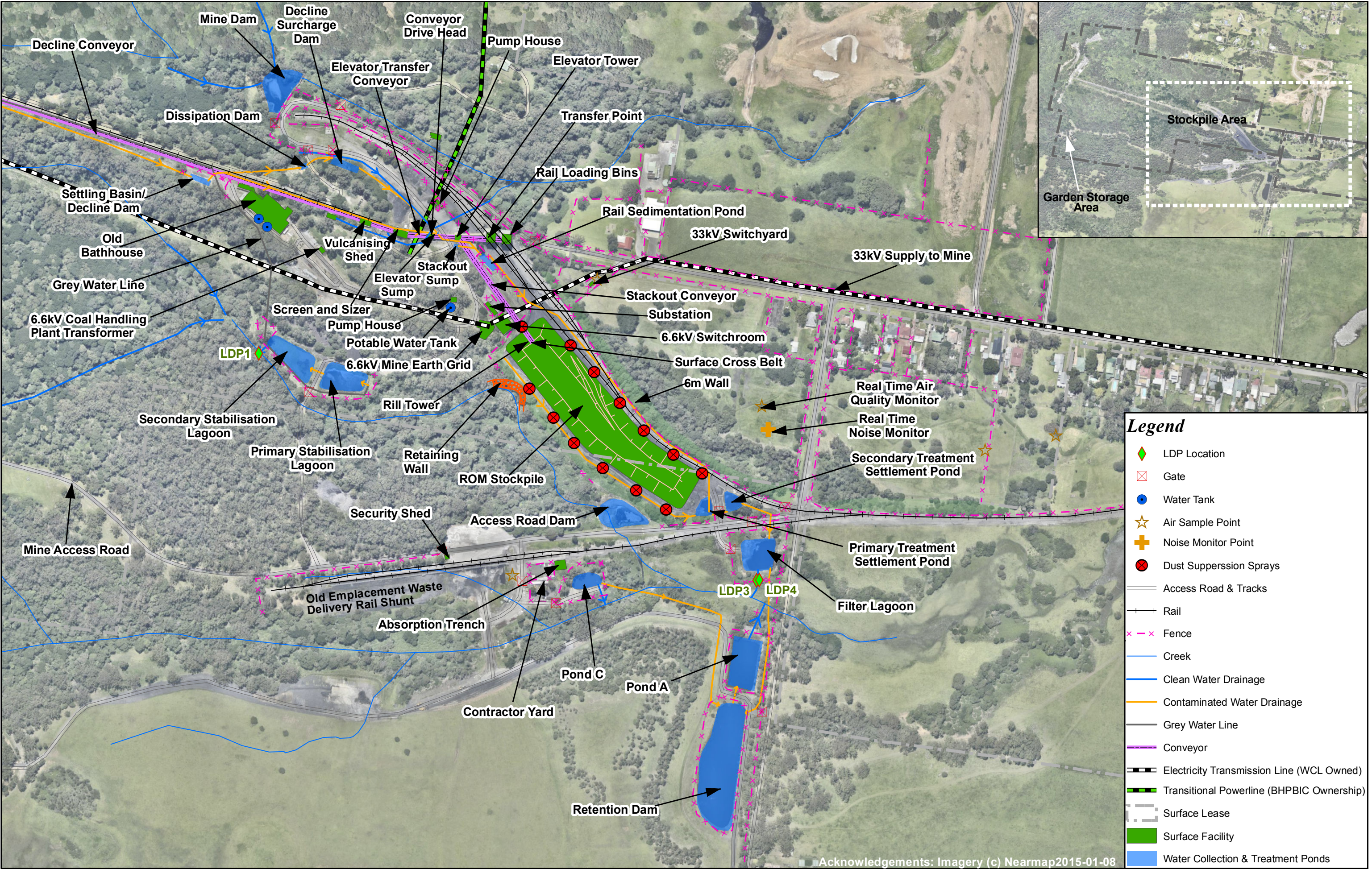
Mine Manager Date Registered Mining Surveyor Date

REV	DESCRIPTION	DATE	DRN	CKD

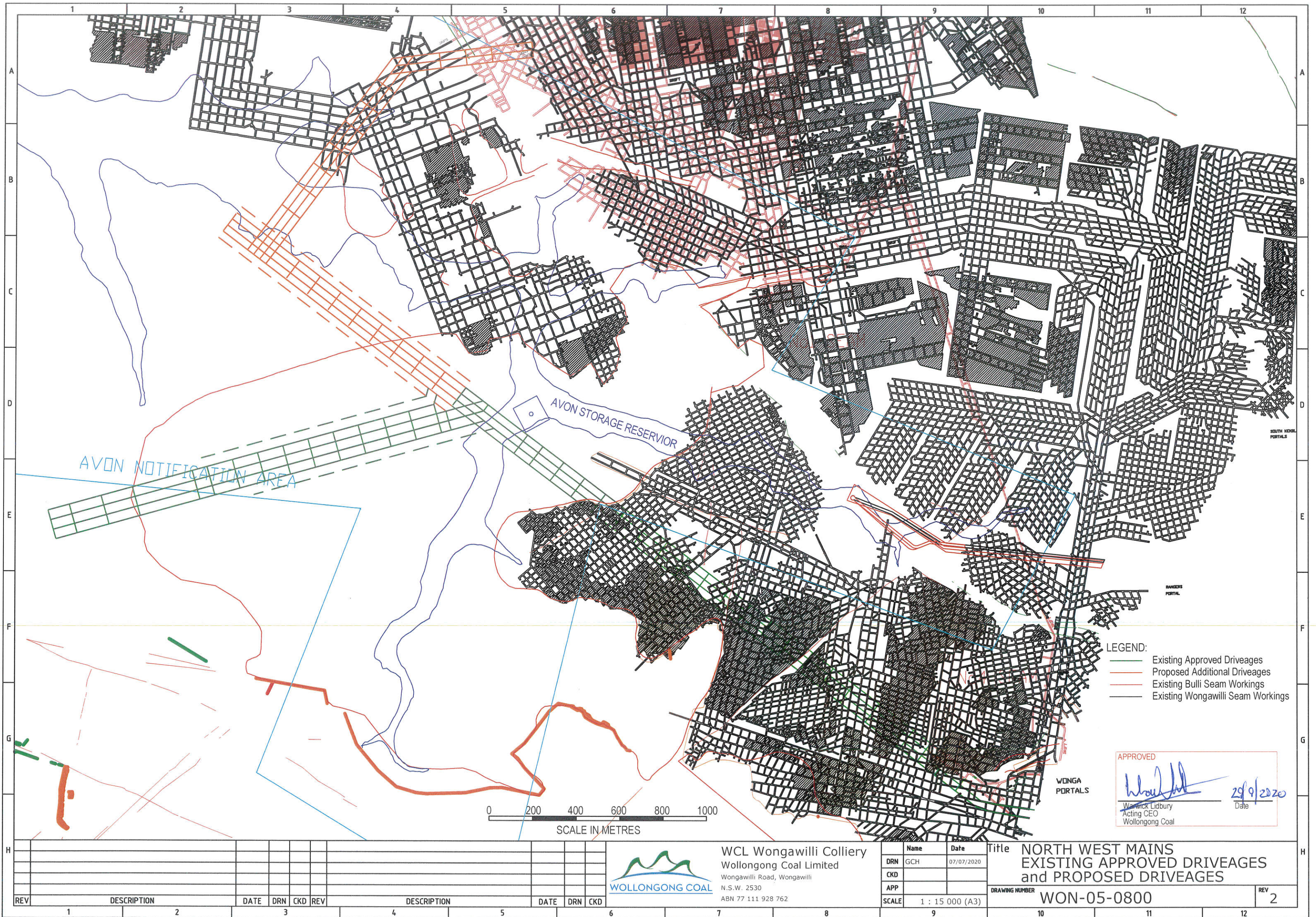
WOLLONGONG COAL DeltaSBD

WCL WONGAWILLI COLLIERY
SBD SERVICES PTY LTD

	NAME	DATE	TITLE
DRN	RT	27/06/17	MINING OPERATION PLAN
CKD			FIGURE 1- WONGAWILLI COLLIERY ASSETS AND LEASES
APP			
SCALE	1:65,000 @A3		DRAWING NUMBER
NTS			WWC-MOP-007
			REV 0



I, Neil Marvell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.		I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.		<div><div><div><div>N</div><div><div></div><div></div><div></div></div></div><div><div>0</div><div>50</div><div>100</div></div><div>Meters</div></div><div>Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator Datum: GDA 1994</div></div> <div><div><div><div></div><div>WOLLONGONG COAL</div></div><div><div></div><div>DeltaSBD</div></div></div><div>WCL WONGAWILLI COLLIERY SBD SERVICES PTY LTD</div></div> <table><tr><td></td><td>NAME</td><td>DATE</td><td>TITLE</td></tr><tr><td>DRN</td><td>RT</td><td>27/06/17</td><td>MINING OPERATION PLAN</td></tr><tr><td>CKD</td><td></td><td></td><td rowspan="2">FIGURE 3- WONGAWILLI COLLIERY STOCKPILE AREA</td></tr><tr><td>APP</td><td></td><td></td></tr><tr><td>SCALE</td><td colspan="2">1:4,000 @A3</td><td>DRAWING NUMBER</td><td rowspan="2">REV 0</td></tr><tr><td>NTS</td><td colspan="2"></td><td>WWC-MOP-009</td></tr></table>			NAME	DATE	TITLE	DRN	RT	27/06/17	MINING OPERATION PLAN	CKD			FIGURE 3- WONGAWILLI COLLIERY STOCKPILE AREA	APP			SCALE	1:4,000 @A3		DRAWING NUMBER	REV 0	NTS			WWC-MOP-009
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DRN	RT	27/06/17	MINING OPERATION PLAN																										
CKD			FIGURE 3- WONGAWILLI COLLIERY STOCKPILE AREA																										
APP																													
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NTS			WWC-MOP-009																										
Mine Manager	Date	Registered Mining Surveyor	Date																										





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Table 1-1 Consents, Leases & Licences relevant to mining activities at Wongawilli Colliery

Licence and/or Approval	Document Number	Approval Authority	Issue Date	Expiry Date
Mining Lease	ML 1596	DRG	03/02/2012	07/10/2029
Mining Lease	ML 1565	DRG	02/08/2006	Renewal Application in Progress
Consolidated Coal Lease	CCL 766	DRG	27/06/2005	Renewal Application in Progress
Mine Operations Plan - Interim	MOP	DRG	31/03/2017	31/12/2020
Project Approval – Nebo Area Project as modified	MP 09_0161	Planning Assessment Commission (PAC)	02/11/2011	31/12/2020
Complying Development Certificate for a ROM Coal Screening and Sizing Plant (PCA)	CDC272/09	Wollongong City Council (WCC)	26/02/2010	NA
Project Approval for the Construction of a New Bath House and Office Extensions	MP 09_0030	Department of Planning and Environment (DP&E)	24/02/2010	NA
Environmental Protection Licence (EPL) - WCL Wongawilli Colliery	EPL 1087	Environment Protection Agency (EPA)	1 st October (Anniversary Date)	NA
Environment Protection Licence WCL - Avondale Colliery	EPL 12442	EPA	31 March (Anniversary Date)	NA
Radiation Control Licence/Registration	5061480	EPA	-	13/8/2021
Special Areas Access Mining Consent	D2015/036046	Water NSW (WNSW)	04/03/2016	04/03/2021



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Licence and/or Approval	Document Number	Approval Authority	Issue Date	Expiry Date
Surface Disturbance Notice	06/3092	DRG	24/02/2010	NA
Surface Disturbance Notice	11/19 & 06/3052	DRG	05/01/2011	NA
Part 5 Approval (WNSW) – Avon Water Quality monitoring	D2011/1059	WNSW	09/05/2011	At Completion of Monitoring
Water Licence	WAL36487	WNSW	16/01/2013	-

1.3 Land Ownership and Land Use

WCs lease area covers a range of Leasehold and Freehold lands as illustrated in Plan 1B and 1C.

The Wongawilli Colliery Pit Top and Coal Handling sites are on Freehold land owned by WCL. The Pit Top site is surrounded by the Illawarra Escarpment State Conservation Area (IESCA), which is gazetted by the Office of Environment and Heritage (OEH), and administered by the National Parks and Wildlife Service (NPWS) and owned by the Crown.

The Avondale Pit Top is located on Freehold land **managed** by Huntley Heritage Pty Ltd.

The ventilation shaft sites are within lands recognised as part of the Metropolitan Special Area which is regulated by the *Water NSW Act 2014*. These lands are owned and administered by WNSW.

The land ownership details relevant to each of the Colliery's surface leases is described in Table 1-2.

Table 1-2 Wongawilli Colliery Lease Land Ownership (Adapted from ERM, 2010)

Property ID / Lot Number	DP Number	Land use	Owner
Wongawilli - ML1596			
Lot 1	321054	Freehold	WCL
Lot 1	44325	Freehold	WCL
Lot 1	212322	Freehold	WCL

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Property ID / Lot Number	DP Number	Land use	Owner
Lot 1	216373	-	Sydney Water
Lot 2	216373	-	Sydney Water
Lot 3	216373	Freehold	Private
Lot 1	255284	Freehold	WCL
Lot 2	255284	Freehold	WCL
Lot 3	255284	Freehold	WCL
Lot 4	255284	Freehold	WCL
Lot 5	255284	Freehold	WCL
Lot 6	255284	Freehold	WCL
Lot 7	255284	Freehold	WCL
Lot 14	255284	Freehold	WCL
Lot 8	255585	Freehold	Private
Lot 12	255285	Freehold	Endeavour Coal Pty Ltd
Lot 1	383829	Freehold	WCL
Lot 14	751278	Leasehold - Crown	NPWS
Lot 16	751278	Leasehold - Crown	NPWS
Lot 171	751278	Leasehold - Crown	NPWS
Lot 196	751278	Leasehold - Crown	WNSW
Part Lot 217	751278	Leasehold - Crown	WNSW
Lot 219	751278	Leasehold - Crown	WNSW
Lot 220	751278	Leasehold - Crown	WNSW
Lot 221	751278	Leasehold - Crown	WNSW



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Property ID / Lot Number	DP Number	Land use	Owner
Part Lot 275	751278	Freehold	Dendrobium Coal Pty Ltd
Lot 295	751278	Freehold	Springhill Farm Company Pty Ltd
Lot 281	751278	Leasehold - Crown	WNSW
Lot 282	751278	Leasehold - Crown	NPWS
Lot 298	751278	Leasehold - Crown	NPWS
Lot 303	751278	Leasehold - Crown	WNSW
Lot 304	751278	Leasehold - Crown	WNSW
Lot 2	986776	Freehold	Private
Part Lot 1	986776	Freehold	Private
Part Lot 1	1001210	Leasehold - Crown	WNSW
Lot 1	1001212	Leasehold - Crown	WNSW
Lot 1	1001213	Leasehold - Crown	WNSW
Lot 1	1006994	Leasehold - Crown	WNSW
Lot 301	1087464	Leasehold - Crown	WNSW
Lot 1	1033422	Freehold	Private
Part Lot 1	1103666	Freehold	Dendrobium Coal Pty Ltd
Part Lot 3	1103666	Freehold	Dendrobium Coal Pty Ltd
Part Lot 1	1103781	Freehold	Dendrobium Coal Pty Ltd
Lot 2	1103781	Freehold	Dendrobium Coal Pty Ltd
Lot 3	1103781	Freehold	Dendrobium Coal Pty Ltd
Part Lot 18	1111734	Freehold	Dendrobium Coal Pty Ltd
Lot 421	11088957	Freehold	WCL

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Property ID / Lot Number	DP Number	Land use	Owner
Lot 422	1123956	Freehold	WCL
Lot 423	1123956	Freehold	WCL
Lot 424	1123956	Freehold	WCL
Lot 425	1123956	Freehold	WCL
Lot 19	1131362	Leasehold - Crown	WNSW
Lot 1	1132869	Leasehold - Crown	The Minister for Public Works

Avondale - ML1565

Lot 41	751263	Freehold	Private
Lot 42	751263	Freehold	Private
Part Lot 43	751263	Freehold	Private
Lot 111	751263	Freehold	Private
Part Lot 140	751277	Leasehold - Crown	WNSW
Part Lot 181	751277	Leasehold - Crown	WNSW

CCL 766

Par Lot 27	3083	Freehold	HTT Huntley Heritage Pty Ltd
Part Lot 111	585959	Freehold	Private
Lot 2	751263	Freehold	The Council of the City of Wollongong
Part Lot 40	751263	Freehold	Private
Lot 49	751263	Freehold	HTT Huntley Heritage Pty Ltd
Part Lot 55	751263	Freehold	HTT Huntley Heritage Pty Ltd
Part Lot 3	852180	Leasehold - Crown	Private
Lot 10	867347	Leasehold - Crown	HTT Huntley Heritage Pty Ltd



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Property ID / Lot Number	DP Number	Land use	Owner
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Across all leases

Lot 32	1138149	Leasehold - Crown	WNSW
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1.4 Stakeholder Consultation

There is substantial change underway within the Wongawilli community as the West Dapto urban expansion continues. As new residents move in to the area around the Colliery, efforts will be made to engage with them to ensure that they are generally aware of the nature and extent of mining and how to make enquiries and complaints.

A Community Consultative Committee (CCC) has been established and the CCC will meet on a regular basis during the MOP period, as dictated by operational activity and CCC meeting frequency preferences.

Government agencies and representatives are regularly consulted as required during the operation of the mine, including:

- Government Ministers;
- **DPIE;**
- WaterNSW;
- **Environment, Energy and Science formally OEHS now part of DPIE**
- NPWS;
- WCC;
- The Resources Regulator;
- Transport for NSW formally RMS;
- Australian Rail Track Corporation (ARTC);
- EPA; and
- Department of Primary Industries (DPI) – Water
- **Dams Safety NSW**

This will continue throughout the duration of the MOP period.



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2 PROPOSED MINING ACTIVITIES

As described in Section 1, WC currently operates under MP 09_0161. The Project Approval, as modified, allows:

- The continuation of mining operations until 31 December 2020;
- Continued use of the surface infrastructure at the Wongawilli pit top;
- Coal production of up to 2 mtpa;
- Mining in the Nebo area in the north east corner of the lease area;
- Continued development and construction of the Western Driveage (North West Mains);
- Continued transportation of run of mine coal from the Colliery to PKCT by rail; and
- Rehabilitation of the site as practical.

The Mod 2 application is seeking an extension of time to complete the 'Western Driveage' mine development and complete additional development to connect to the existing Wongawilli No. 1 shaft for ventilation purposes. This removes the requirement to seek the construction of a new ventilation shaft facility within the catchment in the future.

2.1 Project Description

For most of the MOP period 2020 - 2021, WC will be on care and maintenance. Following the determination of Mod 2 application and the determined consent conditions of approval to continue operations, WC will commence mining in the 2 Bulli seam roadways as well as recovering roadways in the old Wongawilli workings to facilitate a third entry to the North West Mains. A new MOP or legislated alternative under the Rehabilitation Reforms initiative will be presented as required for approval in the advised timeframe.

Table 2-1 Indicative Mining Schedule

Panel	Coal Extracted (tonnes)	Indicative Start	Indicative Finish
North West Driveage	33,000	25/8/2021	31/12/2021
North West Driveage	222,000	1/01/2022	31/12/2022
North West Driveage	226,000	1/01/2023	31/12/2023
North West Driveage	360,000	1/01/2024	31/12/2024
North West Driveage	470,000	1/01/2025	31/12/2025

During the MOP term WC will also continue the development of the Western Driveage (North West Entries) and in accordance with Mod 2. The mining method is first workings bord and



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pillar, which is expected to have negligible subsidence and negligible impacts as described in the Mod 2 Application to DPIE. (Figure 4) This development work will be completed in five years during which a new mining application will be progressed to undertake low impact place change mining in both the Bulli and Wongawilli seams.

Activities relating to existing leases, licences and approvals such as **review and upgrade of** water management, **maintain** sediment control, maintenance works and general housekeeping are, and will continue to be, undertaken during the MOP period.

The arrangement of the existing and proposed underground workings is shown on Plan 2 and 3 **and 4**. Figures 1, 2 and 3 also provide an overview of the Wongawilli Colliery Mining Leases and surface facilities.

2.2 Asset Register

The Wongawilli site has been divided into domains based on features, similarity of activities and location in accordance with the MOP Guidelines. Each of their domains and their characteristics is provided in Table 2-2. The domains for the MOP are shown on Plan 2 and 3.

Table 2-2 Asset Register

Domain	Assets
Infrastructure Area (Domain 1) 220 ha	<ul style="list-style-type: none"> • Administration Buildings • Bath Houses • Workshop • Bulk Liquid Storage • Conveyor and Transfer House • Electrical Infrastructure • Compressor Shed • Water Tank • Portal B & C (for future western driveage) • Rail and RTV portals (current use) • Timberyard Storage Area • Garden Storage Area • Screen/Sizer • Vulcanising Shed • Coal Bins • Stockpile Area • Electrical infrastructure • Old Bath House (decommissioned) • Rail lines (from Stockpile Area to Main Line) • Contractors Yard • Car parking and paved areas • Environmental Monitoring Equipment

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Domain	Assets
Water Management Area (Domain 3) 2 ha	<ul style="list-style-type: none"> • Grey water line and ponds • Contaminated water drainage • Water tanks • Dams • Ponds • Lagoons • Settlement Ponds
Underground Mining Area (Domain 8)	<ul style="list-style-type: none"> • Nebo No.3 Downcast Shaft (decommissioned) • Nebo No.4 Upcast Shaft (decommissioned) • Wongawilli Shaft (decommissioned) (Care and Maintenance) • Electrical Infrastructure

The works involved to demolish infrastructure **with respect to Nebo No. 3 and No. 4 Shafts** and remove any items of heritage significance as part of rehabilitation activities undertaken at WC **in the next three years**, will be undertaken in accordance with the relevant approvals from the relevant regulatory authorities. Works involved to demolish infrastructure listed above **is addressed in this MOP extension. Further works will** be detailed in demolition and final land use assessments to be undertaken in future MOP terms **as opportunity presents** or the operation approaches closure.



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2.3 Activities over the MOP Term

2.3.1 Exploration

No exploration will be undertaken in the period of this MOP extension.

2.3.2 Construction

Construction activities will be undertaken during the MOP period in accordance with the Mod 2 Approval Consent Conditions. Construction activities will address the coal conveyance requirements for the new mine entry system, noise mitigation actions and modifications to existing infrastructure as required by the new workings. These modification areas include services, water management and logistics.

Environmental aspects and impacts will be managed through a Construction Environmental Management Plan in accordance with Mod 2 conditions.

2.3.3 Mining Operations

The following activities are proposed for the duration of the MOP extension period proposed under the current consent and Mod 2:

- Site maintenance and environmental monitoring
- Continued development of the approved western driveage in the Bulli Seam (Mod2);
- Continued dewatering of the mine via LDP 2;
- Continued inspections and area maintenance of the decommissioned catchment shaft sites Nebo No.3 & No.4;
- Continued rail transport of ROM coal from the stockpile area to the PKCT;
- Continued maintenance and use of the site 'dirty' water management system;
- No planned disturbance to previously rehabilitated areas;
- Preliminary rehabilitation works in the catchment (Appendix A)
- Continued environmental and subsidence monitoring in accordance with relevant environmental requirements;

A list of general mine features is provided in the following section.

Wongawilli Pit Top

- Administration Buildings
- Bath Houses
- Workshop
- Bulk Liquid Storage
- Conveyor and Transfer House
- Electrical Infrastructure



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- Compressor Shed
- Water Tank
- Portal B & C (for future western driveage)
- Rail and RTV portals (current use)
- Timberyard Storage Area
- Garden Storage Area
- Dirty water management system infrastructure (dams/sumps/channels)
- Screen/Sizer
- Vulcanising Shed
- Coal Bins
- Stockpile Area
- Electrical infrastructure
- Old Bath House (unused)
- Rail lines (from Stockpile Area to Main Line)
- Contractors Yard
- Environmental Monitoring Equipment

Avondale Pit Top

Avondale Pit Top has been decommissioned and rehabilitated. All that remains in terms of infrastructure are two **secured** portal entrances.

Approved Mining Areas (excluding Pit Top Activities)

Throughout the MOP period, **there are no active and approved mining areas in use. This will remain this way until the Mod 2 approval is achieved. Ongoing care and maintenance tasks will continue prior to approval. This will include environmental monitoring and reporting commitments.**

2.3.4 Rock emplacement

All ROM coal will be transported by train to PKCT. **No rock will be emplaced during this MOP period.**

2.3.5 Processing residues and tailings

No processing residues or tailings will be generated on-site.

2.3.6 Waste Management

Waste management streams at WC are detailed below. All waste management is undertaken by a waste management contractor who provides information to WCL regarding wastes removed each month. In addition, the **licensed** waste management



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contractor undertakes waste tracking in accordance with the *Protection of the Environment Operations (Waste) Regulation 2005* and waste is disposed of to a suitably licensed facility.

Wongawilli Pit Top

Putrescible Waste

Putrescible waste is segregated into the following for disposal from site:

- General waste;
- Recyclable waste;
- Waste water.

All general waste from both the surface and underground operations is collected in large portable skip bins and removed regularly from site by licensed waste management contractors to a licensed waste disposal depot.

Grey water from offices, workshops and bath house facilities on the upper pit top is discharged to the Primary Stabilisation Lagoon. Once full the Primary Stabilisation Lagoon overflows into the Secondary Stabilisation Lagoon. Allowance has been made in EPL 1087 for discharge from the Secondary Stabilisation Lagoons which is via LDP1.

Blackwater from toilets and urinals on the upper pit top is directed to three septic tanks which are regularly pumped out by licensed contractors. Port-a-loos from the underground workings are routinely serviced by a licensed contractor for disposal at an approved facility. The contractor's area toilet, located adjacent to the main access road close to the site entrance, is an absorption trench system but is rarely utilised.

Hydrocarbon Waste Management

Hydrocarbon wastes include:

- Used oil filters;
- Waste oil; and
- Recovered oil (from oil-water separators).

An oily water separator unit is installed at the workshop wash-down bay. Oils and greases are stored in drums on bunded pallets and stored under cover.

Waste oil and oily water is collected from a waste oil tank and the oily water separator and, if necessary, site holding pits or sumps and removed from site by authorised oil recycling/disposal contractors to a suitably licenced facility.



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Oils from disused infrastructure in the special areas' catchment were removed in September 2020 in accordance with the Notice from the Resource Regulator.

2.3.6.1 Avondale Pit Top and Approved Mining Areas (excluding Pit Top Activities)

No waste will be generated in these areas during the MOP term.

2.3.6.2 Contaminated Soil Management

Contaminated soils have been identified during the Heritage assessment on the former coke ovens site, located on the Wongawilli Lower Pit Top. A detailed contaminated land assessment will be undertaken prior to mine closure to ascertain the full extent of contaminated soils at this location and also across the remainder of the lease areas. Results of all contamination assessments undertaken will be detailed in future Annual Reviews (AR) for the site.

2.3.7 Decommissioning and demolition activities

There will be no decommissioning or demolition activities performed on-site during this MOP period prior to the Mod 2 Approval. A structural audit will be completed in early 2021 to confirm demolition planning for targeted redundant infrastructure on the pit top level. Any demolition work post the MOD 2 approval will be undertaken in accordance with the new consent conditions.

2.3.8 Temporary Stabilisation

There is no temporary stabilisation foreseen to be taking place over this MOP period.

2.3.9 Progressive rehabilitation and completion

With the cessation of mining operations and closure of the old Nebo and Wongawilli workings in 2019, WCL have undertaken an assessment of existing infrastructure and assets held by WCL and determined that there are opportunities to commence rehabilitation activities during the MOP extension period.

The assessment and forward planning following the closure of the Wongawilli workings has identified the future utilisation of Wongawilli No 1 shaft in longer term mine planning which has been included in the Mod 2 application program. The assessment also identified that the Nebo No 3 and No 4 shaft facilities in the Catchment are redundant. The shaft sites have been decommissioned and can be progressively rehabilitated over the next three years to the point where ongoing monitoring of the rehab effectiveness will continue. The supporting



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power line infrastructure to these shafts is the property and responsibility of South 32. Ancillary infrastructure in the catchment for the shafts will be addressed in the rehabilitation program.

An overview of the rehabilitation program is included in Appendix A.

The primary objective of post-mining rehabilitation works will be to create a stable final landform that is free draining with acceptable post-mining land use capability.

2.3.10 Material Production Schedule during MOP Term

The material production schedule for WC during the MOP term is provided in Table 2.3.

Table 2-3 Material Production Schedule

Material	Unit	2019	2020	2021	2022
Stripped Topsoil	m ³	NA	NA	NA	NA
Rock/Overburden	m ³	NA	NA	70,000	100,000
Ore/ROM Coal	tonnes	49,303	NA	33,000	222,000*
Reject Material	Mt	NA	NA	NA	NA
Product Coal	Mt	NA	NA	NA	NA

Note*: The production schedule for 2021 and 2022 is indicative only and estimates will be refined and reported within the Annual Review.



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3 ENVIRONMENTAL ISSUES MANAGEMENT

WC currently operates under project approval MP 09_0161 (as modified) granted by the Planning Assessment Commission (PAC) under delegation on 02 November 2011. Further to this, WC holds EPL 1087 (Wongawilli Colliery) and EPL 12442 (Avondale Colliery) which are administered by the EPA.

To ensure WCL achieves regulatory compliance with their project approval, their EPL's and other relevant legislation, WCL has developed a number of approved management plans in consultation with regulators and other relevant stakeholders.

Management plans currently in place at WC are available on the WCL website and include:

- Environmental Management Strategy (EMS STD 001)
- Air Quality & Greenhouse Gas Management Plan (EMS MP 011)
- Biodiversity Management Plan (EMS-MP-007)
- Bushfire Management Plan (NREW-EMS-MP022);
- Heritage Management Plan (EMS-MP-008);
- Noise Management Plan (EMS-MP-0010);
- Surface Water Management Plan (EMS-MP-006)
- Integrated Wastewater Management Plan
- EPL 1087 – Pollution Incident Response Management Plan
- EPL 12442 - Pollution Incident Response Management Plan

WCL will continue to manage WC in accordance with the approved management plans as required. The above plans will be revised during the MOP period as necessary. A range of environmental management controls will be implemented during the MOP period to manage the operations of Wongawilli Colliery. These environmental management controls are detailed in the following sections and will also be discussed within the Wongawilli Colliery Annual Review. An overview of the inspection and monitoring requirements to be undertaken to manage subsidence and biodiversity are included in **Section 3.2.1.4** and **Section 3.2.1.7** respectively.

3.1 Environmental Risk Assessment

A review of the Wongawilli Colliery Environmental Risk Assessment was conducted on the **18th November 2020**, as required by the MOP Guidelines. The Risk Assessment was undertaken in accordance with the Failure Mode Risk and Effect Analysis (FMEA); a recognised methodology described in the NSW Department of Primary Industries document MDG 1010 'Risk Management Handbook for the Mining Industry'.

The risk assessment and risk matrix is provided in **Appendix C**. The review was conducted by representatives of WCL, including the WCL Environment Manager.

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One high level risk was identified. Four moderately ranked risks were identified. The full results from the environmental risk assessment are provided in **Appendix C**.

Table 3-1 Subsidence Monitoring (NRE, 2012)

Risk Aspect	Risk Description	Risk Ranking (prior to mitigation)
Bushfire – Wongawilli and Avondale Colliery Pit top	Dry vegetation, lightning, arson, ignition sources	High
Construction	Environmental damage, poor roads, access issues and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna. Community impacts such as noise, dust and traffic.	Moderate
Soil Types and Suitability	Contamination of soil, dust generated, erosion, sediment	Moderate
Post Mining Land Use - Regulatory Requirements	Regulatory requirements do not meet Post Mining Land Use.	Moderate
Development Consent Requirements	Non-compliance with development consent requirements	Moderate

3.2 Environmental Risk Management

Environmental management controls have been developed to address the potential environmental impacts associated with mining and mining related activities undertaken at WC. Environmental management at WC is undertaken in accordance with the WC EMS.

Management plans and procedures, as listed in Section 3.0, are regularly reviewed and updated in accordance with regulatory requirements, changes in operations or as required by review of the environmental risk assessment. New management plans and procedures are developed for the operation as required. An outline of the environmental management controls currently in place at WC to manage environmental impacts and risks are provided in Section 3.2.1.

3.2.1 Specific Risks relating to Rehabilitation

This section includes information on general environmental risk management and also information on specific risks relating to rehabilitation and how they are managed at WCL.

Geology and geochemistry

WC is located in the NSW Southern Coalfield. The economic coal seams in the Southern Coalfield are located within the Illawarra Coal Measures, which contain a number of



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workable coal seams. The surface geology comprises Cordeaux Crinanite with isolated areas of Hawkesbury Sandstone, Bulga Sandstone, Bald Hill Claystone, Newport Formation and the Garie Formation.

The major geological feature across WC is the Cordeaux Crinanite intrusion. This is a large igneous sill which intruded into the Triassic sediments of both the Narrabeen Group and the Hawkesbury Sandstone and extends over panels N1 to N6. The Crinanite acts as a shield for the sediments above and the subsidence impact is predicted to be minimal where this intrusion occurs. This is discussed in more detail in Section 3.2.1.4.

Material prone to spontaneous combustion

Wongawilli seam coal has a low propensity to self-heat, based on analytical results. Furthermore, the low likelihood for spontaneous combustion is confirmed by:

- No instances of spontaneous combustion having been recorded in the ninety-year life of Wongawilli Seam mines in the NSW Southern Coalfield ;
- No change in chemical properties of the coal in the proposed extraction area has been recognised, which could potentially increase the risk of spontaneous combustion; and
- Periodic testing of core samples of the Wongawilli Seam which indicates that the roof section has a low to low-medium susceptibility to spontaneous combustion, whilst the working section has a low-medium to medium susceptibility.

Comprehensive gas monitoring systems exist at WC and the mine has a control room which analyses these systems. Atmospheric bag samples are taken regularly from the tailgate goaf stream. These have been analysed to report on any spontaneous combustion indicator gases (CO₂, H₂, C₂H₄, and C₂H₆). An extensive database exists, which assists with an understanding of 'normal' gas levels.

Material prone to generating acid mine drainage

Acid mine drainage has not been identified and is not foreseen to be likely to occur in the future at the WC and therefore is not applicable to the MOP.

Mine subsidence

Wongawilli Pit Top and Avondale Pit Top

There is no mine subsidence at these locations as there is no underground mining.

Approved Mining Areas (excluding Pit Top Activities)

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Mine subsidence is now a legacy issue for Wongawilli Mine considering the extensive mining areas where secondary extraction has occurred in the past. WCL has publicly committed to low impact first working mining methods that result in negligible subsidence in the new mining areas. This is currently facing intense scrutiny through the Russell Vale UEP application and this process will provide further guidance in future applications and subsequent operations.

Subsidence Monitoring

A summary of subsidence monitoring proposed, as stipulated in the approved extraction plan, is provided in Table 3-2. Subsidence monitoring associated with first workings mining under Mod 2 will be in accordance with an approved management plan under the Mod 2 consent conditions if required.

Table 3-2 Subsidence Monitoring (NRE, 2012)

Management Period	Monitoring Proposed	Trigger	Response
Baseline prior to mining	<ul style="list-style-type: none"> 2D Survey once prior to mining: <ul style="list-style-type: none"> Total subsidence; Incremental subsidence; Variation in horizontal strain. Report as appropriate 	<ul style="list-style-type: none"> Documentation of pre-mining conditions 	<ul style="list-style-type: none"> Document and report as appropriate
During Mining	<ul style="list-style-type: none"> 2D Survey required only if regular visual inspections indicate impacts appear to fall outside predictions 	<ul style="list-style-type: none"> Major surface cracking (>10mm) 	<ul style="list-style-type: none"> Notify Principal Subsidence Engineer –DRG and DP&E; Conduct subsidence survey and review against predictions; Review mining options

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Management Period	Monitoring Proposed	Trigger	Response
Post Mining	<ul style="list-style-type: none"> 2D Survey on completion of each longwall block of: <ul style="list-style-type: none"> Total subsidence; Incremental subsidence; Variation in horizontal strain. Survey measurement Comparison with predictions Reported in Survey Reports 	<ul style="list-style-type: none"> Check against predictions within MSEC report to enable ongoing modelling of predictions 	<ul style="list-style-type: none"> End of Panel Summary report to Principal Subsidence Engineer – DRG, and DP&E within four (4) months after completion of each longwall block; Conduct subsidence survey and review against predictions; Document actual subsidence against predictions

Erosion and Sediment control

Wongawilli Colliery Pit Top

WCL has management practices and structures in place to assist with the appropriate management of erosion and sedimentation from areas disturbed by mining activities. The management practices utilised include:

- A site water management plan, including the details of water management structures that have been built at the site;
- Permanent erosion and sediment control measures, including a number of settlement structures, as outlined in Section 3.2.1.10.
- A visual erosion monitoring program across the eastern and northern edges of the Timberyard Materials Storage Area as part of regular site environmental inspections.

Avondale Pit Top

Avondale Pit Top has been decommissioned and rehabilitated. The only remaining infrastructure at the Avondale Pit Top are two portal entrances. There are no activities at the Avondale Pit Top that would result in an increased risk of erosion from the site. Further



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information regarding proposed rehabilitation of remaining infrastructure is included in Section 6.1.7.

Other Approved Mining Areas (excluding Pit Top activities)

As part of SMP monitoring, WCL conducts regular inspections for impacts above LW (and now pillar) extraction areas that may have been affected by mine subsidence. Areas that may experience soil erosion due to mine subsidence are generally restricted to rock outcrops, steep slopes and cliff lines, unpaved roads or tracks and streams. These areas are checked regularly as part of the visual inspection monitoring program.

Prior to exploration, mitigation measures specified in the exploration program REF will address the following potential erosion and sediment risks as applicable to the activity being undertaken:

- Disturbance to rock outcrops due to vehicle movements, access track clearance and borehole site preparation;
- Soil disturbance and compaction as a result of vehicle movements;
- Erosion and sedimentation as a result of vegetation clearance along borehole access tracks and for borehole site preparation; and
- Alteration or disturbance of water courses due to access track crossings and associated vehicle movements.

The following general sediment controls are implemented during drilling activities:

- Drill sites as flat as possible;
- Minimising the disturbance footprint at drilling sites;
- Diverting clean water run-off around drill sites using bunds or catch-drains;
- Directing drilling process water to temporary retention sumps;
- Using filtration materials such as sediment fences; and
- Following completion of drilling, rehabilitating the site in accordance with WNSW requirements.

Soil types and suitability

The sites soil types over the underground mining area were identified in the Environmental Assessment undertaken for WC (ERM, 2010). This information is used to assist in the management of any topsoil reserves on-site and the management of any ground disturbance works (with respect to the erosion potential of exposed soils).

Topsoil at the site is conserved during site preparation works and reused in vegetation establishment. All topsoil stockpiled on site is managed in the context of weed control and topsoil viability to ensure the material is suitable for ecosystem re-establishment following disturbance.



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Where there is an insufficient volume of topsoil for rehabilitation works, WCL shall utilise organic ameliorants (e.g. compost) sourced from an external provider. Chemical characterisation testing will be undertaken on the substrate material to confirm the ameliorants required to facilitate rehabilitation and revegetation growth.

There is no plan to disturb soil at the Wongawilli Pit Top, Avondale Pit Top or within the other approved mining areas during the MOP period. If the temporary stabilisation of the stockpile and coal processing area requires topsoil, it will be appropriately sourced and applied as required.

Flora and Fauna

Wongawilli Colliery Pit Top

Flora

WC undertakes pit top vegetation management in the following manner as required:

- Vegetation risk assessments;
- Removal of dead, dying or dangerous trees;
- Removal of dangerous limbs from trees;
- Removal of regrowth trees that are beginning to pose a risk to machinery, buildings or other operational areas such as pipelines, dams, stockpiles;
- Removal of weeds and non-native groundcovers, bushes and trees;
- Removal of vegetation authorised as a result of an DRG Part 5 assessment or other regulatory approval (e.g. development approval, MOP, Part 3A Complying Development, Tree Preservation Order and Native Vegetation Act);
- Approved bushfire management clearing; and
- Removal of vegetation beneath powerlines in accordance with guidelines for safe distances.

WC works closely with the Illawarra District Noxious Weeds Authority (IDNWA) to manage weeds at its Pit Top. Regular inspection for noxious weeds by the IDNWA as well as chemical spraying will continue to be conducted during this MOP period at the Pit Top site.

Threatened flora is managed in accordance with the approved Biodiversity Management Plan. Ongoing operations in historically disturbed areas of the pit top site have no potential effects on threatened aquatic or terrestrial vegetation as none have been identified close to these areas. At a minimum, due diligence assessments are undertaken prior to construction activities that have the potential to impact upon vegetation. This ensures that no unauthorised disturbance of endangered aquatic or terrestrial species occurs during construction.

Fauna



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As with the management of flora at the site, threatened fauna are managed in accordance with the approved Biodiversity Management Plan.

In accordance with the Local Land Services (LLS) Act 2013, WCL are required to control all declared pest species on their land. Currently declared pests in NSW that are potentially relevant to WC are:

- Wild rabbits;
- Wild dogs;
- Feral pigs;
- Foxes; and
- Deer.

WCL will implement control actions to assist in the management of these species as necessary. Control actions may include a combination of baiting or trapping, and will be conducted in accordance with consultation with LLS officers as required.

WCL manages a deer culling program that is currently conducted by members of the Sporting Shooters Association of NSW in close consultation with Wollongong Coal staff. The purpose of the program is to reduce the overall population of deer at the Colliery. WCL record the number, approximate age, sex and species of deer removed in the program.

WCL is also working with the LLS to develop a fox and rabbit baiting program onsite. This involves close consultation with local land holders to place approved baits in locations of known fox and rabbit activity with the aim of reducing overall populations and limiting their effects on threatened flora and fauna.

Avondale Pit Top

No disturbance is anticipated at Avondale pit top during the MOP period and therefore there will be no impact to flora and fauna. Regular inspection for noxious weeds by the IDNWA and/or chemical spraying will be conducted.

Other Approved Mining Areas (Excluding Pit Top Activities)

Flora

Vegetation clearing around the firebreaks at the shaft sites involves management of regrowth areas only and does not impact upon threatened species. An REF for approval to conduct ongoing vegetation management around WC infrastructure in the Catchment Lease Area remains in place with the WNSW.

Areas potentially affected by mine subsidence associated with previous mining were assessed for threatened flora and are being monitored in accordance with SMP and EP



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approval. This work was established as part of the baseline studies for preparation of the SMPs and EPs for the extraction of the Elouera LW 11-20 and Nebo N1-N6 extraction panels.

The SMP approvals for Elouera LW 11-20 and Nebo N1-N6 extraction panels also require regular reporting to DRG (four monthly intervals during extraction), incident reporting (as required), as well as an End of Panel report after each individual longwall is completed.

There are no noxious weed related issues associated with SMP and catchment lease areas.

Fauna

There has been no activity that could impact threatened fauna species at the ventilation shaft sites. As indicated, the SMP approvals for Elouera LW 11-20 and Nebo extraction panels N1-N6 require regular reporting to DRG, including fauna.

Monitoring

A general summary of proposed biodiversity monitoring across all sites is provided in Table 3-3. The results of biodiversity monitoring undertaken and the controls implemented will be reported in the Wongawilli Colliery Annual Review.

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Table 3-3 Summary of Biodiversity Monitoring (NRE, 2013)

Location	Type	Monitoring	Frequency
Pit Top	Endangered Ecological Communities	Vegetation Assessment	Every 2 years
		Lantana Removal	Annual
	Endangered Flora	Targeted flora surveys	Annual
	Endangered Fauna	Prior to and post development that has disturbed identified habitat	As per approval
	Native Vegetation	Vegetation Assessment	Every 3 years
	Weeds	Visual inspection of operational areas	Ongoing
	Feral Herbivores	Ecological Deer Management enclosure regrowth monitoring	Twice per year
	Feral Predators	Visual observation	Ongoing
Mine Subsidence Areas	Terrestrial and Aquatic Ecology	As outlined in LW11-20 SMP and Nebo LW1-6 Extraction Plan	As per plans
Other approved mining areas (incl. exploration Areas)	Terrestrial and Aquatic Ecology	As outlined in the various REF's and accompanying approvals	As per REF and approvals

Slopes and slope management

Management of slopes across WC operations will be undertaken in accordance with the Extraction Plan or Subsidence Management Plan for the relevant underground mining areas, which commits to management strategies to rehabilitate land affected by the underground mining area to that which reflects pre-mining conditions and is consistent with the surrounding landform. All slope management works will be undertaken to achieve the rehabilitation goals and completion criteria for the site. Rehabilitation completion criteria are detailed further in Table 6.1.

Air Quality

Wongawilli Colliery Pit Top



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Air quality at WC is managed in accordance with the Air Quality & Greenhouse Gas Management Plan. WCL implement the following controls to reduce dust emissions which relate to rehabilitation:

- Implementation of a stockpile water spray system. This facility can be automatically activated according to pre-set wind speed and direction controls;
- Implementation of a road surface sweeper particularly around the pit top area;
- A water truck to wet down operational areas of the mine; and
- Covering stockpile areas with dust suppressant material.

Air quality monitoring will continue to be undertaken as per EPA's dust deposition requirements under EPL 1087.

In addition to dust deposition monitoring, an extensive real time air and noise monitoring system has been installed on-site. This system allows WCL to continuously monitor weather conditions and alter pit top operations where appropriate. WC's real time air and noise monitoring system includes the following:

- Continuous monitoring for PM₁₀ and PM_{2.5} using Beta Attenuation Monitors (BAMs); and
- Operation of a single automated weather station.

Avondale Pit Top

There are no activities at the Avondale Pit Top that will impact upon air quality during the MOP period.

Other Approved Mining Areas (excluding Pit Top Activities)

The only activities in these areas that have the potential to adversely affect air quality are related to exploration drilling, SMP and EP inspections and the operation of ventilation shafts. The impacts from these activities are:

- Exhaust air from the ventilation shafts;
- Particulate emissions from motor vehicles and other fuel powered machinery; and
- Dust from drilling activities.

These impacts will be managed in accordance with the overarching Air Quality and Greenhouse Gas Management Plan, and include those measures implemented at the Wongawilli Pit Top.

In addition, mitigation measures specified in REFs prepared prior to exploration drilling will address air quality impacts as required by WNSW.



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Surface Water

Wongawilli Colliery Pit Top

WCL has developed a detailed Site Water Management Plan (SWMP), which addresses the management of water for the site. The SWMP includes mitigation and management strategies as follows:

- Ensuring all work and projects on site pass through the correct approval process and/or consider impacts on surface water;
- Compliance with Environmental Protection Licence conditions;
- Ensuring adequate containment measures at sources of potential contaminants;
- Ensuring the effective operation of the site water management system; and
- Effective management of erosion through the use of sediment control structures for all disturbed areas on-site where sediment can be mobilised.

WC will maintain all existing pollution control structures and storage dams on-site during this MOP period to capture and treat surface water on-site.

Avondale Pit Top

No impact on surface water quality is anticipated during the MOP period as there is no disturbance proposed.

Other Approved Mining Areas (excluding Pit Top Activities)

Surface water in exploration and subsidence affected areas are managed in accordance with the Elouera LW11-20 SMP and Nebo LW N1-6 EP.

All activities occur in the Metropolitan Special Area managed by WNSW. No exploration is undertaken without a Part 5 EP&A Act approval issued by the WNSW. This process involves detailed assessment of the potential impacts of the activity on surface water in the affected areas with production of agreed management plans for disturbed areas.

Groundwater

Details of groundwater monitoring and management at the site are contained within the SWMP. An assessment of potential groundwater contamination was undertaken in 2005 and comprised 22 test pit sites at various locations across WC. The groundwater analysis indicated that Lead and Nickel concentrations exceeded guideline levels. Further investigations will be undertaken when final rehabilitation of the site commences.



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Wongawilli Colliery Pit Top

Groundwater that discharges from the mine naturally flows into the mine dam. Some of the water from the mine dam is used for dust suppression in the stockpile area and overflow from the mine dam discharges to Robins Creek via LDP 2.



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Avondale Pit Top

There has been no activity at the Avondale pit top and hence there is no impact on groundwater.

Other Approved Mining Areas (excluding Pit Top Activities)

Groundwater monitoring is undertaken in these areas on a regular basis and in accordance with SMP and EP approval requirements. The results of groundwater monitoring undertaken at WC are reported in the Annual Review.

A detailed groundwater investigation and remediation action plan will be undertaken prior to rehabilitation and mine closure across all sites.

Contaminated Land

Wongawilli Pit Top

The only confirmed contamination location within this area has been identified at an archaeological site (the old coking beds) located at the Lower Pit Top. A detailed contaminated land assessment will be undertaken during the decommissioning phase of operations, combined with the development of a remediation action plan, prior to rehabilitation works at the end of mine life.

Contamination resulting from environmental incidents (e.g. spills) and areas of high risk associated with hydrocarbon storage infrastructure will be maintained and appropriately managed (e.g. remediated or disposed off-site by an authorised waste contractor) as soon as possible after they occur. Monthly environmental inspections will continue to be undertaken by site personnel throughout the MOP term to identify any potential contamination prior to mine closure works.

Avondale Pit Top and Other Approved Mining Areas (excluding Pit Top Activities)

No contaminated land has been identified in these areas. A detailed contaminated land assessment will be undertaken across all disturbance areas prior to mine closure.



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Hazardous Materials

Wongawilli Colliery Pit Top

WC maintains a register of Material Safety Data Sheets (MSDS) for all chemicals used on-site. The Safety and Training Department oversees the register system and hard copy MSDS's are kept in the control office. A database system known as 'Chem Watch' is used to provide the most current versions of documents and records are available for inspection on request.

All dangerous goods are stored in accordance with the WorkCover NSW Notification of Dangerous Goods requirements.

Other hazardous materials located at WC include compressed gases, flammable and combustible liquids, poisonous substances and corrosive substances, none of which exceed the acceptable holding limits.

Avondale Pit Top

No hazardous materials are located within this region.

Avondale Pit Top and Other Approved Mining Areas (excluding Pit Top Activities)

Hazardous materials located in these areas comprise very minor quantities of diesel (200L), cleaning chemicals (20L) and herbicide (20L). Diesel and cleaning chemicals are stored inside the ventilation shaft buildings in an appropriately bunded area. The herbicide is used to keep vegetation within the compound to a manageable level to reduce fire risk (see Section 3.1.1.20).

Greenhouse gases, methane drainage / venting

Greenhouse gases are managed in accordance with the Air Quality & Greenhouse Gas Management Plan for the site.

Methane drainage is managed in accordance with the current Ventilation Control Plan and Atmospheric Monitoring Management Plan at the site.

The primary objective of the Ventilation Plan is to ensure safety risks posed by gas emissions can be effectively controlled. The Plan also states that it is the intention to operate at ventilation levels that are superior to the minimum standards defined in current legislation.

No significant problems with methane have been encountered in the adjacent workings of the former Wongawilli and Nebo Collieries in their previous mining experiences. The



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monitoring of gas and triggers for actions are also detailed in the mine's Ventilation Control and Atmospheric Monitoring Management Plans.

Based upon typically low gas content information from exploration boreholes, of approximately 2 - 4m³/tonne, methane drainage is not considered warranted. No noxious gases have been identified from exploration samples recovered from the area surrounding the proposed extraction or from current workings.

Blasting

Small scale blasting **can** occur underground as the need arises to fracture rock and allow for the progression of mining activities. There is no surface blasting required to be undertaken as part of the MOP term.

Noise

Noise impacts will be managed in accordance with the Noise Management Plan. **It is likely that there may be changes through the Mod 2 application and the Noise Management Plan will be reviewed at that time as part of the Mine's Change Management Process.** Management procedures for noise control **presently** include the following:

Wongawilli Colliery Pit Top

- Continuous unattended real time noise monitors with audio capture and real time alerts;
- Operator attended noise monitoring at surrounding sensitive receivers on a quarterly basis;
- Noise attenuation provided by a six metre high concrete wall that separates the nearest residences from the coal Stockpile Area. This wall also provides visual attenuation;
- Noise attenuation provided by a three m high, 250 m long earth bund adjacent to the rail line to the east of Jersey Farm Road. This bund was constructed to provide noise attenuation for local residents from the Jersey Farm Road rail crossing;
- Limiting the hours of operation for heavy machinery loading trains within the Stockpile Area to 7am to 6pm Monday to Friday and 8am to 4pm Saturday, with no loading on Sundays and Public Holidays;
- Front end loaders and dump trucks which have exhaust systems that meet manufacturer specifications operating in the Stockpile Area;
- Speed limit restrictions, particularly close to Wongawilli residences; and
- Regular maintenance of the decline overland conveyor system.

Avondale Pit Top



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There will be no noise generating activity at Avondale pit top during the MOP period.

Other Approved Mining Areas (excluding Pit Top Activities)

Due to the absence of potentially affected receivers, noise management is not required in these areas.

Visual and Lighting

Wongawilli Colliery Pit Top

Light from WC is either directly or indirectly visible to the local community as well as to the regional community within the view shed. The site is visible to a large area of the southern Wollongong and Shellharbour Local Government Areas due to its location on the escarpment.

During the MOP term, WCL will implement the following strategies to manage visual impacts from operations:

- Any lighting required will be located and orientated in a manner which minimises the potential impact upon surrounding properties, in accordance with Australian Standards;
- Utilisation and maintenance of existing buffers, visual screens and landscaped areas; and
- Implement the recommendations from a lighting audit, to be completed in the early phases of the MOP period.

Avondale Pit Top

There are no structures or lighting visible to the public at this site.

Other Approved Mining Areas (excluding Pit Top Activities)

The lights at the ventilation shaft are only turned on when required. There is no requirement for management of visual impact or stray light in these areas. **There is now no power to these sites.**

Cultural Heritage

Wongawilli Colliery Pit Top



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The Colliery Pit Top is listed in the Wollongong LEP 2009 and the Wollongong LEP (West Dapto) 2010 as having heritage significance, including Aboriginal heritage. Aboriginal Heritage is managed in accordance with the approved Heritage Management Plan for the mine. General operations at the Colliery Pit Top will have no impact on Aboriginal archaeological sites as the Wongawilli Colliery Pit Top has already been extensively disturbed. There are, however, extensive Aboriginal archaeological sites in areas where subsidence may occur.

The Colliery Pit Top and potential mine subsidence areas will be managed as follows:

- Disturbed areas of the Wongawilli Colliery Pit Top, which include the existing mine benches, works areas and access tracks will not require further Aboriginal archaeological investigation prior to works, provided those works are constrained to those existing disturbed areas.
- Previously undisturbed areas of the Pit Top outside of the existing mine benches, works areas and access tracks, as well as potential mine subsidence areas will be subject to due diligence Aboriginal archaeological investigations undertaken as required. This due diligence process will be undertaken as required by specific approvals processes or as outlined in the NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects.

Chance find protocols will be used for all works as follows:

- (a) If an unknown Aboriginal archaeological site/artefact is identified during works. all work will cease and OEH, DPIE, Aboriginal stakeholders and a qualified archaeologist will be contacted;
- (b) If the site/artefact disturbed is, or includes, human remains, the NSW Police will also be contacted;
- (c) The level of significance of the site/artefact will be determined as well as the extent of harm and likelihood of continued harm if the work proceeds;
- (d) A management plan will be developed in liaison with the stakeholders listed above and will include recording and documentation of the site.

There are few European historic heritage items in areas that will potentially be affected by mine subsidence. Currently, only three have been identified in the area affected by mine subsidence from the Nebo longwalls. A separate management plan has been developed for historic heritage items in the Nebo longwalls and this management plan has been included within the Extraction Plan.

Where demolition, removal or significant modification to a heritage building or structure is required a suitably qualified archaeologist will be engaged to conduct photographic recording of the heritage item and/or archaeological excavations as required. Specific management plans detailing the program/procedures utilised will be developed in consultation with the archaeologist for these activities.



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Avondale Pit Top

Cultural heritage is managed in accordance with the overarching Heritage Management Plan for the Colliery, as described above.

Other Approved Mining Areas (excluding Pit Top Activities)

Aboriginal and European Heritage Monitoring is undertaken in mining and catchment lease areas, in accordance with SMP and EP approval requirements.

Bushfire

A Bushfire Management Plan has been developed to ensure land owned by WC is managed to minimise bushfire risk and to reduce the risk of fire originating on WC owned land spreading to adjacent properties.

Wongawilli Colliery Pit Top

A number of activities are undertaken to reduce the risk of bushfire at WC Pit Top including:

- Ongoing clearing of undergrowth around the general pit top operational areas and stockpile area. This will continue to be undertaken during the MOP period.
- Ongoing maintenance of a firebreak along the pit top access road to ensure the emergency evacuation route remains safe.
- Continued access to a firefighting water main on the site, boosted by a pressure pump.

Avondale Pit Top

There is no activity on this site that may increase bushfire risk.

Other Approved Mining Areas (excluding Pit Top Activities)

A firebreak that has been cleared around the site perimeter fence line of the main ventilation shaft site provides an asset protection zone as well as catchment bushfire protection. This firebreak will be maintained as required during this MOP period.

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4 POST MINING LAND USE

4.1 Regulatory Requirements

A summary of the **current** regulatory requirements relevant to the post mining land use at WC are provided in Table 4.1.

Table 4-1 Regulatory requirements – Post Mining Land Use

Source	Detail of Regulatory Requirement																
<u>Project Approval (MP 09 0161)</u>	Rehabilitation Objectives Schedule 4 Condition 26 – The proponent shall rehabilitate the site to the satisfaction of the DRG. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA, and comply with the objectives in Table 13. Table 13																
	<table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Mine Site (as a whole)</td><td><ul style="list-style-type: none">Safe, stable & non-polluting.Final land use compatible with surrounding land uses.</td></tr><tr><td>Surface infrastructure</td><td><ul style="list-style-type: none">To be decommissioned and removed, unless the DRG agrees otherwise.</td></tr><tr><td>Portals and vent shafts</td><td><ul style="list-style-type: none">To be decommissioned and made safe and stable.Retain habitat for threatened species (e.g. bats), where practicable.</td></tr><tr><td>Watercourses of 2nd order or above subject to subsidence impacts</td><td><ul style="list-style-type: none">Hydraulically and geomorphologically stable.</td></tr><tr><td>Cliffs</td><td><ul style="list-style-type: none">No additional risk to safety compared to prior to mining.</td></tr><tr><td>Other land affected by the project</td><td><ul style="list-style-type: none">Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of:Local native species (unless DRG agrees otherwise); andA landform consistent with the surrounding environment.</td></tr><tr><td>Built features damaged by mining operations</td><td><ul style="list-style-type: none">Repair to pre-mining condition or equivalent unless:The owner agrees otherwise; orThe damage is fully restored, repaired or compensated under the Mine Subsidence</td></tr></table>	Feature	Objective	Mine Site (as a whole)	<ul style="list-style-type: none">Safe, stable & non-polluting.Final land use compatible with surrounding land uses.	Surface infrastructure	<ul style="list-style-type: none">To be decommissioned and removed, unless the DRG agrees otherwise.	Portals and vent shafts	<ul style="list-style-type: none">To be decommissioned and made safe and stable.Retain habitat for threatened species (e.g. bats), where practicable.	Watercourses of 2nd order or above subject to subsidence impacts	<ul style="list-style-type: none">Hydraulically and geomorphologically stable.	Cliffs	<ul style="list-style-type: none">No additional risk to safety compared to prior to mining.	Other land affected by the project	<ul style="list-style-type: none">Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of:Local native species (unless DRG agrees otherwise); andA landform consistent with the surrounding environment.	Built features damaged by mining operations	<ul style="list-style-type: none">Repair to pre-mining condition or equivalent unless:The owner agrees otherwise; orThe damage is fully restored, repaired or compensated under the Mine Subsidence
	Feature	Objective															
	Mine Site (as a whole)	<ul style="list-style-type: none">Safe, stable & non-polluting.Final land use compatible with surrounding land uses.															
	Surface infrastructure	<ul style="list-style-type: none">To be decommissioned and removed, unless the DRG agrees otherwise.															
	Portals and vent shafts	<ul style="list-style-type: none">To be decommissioned and made safe and stable.Retain habitat for threatened species (e.g. bats), where practicable.															
	Watercourses of 2nd order or above subject to subsidence impacts	<ul style="list-style-type: none">Hydraulically and geomorphologically stable.															
	Cliffs	<ul style="list-style-type: none">No additional risk to safety compared to prior to mining.															
	Other land affected by the project	<ul style="list-style-type: none">Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of:Local native species (unless DRG agrees otherwise); andA landform consistent with the surrounding environment.															
	Built features damaged by mining operations	<ul style="list-style-type: none">Repair to pre-mining condition or equivalent unless:The owner agrees otherwise; orThe damage is fully restored, repaired or compensated under the Mine Subsidence															

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Source	Detail of Regulatory Requirement
	<p>Compensation Act1961.</p> <p>Community</p> <ul style="list-style-type: none"> Ensure public safety. Minimise the adverse socio-economic effects associated with mine closure.
<p><u>Project Approval (MP 09 0161)</u></p>	<p>Progressive Rehabilitation</p> <p>Schedule 4 Condition 27–The proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.</p> <p>Rehabilitation Management Plan</p> <p>Schedule 4 Condition 28– The Proponent shall prepare and implement a Rehabilitation Management Plan for the project, to the satisfaction of the Secretary of DRG. This plan must:</p> <p>(a) be prepared in consultation with the Department, OEH, DPI Water, Water NSW, Council and the CCC, and be submitted to the DRG for approval within 6 months of this approval, or as otherwise agreed with the Secretary;</p> <p>(b) be prepared in accordance with any relevant DRG guideline, and be consistent with the rehabilitation objectives in the EA and in Table 13</p> <p>(c) build, to the maximum extent practicable, on the other management plans required for approval; and</p> <p>(d) address all aspects of rehabilitation and mine closure, including final land use assessment rehabilitation objectives, domain objectives, completion criteria and rehabilitation monitoring</p>
<p><u>Project Approval (MP 09 0161)</u></p>	<p>Extraction Plan</p> <p>Schedule 3 Condition 7.</p> <p>The Proponent shall prepare and implement an Extraction Plan for any second workings on site, to the satisfaction of the Secretary. The plan must:</p> <p>(a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;</p> <p>(b) be approved by the Secretary before the Proponent carries out any of the second workings covered by the plan;</p> <p>(c) include detailed plans of existing and proposed first and second workings and any associated surface development;</p> <p>(d) provide revised predictions of the conventional and non-conventional subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;</p> <p>(e) include detailed performance indicators for each of the performance measures in Tables 1 and 2;</p> <p>(f) describe the measures that would be implemented to:</p> <ul style="list-style-type: none"> - ensure compliance with the performance measures in Tables 1 and 2; and - manage or remediate subsidence impacts and/or environmental consequences; <p>(g) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 1 and 2, or where any such exceedance appears likely;</p>

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Source	Detail of Regulatory Requirement		
	<p>(h) include the following to the satisfaction of DRG:</p> <ul style="list-style-type: none">- a subsidence monitoring program to:<ul style="list-style-type: none">o provide data to assist with the management of the risks associated with subsidence;o validate the subsidence predictions;o monitor the integrity of the overlying strata, particularly the Cordeaux Crinanite; ando analyse the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; ando inform the contingency plan and adaptive management process;- a coal resource recovery plan that demonstrates effective recovery of the available resource;- a Built Features Management Plan, which has been prepared in consultation with the owners of such features, to manage the potential impacts and consequences of subsidence on any built features;- a Public Safety Management Plan to ensure public safety in the mining area;- appropriate revisions to the Rehabilitation Management Plan required under condition 26 of schedule 4; and <p>(i) include a:</p> <ul style="list-style-type: none">- Water Management Plan, which has been prepared in consultation with EPA, Water NSW and DPI Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including:<ul style="list-style-type: none">o surface and groundwater impact assessment criteria based on at least 2 years of baseline data, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;o a program to monitor and report groundwater inflows to underground workings; ando a program to predict, manage and monitor impacts on any groundwater bores on privately-owned land;- Biodiversity Management Plan, which has been prepared in consultation with OEH and DRG, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities, and water dependent ecosystems;- 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, with a specific focus on cliffs and steep slopes;- Heritage Management Plan, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage sites or values; and <p>(j) include a program to collect sufficient baseline data for future Extraction Plans.</p> <p>Note: An SMP that is substantially consistent with this condition and which is approved by DRG prior to 31 December 2011 is taken to satisfy the requirements of this condition.</p>		
Project	Appendix C: Statement of Commitments - Rehabilitation		
	Outcome	Commitment	Timing

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Source	Detail of Regulatory Requirement		
Approval (MP 09_0161)	Progressive rehabilitation of mine access and disused portals	The Rehabilitation Plan will be developed, presented and undertaken in accordance with a REMP to the satisfaction of IIN	Continuous and as required
	Restoration of disturbed areas with a vegetation cover similar in nature to that of the surrounding bushland	All mine entries surplus to operational requirements will be progressively sealed and rehabilitated	Within seven years
		Progressive rehabilitation of all other disused areas and infrastructure will be undertaken where possible	Continuous and as required
<u>Mining Lease (Consolidated Coal Lease 766)</u>	In accordance with CCL 766, it is required that, upon completion of operations, WCL rehabilitate the subject area and establish vegetation to satisfaction of Minister, the WNSW and other relevant stakeholders.		
<u>Mining Lease 1596</u>	<p>Clause 7 – Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.</p> <p>Clause 28 – The lease holder must, within a period of three (3) months from the date of this lease undertake, complete and lodge with the Director-General Department of Primary Industries, a "Rehabilitation Cost Estimates" in accordance with the Department of Primary Industries, Mineral Resources requirements.</p> <p>Clause 31 – The lease holder shall:</p> <p>(j) Complete work in relation to rehabilitation within the Metropolitan Special Area before termination of the authority to the satisfaction of the Authority.</p>		
<u>Mining Lease 1565</u>	<p>Clause 4 – The Mining Operations Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:</p> <p>(b) mining and rehabilitation method(s) to be used and their sequence;</p> <p>(f) progressive rehabilitation schedules; and</p> <p>(q) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining land-use/vegetation.</p> <p>Clause 29 – The lease holder shall:</p> <p>(q) Complete work in relation to rehabilitation within the Metropolitan Special Area before termination of the authority to the satisfaction of the Authority.</p>		

4.2 Post-Mining Land Use Options

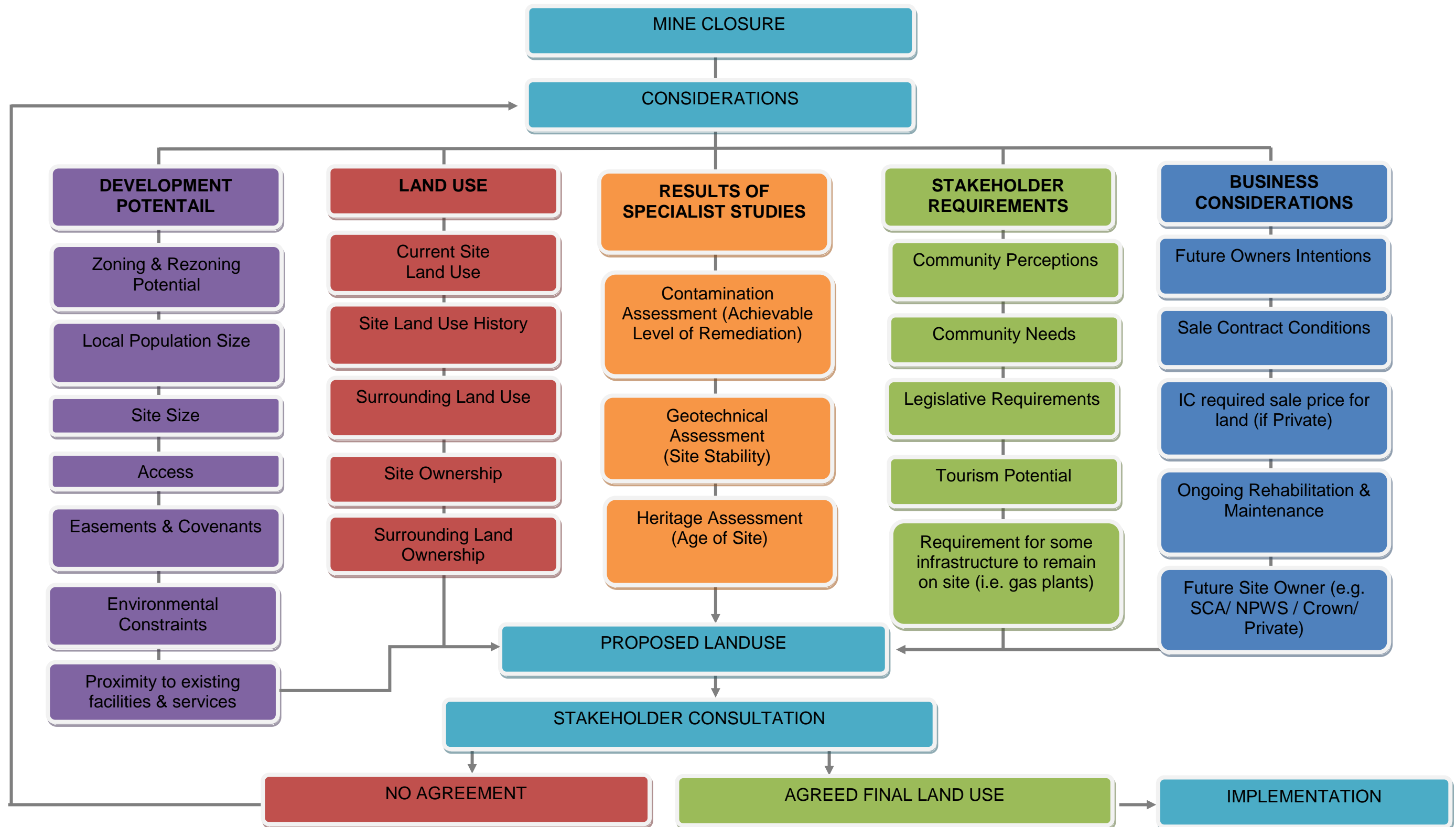
Post-mining land-use options at Wongawilli Colliery may be confined by limitations such as infrastructure, mining methods and features, as well as other physical or operational



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limitations and stakeholder requirements. The actual final land use for the Colliery will be assessed against these limitations at the time of final rehabilitation or mine closure. A conceptual plan of the final land use determination processes is provided in **Figure 4** below.

FIGURE 5 - CONCEPTUAL PLAN OF THE FINAL LAND USE DETERMINATION PROCESS





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Wongawilli Colliery is established on land that was previously covered in native vegetation prior to the mine being established. The principal restoration objective is to return the Colliery's surface facilities to their original pre-mining condition, unless acceptable alternative uses can be found. Alternative land use options are limited by site topography and Council strategic planning such as the "Wollongong Local Environmental Plan (LEP)" allocated zone objectives and the Illawarra Escarpment Strategic Management Plan (refer **Figure 5** for an overview of zonings).

The lands associated with the Pit Top within the Wollongong LEP 2009 are zoned for primary production (RU1) and environmental conservation (E1, E2). The lands associated with the mining operation within the WCC (West Dapto) LEP 2010 are zoned for primary production (RU1), environmental living (E3), low density residential (R2) and services corridor (SP2).

Options for post mining land use are limited as the majority of this land is subject to the zones with environment protection objectives. The largest portion of the area is zoned E1 and E2, with smaller portions lower down on the escarpment zoned E3 and R2, which allow for environmental conservation with low density residential allowed for in Zone R2.

The WCC Illawarra Escarpment Strategic Management Plan identifies the Pit Top as "Core Escarpment" and "Landscape Support". These are environmental conservation values assigned to the escarpment and foothills. Core Escarpment is the area of the escarpment that contain the highest environmental values. Landscape support areas are those areas of land that form a link between core and support areas of the escarpment and foothills with the coastal plain. The current permissible land uses for these zones are identified in the WCC Illawarra Escarpment Strategic Management Plan.

All of the Ventilation Shaft Sites are located in the Metropolitan Special Area (Zoned E2) and are required to be rehabilitated to native bushland in accordance with the requirements of Water NSW.

4.3 Post-Mining Land Use Goal

Rehabilitation objectives described in this MOP are in accordance with those included in Schedule 4 Condition 26 of the Project Approval.

As noted, WC is established on land that was previously covered in native vegetation. The principal restoration objective is to return the Colliery's surface facilities to their original pre-mining condition, unless acceptable alternative uses can be found.

The preferred post mining land use for the Colliery is to rehabilitate the majority of disturbed areas back to natural bushland in imitation of the surrounding environment and in compliance with Mining Lease and Wollongong LEP allocated zone objectives. If areas are



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not zoned for environmental protection works then dwellings or public spaces will be the preferred allocated land-uses.

The Continuing Use EA (ERM, 2010) included an assessment of the zone classifications that dictate the range of land reuse options and likely end use based on the assessment. A summary of the most likely land reuse options is provided in **Table 4-2**.

The final landform and the rehabilitation conducted will be designed to produce a stable landform and vegetation that is consistent with development consent / project approval requirements for the respective domain. Areas within the conceptual final landform design will consist of various vegetation communities which are consistent with the surrounding landscape.

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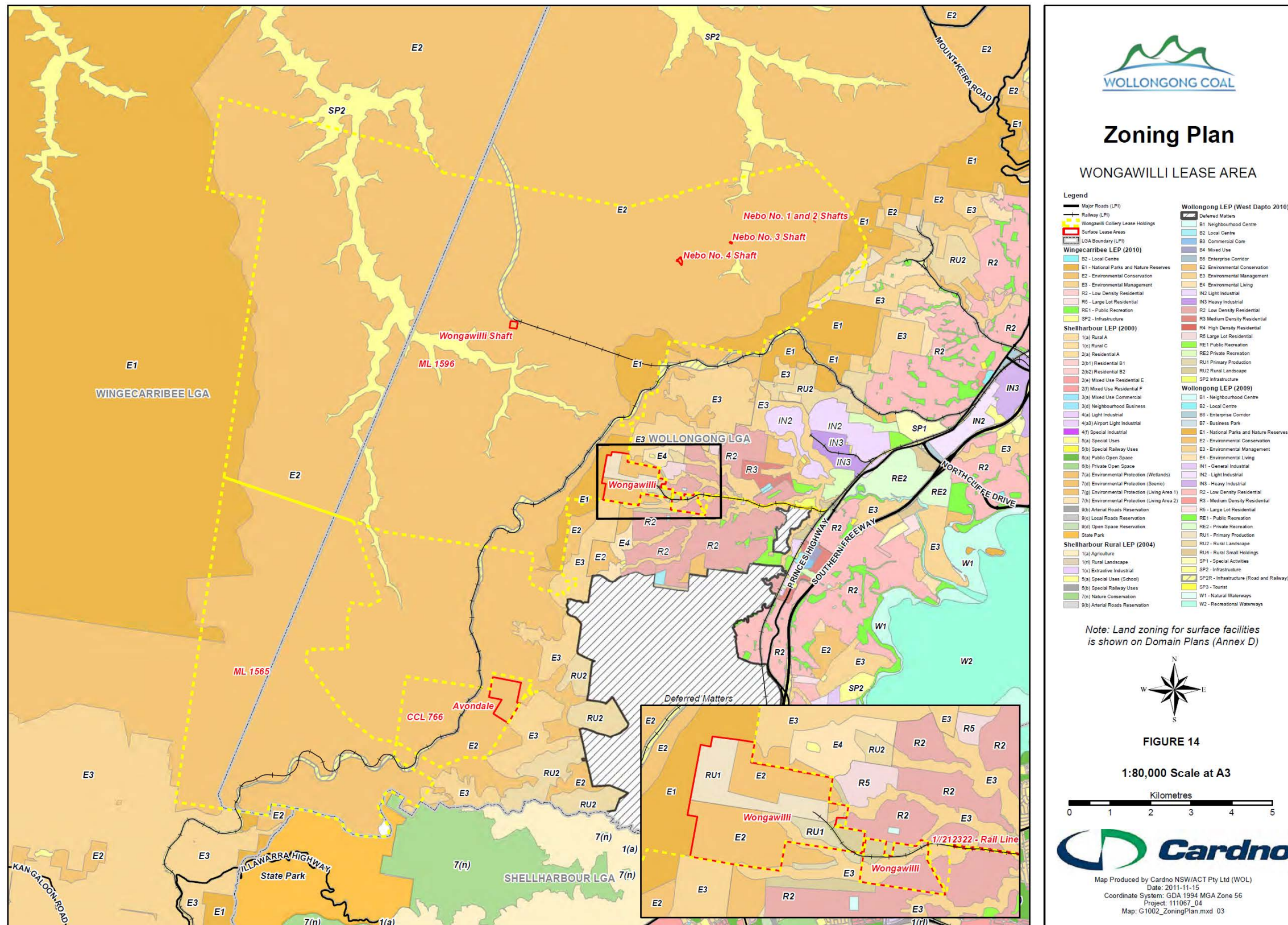


Figure 6

Zoning Plan – Wongawilli Lease Area

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Table 4-2 Indicative Land-Use (adapted from ERM, 2010)

LEP	Zone	Locality	Indicative End use
Wollongong LEP (West Dapto 2010)	E2 - Environmental Conservation	South West Area of Upper Pit Top (adjacent to community hall).	Recreation area-land to be used as open space.
Wollongong LEP (West Dapto 2010)	R2 - Low Density Residential	Land SW of Wongawilli Village and small parcel on corner of Shone Ave and West Dapto Rd.	Dwelling Houses.
Wollongong LEP (West Dapto 2010)	R2 - Low Density Residential	2 Shone Ave.	Recreation Areas. Land to be used as public open space. Areas could provide a buffer on the southern side of the Wongawilli Village to help protect the heritage conservation values of the village.
Wollongong LEP (West Dapto 2010)	RU1 - Primary Production	Lower Wongawilli Pit Top.	Dwelling Houses.
Wollongong LEP (West Dapto 2010)	RU2 - Rural Landscape	Lower Wongawilli Pit Top.	Recreation Areas. Land to be used as public open space. Areas could be used to provide a buffer on the eastern side of the Wongawilli Village to help protect the heritage conservation values of the village.
Wollongong LEP (West Dapto 2010)	RU2 - Rural Landscape	Jersey Farm Road.	Dwelling Houses.
Wollongong LEP (West Dapto 2010)	SP2 - Infrastructure	Northern section of upper and lower Wongawilli Pit Top.	Environmental protection works. Rehabilitation of lands to a natural state.
Wollongong LEP 2009	RU1 - Primary Production	Northern section of upper and lower Wongawilli Pit Top.	Environmental Protection Works.
Wollongong LEP 2009	E2 - Environmental Conservation	Land north of the Upper and Lower Wongawilli Pit Top. Surface lease land west of Illawarra Escarpment Avondale Pit Top.	Environmental Protection Works. Rehabilitation of land to a natural state.

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LEP	Zone	Locality	Indicative End use
Wollongong LEP 2009	E2 - Environmental Conservation	Shaft Sites and Portals.	Environmental Protection Works. Rehabilitation of land to a natural state.

4.4 Rehabilitation Objectives

The primary objective of post-mining rehabilitation works is to create a stable final landform that is consistent with the surrounding natural landscape with acceptable post-mining land use capability.

The post-mining land use will include the progressive rehabilitation to self-sustaining locally occurring vegetation communities, which aims to emulate the pre-mining environment, enhance local and regional ecological linkages and provide for a sustainable final land use option. All rehabilitation works will be scheduled to occur progressively as soon as practicable following disturbance and rehabilitation of infrastructure areas will occur as soon as practical following decommissioning. This approach will also minimise the total disturbed area at any one time while reducing the potential environmental and visual impact of mining operations.

Rehabilitation objectives for WC are detailed in the Project Approval and are reproduced in **Table 4.3**.

Table 4-3 Rehabilitation objectives

Feature	Objective
Mine Site (as a whole)	<ul style="list-style-type: none"> Safe, stable & non-polluting. Final land use compatible with surrounding land uses.
Surface infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed, unless the DRG agrees otherwise.
Portals and vent shafts	<ul style="list-style-type: none"> To be decommissioned and made safe and stable. Retain habitat for threatened species (e.g. bats), where practicable.
Watercourses of 2nd order or above subject to subsidence impacts	<ul style="list-style-type: none"> Hydraulically and geomorphologically stable.
Cliffs	<ul style="list-style-type: none"> No additional risk to safety compared to prior to mining.
Other land affected by the project	<ul style="list-style-type: none"> Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: Local native species(unless DRG agrees otherwise); and A landform consistent with the surrounding environment.

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Feature	Objective
Built features damaged by mining operations	<ul style="list-style-type: none"> Repair to pre-mining condition or equivalent unless: The owner agrees otherwise; or The damage is fully restored, repaired or compensated under the Mine Subsidence Compensation Act 1961.
Community	<ul style="list-style-type: none"> Ensure public safety. Minimise the adverse socio-economic effects associated with mine closure.

5 REHABILITATION PLANNING AND MANAGEMENT

Rehabilitation objectives for WC are detailed within Section 4.4 and are based on the objectives specified in the environmental assessment and the project approval. Domain specific rehabilitation objectives have been developed and are included in Section 5.2.

5.1 Domain Selection

The domains selected are listed in Table 5.1 and shown in Appendix B and Plan 2. Rehabilitation objectives for the MOP period are listed in Table 5-2.

Table 5-1 Domain selection

Primary Domain	Sub-Domain	Code	Proposed Final Land Use
Infrastructure Area	<ul style="list-style-type: none"> Domain 1 - Coal Stockpile and Handling Site incl. Bathhouse Bench Domain 2 - Pit Top Site incl. Decline Corridor Domain 3 - Nebo No.1 and 2 Shaft Sites Domain 4 - Nebo No.3 Shaft Site Domain 5 - Nebo No.4 Shaft Site Domain 6 - Wongawilli No.1 Shaft Site Domain 7 - Avondale Domain 8 - Portal Sites Domain 9 - Garden Storage Area 	1F	Rehabilitation Area – Forest
Water Management Area	N/A	3F	Rehabilitation Area - Forest
Underground Mining Area	N/A	8F	Rehabilitation Area - Forest



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5.1.1 Infrastructure

Facilities within the infrastructure area are detailed in Table 2.2. The infrastructure areas include: pit top area (including the administrative facilities), bathhouse, underground mining infrastructure, ventilation shafts and portals, workshop and associated laydown storage areas and other employee facilities.

A number of sub-domains were previously allocated in the 2016 MOP (Domains 1-9, as listed in Table 5-1) and these have been included within the Infrastructure primary domain. Further detail on these specific aspects are provided in the following sections.

The current secondary domain for infrastructure does not allow for infrastructure to be retained. Retention of these facilities and structures will be further considered in future iterations of the MOP as part of the continued land use options assessment, within a primarily 'Rehabilitated Land – Forest' final land-use.

5.1.2 Water Management Areas

The water management areas at WC include the following: water storage facilities for dirty water; water management structures for diverting water to appropriate water zones; and water management structures which are utilised to assist in improving water quality e.g. sediment dams. These water management areas are located at the Wongawilli pit top predominantly.

The current secondary domain for water management does not allow for relevant water infrastructure to be retained. Retention of these facilities and structures will be further considered in future iterations of the MOP as part of the continued land use options assessment, within a primarily 'Rehabilitated Land – Forest' final land-use.

5.1.3 Mining Areas

The rehabilitation objectives for the mining area are to return the area to a safe and stable landform. Remediation of subsidence cracking will be undertaken in accordance with the Extraction Plan or Subsidence Management Plan for the relevant underground mining area.

5.2 Domain Rehabilitation Objectives

Domain rehabilitation objectives are based primarily on regulatory requirements and are subject to detailed final land-use options assessments to be completed as mine closure approaches. The domain rehabilitation objectives are detailed in Table 5.2 and management of potential environmental risks will be controlled as described in Section 3.2.

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Table 5-2 Wongawilli Colliery Domains and Rehabilitation Objectives

Domain	Code	Rehabilitation Objectives
Infrastructure Area	1F	<ul style="list-style-type: none"> All non-heritage Infrastructure removed to ensure the site is safe and free of hazardous materials Provide soil chemical and physical properties that are comparable with the reference sites, or alternate growth medium that is suitable for the establishment and maintenance of the selected vegetation species. Native ecosystem established. Runoff water quality from the rehabilitated area is within the range of water quality data recorded from analogue sites. All mine openings including shafts declines and portals will be rehabilitated in accordance with the relevant DRG requirements.
Water Management Area	3F	<ul style="list-style-type: none"> All non-heritage Infrastructure removed to ensure the site is safe and free of hazardous materials Provide a self-sustaining land form post mine closure. Provide soil chemical and physical properties that are comparable with the reference sites, or alternate growth medium that is suitable for the establishment and maintenance of the selected vegetation species. Native ecosystem established. Runoff water quality from the rehabilitated area is within the range of water quality data recorded from analogue sites.
Underground Mining Area	8F	<ul style="list-style-type: none"> Landform consistent with the surrounding environment Watercourses are hydraulically and geomorphologically stable No additional risk to public safety compared to prior to mining Publicly accessible subsidence impacts are remediated in accordance with Water NSW/ OEH / DRG / DPE approved remediation methods

5.3 Rehabilitation Phases

In accordance with the requirements of the Project Approval, rehabilitation will be conducted at Wongawilli Colliery as soon as reasonably practicable following disturbance. The current status of rehabilitation for each site Domain is outlined in Table 5-3.

Table 5-3 Rehabilitation Phases

Rehabilitation Phase	Infrastructure Area#	Water Management Area *	Underground Mining Area
Active Mining Area	Yes	Yes	Yes
Decommissioning	Yes	No	No
Landform establishment	Yes	No	No
Growing Medium Development	Yes	No	No



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Ecosystem and Land Use establishment

Yes No No

Ecosystem and Land Use Sustainability

Yes No No

Relinquished Lands

No No No

Note #: The rehabilitation phase for this Domain varies within each sub-domain. There are infrastructures areas which are further progressed with respect to rehabilitation than others. There are areas where rehabilitation has occurred (e.g. Avondale Pit Top) there are also areas which have not yet been rehabilitated. Refer to **Table 6.1** below.

*: There have not yet been any dams which have been rehabilitated at Wongawilli Colliery.



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6 PERFORMANCE INDICATORS AND COMPLETION/RELIQUISHMENT CRITERIA

The performance indicators and completion criteria represented in the following tables have been developed in accordance with the requirements of Schedule 4 Condition 26 of the Project Approval and represent the current knowledge from monitoring data and operational experience relating to the proposed final land use and rehabilitation requirements for WC.

WC will continue to utilise the biodiversity monitoring results from analogue and rehabilitation sites to inform and if necessary refine the performance indicators and completion criteria. Data collected from the biodiversity monitoring program will be ultimately be used during detailed closure works to further refine the specific performance indicators and measurable completion criteria. WC will also utilise the results of geomorphology monitoring undertaken as part of water management planning to further refine performance indicators and completion criteria.

The refinement of these indicators and criteria will be conducted in consultation with relevant stakeholders in accordance with Project Approval requirements and during the completion of detailed closure works.

At the appropriate time a risk assessment will be completed as part of the detailed mine closure planning phase to determine appropriate risk management strategies for the post closure phase of the project.

A number of specific sub-domain strategies have been developed to achieve the preferred post-mining land-use within the Infrastructure Domain. Further details on the proposed activities within each of the specified sub-domains are provided in Sections 6.1 and 6.2, with a summary provided in Table 6-1 and 6-2.



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Table 6-1 Rehabilitation Phases for Infrastructure Domain

Domain	Rehabilitation Objective	Rehabilitation Status at commencement of MOP	Rehabilitation Status at Completion of MOP
Domain 1 Coal Stockpile and Handling Site incl. Bathhouse Bench	Infrastructure removed and site rehabilitated.	Operational	Operational
Domain 2 Pit Top Site incl. Decline Corridor	Infrastructure removed, portals sealed and site rehabilitated.	Operational	Operational
Domain 3 Nebo No.1 and 2 Shaft Sites	Sealed and rehabilitated Infrastructure removed.	Sealed and rehabilitated	Completed in 2006
Domain 4 Nebo No.3 Shaft Site	Infrastructure removed*, Shaft sealed and site rehabilitated.	Currently operational – as a downcast shaft and for emergency firefighting infrastructure. Minor rehabilitation works have been undertaken	Decommissioned (Rehabilitation proposed 2022)
Domain 5 Nebo No.4 Shaft Site	Infrastructure removed*, Shaft sealed and site rehabilitated.	Operational	Decommissioned (Rehabilitation Proposed 2023)
Domain 6 Wongawilli No.1 Shaft Site	Infrastructure removed*, Shaft sealed and site rehabilitated.	Care and Maintenance	Care and Maintenance, Potentially operational dependant on mine planning
Domain 7 Avondale	Infrastructure removed*, Shaft sealed and site rehabilitated.	Care and Maintenance	Care and Maintenance, potentially operational dependant on mine planning
Domain 8 Portal Sites	Sealed and rehabilitated.	Refer Table 6.2	As per Table 6.2



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Domain	Rehabilitation Objective	Rehabilitation Status at commencement of MOP	Rehabilitation Status at Completion of MOP
Domain 9 Garden Storage Area	Infrastructure removed and site rehabilitated.	Operational	Operational

*Unless of heritage significance

6.1 Infrastructure Domain

6.1.1 Domain 1 – Coal Stockpile and Handling Site (including Bathhouse Bench)

Rehabilitation of the Coal Stockpile and Handling Site is considered in respect of the following activities:

- For the life of the MOP period, the Coal Stockpile and Handling Site is intended to be fully operational and utilised to full capacity.
- At mine closure, all buildings and infrastructure non-contributory to the future land use will be removed. Some minor reshaping and vegetation work will be undertaken to ensure long term stability of the land and that the land remains in a stable and non-polluting condition to the satisfaction of the future land owner.

6.1.2 Domain 2 – Wongawilli Pit Top Site (incl. Decline Corridor)

Rehabilitation of the Pit Top Site and the Decline Corridor is considered in respect of the following activities:

- For the life of the MOP period the Pit Top Site and Decline Corridor is intended to be fully operational and utilised to full capacity.
- At mine closure, all buildings and infrastructure non-contributory to the future land use will be removed. Some minor reshaping and vegetation work will be undertaken to ensure long term stability of the land and that the land remains in a stable and non-polluting condition to the satisfaction of the future land owner.
- At mine closure or during progressive rehabilitation, all mine entrances such as Portals will be sealed.
- At mine closure or during progressive rehabilitation, historic buildings will be assessed for their heritage significance and managed in accordance with OEH requirements and the Heritage Act 1977. Those of low to no heritage significance will be progressively removed dependent on their condition.



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6.1.3 Domain 3 – Nebo No.1 and 2 Shaft Sites

Rehabilitation of the Nebo No.1 and No.2 Shaft Site was completed in 2006. The existing maintenance plan for the rehabilitated sites will continue to be implemented until signed off by DRG as complete.

6.1.4 Domain 4 – Nebo No.3 Shaft Site

Rehabilitation of the Nebo No.3 Shaft site is addressed in Appendix A.

6.1.5 Domain 5 – Nebo No.4 Shaft Site and Domain 6 - Wongawilli No.1 Shaft Site and

Rehabilitation of the Nebo No.4 Shaft site is addressed in Appendix A.

6.1.6 Domain 7– Avondale

Rehabilitation of the Avondale site is considered in respect of the following activities:

- For the life of the MOP period, the Avondale site will be maintained in a stable and non-polluting condition, with existing portals being secured to prevent unauthorised access.
- At mine closure, or when this site is no longer required, relevant assessment will be undertaken to determine the rehabilitation requirements for this site. It is anticipated that some minor reshaping and vegetation work will be undertaken to ensure long term stability of the land and that the land remains in a stable and non-polluting condition to the satisfaction of the land owner.
- All portals will be fully sealed to the satisfaction of the District Inspector of Coal Mines.

6.1.7 Domain 8 – Portals

WCL is responsible for the rehabilitation of a number of historic and current mine entries within their lease areas (Table 6-2). The locations of these Portals is shown in Appendix B.

Table 6-2 Domain 8 (Portals) Rehabilitation Status and Objectives

Ref No	Portal Name	Rehabilitation Objective	Heritage Significance	Rehabilitation Status
1	W1 South Kembla Colliery Portal	To be rehabilitated	None	Outside MOP period Post mine closure



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Ref No	Portal Name	Rehabilitation Objective	Heritage Significance	Rehabilitation Status
2	W2 South Kembla Colliery Entry	To be rehabilitated	None	Outside MOP period Post mine closure
3	W3 South Kembla Colliery Entry	To be rehabilitated	None	Outside MOP period Post mine closure
4	W4 Rangers Portal	Sealed by Natural Means	Associative	Outside MOP period Post mine closure security and rehabilitation to be assessed
5	W5 Daylight Entry	Sealed by Natural Means	Associative	Outside MOP period Post mine closure security and rehabilitation to be assessed
6	W6A Wongawilli R T V Transport Portal	Currently Operational	Associative	Outside MOP period Post mine closure
7	W6 Main transport (Track) Portal	Currently Operational	Associative	Outside MOP period Post mine closure
8	Portal C	Currently Operational	None	Outside MOP period Post mine closure
9	W7 Old Prospect Tunnel	Sealed by Natural Means	Contributory	Outside MOP period Post mine closure security and rehabilitation to be assessed
10	W8 Belt Conveyor Inspection Portal	Currently Operational	Primary	Outside MOP period Post mine closure
11	W9 Belt Conveyor Portal	Currently Operational	Contributory	Outside MOP period Post mine closure
12	W10 Loco Track Portal	Currently Operational	Contributory	Outside MOP period Post mine closure



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Ref No	Portal Name	Rehabilitation Objective	Heritage Significance	Rehabilitation Status
13	Portal B	Currently Operational	None	Outside MOP period Post mine closure
14	Portal A	Proposed	None	Outside MOP period
15	W11 Old Portal	To be rehabilitated	Contributory	Outside MOP period Post mine closure
16	W11B Wombat hole	To be rehabilitated	Associative	Outside MOP period Post mine closure
17	W11A Old Main Rope Haulage Drift Portal	To be rehabilitated	Contributory	Outside MOP period Post mine closure
18	W12 old Main Fan Portal	To be rehabilitated	Primary	Outside MOP period Post mine closure
19	W13 Old 1 South Track Portal	To be rehabilitated	Primary	Outside MOP period Post mine closure
20	W14 Southern Entry (Eastern Portal)	Sealed by Natural Means	None	Outside MOP period. Post mine closure security and rehabilitation to be assessed
21	W15 Southern Entry (Western Portal)	Sealed by Natural Means	None	Outside MOP period. Post mine closure security and rehabilitation to be assessed
22	W16	Sealed by Natural Means	None	Outside MOP period. Post mine closure security and rehabilitation to be assessed
23	N6 Forrest 11 Entry (Eastern Portal)	To be rehabilitated	None	Outside MOP period Post mine closure



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Ref No	Portal Name	Rehabilitation Objective	Heritage Significance	Rehabilitation Status
24	N7 Forrest 11 Entry (Western Portal)	To be rehabilitated	None	Outside MOP period Post mine closure
25	Avondale Portal 1		None	Outside the MOP period Maintained in secure state
26	Avondale Portal 2		None	Outside the MOP period Maintained in secure state

6.1.8 Domain 9 – Garden Storage Area

The Garden Storage Area is located approximately 250 m to the south of the Pit Top benches (Domain 2) on Wongawilli Colliery freehold land and has been allocated as 'Domain 9'. The Garden Storage Area is used for storage of mining equipment and materials.

The site is surrounded by eucalypt forest some of which is Endangered Ecological Community (EEC). Rehabilitation of the Garden Storage Area is considered in respect of the following activities:

- For the life of the MOP period the Garden Storage Area will continue to be fully operationally utilised for the storage of materials for use both underground and at the mine sites surface.
- At mine closure the site will be rehabilitated. Materials stored at the site are not fixed and may be easily removed. Minor reshaping and vegetation work will be undertaken to ensure long term stability of the land and that the land remains in a stable and non-polluting condition to the satisfaction of the future land owner.
- Revegetation will be in accordance with the surrounding vegetation.

6.2 Domain Specific Conceptual Closure Works

All works will be tendered for and undertaken by appropriately qualified contractors. Expert engineering, geotechnical, ecological, contamination or other advice will be sought as appropriate. WCL health and safety requirements will be observed at all times whilst undertaking closure or rehabilitation works.

The following section provides an indication of likely works. However, these may be modified or updated on the results of specialist investigations



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6.2.1 Pit Top Sites

Coal Stockpile and Handling Site Works (incl. Bathhouse Bench)

In order to rehabilitate the Coal Stockpile and Handling Site, on ground works will include:

- a) Removal of Infrastructure; and
- b) Land Rehabilitation.

This part of the site is populated by a variety of heavy industrial infrastructure. Major issues for consideration will include, settling dams, discharge points, coal conveyor and associated buildings, site re-contouring, revegetation, drainage and remediation of contaminated soil/water. Locations of major surface infrastructure at the Coal Stockpile and Handling facility and the Bathhouse Bench are shown in the attached Domain 1 Plan (refer Appendix B).

Works required on the Coal Stockpile and handling site works include:

1. Demolish and remove (unless retained due to heritage significance):
 - Coal Sizer;
 - Two 2000 t coal bins;
 - Rill towers;
 - Substation, powerlines and stanchions;
 - Drainage infrastructure draining to collection ponds;
 - Pipelines and services;
 - Noise barrier;
 - Car parking hardstand and access road;
 - Bathhouse and administration complex;
 - Various small buildings; and
 - Rail Corridor (4km and associated infrastructure).
2. Remove retired/discarded equipment and scrap.



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3. Remove any contaminated sediment from sediment basins and buffer dam. Backfill with wall material and clean material.
4. Removal of roadway, hardstand and foundations.
5. Removal of rail infrastructure.
6. Removal of substation and power poles.
7. Remediate contaminated soil by removal, encapsulation or land farming on site.
8. Re-profile site as per the final landform design to reduce the slope lengths by constructing contour banks and armouring channels to prevent erosion if necessary.
9. Revegetate as per the final revegetation/landscape plan utilise local species. Rip and seed to stabilise the bare soil using an appropriate method (such as hydroseeding/ hydromulching).
10. Develop ongoing management plans.
11. If returning to natural bushland, monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for at least 5 years after works have been completed.
12. If returning to natural bushland, carry out weed control and replanting/reseeding as necessary.

Pit Top Works (incl. Decline Corridor)

In order to rehabilitate the Pit Top Site, on ground works will include:

- a) Removal of Infrastructure;
- b) Sealing of Mine Entrances; and
- c) Land Rehabilitation.

The Pit Top bench site covers an area of approximately 1 ha of land. The site is located on WCL freehold land and is surrounded by eucalypt forest some of which is EEC. The forest areas to the west of the site are gazetted National Parks and Wildlife Services (NPWS) lands. The portals shall be progressively sealed depending upon if they are redundant or in use and the effect of sealing the portals on the mine ventilation.

The Decline Corridor runs east west for approximately 800 m and connects the Pit Top and Bathhouse Benches. The site is located on WCL freehold land and is surrounded by EEC on either side.



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Major issues for consideration will include heritage items, vegetation protection, site re-contouring, revegetation, drainage and remediation of contaminated soil/water. Locations of major surface infrastructure on the Pit Top are shown in the attached Domain 2 Plan (refer Appendix B).

Works required on the pit top will include:

1. Removing major infrastructure (unless of heritage significance and otherwise agreed) including:
 - Enclosed coal conveyor and associated buildings;
 - Covered storage areas;
 - Open Storage Areas;
 - Fire station and water tank;
 - Control building;
 - Workshop and store;
 - Bridges over conveyor and watercourses;
 - Man transport rail car and railway track;
 - Covered coal conveyor;
 - Vehicular access track;
 - Sealed car parking areas and access roads; and
 - Sundry small buildings.
2. The removal of retired equipment (e.g. discarded conveyor belts, pipes, hoses, cables).
3. Seal Pit Top Portals W6 to 13 and A to C as per DRG guidelines. (Portals may be sealed from either underground or from the surface depending upon access).
4. Remediate any contaminated soil by removal, encapsulation or land farming on-site.
5. Demolish and remove all concrete slabs and bitumen surfaces.
6. Demolish and remove all pipelines and services.
7. Demolish and remove all power lines.



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8. Remove infrastructure of water release points and ensure discharge points and drainage lines are stabilised appropriately.
9. Re-profile the site as per the final landform design including slope stabilisation works and erosion prevention works (such as reducing slope gradient, reducing lengths by constructing contour banks, armouring channels to prevent erosion).
10. Topsoil bare or stripped areas.
11. Revegetate as per the final revegetation/landscape plan utilising local species. Rip and seed to stabilise the bare soil using an appropriate method (such as hydroseeding / hydromulching).
12. Develop ongoing maintenance management plans.
13. Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for at least 5 years after works have been completed (or site sold).
14. Carry out weed control and replanting/reseeding as necessary.

6.2.2 Avondale

Rehabilitation works at Avondale are generally complete. On ground works will include:

- a) Removal of any remaining Infrastructure;
- b) Checking Portals are sealed to the satisfaction of DRG; and
- c) Weed control and Revegetation.

Two sealed portals are located on a cleared pad at the outcrop of the Wongawilli Seam on the escarpment. Access is by a private road leading off Avondale Road. The location of the portals are shown in the attached Domain 7 Plan (refer Appendix B).

1. Ensure that the sealing of the two portals is to DRG requirements.
2. Removal of mine debris.
3. Re profiling of the site and repair of any scoured areas.
4. Revegetation of all disturbed areas (if required).
5. Develop ongoing maintenance management plans.
6. If revegetation is undertaken, monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for the site is reassigned.



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7. If revegetation undertaken, carry out weed control and replanting/reseeding as necessary.

6.2.3 Ventilation Shaft Works

The Rehabilitation Plan for Nebo No.1 and No.2 Shafts has been approved by the DRG, and works were completed in 2006. Nebo No. 3 Ventilation Shaft will remain in use as a downcast ventilation shaft until the mine ventilation fan at Nebo No. 4 shaft is decommissioned.

Wongawilli No.1 Ventilation Shaft

In order to rehabilitate the Wongawilli No.1 Shaft Site, on-ground works will include:

- a) Removal of remaining Infrastructure;
- b) Sealing mine entries; and
- c) Land rehabilitation.

Major issues for consideration will include the removal of remaining surface infrastructure, site re-contouring and revegetation. Locations of major surface infrastructure at the Shaft Sites are shown in the attached Domain 6 Plan (refer Appendix B).

Remediation work will be conducted in stages and include:

1. Demolishing and removing major infrastructure including:
 - o Fan ducting;
 - o Fan drive houses and foundations;
 - o Miscellaneous mine debris and fencing;
 - o An Electrical sub-station; and
 - o Overhead powerlines and poles.
2. Exposure of shaft and preparation for filling.
3. Filling of shaft with fill excavated from shaft site as per DRG guidelines.
4. Re-profiling of the site and repair of any scoured areas.
5. Sealing of shaft with concrete capping.
6. Revegetation of all disturbed areas.



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7. Develop ongoing maintenance management plans.
8. After WNSW sign-off from rehabilitation works, revegetate the access track, rendering it non trafficable to motor vehicles but accessible for long-term maintenance (in consultation with WNSW).
9. Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for site is reassigned.
10. Carry out weed control and replanting/reseeding as necessary.

Nebo No.3 Shaft Site

In order to rehabilitate the Nebo No.3 Shaft Site, on ground works will include:

- a) Removal of Remaining Infrastructure;
- b) Sealing Mine Entries; and
- c) Land Rehabilitation.

Major issues for consideration will include the removal of remaining surface infrastructure, site re-contouring and revegetation. Locations of major surface infrastructure at the shaft sites are shown in the attached Domain 4 Plan (refer Appendix B).

Remediation work will be conducted in stages and include:

1. Demolishing and removing major infrastructure including:
 - o Shed and foundations;
 - o Miscellaneous mine debris and fencing;
 - o Demolition and removal of water tank foundation, pump house and water supply infrastructure;
 - o Electrical sub-station; and
 - o Overhead powerlines and poles and fencing.
2. Exposure of shaft and preparation for filling.
3. Filling of shaft with fill excavated from shaft site as per DRG guidelines.



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4. Re profiling of the site and repair of any scoured areas.
5. Sealing of shaft with concrete capping.
6. Revegetation of all disturbed areas.
7. Develop ongoing maintenance management plans.
8. Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for site is reassigned.
9. Carry out weed control and replanting/reseeding as necessary.

Nebo No.4 Shaft Site

In order to rehabilitate the Nebo No.4 Shaft site, on ground works will include:

- a) Removal of Remaining Infrastructure;
- b) Sealing Mine Entries; and
- c) Land Rehabilitation.

Major issues for consideration will include the removal of remaining surface infrastructure, site re-contouring and revegetation. Locations of major surface infrastructure at the Shaft Sites are shown in the attached Domain 5 Plan (refer Appendix B).

1. Demolish and Remove Major infrastructure including:
 - o Two Fans and Fan ducting;
 - o The fan drive houses and foundations;
 - o Miscellaneous Mine debris and fencing;
 - o Electrical sub-station; and
 - o Overhead powerlines and poles.
2. Exposure of shaft and preparation for filling.
3. Filling of shaft with fill excavated from shaft site as per DPI guidelines.
4. Re profiling of the site and repair of any scoured areas.



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5. Sealing of shaft with concrete capping.
6. Revegetation of all disturbed areas.
7. Develop ongoing maintenance management plans.
8. After WNSW sign-off from rehabilitation works, revegetate the access track, rendering it non trafficable to motor vehicles but accessible for long-term maintenance (in consultation with WNSW).
10. Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for site is reassigned.
11. Carry out weed control and replanting/reseeding as necessary.

6.2.4 Mine Portal Works

Department of Industry (DI) - MDG 6001 Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams, February 2012; Section 5 Adit Filling and Capping, states that the surface entries /adits are to be provided with design engineered bulkheads or bulkhead seals. Therefore, during progressive rehabilitation and upon final rehabilitation, all mine entries will be sealed. Permanent sealing plans will be developed in accordance with DI MDG 6001 Guidelines and will be prepared and submitted to the DI as per the High Risk Activity (HRA) Notification procedure. There is a requirement of a 1 month waiting period prior to the commencement of sealing activities

Further details regarding the required rehabilitation actions for each asset (as identified in Table 5-2) are provided in the following sections. The locations of the Portals are indicated on Domain Plan 8 (refer Appendix B).

Wongawilli Pit Top Portals

The portals at Wongawilli Colliery that are currently operational include the following:

- Bulli Seam Conveyor Portal (A);
- Wongawilli Seam Conveyor Portal (B);
- Rubber Tyred Vehicle Portal (C);
- W6A Wongawilli RTV Transport Portal;
- W6 Main transport (Track) Portal;
- W8 Belt Conveyor Inspection Portal;



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- W9 Belt Conveyor Portal;
- W10 Loco Track Portal; and
- W11 Old Portal.

These portals are currently contributing to mine operations either in their original capacity of for some modified use such as storage or ventilation (refer Table 5-2).

The A Portal is required to provide access to Bulli Seam coal in the western part of the Wongawilli Colliery lease areas and includes a coal conveyor from the portal to the Transfer House and Coal Bin. The Wongawilli Conveyor Portal B contains a Clearance Conveyor that brings coal from the Wongawilli Seam to the Pit Top surface and the RTV Portal C is for Men and Material entry and egress from the new underground mine.

The W6 Main transport (Track) Portal has been partially rehabilitated to serve as the Colliery explosives store. W8 serves as the Belt conveyor portal, W9 is the Belt conveyor portal and W10 is the Loco track portal. W11 provides inspection access to old workings and is part of the ventilation circuit.

W12 Old Main Fan Portal and W13 Old 1 South Track Portal and W16 are also located at the Wongawilli Pit Top. The W16 portal has been sealed over a long period of time by natural means and cannot be located due to heavy vegetative cover. This portal may need to be rehabilitated as part of the CDC 836/11 for the upgrade of the upper Pit Top power and new switchyard.

In order to rehabilitate the Pit Top Portals, on ground works will include:

- a) Removal of Remaining Infrastructure;
- b) Sealing Mine Entries; and
- c) Land Rehabilitation.

Remediation work includes:

1. Sealing of the three portals as per DRG requirements.
2. Removal of mine debris.
3. Re profiling of the site and repair of any scoured areas.
4. Undertake revegetation and maintenance management as per Upper Pit Top Rehabilitation (Section 6.2.2).



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Forrest 11 Entries (Portals N6, N7)

In order to rehabilitate the Forest 11 entries, on ground works will include:

- a) Removal of Remaining Infrastructure;
- b) Sealing Mine Entries; and
- c) Land Rehabilitation.

These portals are currently acting as downcast shafts into the underground mine workings and will not be rehabilitated until they no longer serve this function.

Remediation work includes:

1. Exposure of the portals and preparation for sealing.
2. Sealing of the two portals as per DRG requirements.
3. Removal of mine debris.
4. Re profiling of the site and repair of any scoured areas.
5. Revegetation of all disturbed areas (if required).
6. Develop ongoing maintenance management plans.
7. If revegetation undertaken, monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for site is reassigned.
8. If revegetation is undertaken. carry out weed control and replanting/reseeding as necessary.

South Kembla (Portals W1 to W3)

The South Kembla Portals are redundant and as such can be rehabilitated without affecting mining operations.

In order to rehabilitate the South Kembla Portals W1 to W3, on ground works will include:

- a) Removal of Remaining Infrastructure;
- b) Sealing Mine Entries; and
- c) Land Rehabilitation.



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Remediation work will be conducted in stages and include:

1. Upgrading of the existing access track leading to the South Kembla Portals site to facilitate heavy vehicle access.
2. The fan drive houses, ducting and foundations are to be removed.
3. Removal of mine debris.
4. Exposure of portals and preparation for sealing.
5. Sealing of portals as per DRG guidelines.
6. Re-profiling of the site and repair of any scoured areas.
7. Revegetation of all disturbed areas.
8. Develop ongoing maintenance management plans.
9. Revegetation of access track, rendering it non-trafficable to motor vehicles but accessible for long-term maintenance requirements (unless required to be kept by WNSW).
10. Develop ongoing maintenance management plans.
11. Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for up to 5 years after works have been completed or until responsibility for site is reassigned.
12. Carry out weed control and replanting/reseeding as necessary.

Rangers Portal W4

The portal has already collapsed and vegetation has established. The portal is surrounded by established native vegetation. Consequently, a track would have to be cut in to allow heavy vehicle access to fill the portals with materials imported to site. The environmental damage caused by this action is believed to outweigh any potential environmental benefit from sealing the portals with imported fill. Furthermore, additional heavy equipment would be required to make the portal safe for entry.

The Rangers Portal is not in use and is a significant distance from the current workings. It is not safely accessible from underground as that area of the mine has experienced major roof falls and flooding.



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Rehabilitation works at this stage will therefore involve:

1. Further investigations and risk assessments to determine the most appropriate means of rehabilitation required, if any.
2. Obtaining DRG signoff.

Daylight Portal W5

This portal has collapsed and is surrounded by established native vegetation. Consequently, the portal is not visible from the surface. Natural processes have effectively sealed the portal. In order to open the portal and seal it with imported material a track would have to be cut in to allow heavy vehicle access. The environmental damage caused by this action is believed to outweigh any potential environmental benefit from sealing the portal with imported fill. Furthermore, additional heavy equipment would be required to make the portal safe for entry. The Daylight Portal is not in use and is inaccessible from underground as that area of the mine has experienced major roof falls and flooding.

It is proposed that no remediation work is required at the Daylight Portal as it has been effectively sealed by natural processes.

Closure works at this stage are therefore limited to:

1. Documenting investigations and risk assessments and obtaining DRG signoff.

Southern Entries (W14,15)

The Southern portals site is located 0.5 km south of the Wongawilli Pit Top, on gazetted NPWS land.

There is no defined access to the site, and the portals have been covered over a long period of time by natural means. The Southern Portals site is surrounded by rainforest, typical of the Illawarra Escarpment. The environmental damage that would be caused in order to construct a heavy vehicle access track to seal the portal far outweighs its environmental benefit. Therefore, to minimise this effect, a grout pumping station may be located nearby in order to pump cementitious material to the site. Closure works at this stage are therefore limited to:

1. Establishing a grout pumping location.
2. Pumping cementitious grout to the site to fill a small shaft 2m wide by 3m deep and one entry that is still accessible.



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3. Site clean-up.
4. Revegetation of all disturbed areas.

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6.3 Infrastructure Area Rehabilitation Phases

Table 6-3 Infrastructure Area Decommissioning Phase

Phase – Decommissioning (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
All non-heritage Infrastructures to be removed to ensure the site is safe and free of hazardous materials	Services: removal of all services (power, water, communications, roads)	Infrastructure not required for post mining land use has been removed.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term
	Rehabilitation of open boreholes	Boreholes which are no longer required for operations / monitoring purposes are rehabilitated in accordance with EDG 01 Borehole Sealing Requirements on Land.					
	Ventilation Shafts (Wongawilli No.1 Shaft, Nebo No.3 and No.4 shafts)	Shafts to be filled and capped in accordance with DRG rehabilitation requirements.					
	Mine Portals (Wongawilli Pit Top Portals, Forrest 11 Entries (Portals N6 and N7), South Kembla Portals (W1 to W3), Rangers Portal, Daylight Portal	Portals to be filled and capped in accordance with Department of Industry (DI) - MDG 6001 Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams, February 2012					

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Phase – Decommissioning (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
	W5, Southern Entries (W14 and W15).						
	Wongawilli Pit Top: demolition and removal of all office and workshop related facilities including refuelling facilities.	Infrastructure not required for post mining land use has been removed.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term
	Avondale Pit Top demolition and removal of all office and workshop related facilities including refuelling facilities.	Infrastructure not required for post mining land use has been removed and site rehabilitated	Schedule 4, Clause 26, Table 13 of Project Approval	Yes	Infrastructure Area	Rehabilitation Area - Forest	Rehabilitation undertaken. Monitoring and maintenance ongoing
Ensure the site is safe and free of hazardous materials	Soil quality	Soil testing completed to verify rehabilitated area meets required soil quality criteria for the proposed final land use in accordance with the relevant contaminated land guidelines under the Contaminated Land Management Act 1997. Values to be defined in subsequent revisions to the MOP.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term

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Phase – Decommissioning (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Minimise risk of injury to people and animals from any remaining infrastructure and stability of subsidence	Safety risks identified and appropriately mitigated.	<ul style="list-style-type: none"> Risk assessment conducted to document security controls to minimise risk of unauthorised access to mining area by personnel or animals. Assessment at mine closure to provide report on slope stability and confirm slopes are stable for post mining land use. 	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term

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Table 6-4 Infrastructure Area Landform Establishment Phase

Phase – Landform Establishment (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Final landform shaped and rehabilitated	Geotechnical report completed by qualified person shows landform is stable and slopes are stable for post mining land use.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	All Wongawilli infrastructure in use throughout MOP term Avondale pit top has been rehabilitated
	Erosion	Minor rilling only (less than 20 cm by 20cm).					
	Surface layer is free of any hazardous materials	Inspection conducted by a suitably qualified person to verifies that the surface layer is free of any hazardous materials.					

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Table 6-5 Infrastructure Area Growth Medium Development Phase

Phase – Growth Medium Development (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Provide soil chemical and physical properties comparable with the analogue sites, or alternate growth medium that is suitable for the establishment and maintenance of the selected vegetation species	Topsoil or suitable alternative has been spread over the rehabilitation surface.	Rehabilitation monitoring reports provide evidence that topsoil or suitable alternatives have been spread uniformly over the rehabilitation surface.	Developed for this MOP.	No	Infrastructure Area	Rehabilitation Area - Forest	Area in use during the MOP term. Avondale pit top has been rehabilitated
	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Developed for this MOP	No	Infrastructure Area	Rehabilitation Area - Forest	Area in use during the MOP term. Avondale pit top has been rehabilitated

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Table 6-6 Ecosystem and Land Use Establishment Phase

Phase – Ecosystem and Land Use Establishment (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Revegetation	Native plant species compatible with the surrounding environment are used in revegetation	Areas of exposed soils are revegetated to achieve cohesive ground cover using a native plant species mix compatible with the surrounding environment.	Schedule 4, Clause 26, Table 13 of Project Approval.	No	Infrastructure Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term Avondale pit top has been rehabilitated
Vegetation Establishment	% ground cover, species mix	Ground cover comparable to analogue sites / baseline monitoring. Rehabilitated areas revegetated with species selected based on the surrounding vegetation and monitoring of analogue sites.	WCL Biodiversity Management Plan	No	Infrastructure Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term Avondale pit top has been rehabilitated
Floristic diversity is progressing towards the ecosystems planned in the final land use.	Development of native ecosystems as per the final land use.	Composition characteristics of revegetated areas such as groundcover, understorey and canopy will be developed as part of subsequent revisions to the MOP and will be	WCL Biodiversity Management Plan	No	Infrastructure Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term

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Phase – Ecosystem and Land Use Establishment (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		based on either baseline studies or monitoring of analogue sites.					Avondale pit top has been rehabilitated
		Weeds absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation.	WCL Biodiversity Management Plan and Land Management Plan				
Fauna diversity is progressing towards the ecosystems planned in the final land use.	Rehabilitation areas provide a range of structural habitats similar to pre mining fauna communities.	Monitoring data provides evidence of a range of structural habitats similar to pre mining. Fauna communities are evident in rehabilitation areas.	WCL Biodiversity Management Plan	No	Infrastructure Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term Avondale pit top has been rehabilitated
	Fauna pest species are managed and controlled (where possible)	Pest monitoring and pest control requirements will be developed as part of subsequent revisions to the MOP and will be based on historical monitoring information or monitoring from analogue sites.					
The area does not present an extreme bushfire hazard to surrounding areas.	Appropriate bushfire hazard controls have been implemented with advice from the NSW Rural Fire Service.	The Bushfire Management Plan has been reviewed in accordance with RFS requirements and using relevant NSW Fire Service guidelines.	Bushfire Management Plan	No	Infrastructure Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout



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Phase – Ecosystem and Land Use Establishment (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
							MOP term Avondale pit top has been rehabilitated

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Table 6-7 Infrastructure Ecosystem and Land Use Sustainability Phase

Phase – Ecosystem and Land Use Sustainability (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Weeds and pest species are actively managed and controlled.	Weed audits conducted on a regular basis. Weeds identified on site are actively controlled and/or removed using appropriate weed control techniques.	No increase in weed population and monitoring indicates the absence of or decline in weed species.	WCL Biodiversity Management Plan	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term Avondale pit top has been rehabilitated
	A range of appropriate pest control measures (e.g. the destruction of habitat, trapping, targeted shooting programmes and baiting) are employed as determined in consultation with adjoining landholders.	Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures.	WCL Biodiversity Management Plan				
		No increase in feral animal population and monitoring indicates the absence of or decline in feral animal species numbers	WCL Biodiversity Management Plan				
Establishment of revegetation that is to achieve the final land	Revegetation is progressing towards a sustainable ecosystem	Composition characteristics of revegetated areas such	WCL Biodiversity Management	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term

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Phase – Ecosystem and Land Use Sustainability (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
use.	and only requires maintenance that is consistent with the intended final land use.	as groundcover, understorey and canopy will be developed and included in subsequent revisions of the MOP and will be based on either baseline studies or monitoring of analogue sites.	Plan				Avondale pit top has been rehabilitated
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment.	Biodiversity Management Plan	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term Avondale pit top has been rehabilitated
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	More than 75% of trees are healthy and growing.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term
		Weeds are absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation.	Biodiversity Management Plan				Avondale pit top has been rehabilitated
		Pest monitoring and pest control requirements will be developed as part of subsequent revisions to the MOP and will be based on historical monitoring information or	Biodiversity Management Plan	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term Avondale pit top has been rehabilitated

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Phase – Ecosystem and Land Use Sustainability (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		monitoring from analogue sites.					
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	Fire access tracks will be maintained and fuel load monitoring will occur at annual intervals. Fuel reduction works will be completed in accordance with the Bushfire Management Plan. Post closure requirements will be discussed in subsequent revisions to the MOP	Developed for this MOP.	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term Avondale pit top has been rehabilitated
	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Analogue sites / or monitoring to be confirmed as part of subsequent revisions to the MOP	No	Infrastructure	Rehabilitation Area – Forest	Area in use during the MOP term Avondale pit top has been rehabilitated

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Table 6-8 Infrastructure Relinquished Lands Phase

Phase – Relinquished Lands (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Provide soil chemical and physical properties comparable with the analogue sites.	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Analogue sites / or monitoring to be confirmed as part of subsequent revisions to the MOP	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Water quality from rehabilitation area meets relevant water quality standards.	Runoff water quality from rehabilitation areas	Water quality monitoring data provides evidence that runoff water quality from rehabilitation areas is within the range of baseline surface water from nearby creeks for a range of analytes in accordance with EPL requirements.	Surface Water Management Plan.				

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Phase – Relinquished Lands (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Revegetation/ Regeneration is sustainable for the long term and only requires maintenance.	Second generation tree seedlings are present.	Signs of seeding occurring and signs of recruitment in all stratum. Or evidence to demonstrate that the ecosystem will progress towards recruitment.	Schedule 4, Clause 26, Table 13 of Project Approval				
Revegetation/ Regeneration is sustainable for the long term and only requires maintenance.	Trees are healthy and growing.	Monitoring data provides evidence that more than 75% of trees are healthy and growing.	Biodiversity Management Plan Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
	No significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.	Weeds are absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation.					
	A range of vegetation structural habitats exist that are commensurate with the final land use of each domain.	Composition characteristics of revegetated areas such as groundcover, understorey and canopy will be developed and included in subsequent revisions					

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Phase – Relinquished Lands (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		of the MOP and will be based on either baseline studies or monitoring of analogue sites.					
Landform suitable for final land use and compatible with surrounding landscape.	Visual assessment conducted to verify that landforms developed are compatible with surrounding landscape	Sign off from DRG that the landforms developed are compatible with the surrounding landscape and they approve such landform as part of the MOP approval	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Native ecosystem established.	Fauna pest species	Pest monitoring and pest control requirements will be developed as part of subsequent revisions to the MOP and will be based on historical monitoring information or monitoring from analogue sites.	Biodiversity Management Plan	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Stable Landform	Inspections conducted by suitably qualified persons to check and verify landform stability.	Erosion rills of less than 20 cm by 20 cm, and showing signs of regeneration of vegetation.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.

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Phase – Relinquished Lands (Infrastructure Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Stable Landform	Inspections conducted by suitably qualified persons to check and verify landform stability.	Drainage structures are stable and there is no evidence of overtopping. Less than 1 metre scouring as a result of runoff.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
	Inspections conducted by suitably qualified persons to check and verify landform stability.	Surface layer is free of any hazardous materials.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Land free of contamination	Soil and groundwater quality meets statutory requirements.	Contaminated land assessment completed and soils / groundwater signed off as acceptable by contaminated land specialist in accordance with guidelines under the Contaminated Land Management Act 1997.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Infrastructure Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.

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6.4 Water Management Area

Table 6-9 Water Management Area Decommissioning Phase

Phase – Decommissioning (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
All non-heritage Infrastructures to be removed to ensure the site is safe and free of hazardous materials	Pumps, pipes and power: removal of water management infrastructure and fill open drains	Infrastructure not required for post mining land use has been removed.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term
	Soil quality	Soil testing completed to verify rehabilitated area meets required soil quality criteria for the proposed final land use in accordance with the relevant contaminated land guidelines under the Contaminated Land Management Act 1997. Values to be defined and included in subsequent revisions of the MOP					
Minimise risk of injury to people and animals from any remaining infrastructure and stability of subsidence	Safety risks identified and appropriately mitigated.	Risk assessment conducted to document security controls to minimise risk of unauthorised access	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term

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Phase – Decommissioning (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		to mining area by personnel or animals. Assessment at mine closure to provide report on slope stability and confirm slopes are stable for post mining land use.					
Minimise risk of injury to people and animals from any remaining infrastructure and stability of subsidence	Ensure the site is safe and free of hazardous materials	Risk assessment conducted to document security controls to minimise risk of unauthorised access to mining area by personnel or animals. Assessment at mine closure to provide report on slope stability and confirm slopes are stable for post mining land use	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term

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Table 6-10 Water Management Area Landform Establishment Phase

Phase – Landform Establishment (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Final landform shaped and rehabilitated	Geotechnical report completed by qualified person shows landform is stable and slopes are stable for post mining land use.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	Infrastructure in use throughout MOP term
	Erosion	Minor rilling only (less than 20 cm by 20cm).					
	Surface layer is free of any hazardous materials	Inspection conducted by a suitably qualified person to verifies that the surface layer is free of any hazardous materials.					

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Table 6-11 Water Management Area Growth Medium Development Phase

Phase – Growth Medium Development (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Provide soil chemical and physical properties comparable with the analogue sites, or alternate growth medium that is suitable for the establishment and maintenance of the selected vegetation species	Topsoil or suitable alternative has been spread over the rehabilitation surface.	Rehabilitation monitoring reports provide evidence that topsoil or suitable alternatives have been spread uniformly over the rehabilitation surface.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitati on Area - Forest	Area in use during the MOP term.
	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Developed for this MOP	No	Water management Area	Rehabilitati on Area - Forest	Area in use during the MOP term.

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Table 6-12 Water Management Area Ecosystem and Land Use Establishment Phase

Phase – Ecosystem and Land Use Establishment (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Revegetation	Native plant species compatible with the surrounding environment are used in revegetation	Areas of exposed soils are revegetated to achieve cohesive ground cover using a native plant species mix compatible with the surrounding environment.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term
Vegetation Establishment	% Ground Cover Species Mix	Ground cover comparable to analogue sites / baseline monitoring. Rehabilitated areas revegetated with species selected based on the surrounding vegetation and monitoring of analogue sites.	WCL Biodiversity Management Plan.	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term
Floristic diversity is progressing towards the ecosystems planned in the final land use.	Development of native ecosystems as per the final land use.	Composition characteristics of revegetated areas such as groundcover, understorey and canopy will be developed as part of subsequent revisions to the MOP and will be based on either baseline studies or monitoring of analogue	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term

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Phase – Ecosystem and Land Use Establishment (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		sites.					
Floristic diversity is progressing towards the ecosystems planned in the final land use.	Development of native ecosystems as per the final land use.	Weeds are absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term
Fauna diversity is progressing towards the ecosystems planned in the final land use.	Rehabilitation areas provide a range of structural habitats similar to pre mining fauna communities.	Monitoring data provides evidence of a range of structural habitats similar to pre mining. Fauna communities are evident in rehabilitation areas.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout MOP term
	Fauna pest species are managed and controlled (where possible)	Pest monitoring and pest control requirements will be developed as part of subsequent revisions to the MOP and will be based on historical monitoring information or monitoring from analogue sites.					
The area does not present an extreme bushfire hazard to surrounding areas.	Appropriate bushfire hazard controls have been implemented with advice from the NSW Rural Fire Service.	The Bushfire Management Plan has been reviewed in accordance with RFS requirements and using relevant NSW Fire Service	Bushfire Management Plan	No	Water management Area	Rehabilitation Area - Forest	Mining Infrastructure and associated facilities in use throughout



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Phase – Ecosystem and Land Use Establishment (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		guidelines.					MOP term

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Table 6-13 Water Management Area Ecosystem and Land Use Sustainability Phase

Phase – Ecosystem and Land Use Sustainability (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Weeds and pest species are actively managed and controlled.	Weed audits conducted on a regular basis. Weeds identified on site are actively controlled and/or removed using appropriate weed control techniques.	No increase in weed population and monitoring indicates the absence of or decline in weed species.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term
	A range of appropriate pest control measures (e.g. the destruction of habitat, trapping, targeted shooting programmes and baiting) are employed as determined in consultation with adjoining landholders.	Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures. No increase in feral animal population and monitoring indicates the absence of or decline in feral animal species numbers	WCL Biodiversity Management Plan				
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires	Composition characteristics of revegetated areas such as groundcover, understorey and	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term

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Phase – Ecosystem and Land Use Sustainability (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
	maintenance that is consistent with the intended final land use.	canopy will be developed and included in subsequent revisions of the MOP and will be based on either baseline studies or monitoring of analogue sites.					
Establishment of revegetation that is to achieve the final land use.		Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment.	Condition 27, Schedule 4 of Project Approval	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	More than 75% of trees are healthy and growing.	Condition 27, Schedule 4 of Project Approval	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term
		Weeds are absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation.	WCL Biodiversity Management Plan				
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	Pest monitoring and pest control requirements will be developed as part of subsequent revisions to the MOP and will be based on historical monitoring information or monitoring from analogue sites.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term

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Phase – Ecosystem and Land Use Sustainability (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use.	Fire access tracks will be maintained and fuel load monitoring will occur at annual intervals. Fuel reduction works will be completed in accordance with the Bushfire Management Plan. Post closure requirements will be developed and included in subsequent revisions of the MOP	Developed for this MOP/WCL Bushfire Management Plan	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term
Establishment of revegetation that is to achieve the final land use.	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Analogue sites / or monitoring to be confirmed as part of subsequent revisions to the MOP	No	Water management Area	Rehabilitation Area – Forest	Area in use during the MOP term

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Table 6-14 Water Management Area – Relinquished Lands Phase

Phase – Relinquished Lands (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Provide soil chemical and physical properties comparable with the analogue sites.	Soil Chemistry	Rehabilitation monitoring reports verify that soil pH, Cation Exchange Capacity and other relevant soil chemistry indicators are within the range of analogue sites or baseline studies. Specific criteria for this item will be developed as part of subsequent revisions to the MOP	Analogue sites / or monitoring to be confirmed as part of subsequent revisions to the MOP	No	Water management Area	Rehabilitation Area - Forest	WC will not progress to this phase during the MOP term.
Water quality from rehabilitation area meets relevant water quality standards.	Runoff water quality from rehabilitation areas	Water quality monitoring data provides evidence that runoff water quality from rehabilitation areas is within the range of baseline surface water from nearby creeks for a range of analytes in accordance with EPL requirements.	WCL Surface Water Management Plan				
Revegetation/ Regeneration is sustainable for the long term and only requires maintenance.	Second generation tree seedlings are present.	Signs of seeding occurring and signs of recruitment in all stratum. Or evidence to demonstrate that the ecosystem will progress towards recruitment.	Schedule 4, Clause 26, Table 13 of Project Approval				

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Phase – Relinquished Lands (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Revegetation/ Regeneration is sustainable for the long term and only requires maintenance.	Trees are healthy and growing.	Monitoring data provides evidence that more than 75% of trees are healthy and growing.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
	No significant weed infestation such that weeds do not comprise significant proportion of species in any stratum	Weeds are absent from canopy and understorey, and comprise no more than 20% of ground cover vegetation	Schedule 4, Clause 26, Table 13 of Project Approval/Biodiversity Management Plan.	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
	A range of vegetation structural habitats exist that are commensurate with the final land use of each domain.	Composition characteristics of revegetated areas such as groundcover, understorey and canopy will be developed and included in subsequent revisions of the MOP and will be based on either baseline studies or monitoring of analogue sites.	Biodiversity Management Plan	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Landform suitable for final land use and compatible with surrounding landscape.	Visual assessment conducted to verify that landforms developed are compatible with surrounding landscape	Sign off from DRG that the landforms developed are compatible with the surrounding landscape and they approve such landforms as part of the MOP approval	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.

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Phase – Relinquished Lands (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Native ecosystem established.	Fauna pest species	Pest monitoring and pest control requirements will be developed as part subsequent revisions to the MOP and will be based on historical monitoring information or monitoring from analogue sites.	WCL Biodiversity Management Plan	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
Stable Landform	Inspections conducted by suitably qualified persons to check and verify landform stability.	Erosion rills of less than 20 cm by 20 cm, and showing signs of regeneration of vegetation.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
		Drainage structures are stable and there is no evidence of overtopping. Less than 1 m scouring as a result of runoff.		No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.
		Surface layer is free of any hazardous materials.					

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Phase – Relinquished Lands (Water Management Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Land free of contamination	Soil and groundwater quality meets statutory requirements.	Contaminated land assessment completed and soils / groundwater signed off as acceptable by contaminated land specialist in accordance with guidelines under the Contaminated Land Management Act 1997.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Water management Area	Rehabilitation Area - Forest	WCL will not progress to this phase during the MOP term.

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6.5 Underground Mining Area

Table 6-15 Underground Mining Area - Decommissioning Phase

Phase – Decommissioning (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Minimise risk of injury to people and animals from any remaining infrastructure and stability of Subsidence	Safety risks identified and appropriately mitigated.	<p>Risk assessment conducted to document security controls to minimise risk of unauthorised access to mining area by personnel or animals.</p> <p>Implementation of a Public Safety Management Plan during following the completion of subsidence remediation works.</p> <p>Geotechnical report completed by qualified person at mine closure shows landform is stable and slopes are stable for post mining land use.</p>	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.

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Phase – Decommissioning (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Minimise risk of injury to people and animals from any remaining infrastructure and stability of Subsidence	Safety risks identified and appropriately mitigated	All subsidence pegs removed in consultation with OEH and DRG	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Final landform shaped and rehabilitated	Geotechnical report completed by qualified person at mine closure shows rehabilitated landform is stable and slopes are stable for post mining land use	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Landform establishment works in the form of subsidence remediation will be undertaken in the MOP term
	Subsidence monitoring undertaken confirms that subsidence movement has stabilised.	Two consecutive subsidence monitoring periods confirms movement has stabilised.					Mining of Nebo LW N2-N6 and Elouera LW E16 to be undertaken during MOP term
	Watercourses are hydraulically and geomorphologically consistent with baseline monitoring and watercourses within the surrounding landscape.	Geomorphology monitoring of creeks in the Continued Underground Mining Area indicate hydraulic and geomorphic conditions consistent with baseline monitoring and watercourses	WCL Surface Water Management Plan and Pre Mining Assessments				

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Phase – Decommissioning (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		within the surrounding landscape during geomorphology monitoring post subsidence. Any remediation works required will be detailed on the geomorphology monitoring forms.					
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Ground water bores are consistent with baseline monitoring and bores within the surrounding landscape.	Monitoring of ground water bores in the Underground Mining Area shows there are no groundwater impacts.	WCL Water Management Plan/ Baseline water quality monitoring	No	Underground Mining Area	Rehabilitation Area - Forest	Mining of Nebo LW N2-N6 and Elouera LW E16 to be undertaken during MOP term.
Remediation of subsidence cracks using cementitious grout.	Subsidence cracks are filled with cementitious grout in accordance with WCL grouting procedures.	<p>Cement grout is filled to the surface with excess grout cut away and placed in empty cracks or disposed of to a licensed facility. After filling the cracks is to be lightly raked with surrounding leaf litter and soil.</p> <p>Fill material placed to surface level on access tracks in accordance with WNSW requirements and</p>	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP				Active operation during MOP term with subsidence remediation works to be undertaken.

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Phase – Decommissioning (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		conforming with any access agreements between WNSW and WCL					
Drainage upslope of subsidence features is not contributing to erosion.	Erosion controls have been established upslope of drainage features as required.	Post subsidence inspection conducted which determines drainage upslope of subsidence features is stable.	Nebo LW 1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term with subsidence remediation works to be undertaken
Prevention of surface water from flowing into subsidence cracks post remediation.	Visual inspection confirms whether subsidence repairs or natural processes prevent surface water from flowing into subsidence cracks.	Subsidence monitoring undertaken during long term monitoring confirms surface water is not flowing into subsidence cracks.	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term with subsidence remediation works to be undertaken

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Table 6-16 Underground Mining Area - Landform Establishment Phase

Phase – Landform Establishment (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Final landform shaped and rehabilitated	Geotechnical report completed by qualified person at mine closure shows landform is stable and slopes are stable for post mining land use	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.
	Subsidence monitoring undertaken confirms that subsidence movement has stabilised.	Two consecutive subsidence monitoring periods confirms movement has stabilised.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.
	Watercourses are hydraulically and geomorphologically consistent with baseline monitoring and watercourses within the surrounding landscape.	Geomorphology monitoring of creeks in the Underground Mining Area indicate hydraulic and geomorphic conditions consistent with baseline monitoring and watercourses within the surrounding landscape during geomorphology monitoring post subsidence. Any remediation works	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.

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Phase – Landform Establishment (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
		required will be detailed on the geomorphology monitoring forms.					
Landform suitable for final land use and compatible with surrounding landscape as sustainable native ecosystem.	Ground water bores are consistent with baseline monitoring and bores within the surrounding landscape.	Monitoring of ground water bores in the Continued Underground Mining Area shows there are no groundwater impacts.	WCL Water Management Plan/Pre Mining assessments	No	Underground Mining Area	Rehabilitation Area - Forest	Mining of N2-N6 and EL 16 to be undertaken during MOP term.
Remediation of subsidence cracks using cementitious grout.	Subsidence cracks are filled with cementitious grout in accordance with subsidence management requirements in the extraction plan	Cement grout is filled to the surface with excess grout cut away and placed in empty cracks or disposed of to a licensed facility. After filling the cracks is to be lightly raked with surrounding leaf litter and soil.	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term with subsidence remediation works to be undertaken.
		Fill material placed to surface level on access tracks in accordance with WNSW requirements and conforming with any access agreements between WNSW and WCL.		No	Underground Mining Area	Rehabilitation Area - Forest	

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Phase – Landform Establishment (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Drainage upslope of subsidence features is not contributing to erosion.	Erosion controls have been established upslope of drainage features as required.	Post subsidence inspection conducted which determines drainage upslope of subsidence features is stable.	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term with subsidence remediation works to be undertaken
Prevention of surface water from flowing into subsidence cracks post remediation.	Visual inspection confirms whether subsidence repairs or natural processes prevent surface water from flowing into subsidence cracks.	Subsidence monitoring undertaken during Long Term monitoring confirms surface water is not flowing into subsidence cracks.		No	Underground Mining Area	Rehabilitation Area - Forest	
Landform for subsidence features other than subsidence cracks (e.g. scarps) are geotechnically stable.	Geotechnical assessment undertaken by suitably qualified person identifies that subsidence features are geotechnically stable.	Any subsidence features where remediation is not proposed to be undertaken will be subject to a geotechnical assessment by a suitably qualified person to confirm the feature is stable.		No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term.

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Phase – Landform Establishment (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Erosion risk on areas where subsidence remediation has been undertaken is minimised.	Presence of erosion down slope of where subsidence repairs have been undertaken.	Leaf litter and soil material has been raked from adjacent area over remediation undertaken and subsidence monitoring confirms erosion is not present.	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term
Erosion risk on access tracks is minimised.	Rehabilitation of access tracks.	Access tracks and pumping pads will be rehabilitated with natural leaf litter and fill material with monitoring undertaken to confirm this.		No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term
Built features are safe and serviceable.	Monitoring undertaken by suitably qualified person. Two consecutive monitoring periods shows negligible movement.	Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation Area - Forest	Active operation during MOP term

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Table 6-17 Underground Mining Area - Growth Medium Development Phase

Phase – Growth Medium Development (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Subsidence remediation (grout placed in subsidence cracks) shows minimal signs of cracking	Subsidence remediation monitoring undertaken by suitably qualified person	Subsidence remediation monitoring undertaken which shows minimal signs of erosion or dilation of grout has occurred	Nebo LW1-6 Subsidence Monitoring Program and LW's 11, 12, 15, 16, 19 & PE1 ESSMP	No	Underground Mining Area	Rehabilitated Land – Forest	Area in use during MOP. Portion of subsidence remediation undertaken may be at this phase
Fill material placed over grout filled subsidence cracking to surface level.	Visual inspection undertaken by WCL personnel confirms leaf litter and soil is present on subsidence remediation works which have been undertaken,	Subsidence monitoring undertaken in accordance with the subsidence monitoring program confirms leaf litter and soil is present on the surface of subsidence remediation works and that no slumping of grout material has occurred.					
Subsided slopes are stable.	Suitably qualified expert confirms slope is stable	Suitably qualified expert confirms subsidence monitoring indicates slopes are stable.					



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Phase – Growth Medium Development (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Public safety risks to persons and fauna minimised.	Subsidence cracks have been filled with grout.	Monitoring undertaken confirms that subsidence remediated cracks are stable and can be walked on by persons.	Public Safety Management Plans	No	Underground Mining Area	Rehabilitated Land – Forest	Area in use during MOP

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Table 6-18 Underground Mining Area- Ecosystem and Land Use Establishment Phase

Phase – Ecosystem and Land Use Establishment (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Mulch and leaf litter present over grouted cracks.	Subsidence remediation monitoring undertaken by suitably qualified person.	Less than 10% of grout is visible at the surface within subsidence monitoring undertaken two years post subsidence remediation.	Developed for this MOP.	No	Underground Mining Area	Rehabilitated Land – Forest	No ecosystem establishment works will be undertaken in the MOP term
Subsidence remediation (grout placed in subsidence cracks) shows minimal signs of cracking	Subsidence remediation monitoring undertaken by suitably qualified person	Subsidence remediation monitoring undertaken which shows minimal signs of erosion or dilation of grout has occurred.	Nebo LW1-6 Subsidence Monitoring Program and LWs 11, 12, 15, 16, 19 & pe1 ESSMP				Area in use during MOP. Portion of subsidence remediation maybe undertaken at this phase.
Establishment of vegetation	Vegetation health	There is no evidence of vegetation die back in areas where subsidence remediation has been undertaken.	Nebo LW1-6 Subsidence Monitoring Program and Lw's 11, 12, 15, 16, 19 & pe1 ESSMP				No
	Vegetation health	Vegetation (grass, shrubs, and trees) has begun to re-establish in affected areas.					

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Table 6-19 Underground Mining Area- Ecosystem and Land Use Sustainability Phase

Phase – Ecosystem and Land Use Sustainability (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Weeds and pest species are actively managed and controlled.	Weed audits conducted on a regular basis. Weeds identified on site are actively controlled and/or removed using appropriate weed control techniques.	No increase in weed population and monitoring indicates the absence of or decline in weed species.	WCL Biodiversity Management Plan	No	Underground Mining Area	Rehabilitati on area - Forest	No ecosystem sustainability works will be undertaken in the MOP period.
Establishment of revegetation that is to achieve the final land use.	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use	Fire access tracks will be maintained and fuel load monitoring will occur at annual intervals. Fuel reduction works will be completed in accordance with the Bushfire Management Plan. Post closure requirements will be discussed in subsequent revisions of the MOP	WCL Biodiversity Management Plan	No	Underground Mining Area	Rehabilitati on area - Forest	
Subsidence crack repairs are stable.	No evidence of slumping of remediation works as detailed in subsidence remediation	Subsidence remediation monitoring undertaken identifies that subsidence remediation works are stable 12 months after	Nebo LW1-6 Subsidence Monitoring Program and Lw's 11, 12, 15, 16, 19 & pe1	No	Underground Mining Area	Rehabilitati on area - Forest	Active operation in during MOP term

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Phase – Ecosystem and Land Use Sustainability (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
	monitoring	subsidence repairs are undertaken.	ESSMP				
Establishment of vegetation	Vegetation health	There is no evidence of vegetation die back in areas where subsidence remediation has been undertaken. Vegetation (grass, shrubs, and trees) has established in affected areas with vegetation structure and composition similar to that of surrounding areas.	Developed for this MOP.	No	Underground Mining Area	Rehabilitation area - Forest	No ecosystem sustainability works will be undertaken in the MOP period.

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Table 6-20 Underground Mining Area - Relinquished Lands Phase

Phase – Relinquished Lands (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Water quality from rehabilitation area meets relevant water quality standards.	Runoff water quality from rehabilitation areas	Water quality monitoring data provides evidence that runoff water quality from rehabilitation areas is within the range of baseline surface water from nearby creeks for a range of analytes in accordance with EPL requirements.	WCL Surface Water Management Plan.	No	Underground Mining Area	Rehabilitation area - Forest	WCL will not progress to this phase during the MOP term.
Access tracks required for ongoing use by WNSW have suitable erosion control in place.	Erosion control established in accordance with WNSW requirements and conforming with any access agreements between WNSW and WCL	Field inspection undertaken with WNSW confirms erosion controls are acceptable	WCL Surface Water Management Plan.	No	Underground Mining Area	Rehabilitation area - Forest	WCL will not progress to this phase during the MOP term
Subsidence remediation works do not pose a risk to public safety.	WNSW requirements are met	Long term subsidence monitoring inspections identify that are no public safety risks attributable to the operations of WCL which require the implementation of remedial actions.	Schedule 4, Clause 26, Table 13 of Project Approval and Public Safety Management Plans.	No	Underground Mining Area	Rehabilitation area - Forest	Subsidence remediation to be undertaken during MOP term

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Phase – Relinquished Lands (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
The site is neat and tidy (i.e. it does not contain any rubbish)	All rubbish and equipment associated with the completion of subsidence remediation works has been removed from the work site.	There is no rubbish or WCL equipment at the location of any completed subsidence remediation works.	Developed for this MOP	No	Underground Mining Area	Rehabilitation area - Forest	Subsidence remediation to be undertaken during MOP term
Subsidence remediation repairs are stable	Crack dilation is not observed in subsidence remediation works.	Renewed crack dilation is not evident in consecutive annual subsidence monitoring. Monitoring of subsidence remediation works is to be undertaken for three years post subsidence repairs.	Nebo LW1-6 Subsidence Monitoring Program and Lw's 11, 12, 15, 16, 19 & pe1 ESSMP				
Landform is stable and no subsidence repairs are required	Erosion is not evident upslope of subsidence repairs.	Drainage, erosion and/or sediment control measures are effective as reviewed during subsidence monitoring undertaken within Years 1 – 3 post monitoring.	Condition 27, Schedule 4 of Project Approval				

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Phase – Relinquished Lands (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Vegetation has developed to support native vegetation and is consistent with adjacent vegetation	Subsidence remediation monitoring undertaken to confirm vegetation has established and is sustainable.	Native vegetation is naturally regenerating or active revegetation is establishing and no further active revegetation measures are required.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Underground Mining Area	Rehabilitation area - Forest	Subsidence remediation to be undertaken during MOP term.
Ecological value of subsidence remediation areas.	Cover abundance is equal to or greater than the adjacent land.	Vegetation (grass, shrubs and trees) has re-established and there is no maintenance works required.	WCL Biodiversity Management Plan				
Weeds within the subsidence disturbed areas are to be monitored and treated for a period of two years after completion of any surface disturbance.	Ecological inspection for the presence of weeds undertaken.	Ecological monitoring confirms that no weeds are present in the subsidence disturbed areas of the SSCA for a period of two years after disturbance is completed.	WCL Biodiversity Management Plan				
Visual amenity of subsidence remediation works.	Visual amenity of subsidence remediation works.	Subsidence cracks are covered with natural material and < 10% grout is visible on the surface	Schedule 4, Clause 26, Table 13 of Project Approval				

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Phase – Relinquished Lands (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Land free of contamination	Soil and groundwater quality meets statutory requirements.	Contaminated land assessment completed and soils / groundwater signed off as acceptable by contaminated land specialist in accordance with guidelines under the Contaminated Land Management Act 1997.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Mining Underground Area	Rehabilitation area - Forest	WC will not progress to this phase during the MOP term.
Removal of signage and barrier tape which is not required for ongoing operations.	Work area has had all relevant work material removed.	All demarcation of work areas and signage that is no longer required for public safety management purposes has been removed.	Schedule 4, Clause 26, Table 13 of Project Approval	No	Mining Underground Area	Rehabilitation area - Forest	Subsidence remediation to be undertaken during MOP term
Subsidence remediation in creek lines has been undertaken.	Subsidence remediation in creek lines has been undertaken.	Subsidence remediation in creek lines has been undertaken.	WCL Surface Water Management Plan	No	Mining Underground Area	Rehabilitation area - Forest	

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Phase – Relinquished Lands (Underground Mining Area to Rehabilitation Area – Forest)							
Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Applicable Domain	Final Land Use Domain	Progress at start of MOP
Built features are safe and serviceable.	Monitoring undertaken by suitably qualified person. Two consecutive monitoring periods shows negligible movement.	Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated	Schedule 4, Clause 26, Table 13 of Project Approval	No	Mining Underground Area	Rehabilitation Area – Forest	Active Operation During MOP term



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7 REHABILITATION IMPLEMENTATION

7.1 Status at MOP Commencement

At the commencement of this MOP period, 63.7 (this includes 30.8ha for the underground mining area) ha have been disturbed for mining and construction related activities. At the commencement of this MOP, there has been limited rehabilitation of disturbance areas (other than Avondale Pit Top – approximately 14 ha) undertaken to date, as there has been limited land available to rehabilitate.

Additional information regarding the rehabilitation to be undertaken will be included within the subsequent revisions to the MOP. A summary of the rehabilitation status for each domain at the commencement of the MOP **extension** period is provided in Table 7.1.

Table 7-1 Rehabilitation Status at Commencement of MOP

Domain	Rehabilitation Status	Description of Rehabilitation Activities to Date
1-Infrastructure Area	Active	Rehabilitation of Nebo Mine Shafts No.1 and No.2 Rehabilitation of Avondale Pit Top Total: 14 ha
3-Water Management Area	Active	Stabilisation of structures through revegetation works.
8-Underground Mining Area	Active	Rehabilitation of subsidence cracking to be undertaken as required. Decommissioning of Nebo Number 3 and 4 Shafts

7.2 Proposed Rehabilitation Activities During the MOP Term

It is noted that a detailed rehabilitation strategy will be included within subsequent revisions of the MOP. A summary of the proposed rehabilitation activities for each primary domain during the period of the MOP is provided in Table 7.2. Rehabilitation to be undertaken during the MOP period will predominantly relate to the remediation of subsidence cracks which occur as a result of mining within N1-N6 and EL 16. Disturbance and rehabilitation progression at WC' during the term of the MOP **extension period** is provided in Table 7.3 in accordance with the MOP Guidelines. WC rehabilitation activities have been developed to achieve the post mining land use goal for each of the secondary domains detailed within Section 4.2 and shown on Plan 4.



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7.3 Summary of Rehabilitation Areas During MOP Term

The rehabilitation proposed in accordance with s6.2.3 over the next three-year period is proposed to be as follows:

2021 – Stakeholder consultation, approvals requirements related to rehabilitation, detailed planning and preparatory access and road upgrade to surface facilities to facilitate rehabilitation at No 3 and No 4 sites.

2022 – planning, design, removal of building, back fill and rehabilitation of No 3 site

2023 – planning, design, removal of building, back fill and rehabilitation of No 4 site and monitor No 3 rehabilitation.

Table 7-2 Disturbance and rehabilitation progression during the term of the MOP

Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha) (per MOP year)	Cumulative Rehabilitation Area	Comments/Explanation
At start of MOP e.g. March 2017	32.9	14	14	14 ha rehabilitated at Avondale pit top.
1 (e.g. 1 January 2021)	0	0	14	
2 (e.g. 1 January 2022)	0	1	15	
3 (e.g. 1 January 2023)	0	1	16	



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Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha) (per MOP year)	Cumulative Rehabilitation Area	Comments/Explanation
End Year 3 (December 31 st 2020)	32.9	0	14	

* Total disturbance area includes areas of land which are within the following phases: Active and Decommissioning. Temporary rehabilitation is to be considered as an active mining area for the purposes of this table. The total disturbance area does not include underground mining areas and includes surface disturbance areas only.

** Total Rehabilitation Area includes areas of land which are within the following phases: Landform Establishment and Growth Medium Development, Ecosystem and Land Use Establishment, and Ecosystem and Land Use Sustainability.

Table 7-3 (Rehabilitation Data showing primary and secondary domains, rehabilitation phases and areas at commencement and completion of MOP)

Primary Domain	Secondary Domain	Code (with map legend)	Rehabilitation Phase	Area at Start of MOP (ha)	Area at end of MOP (ha)
Infrastructure	Rehabilitation Area - Forest	1F	Active	30.9	30.9
			Decommissioning	0	0
			Landform Establishment	0	0
			Growing Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem and Land Use Sustainability	14	14



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Primary Domain	Secondary Domain	Code (with map legend)	Rehabilitation Phase	Area at Start of MOP (ha)	Area at end of MOP (ha)
			Relinquished Lands	0	0
Water Management	Rehabilitation Area - Forest	1F	Active	2	2
			Decommissioning	0	0
			Landform Establishment	0	0
			Growing Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem and Land Use Sustainability	0	0
			Relinquished Lands	0	0
			Active	30.8	70
Underground Mining Area	Rehabilitation Area - Forest	1F	Decommissioning	0	0
			Landform Establishment	0	0
			Growing Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0



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Primary Domain	Secondary Domain	Code (with map legend)	Rehabilitation Phase	Area at Start of MOP (ha)	Area at end of MOP (ha)
			Ecosystem and Land Use Sustainability	0	0
			Relinquished Lands	0	0



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7.4 Relinquishment Phase achieved During MOP Term

During the MOP period, there will be no areas that will be in the relinquishment rehabilitation phase as per the MOP Guidelines.



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8 REHABILITATION MONITORING AND RESEARCH

To provide an opportunity to assess the progression of rehabilitation completed at WC, a rehabilitation monitoring program has been developed. This includes:

- Rehabilitation monitoring;
- Fauna monitoring; and
- Aquatic monitoring

The monitoring programs are detailed in Section 8.1. Detail regarding the subsidence monitoring undertaken is included in Section 3.2.1.4.

8.1 Rehabilitation Monitoring

Rehabilitation monitoring will be undertaken in accordance with the Biodiversity Management Plan (EMS-MP-007). Locations within the Underground Mining Area where rehabilitation or remediation works have been undertaken will be monitored on a regular basis in accordance with site procedures until they are considered to be self-sustaining and no longer requiring management.

Monitoring of these areas will include visual inspections and photo monitoring and will focus on the following: germination rates; success rates of tube stock; weed and feral pest infestation; and general condition.

The *Australian Government's Mine Closure and Completion Guidelines* (DITR, 2006) outlines a range of different types of monitoring and assessment to be undertaken to ensure that mine closure meets the required and agreed to standards. WCL will follow industry best practice to ensure that the appropriate monitoring program is implemented, however it is noted that the exact scope of the monitoring program will be dependent on the outcomes of specialist assessments and the final land use as agreed to by the relevant stakeholders. WCL will prepare a Monitoring and Maintenance Program for each site to ensure that the desired outcomes are achieved.

Based on the DITR Guidelines, it is expected that the following types of monitoring will be required:

- Baseline monitoring on pre mining and during mining conditions (undertaken by WCL as part of Approvals and Operational phases of the mine).
- Documentation of the rehabilitation activities carried out.
- Initial rehabilitation monitoring for a period of 1 to 2 years post rehabilitation.
- Ongoing monitoring (less frequently) from 2 years post mining until lease relinquishment.



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- Post lease relinquishment monitoring (to be negotiated with future land owner).

Post-closure monitoring should focus on achieving the stated outcomes in terms of:

- Revegetation;
- Contamination remediation;
- Gas Management;
- Water Management;
- Land stability (geotechnical); and
- Site safety and security.
- Adaptive management

Long term water management will continue to be carefully considered during future closure risk assessment in terms of their impact on the staging of shaft sealing and any impacts on neighbouring workings. The above monitoring requirements will be refined as further information regarding final land use and completion criteria is obtained.

8.2 Subsidence Monitoring

Subsidence remediation monitoring will also be undertaken within the MOP term in accordance with methodologies specified in Section 3.2.1.4. Following the completion of subsidence remediation, a formal post remediation inspection will be undertaken. End of Panel reports are published on the WCL website: <https://wollongongcoal.com.au/monitoring/>

Locations within the Underground Mining Area where rehabilitation or remediation works has been undertaken will be monitored in accordance with monitoring detailed within the Nebo LW1-6 Subsidence Monitoring Program and Elouera Lw's 11, 12, 15, 16, 19 & pe1 Environment, Subsidence and Safety Management Plan (ESSMP).

8.3 Research and Rehabilitation Trials and Use of Analogue Sites

Rehabilitation trials are not proposed for WC. As the majority of the area to be rehabilitated is currently being utilised for operational purposes and is limited in size, rehabilitation will be carried out progressively during the mine closure phase.

The utilisation of analogue sites in the establishment of performance and completion criteria will be further defined in subsequent revisions of the MOP, and will also detail the selected final landform and land use for the respective operations.



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9 INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 Threats to Rehabilitation

All rehabilitation activities will be undertaken as soon as practicable following the progressive completion of rehabilitation phases identified for the site. The issues and risks that may impact upon the ability of WCL to achieve their rehabilitation goals successfully, and where they are addressed within this document, are outlined in Table 9.1.

The management techniques utilised to avoid these potential threats to the success of rehabilitation from occurring are detailed in Table 9.1. Actions to be undertaken should these threats occur are detailed in Section 9.2.

Table 9-1 Threats to rehabilitation

Issue/Risk	Section of this MOP
Erosion / poor water quality from rehabilitation areas.	3.2.1.10
Failure to meet criteria for each rehabilitation phase.	9.2, 3.2.1
Weed infestation threatening rehabilitation success.	3.2.1.7
Damage to rehabilitation by animals.	3.2.1.7
Growth medium not acceptable for rehabilitation requirements.	7.2
Final landform instability resulting in poor water quality.	3.2.1.4
Rehabilitation not completed in accordance with rehabilitation goals and objectives.	9.2

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9.2 Trigger Action Response Plan

The rehabilitation monitoring program, as outlined in Section 8.0, will be used to identify any maintenance actions required and to determine whether further works are necessary to achieve the specific closure criteria (refer to **Section 6**).

The proposed containment and remediation actions based on the risks relating to rehabilitation identified through the environmental risk assessment process described in Section 3.2 are provided in Table 9.2. Further details on the proposed environmental management measures utilised by WCL are provided in Section 3.2.1.

Table 9-2 Trigger action responses

Trigger	Containment Action	Remediation Action
Inter-connective cracking of water courses into lower strata as a result of subsidence.	Undertake survey and monitoring of areas of concern to determine areas of non-compliance.	Rehabilitate affected areas and validate to minimise potential for environmental harm
Changed profile/velocity of water courses due to subsidence.		Avoid extraction in proximity of the affected watercourse/s
Surface cracking of water courses.		Review subsidence management methods
Hazardous Materials (asbestos) inappropriately removed during demolition of heritage structures, leading to soil contamination and/or health impact.	Undertake monitoring / engage specialist to understand extent of the impact. Install public safety management measures as required to minimise risk of harm.	Implement corrective actions as necessary based on outcomes of specialist reports. Remediate soils and validate to minimise potential for harm.
Landform not in accordance with DRG requirements (i.e. not within criteria identified in Section 6.	Undertake survey of areas of concern to determine areas of non-compliance.	Undertake reshaping works and reseedling of the amended landform, utilising target species for the proposed final land use.
Erosion / poor water quality from rehabilitation areas (in excess of target criteria identified in Section 6 Table 6.1).	Install appropriate erosion and sedimentation controls such as sediment fences or similar.	Regrade and stabilise with target species for proposed final land use.

Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
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Trigger	Containment Action	Remediation Action
Lack of vegetation establishment or dieback of rehabilitated areas resulting in inability to meet vegetation criteria targets specified in Section 6.	Undertake soil chemistry monitoring of target area to determine if growth medium is appropriate for vegetation establishment.	Apply ameliorants as required based on results of laboratory testing and re-seed utilising appropriate species as per target final land use
Weed infestation threatening rehabilitation success and weeds in excess of identified criteria level identified in Section 6.	Undertake monitoring to understand weed location and abundance.	Implement weed management actions as required. Re-seed utilising appropriate species as per target final land use where necessary.
Significant damage to rehabilitation areas by feral animals, resulting in inability to meet vegetation criteria targets specified in Section 6.	Undertake monitoring to understand potential feral animal habitat location and abundance	Implement feral management actions as required. Re-seed utilising appropriate species as per target final land use where necessary.

It is envisaged that the rehabilitation monitoring program will be continued as required until it can be demonstrated that the rehabilitation has satisfied the closure criteria.

In addition to the annual monitoring program, routine site inspections are also conducted on a monthly basis by WCL environmental personnel. Mining personnel also conduct inspections of the site which also include rehabilitation areas and inspections of subsidence repairs undertaken. In the event that issues are identified during this inspection process, the Environment Manager is advised and corrective actions are implemented as required.



Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

10 REPORTING

During the MOP period, an Annual Review will be completed in accordance with the Project Approval and WCL Mining Lease Requirements. The Annual Review will be completed to satisfy DPE and DRG requirements and will detail activities undertaken during the report period that support progression towards the final land use. The Annual Review will include:

- Summary of operations and rehabilitation undertaken during the report period;
- Monitoring results against key performance indicators, including: rehabilitation performance air quality; noise; surface and groundwater; flora and fauna; weed control; and bushfire.
- Summary of complaints and incidents during the report period;
- Analysis of all monitoring results;
- Key trends in monitoring results;
- Non-compliances; and
- Any other environmental aspects required by DRG.

In addition to this reporting process, WCL also maintains a website which provides updates on the operations status and environmental monitoring program results.



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Doc Title	MINING OPERATIONS PLAN		

11 PLANS

The following plans have been developed to accompany this MOP:

Plan 1A – Pre Mining Environment – Project Locality;
Plan 1B – Pre Mining Environment – Natural Environment;
Plan 1C – Pre Mining Environment – Built Environment;
Plan 2 – Mine Domains at commencement of MOP;
Plan 3 – Mining and Rehabilitation;
Plan 4 – Final Rehabilitation and Post Mining Land Use; and
Plan 5 – Cross Section
Plan 6 – Mod 2 Proposed working

These plans have been included as Appendix D.



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Doc Title	MINING OPERATIONS PLAN		

12 REVIEW AND IMPLEMENTATION OF THE MOP

12.1 Review of the MOP

Ongoing monitoring and review on the performance and implementation of this MOP will be undertaken in accordance with the Project Approval. In accordance with Condition 4 of Schedule 6 of Project Approval, WCL shall review, and if necessary revise, the strategies, plans, and programs required under Project Approval to the satisfaction of the Director-General, within 3 months of:

- (a) The submission of an annual review under Condition 3 of Schedule 6;
- (b) The submission of an incident report under Condition 6 of Schedule 6;
- (c) The submission of an audit report under Condition 8 of Schedule 6; or
- (d) Any modification to the conditions of this approval, (unless the conditions require otherwise), the Proponent shall review the strategies, plans, and programs required under this approval, to the satisfaction of the Secretary.

Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the Project.

The Group Environment Manager will review and if necessary, revise the MOP and resubmit to DPIE three months prior to the conclusion of the specified MOP term or following the determination of MOD 2. Any changes made to the MOP as a result of the review will be made in accordance with the current MOP guidelines.

12.2 Implementation

Those responsible for the implementation and ongoing management of this MOP are the WCL Wongawilli Mine Operations Manager and the WCL Environment Manager, as listed in the Title Block at the front of this document.

Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

13 DOCUMENT INFORMATION

13.1 Related Documents

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information provided in Table 13-1 provides the linkage and source to develop and maintain site compliance information.

Table 13-1 Related documents

Document	Reference
Environmental Management Strategy	WWC EC STD 001 published September 2016
Air Quality and Greenhouse Gas Management Plan	WWC EC PLN 005 published February 2020
Biodiversity Management Plan	EMS-MP-007 published March 2013
Bushfire Management Plan	WWC EC PLN 006 published August 2016
Heritage Management Plan	WWC EC PLN 004 published February 2020
Noise Management Plan	WWC EC PLN 007 published July 2016
Surface Water Management Plan	WWC EC PLN 003 published August 2016
Integrated Wastewater Management Plan	Published October 2010
Pollution Incident Response Management Plan	WWC EC PLN001 - EPL 1087 – (published October 2019)
Pollution Incident Response Management Plan	WWC EC PLN 002 - EPL 12442 (published October 2019)

14 REFERENCES

Department of Trade and Investment, Regional Infrastructure and Services -Division of Resources and Energy (2013), ESG3: Mining Operations Plan (MOP) Guidelines.

Environmental Resources Management (2010), NRE Wongawilli Colliery Nebo Area Environmental Assessment, Report prepared for Gujarat NRE FCGL Pty Ltd.



Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
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Wongawilli Colliery (2014). LWN2 End of Panel Report.

Wollongong City Council (2009). Wollongong Local Environmental Plan 2009.

Wollongong City Council (2010). West Dapto Local Environmental Plan 2010.

Wollongong City Council (2014). Escarpment Strategic Management Plan.

AMC, 2015. SBD Services Pillar Extraction Geotechnical Review, Wongawilli Colliery.



Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

15 CONTROL AND REVISION HISTORY

PROPERTY	VALUE
Approved by	Mine Manager
Document Owner	Group Environment Coordinator
Effective Date	27/11/2020

Revisions

VERSION	DATE REVIEWED	REVIEW TEAM (CONSULTATION)	NATURE OF THE AMENDMENT
1	31 March 2017	Dave Clarkson	MOP for Submission to DPE - DRG
2	27 July 2017	Kamlesh Prajapati	Revised to address DPE-DRG comments received in letter dated 24 May 2017
3	27 November 2020	Wayne Sly Peter Roser Eladio Perez	Modification 2 - Extension



Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

Appendix A – Rehabilitation – preliminary Scope of Works and Program



Wollongong Coal Limited

Wongawilli Colliery

Nebo Shafts #3 and #4 Rehabilitation Plan

Draft Scope of Work

November 2020

Document Control	
Site:	Wongawilli Colliery
Document ID:	WCL_WW_Nebo Shafts 3 and 4 Rehabilitation SOW
Document Type:	Draft Scope of Work
Date Published:	
Document Title:	Wongawilli Colliery Nebo Shafts #3 and #4 Rehabilitation Plan Draft Scope of Work
Version Number:	1
Document Author:	Peter Roser

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2.1 Current Status.....	5
2.2 Preliminary Works.....	5
2.3 No 3 Shaft Work Program.....	6
2.4 No 4 Shaft Work Program.....	8
2.5 Standards and reference documents	9

1 INTRODUCTION

With the cessation of mining operations and closure of the old Nebo and Wongawilli workings in 2019, WCL have undertaken an assessment of existing infrastructure and assets held by WCL and determined that there are opportunities to commence rehabilitation activities during the MOP extension period currently being pursued with the Regulator. With pending legislated changes to Rehabilitation management and the shift in mining operations to the southern area of the lease holdings, it is expected that this will be part of an ongoing strategy for the operations at the Wongawilli Mine.

The assessment and forward planning following the closure of the Nebo workings has identified the future utilisation of Wongawilli No 1 shaft in longer term mine planning which has been included in the Mod 2 application which was recently submitted for approval. The assessment also identified that the Nebo No 3 and No 4 shaft facilities in the Catchment are redundant to any future mining operations. The shaft sites have been decommissioned and can be progressively rehabilitated over the next a forecasted three-year period to the point where ongoing monitoring of the rehabilitation effectiveness will continue.

The scope of work document has been prepared to facilitate the planning of the works, the development of an indicative program and support the budgeting provisions for the work program. This will also assist with consultation of stakeholders and reporting requirements in the future. The nature of the shaft infrastructure and its location is ideal for a managed works program.

The location of the targeted shafts is shown below. Note that the Nebo No 1 and 2 shafts were rehabilitated back in 2006 and are no longer monitored.



2 SCOPE OF WORK – NEBO SHAFTS REHABILITATION ACTIVITIES

2.1 Current Status

Both shaft facilities have been decommissioned and isolated from power or services.

Number 3 shaft was changed from an active upcast shaft to a downcast shaft around 40 years ago and some of the surface infrastructure has already been removed in the intervening years.

Number 4 shaft was the upcast shaft for the Nebo mine with a substation in proximity to power the Mine Fans and underground HT feeders to the mine. The power has been removed, the oil removed from the switchgear and transformers at the substation, the lines disconnected, and site cleared of stored fluids and other risk items. The powerlines supplying the substation are the property of South32 and they are addressing the removal of these lines in their rehabilitation planning.

The sites are regularly inspected and maintained for Asset Protection Zone (APZ) purposes.

2.2 Preliminary Works

The preliminary planning work will involve notification and consultation with the Regulator and Stakeholder groups pertaining to the rehabilitation plan of the shaft facilities. The confirmation of requirements in relation to the work plan will facilitate the necessary approvals required in relation to the works. It is believed that the DPIE and WaterNSW are likely to be the principal participants in this process.

The works on the access roads can be completed as part of the normal maintenance functions in the catchment with plans to recover the 4 shaft substation transformers occurring early in 2021. Detailed survey, geotechnical and other surveys to support the planning will be undertaken to support a detailed engineering design for the demolition and shaft sinking tasks in line with government guidelines. Reviews of the sites will be undertaken for heritage, biodiversity and other environmental management elements. Considering the age of the facilities, the risk of contamination or hazardous materials will need to be addressed both in the planning and through the execution of the works. Subject to confirmation of the volume and suitability of material at the site for backfilling purposes, the need to address external supply and transport through the catchment may need to be addressed. In any event, specialist materials such as concrete will need to be bought in.

As part of any pre-work and approval process, risk assessments will be undertaken into the various activities in the work program.

Consultation will be performed with WaterNSW, RFS and the Regulator to ensure that assets like fire trails and access roads may be left if required and to ensure that the rehabilitation is satisfactory to final land use.

A contaminated land survey Phase 1 and if required Phase 2 (sampling and analysis) report will be prepared. Hazardous material survey for asbestos, PCB's and synthetic material fibres in accordance with WHS Regulation 49. Any asbestos will be removed by

a suitably qualified contractor to a suitably licensed facility prior to major demolition works.

Demolition methods will be assessed with proposed sequence of works, including details of staging and location of temporary storage of demolition waste, number and type of equipment to be used, the site access arrangements for workers and plant, any material or components which will be retained by WCL and the sources of suitable material used to back fill will be documented. Waste will be classified in accordance with the NSW EPA Waste Classification Guidelines and materials will be recycled where reasonable and feasible to minimise waste.

If blasting is proposed to be used, a suitably qualified contractor will be engaged, and a Blast Management Plan will be prepared to cover; type of explosive and detonator to be used; method of placing and firing; maximum instantaneous charge to be fired; firing pattern and delay sequence will be prepared by the contractor.

Health and safety measures will be documented including measures to isolate the demolition work from the public; measures to protect against the risk of falling debris; other measures to provide safe access to the demolition site; measures for working in the presence of hazardous chemicals and materials including asbestos; method of handling contaminated materials

Currently, major works are not normally executed in the summer months in the catchment with both bushfire and wet weather risks and restrictions being experienced. It is envisaged that site works will begin at the 3 shaft site around mid-2021. The detailed work program will be developed through the planning and approval stage in accordance with section 6.2.3 of the MOP, but it is envisaged that the works at both sites will be completed to the monitoring and maintenance stage (post revegetation) by October 2023.

2.3 No 3 Shaft Work Program

The Nebo 3 shaft site is located 5.0km north- north east of the Elouera pit top on Sydney Catchment Authority land, approximately 400m downstream of the Upper Cordeaux Dam No 1. Access to the site is via a 0.5km long unsealed track off Cordeaux Road, adjacent to the apple orchards. The track is generally single lane with thick vegetation on either side. A gate at the start of the track prevents unauthorised access to the site. The shaft site is approximately 0.20 ha of cleared land. The shaft site and access track are surrounded by eucalypt forest.

The structures attached to or associated with the Nebo 3 Shaft site include:

- One ventilation shaft of 3.6 metres diameter and 128.1 metres deep.
- Emplaced filling material excavated from sinking of shaft.
- Fan drive house and foundations.
- One water tank foundation (tank has been removed);
- Overhead power lines and poles; and
- Miscellaneous mine debris and fencing.

The Nebo No 3 was converted from an upcast shaft to a downcast shaft in the early 1980's. The site was used as a downcast ventilation shaft. Spoil from the shaft construction was spread around the site to create a level working platform for the facilities. Vegetation within the site consists only of grass.



No 3 Shaft Site

Rehabilitation work will be conducted in stages and subject to an approved rehabilitation plan is likely to include the following activities:

1. Demolition and removal of the fan drive houses and foundations.
2. Removal of mine debris.
3. Demolition and removal of the water tank footings.
4. Demolition and removal of remaining site infrastructure.
5. Exposure of shaft and preparation for filling.
6. Filling of shaft with fill excavated from shaft site as per DPIE guidelines.
7. Re-profiling of the site and repair of any scoured areas.
8. Sealing of shaft with concrete capping.
9. Revegetation of all disturbed areas; and
10. Subject to an agreed process or period, the final ripping and revegetation of access track, rendering it non-trafficable to motor vehicles but accessible for long-term maintenance requirements.
11. Develop ongoing maintenance management plans for the site until it is signed off as achieving the rehabilitation objectives.

2.4 No 4 Shaft Work Program

The shaft site is located 4.5km north of the Elouera pit top on Sydney Catchment Authority land in the upper reaches of the Upper Cordeaux Dam No 1. Access to the site is via a 2.5km long unsealed track off Cordeaux Road, adjacent to the apple orchards. The track is generally single lane with thick vegetation on either side. A gate at the start of the track prevents unauthorised access to the site. The shaft site is approximately 0.30 ha of cleared land. The shaft site and access track are surrounded by eucalypt forest.

The structures attached to or associated with the Nebo 4 shaft site include:

- One ventilation shaft of 5.0 metres diameter and 285.7 meters depth.
- Emplaced material excavated from sinking of shafts.
- One drive house and foundation.
- Two fans and ducting.
- One electrical substation.
- Overhead power lines and poles; and
- Miscellaneous mine debris and fencing.

The Nebo No 4 shaft was in use as an upcast ventilation shaft. The shaft was sunk during 1980's, spoil from the shaft excavation was spread around the site forming several benched work platforms. The site is grassed with intermittent canopy trees.





Nebo 4 Shaft Facility and Substation

Rehabilitation work will be conducted in stages and subject to an approved rehabilitation plan is likely to include the following activities:

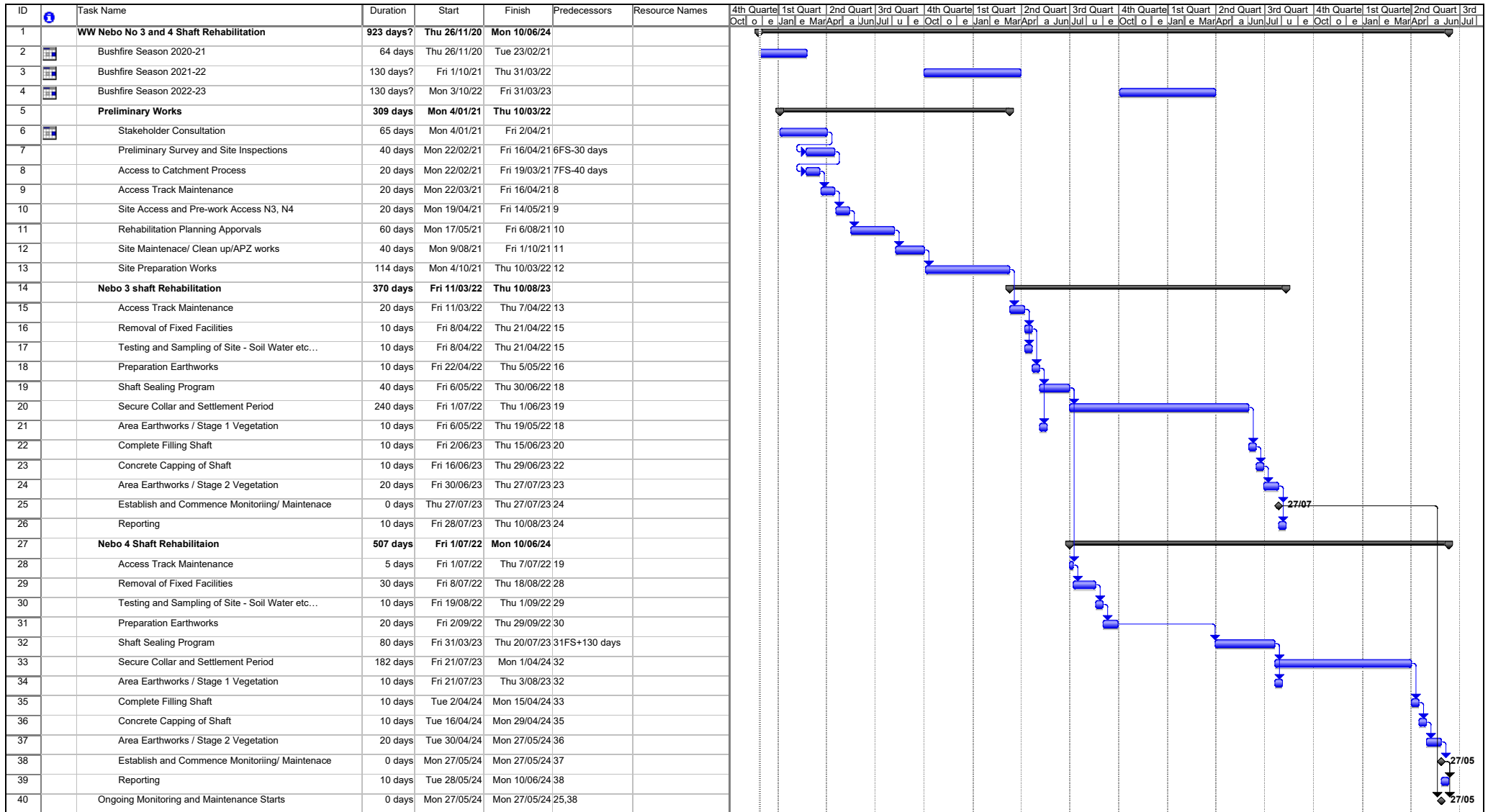
1. Upgrading of the existing access track leading to the Nebo No 4 Shaft site to facilitate heavy vehicle access to the site.
2. Demolition and removal of the fan drive houses and foundations.
3. Removal of mine debris.
4. Demolition and removal of the electrical sub-station.
5. Exposure of shaft and preparation for filling.
6. Filling of shaft with fill excavated from shaft site.
7. Re-profiling of the site and repair of any scoured areas.
8. Sealing of shaft with concrete capping.
9. Revegetation of all disturbed areas; and
10. Post rehabilitation works, the revegetation of access track, rendering it non-trafficable to motor vehicles but accessible for long-term maintenance requirements.
11. Develop ongoing maintenance management plans

2.5 Standards and reference documents

Australian Standard AS2601: The demolition of structures (AS 2601)
Safe Work Australia: Demolition Work Code of Practice October 2018

NSW - Work Health and Safety Regulation 2017
NSW – Code of Practice Demolition Work August 2019
NSW – Waste Classification guidelines NSW EPA

Wongawilli MOP



Project: Nebo Shaft Rehab Schedule_
Date: Thu 26/11/20

Task

Split

Progress
 Milestone

Summary

Project Summary

External Tasks
 External Milestone

Deadline



Site	Wongawilli Colliery	DOC ID	WWC EC PLN 010
Type	Plan	Date Published	27/11/2020
Doc Title	MINING OPERATIONS PLAN		

Appendix B – Domains

DOMAIN 1 - STOCKPILE AREA

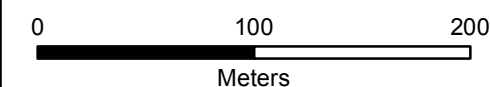
Wongawilli Lease Area

Legend

- LDP Location
- Gate
- Water Tank
- Air Sample Point
- Noise Monitor Point
- Dust Suppression Sprays
- Access Road & Tracks
- Rail
- Fence
- Creek
- Clean Water Drainage
- Contaminated Water Drainage
- Grey Water Line
- Conveyor
- Electricity Transmission Line (WCL Owned)
- Transitional Powerline (BHPBIC Ownership)
- Surface Lease
- Wongawilli Colliery Lease Holdings
- Surface Facility
- Water Collection & Treatment Ponds



1:3,500 Scale at A3



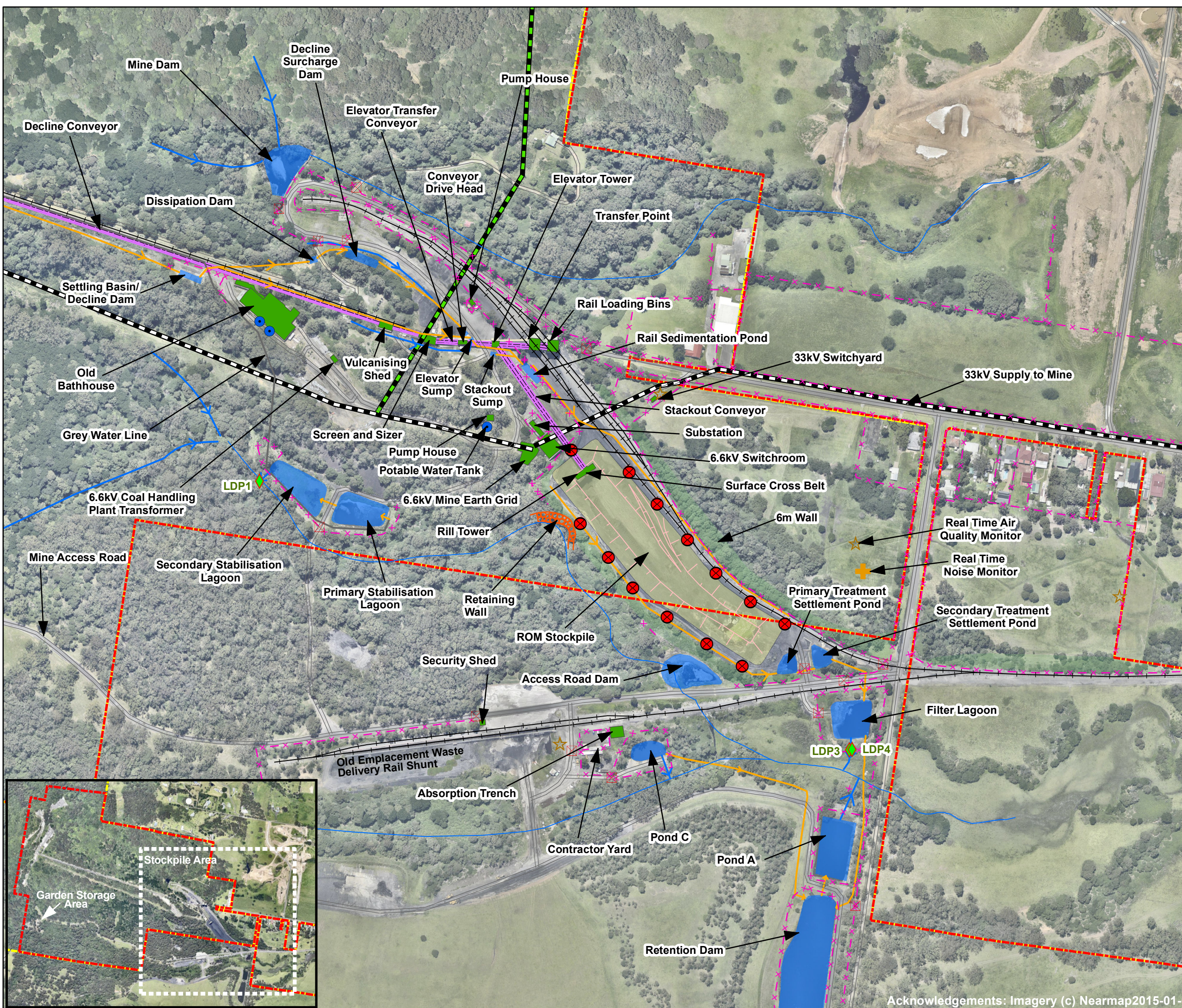
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Projection: Transverse Mercator
Datum: GDA 1994

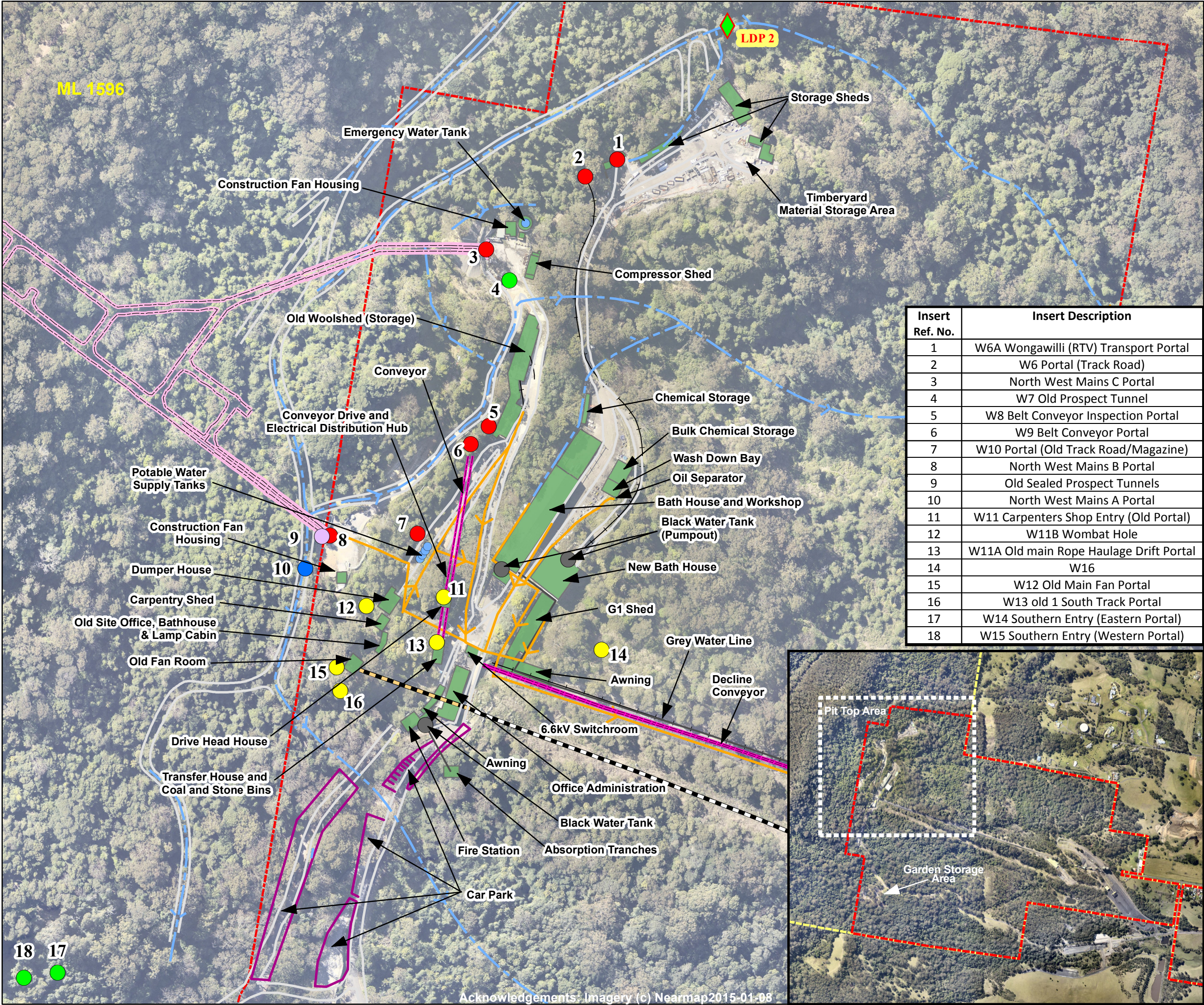


WCL Wongawilli Colliery
Wongawilli Coal Pty Ltd

Wongawilli Road, West Dapto, NSW 2530
ABN 77 111 928 762

Acknowledgements: Imagery (c) Nearmap2015-01-08





DOMAIN 2 -
PIT TOP AREA
Wongawilli Lease Area

Legend

Water Tank

LDP Location

Portal Location

Currently Operational

Decommissioned

Proposed

Rehabilitated

Sealed By Natural Means

To be Rehabilitated

Underground Workings

Conveyor

Clean Water Drainage

Contaminated Water Drainage

Grey Water Line

Car Park

Access Roads & Tracks

Loco Track

Electricity Transmission Line (WCL Owned)

Powerline (Inactive)

Surface Facility

Surface Lease

Insert Ref. No.	Insert Description
1	W6A Wongawilli (RTV) Transport Portal
2	W6 Portal (Track Road)
3	North West Mains C Portal
4	W7 Old Prospect Tunnel
5	W8 Belt Conveyor Inspection Portal
6	W9 Belt Conveyor Portal
7	W10 Portal (Old Track Road/Magazine)
8	North West Mains B Portal
9	Old Sealed Prospect Tunnels
10	North West Mains A Portal
11	W11 Carpenters Shop Entry (Old Portal)
12	W11B Wombat Hole
13	W11A Old main Rope Haulage Drift Portal
14	W16
15	W12 Old Main Fan Portal
16	W13 old 1 South Track Portal
17	W14 Southern Entry (Eastern Portal)
18	W15 Southern Entry (Western Portal)

N

1:2,500 Scale at A3

050100150

Meters

Coordinate System: GDA 1994 MGA Zone 56

Projection: Transverse Mercator

Datum: GDA 1994

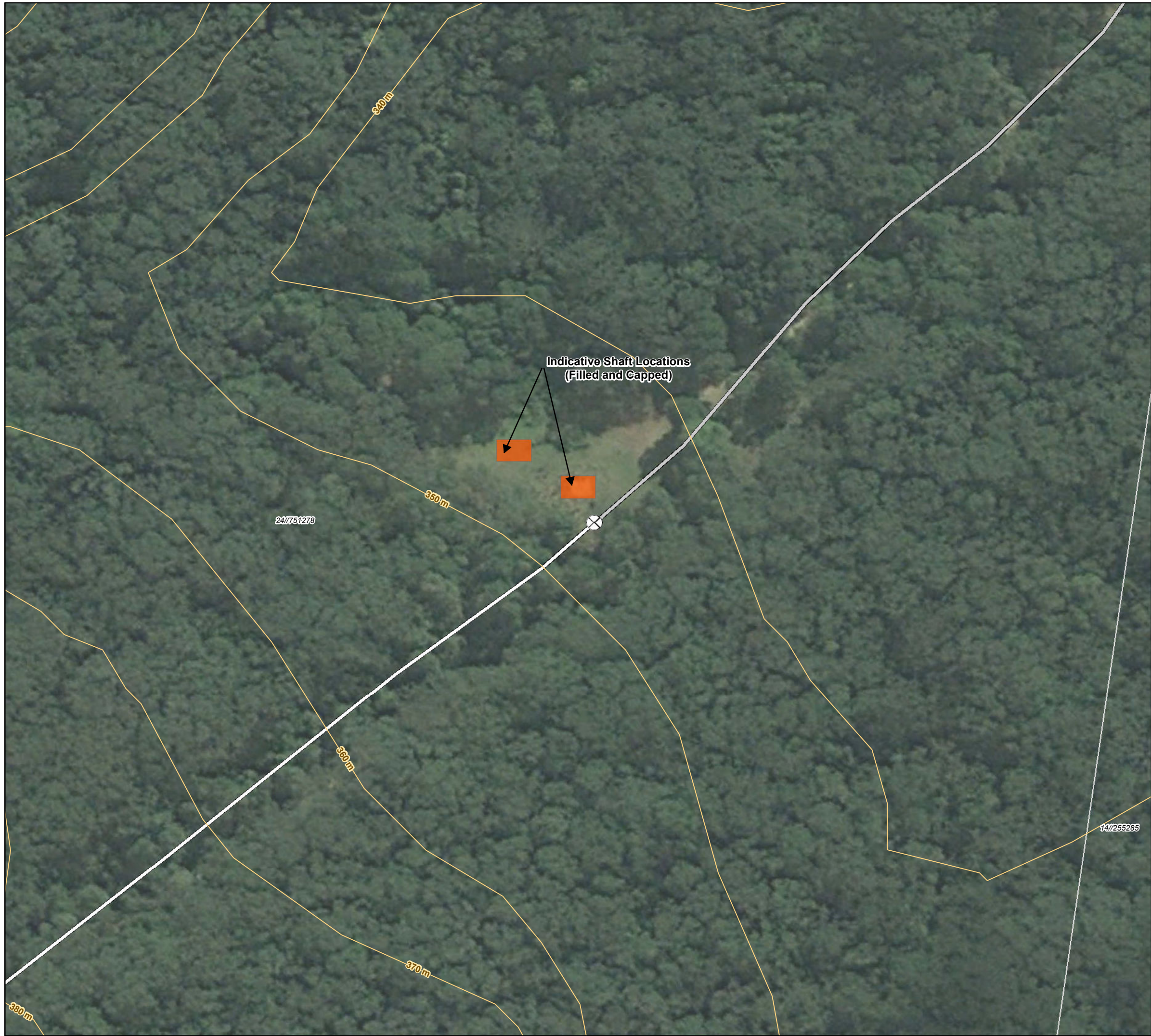
WCL Wongawilli Colliery

Wongawilli Coal Pty Ltd

Wongawilli Road, West Dapto, NSW 2530

ABN 77 111 928 762


Acknowledgements: Imagery (c) Nearmap2015-01-08




Domain 3

NEBO NO. 1 AND NEBO NO. 2

Legend

-  Gate
-  10m Contours (LPI)
-  Cadastre (LPI, 2009)
-  Private Access Road
-  Public Access Road/Fire Trail

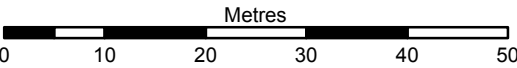
Surface Facilities

-  Sealed Vent Shaft

Note: Extent of Plan has E2 - Environmental Conservation Zoning under Wollongong LEP 2009



1:750 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-09-12
Coordinate System: GDA 1994 MGA Zone 56
Project: 111067-04
Map: G1007_NeboNo1and2_Plan.mxd 03

Aerial imagery supplied by Google Earth Pro and associated third party suppliers (September 2009)



Domain 4

NEBO NO. 3

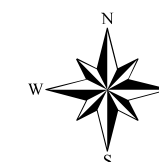
Legend

- Surface Lease (Approx 0.2 ha)
- 10m Contours (LPI)
- Watercourses (LPI)
- Railway (LPI)
- Local Roads (LPI)
- Private Access Road
- Public Access Road/Fire Trail
- Cadastre (LPI, 2009)

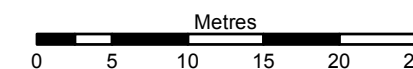
Surface Facilities

- Fence
- Hardstand
- Industrial Building
- Miscellaneous Plant
- Vent Shaft
- Water Tank

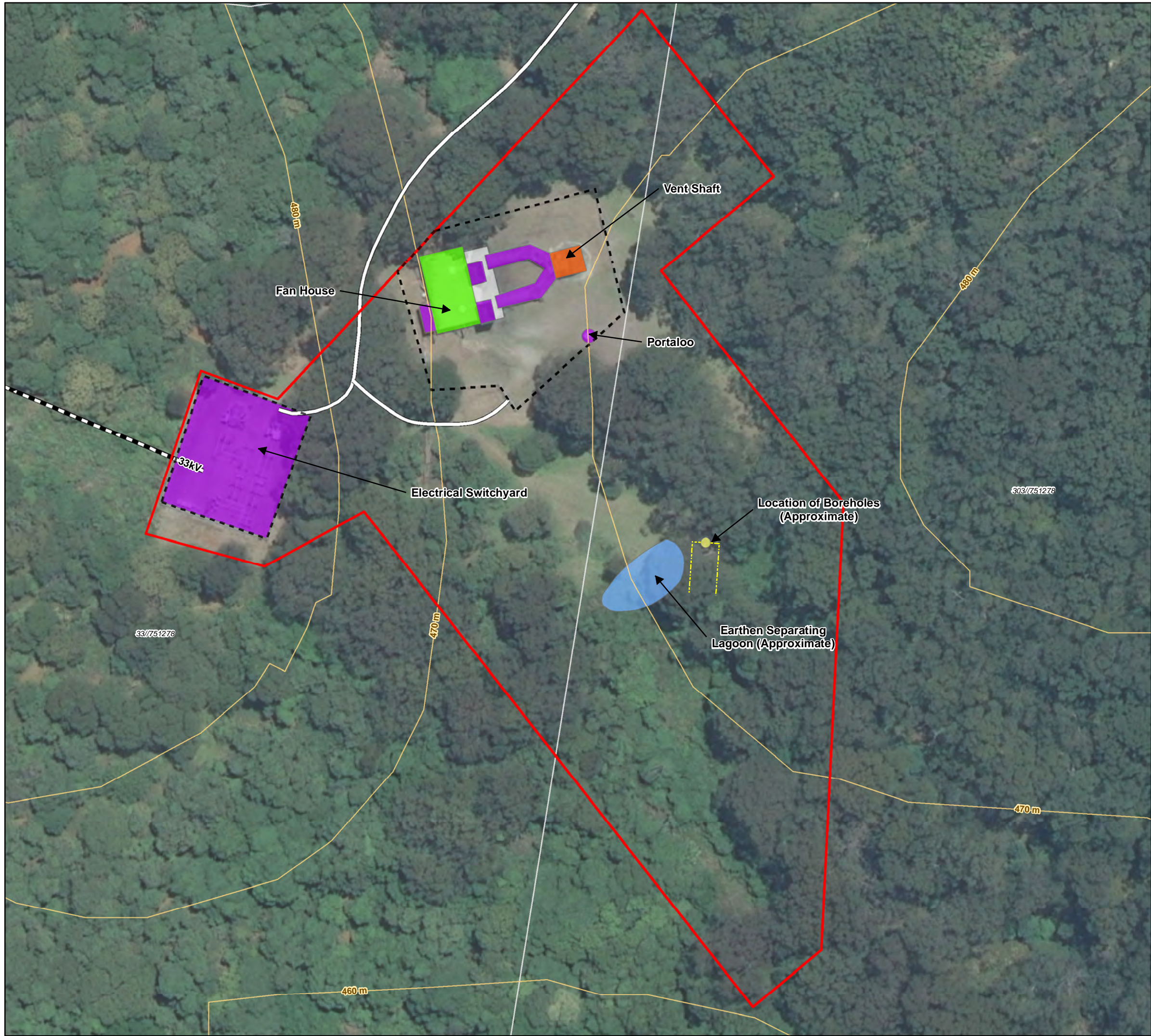
Note: Extent of Plan has E2 - Environmental Conservation Zoning under Wollongong LEP 2009



1:500 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-09-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 111067-04
Map: G1009_NeboNo3_Plan.mxd 05
Aerial Imagery supplied by AAM 2009



Domain 5

NEBO NO. 4

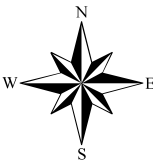
Legend

- Surface Lease (Approx 1.3 ha)
- Earth Grid
- 10m Contours (LPI)
- Private Access Road
- Electricity Transmission Line (LPI)
- Cadastre (LPI, 2009)

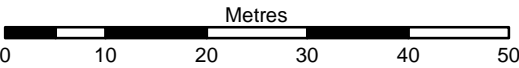
Surface Facilities

- Fence
- Hardstand
- Borehole
- Industrial Building
- Miscellaneous Plant
- Vent Shaft
- Earthen Separating Lagoon

Note: Extent of Plan has E2 - Environmental Conservation Zoning under Wollongong LEP 2009



1:750 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-09-26
Coordinate System: GDA 1994 MGA Zone 56
Project: 111067-04
Map: G1006_NeboNo4_Plan.mxd 03

Aerial imagery supplied by AAM and associated third party suppliers.



Domain 6

WONGAWILLI SHAFT

Legend

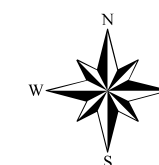
- Surface Lease (Approx 3.1 ha)
- Powerline (Transitional - Inactive)
- 10m Contours (LPI)
- Local Roads (LPI)
- Private Access Road
- Public Access Road/Fire Trail
- Cadastre (LPI, 2009)

Surface Facilities

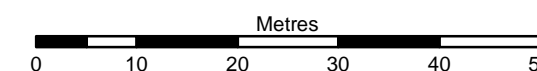
- Emplacement Area
- Fence
- Industrial Building
- Miscellaneous Plant
- Vent Shaft and Housing
- Hardstand Area

Wollongong LEP (2009)

- E2 - Environmental Conservation
- SP2R - Infrastructure (Road and Railway)

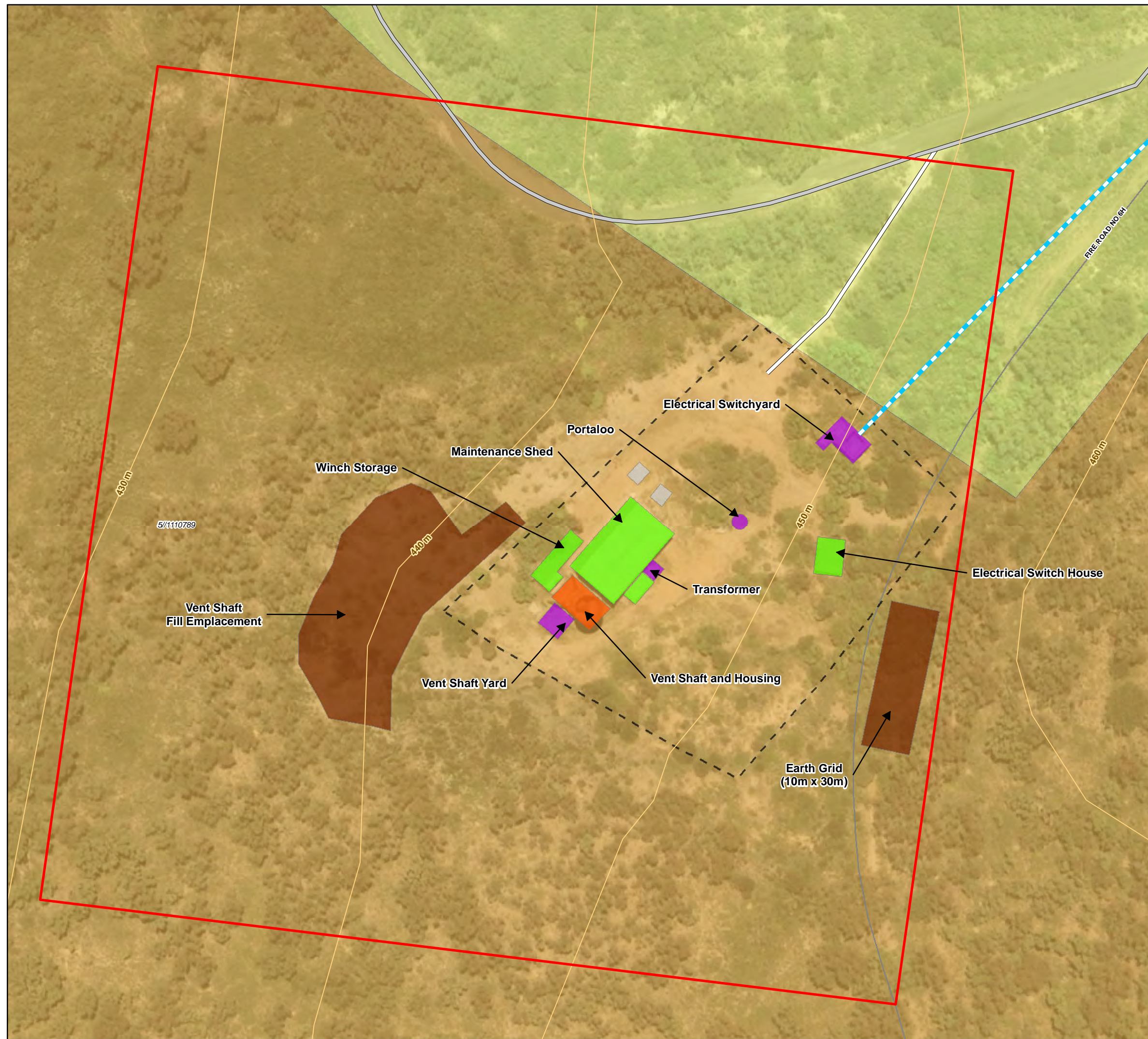


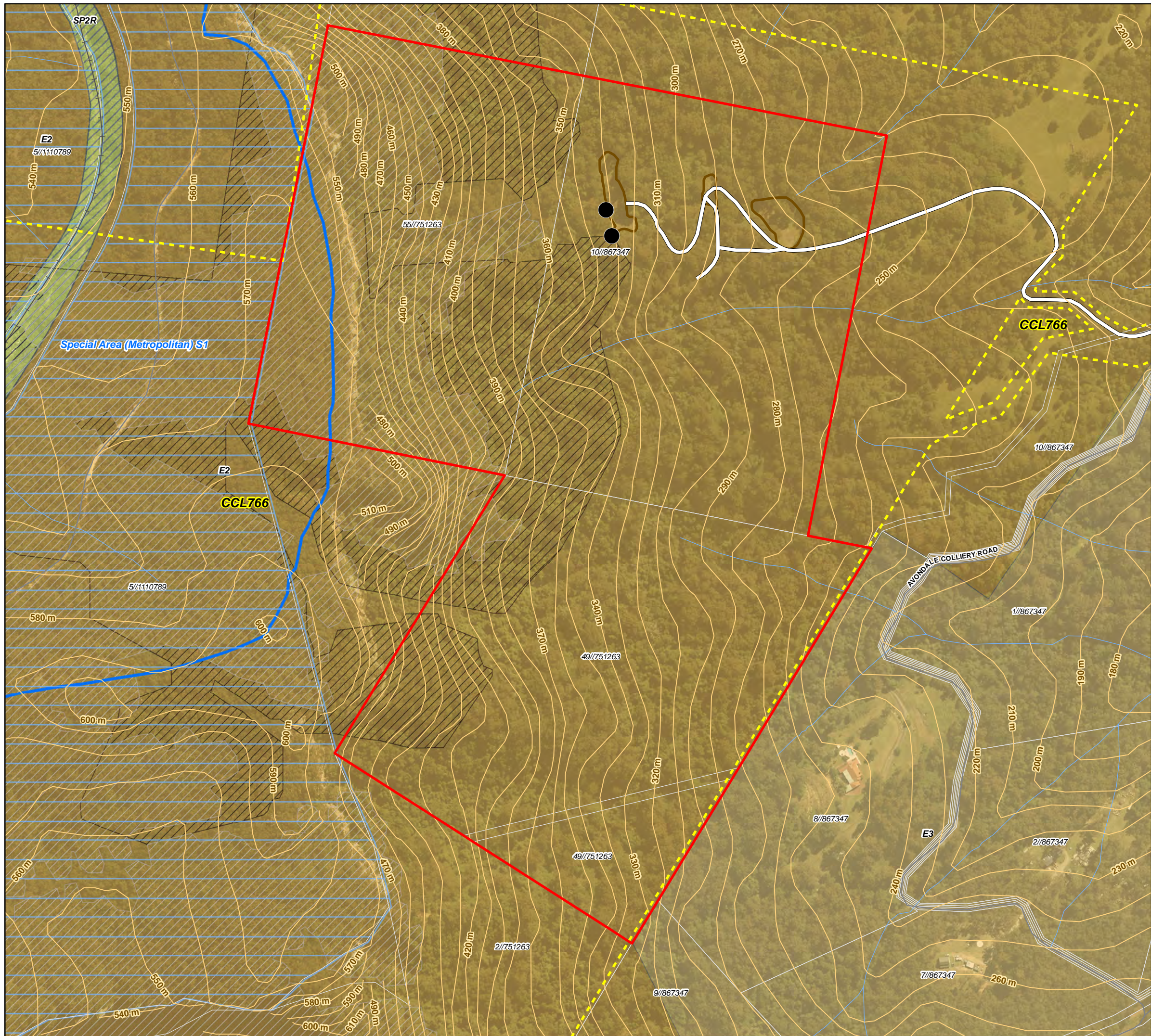
1:750 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-09-07
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Project: 111067-04
Map: G1008_WongawilliShaft_Plan.mxd 05

Aerial Imagery supplied by AAM 2009





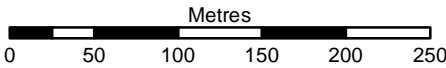
Domain 7

AVONDALE

- Legend**
- Portal Entries
 - ▭ Surface Lease (Approx 56.7 ha)
 - ▭ Wongawilli Colliery Lease Holdings 10m
 - Contours (LPI)
 - Access Roads
 - Local Roads (LPI)
 - Watercourses (LPI)
 - Railway (LPI)
 - ▭ Disturbance Areas
 - ▭ Metropolitan Special Area (SCA)
 - ▭ SCA Freehold Land (SCA)
 - ▭ Cadastre (LPI, 2009)
- Previous Workings (Approx - ERM, EA)**
- ▨ Tongarra Seam Workings
 - ▨ Wongawilli Seam Workings
- Wollongong LEP (2009)**
- ▨ E2 - Environmental Conservation
 - ▨ E3 - Environmental Management
 - ▨ SP2R - Infrastructure (Road and Railway)



1:4,500 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-11-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 111067-04
Map: G1012_Avondale_Plan.mxd 04

Aerial Imagery supplied by AAM 2011



Domain 8 - Portals

WONGAWILLI LEASE AREA

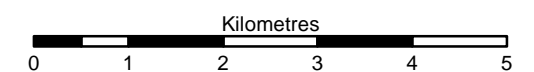
Legend

Portals

- Currently Operational
- Decommissioned
- Proposed
- Rehabilitated
- Sealed by Natural Means
- To be Rehabilitated
- Major Roads (LPI)
- Surface Lease Extents
- Wongawilli Colliery Lease Holdings

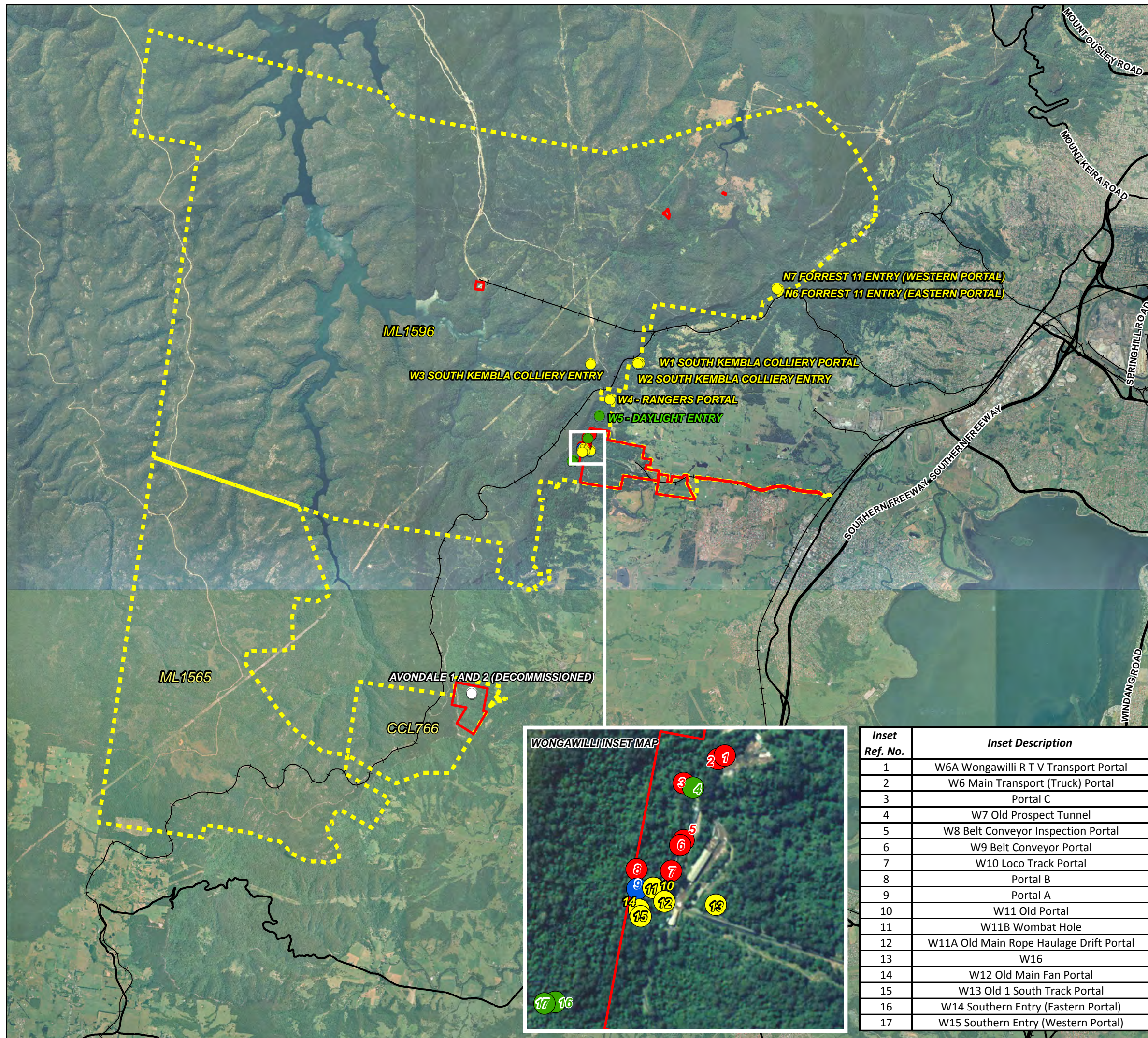


1:80,000 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2011-11-24
Coordinate System: GDA 1994 MGA Zone 56
Project: 111067-04
Map: G1017_Domain8.mxd 03

Aerial imagery supplied by NSW Land and Property Information





Domain 9 - Garden Storage Area

WONGAWILLI LEASE AREA

Legend

- Surface Lease (Approx 141 ha)
- Watercourses (LPI and NRE)
- 10m Contours (LPI)
- NRE Wongawilli Colliery Lease Holdings
- Cadastre (LPI, 2011)
- Hardstand
- Access Road

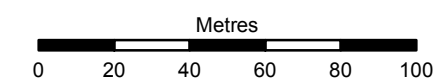
Wollongong LEP 2009 & West Dapto 2010 (WCC)

- E1 - National Parks and Nature Reserves
- E2 - Environmental Conservation
- E3 - Environmental Management

** Cadastre and zoning are from different sources and are not spatially aligned*



1:2,000 Scale at A3



Map Produced by Cardno NSW/ACT Pty Ltd (WOL)

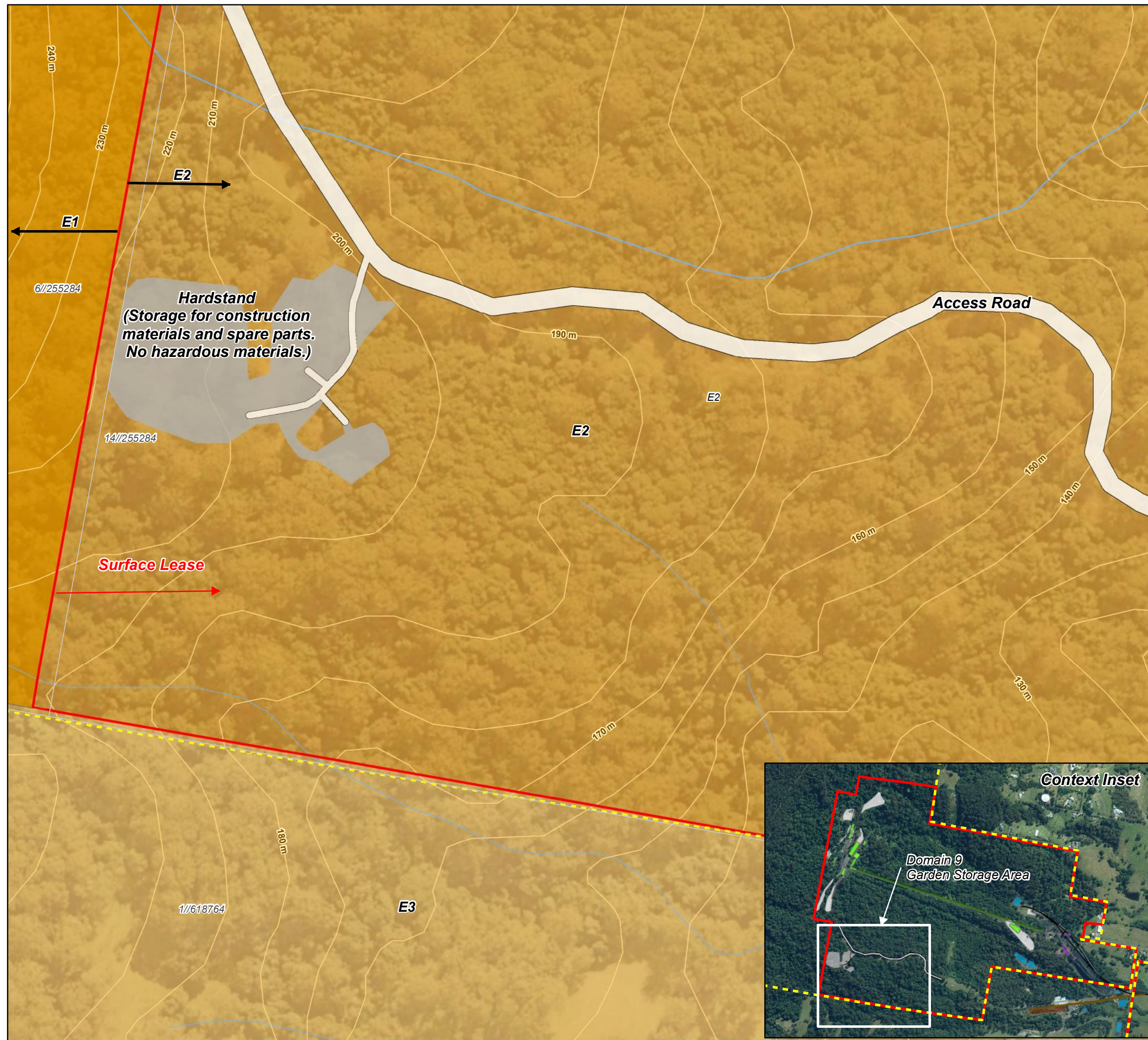
Date: 2012-03-29

Coordinate System: GDA 1994 MGA Zone 56

Project: 111067-04

Map: G1019_Domain9_GardenStorage_Plan.mxd 02

Aerial imagery supplied by AAM 2011 and Bing Maps
and associated third party suppliers






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Doc Title	MINING OPERATIONS PLAN		

Appendix C – Risk Assessment Methodology and Results

Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
Type	Risk Assessment	Date Published	27/11/2020
Doc Title	Mining Operations Plan (MOP) Risk Assessment		

RISK ASSESSMENT SIGN OFF/ APPROVAL SHEET

OPERATION: Wongawilli Colliery	RA Document Control Number: WWC EC RA 007
Risk Assessment Title: Mining Operations Plan (MOP)	
AUTHOR/ OWNER: Name: Wayne Sly	Title: Chief Operating Officer (COO)

REVIEWS	
RISK ASSESSMENT FOLLOWED PROCESS? SPECIFIC COMMENTS / ACTION REQUIRED:	Health, Safety & Training Manager NAME: David Moore SIGNATURE:  DATE: 18/11/2020
SPECIFIC COMMENTS / ACTION REQUIRED:	Mining Engineering & Operations Manager (Wongawilli) NAME: Peter Roser SIGNATURE:  DATE: 18/11/20
SPECIFIC COMMENTS / ACTION REQUIRED:	Chief Operating Officer NAME: Wayne Sly SIGNATURE:  DATE: 18/11/20
SPECIFIC COMMENTS / ACTION REQUIRED:	Group Environment and Approvals Manager NAME: Richard Sheehan SIGNATURE:  DATE: 18/11/20
SPECIFIC COMMENTS / ACTION REQUIRED:	Environmental Consultant NAME: Eladio Perez SIGNATURE:  DATE: 18/11/2020
SPECIFIC COMMENTS / ACTION REQUIRED:	Logistics Manager NAME: Paul Evert SIGNATURE:  DATE: 18-11-20
(Optional) ADDITIONAL CONTENT EXPERT Absent on day of risk assessment	Environmental Coordinator (Wongawilli) NAME: Justin Meredith SIGNATURE: DATE:



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(Optional) ADDITIONAL CONTENT EXPERT

Environmental Monitoring & Reporting Coordinator

NAME: Sasa Cugalj

SIGNATURE:

DATE: 18/11/20

ACTIONS WORKFLOW

Actions added to the Actions Database ☐ Date : _____

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Mining Operations Plan (MOP) Risk Assessment

1. INTRODUCTION

This risk assessment supports the extension of the current Mining Operations Plan (MOP) which expires on 31 December 2020.

The Mining Operations Plan (MOP) describes the arrangements and proposed management of the Wongawilli Colliery during this MOP term. It has been compiled in accordance with, the NSW Department of Trade and Investment, Regional Infrastructure and Services (ESG3) Mining Operations Plan (MOP) Guidelines (September 2013).

Description of Operation

Wongawilli Coal Pty Ltd owns Wongawilli Colliery (WC) in the Southern Coalfield of New South Wales. Wongawilli Coal Pty Ltd is a wholly owned subsidiary of Wollongong Coal Limited (WCL). Wongawilli Colliery is located approximately 14 kilometres (km) south-west of Wollongong (Plan 1A), within the Wollongong and Wingecarribee Local Government Areas (LGAs). The total lease area covered by Wongawilli Colliery is 147.67 square kilometres (km²). WCL operate WC in accordance with the Project Approval for the Wongawilli Colliery – Nebo Project Area Major Project (MP) 09_0161 as modified. The Project Approval was supported by NRE Wongawilli Colliery Nebo Area Project Environmental Assessment (ERM, 2010). In accordance with MP 09_0161 WCL have approval to conduct underground mining operations in the Nebo area in the north east corner of the lease producing up to 2 Million tonnes per annum (Mtpa) of coal utilising the surface infrastructure at the Wongawilli pit top. MP 09_0161 also permits the continued development and construction of the North Western Driveage. Run-of-mine (ROM) coal from the Colliery is transported to Port Kembla Coal Terminal (PKCT) by rail.

MP 09_0161 expires on December 31st, 2020. Mining Operations ceased in the Nebo area in March 2019 and subsequently, the old mine workings have been closed with ventilation and power removed. The mine was placed on Care and Maintenance in May 2019. An application was submitted to the DPIE in November 2 to extend the term of MP 09_0161 to December 2025 to complete the approved North Western Driveage which is the first stage of the Wonga South Development to south of the Wongawilli and Nebo Workings.

The Wongawilli pit top contains the main mine portal and caters for men, mining equipment, vehicle and machinery maintenance, mine supplies, administration, coal transport to the surface, a 100,000 tonne capacity coal stockpiling facility and rail transportation facilities to load and transport coal to the PKCT.

2. CONTEXT STRATEGY, CORPORATE AND RISK MANAGEMENT

The process followed in this review was based on the Wollongong Coal Risk Management Procedure. This procedure is consistent with the requirements of the NSW Trades and Investment Mine Safety MDG1010 Guidelines for Risk Management and Risk

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Assessment and as well as the Australian / NZ Standard for Risk Management AS/NZ/ISO:31000:2009.

The results from the risk assessment will be used to ensure all controls including practices and procedures, are adequate for the identified risks. Additionally, it defines the controls and conditions necessary to ensure the safe handling application and management of the materials, process at any 'generic' location.

3. OBJECTIVES AND SCOPE

The primary objective of this risk assessment is to assist to fulfil the requirements of the NSW Resources Regulator ESG3: Mining Operations Plan (MOP) Guidelines, September 2013 which details a process for monitoring and managing progression towards successful rehabilitation outcomes.

The Mining operations plan (MOP) requires Wongawilli and Avondale Collieries to identify and provide measurable data and demonstrate that proposed rehabilitation outcomes are achievable and realistic within a given timeframe. This underpinning risk assessment of the Mining operations plan (MOP), will analyse the risks to successfully achieving the requirements and to make recommendations for further controls where appropriate.

The main consideration is environmental impact, however, harm to people's safety and health, business interruption and damage, impact on reputation, social and community issues and legal and regulatory impact will be considered where relevant.

The MOP comprises the areas known as Wongawilli Colliery Pit Top, Avondale Pit Top and the remaining Project Approval Area, and is collectively referred to as the Wongawilli Colliery.

The risk assessment scope was restricted to Wongawilli and Avondale Collieries and includes both the pit top areas and SMP and Catchment Lease Areas. Local residences are also included in the scope of the assessment with the ability to affect the residences by noise, dust, water and lighting impacts.

Scoping meeting

The scope and method of the risk assessment was discussed between Richard Sheehan (Group Environment and Approvals Manager) and David Moore (Health, Safety and Training Manager/RA facilitator) prior to the workshop. At this session, the scope, resources and workshop participants were agreed and confirmed.

The assessment team was assembled at WCL Russell Vale Colliery and undertook the assessment on Wednesday 18 November 2020.

The work of the Risk Assessment Team

A key factor in the effectiveness of an exercise is the availability of relevant information and expertise. This is addressed mainly through the group workshop. Group workshops recruit the knowledge and experience of a group of people who are familiar with a particular work situation.

The role of team members is to provide their expertise, experience and technical knowledge, and to respect that provided by others. Outcomes are critically dependent

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on the team as a whole providing a balanced view at a level of expertise appropriate to the nature of the subject under Assessment. The experience and expertise of the team, together with the quality of facilitation, are crucial factors in the quality of the results derived.

3.11 Assessment team

Facilitator: David Moore.

Name	Role	Experience relevant to this risk assessment
David Moore	Health, Safety & Training Manager/Facilitator	Bachelor of Arts (Psychology), Associate Diploma in in Administration (Industrial Studies). HLT21015 Certificate II Medical Service First Response, HLTINFCOV001 Comply with infection prevention and control policies and procedures (Transport & Logistics), 'G2' RIIRIS402E Carry out the Risk Management Processes qualification. Australian Institute of Occupational Hygienists (AIOH) Basic Occupational Hygiene qualification. 25 years working in the black coal industry (underground). Mines Rescue Brigadesman.
Peter Roser	General Manager – Wongawilli Colliery	41 years in Mining industry, Masters of Mining Engineering, Mine Manager's Certificate of Competency, 15 years Operations/General Manager of Underground and Open Cut Mines (Coal, Gold, Iron Ore and Manganese) Board of Tasmanian Minerals Council
Richard Sheehan	Group Environment and Approvals Manager	Bachelor of Environmental Biology, Certificate IV Work Health and Safety, Various workshops and courses in Dangerous Goods and Waste Classification, EPL, Contaminated sites, Air Quality and Erosion and Sediment Control. 16 years industry experience in a

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Name	Role	Experience relevant to this risk assessment
		range of environmental roles.
Justin Merdith	Environmental Coordinator (Wongawilli)	Bachelor of Environmental Science Degree, 3 years' experience as an Environmental Field Officer, 1 year experience as an Ecologist Consultant.
Wayne Sly	Chief Operating Officer	42 years industry experience, Bachelor of Engineering (Mining) Qld 1978, Mine Managers Competency NSW and QLD 1992.
Eladio Perez	Group Environmental and Approvals Manager	Bachelor of Applied Science (Applied Chemistry), University of Technology, Sydney, RABQSA AU Management Systems Auditing, SAI Global, 2009, RABQSA-EM Environment Management Systems, SAI Global 2009, RABQSA-TL Lead Management Systems Audit Teams, SAI Global, 2009 OHS Risk Management, SAI Global, 2009. April 2017 – Present SMEC Associate Scientist September 2016 – April 2017 CPB Senior Environmental Coordinator
Sasa Cugalj	Environmental Monitoring Coordinator	2 years' experience in the Environmental Monitoring Coordinator role. 2 years' experience as an Environmental Officer at Wongawilli Colliery.
Paul Evert	Logistics Manager	Certificate IV in Transport and Distribution, Certificate III in Transport and Distribution, Diploma of Human Resource Management, Certificate IV in Human Resources. 10 years' experience in logistics in coal haulage. 20 years' experience in rail industry management roles.

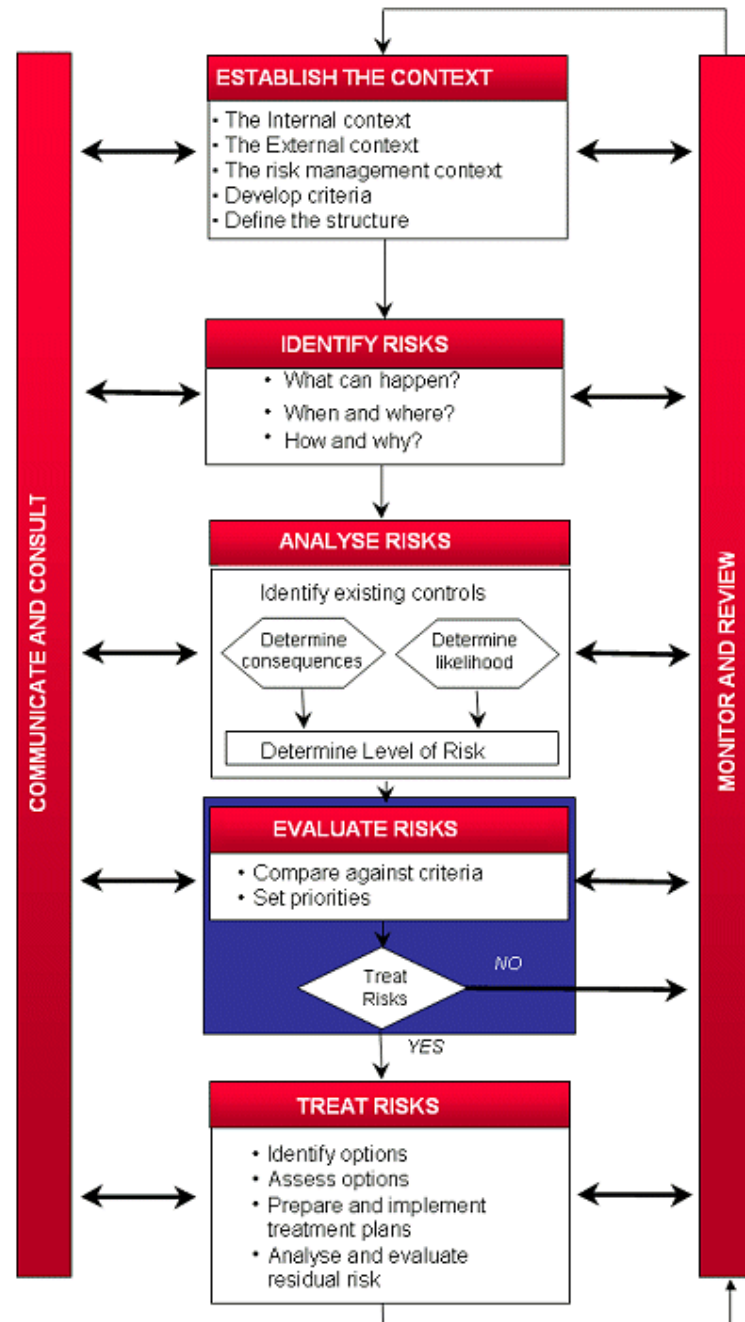


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4. METHODOLOGY

The assessment was conducted in line with the requirements of the Australian Standard for Risk Management (AS/NZS ISO 31000:2009) and MDG 1010 Minerals industry safety & health risk management guideline (January 2011) while utilising the colliery's methodology in the identification, assessment and effective control of each of the recognised hazards and, included rating of likelihood and consequence of occurrence based on a combination of aspects including health and safety.

The resulting documented assessment of hazards, their rating, proposed controls and residual assessment were then circulated to all participants for comment to ensure all concerns raised were effectively addressed and controlled. Comments were discussed and the assessment amended as required. An action plan with specific responsibilities was then developed to ensure implementation of the identified controls.



5. ASSUMPTIONS AND REFERENCES

The following assumptions and limitations were applied to this risk assessment:

- The site has an existing Mining Operations Plan (MOP) and will use this to review and develop the new Mining Operations Plan.
- All existing Management Plans, Systems and Procedures are available and understood.

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- Existing Environmental Management Plans are being reviewed for compliance to relevant legislation and current site practices in line with MOD 2.
- References to draft legislation released by the DPIE in 2020 on Mine Rehabilitation provided insight to future legislative requirements impacting the MOP within the forecast period in approval.

Compliance with the requirements of the:

- Work Health and Safety Act 2011 No.10,
- Work Health and Safety Regulation 2017,
- Work Health and Safety (Mines & Petroleum Sites) Act 2013 No.54,
- Work Health and Safety (Mines & Petroleum Sites) Regulation 2014,
- Work Health and Safety (Mines and Petroleum Sites) Amendment Regulation 2018,
- MDG 1010 Minerals industry safety & health risk management guideline (January 2011),
- MDG 1014 Guide to reviewing a risk assessment of mine equipment & operations (July 1997),
- Contaminated Land Management Act 1997 No.140,
- Crown Lands Management Act 2016 No.58,
- Dams Safety Act 2015 No.26,
- Dangerous Goods (Road and Rail Transport) Act 2008 No.95,
- Energy and Utilities Administration Act 1987 No.103,
- Environmental Planning and Assessment Act 1979 No.203,
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
- Fisheries Management Act 1994 No.38,
- Heritage Act 1977 No.136,
- Mining Act 1992 No.29,
- Biosecurity Act 2015 No.24,
- Protection of the Environment Operations Act 1997 No.156,
- Protection of the Environment Operations (Waste) Regulation 2014
- Road and Rail Transport (Dangerous Goods) Act 2008 No.95,
- Roads Transport Act 2013 No.18,
- Heavy Vehicle (Adoption of National Law) Amendment Act 2013 No.71,
- Water NSW Act 2015 No.74,
- Biodiversity Conservation Act 2016 No.63,



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- Water Act 1912 No.44,
- Water Management Act 2000
- Australian Standard 4282-2019 Control of the obtrusive effects of outdoor lighting

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6. DEFINITIONS

6.1 Hazard

The term "hazard" is defined as "a source of potential harm". The minerals industry has many large and sometimes complex hazards. Using this definition, electricity, large mobile equipment, ground and objects at height all have a potential for harm. This guideline, in conjunction with the NMIHSRAG, suggests that good risk management involves the identification and understanding of hazards, the establishment of potential unwanted events related to those hazards and, subsequently, the analysis of risk related to the unwanted event. Using this approach risk is a measure of concern; used to increase awareness, set priority or determine acceptability of an unwanted event risk.

Environment note: The term 'hazard' is essentially equivalent to 'environmental aspect'.

Establishing the context within the risk management process involves the overall direction setting and rationale for the entire process. AS/NZS ISO 31000:2009 includes consideration of external and internal factors in establishing context as well as the resultant goals, objectives and strategies including definition of risk acceptability criteria.

6.2 Incident (or ongoing condition)

An incident (or ongoing condition) is any occurrence that has the potential to result in adverse consequences to people, the environment, property/plant, or a combination of these.

6.3 Consequence

Consequences can result from the development of an incident over time (immediately after or over an extended period). The concept of consequence includes, within its scope, the potential adverse impacts/effects on people, the environment, plant or property, or a combination of these. By definition, consequence must be expressed as a quantitative between 1 and 5.

6.4 Impact/Effect

Impacts are specific adverse effects resulting from an incident and may be related to people, the environment, plant or property, or a combination of these.

6.5 Probability

Probability is an expression of the chance of a particular outcome. By definition, probability must be expressed as an alphabetical reference between A and E. Within this guideline the term probability is the qualitative description of likelihood and/or frequency in relation to the chance that something will occur & will be referenced as such in this risk assessment.

6.6 Frequency

Frequency is defined as the number of times something (e.g. an activity, the hazard or incident) may occur within a specified timeframe, such as daily, weekly or annually. Within this guideline the frequency term is used in quantitative risk assessments.

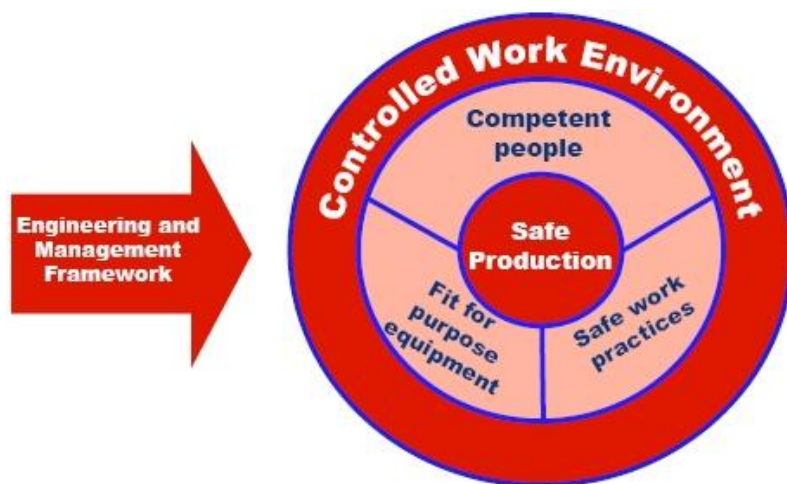
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6.7 Risk

Risk is defined as the likelihood of an impact on people, the environment, property, or a combination of these.

6.8 “Nertney Wheel”

The “Nertney Wheel” (Bullock, 1979), illustrated below, offers a model of an ideal work process for achieving safe production - the intended outcome of most site decisions. The wheel identifies four components of a safe and productive work process, competent people, safe work practices, fit for purpose equipment and a controlled environment.



Process Model or the Nertney Wheel

The term competent people is intended to not only refer to competency related to training and skills but also appropriate motivation and “fitness for duty”.

6.9 The basic risk management process

The first step in understanding risk management involves becoming comfortable with the terminology and the intention of risk management. Obviously correct use of the word “risk”, considering its definition, is important to successful risk management. Risk is defined as “effect of uncertainty on objectives” (AS/NZS ISO 31000:2009). This definition has evolved over the last 10 years, improving its clarity. AS/NZS ISO 31000:2009 also notes that “Risk is often characterized by reference to potential events and consequences or a combination of these”. For the purposes of this guideline, the identification of an unwanted event will be separated from the term “risk”. The term “risk” will be used to describe MDG 1010 – Risk Management Guideline Page 14 of 117 only the measure of event consequences and likelihood. Note that a risk is usually thought of in terms of negative impact but similar approaches can be used to identify positive events or opportunities. It is important to note that there is no “zero risk”. A source may suggest that risks must be eliminated but unless the hazard is totally removed and no related hazard put in its place, elimination cannot be achieved. Risk is managed to a level of acceptability or practicality.

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Risk analysis is defined as a “process to comprehend the nature of risk and to determine the level of risk” (AS/NZS ISO 31000:2009). In other words, this is the step where likelihood and consequence are somehow estimated. Risk analysis is usually done considering the impact of existing controls though there are circumstances where estimating inherent risk, or risk without controls, is desirable.

AS/NZS ISO 31000:2009 defines risk assessment as the “overall process of risk identification, risk analysis and risk evaluation” as outlined above. In practice, most risk assessment involves the application of a variety of informal and formal, qualitative and quantitative methods to assist with the management of risk.

6.10 Common Mining Energies

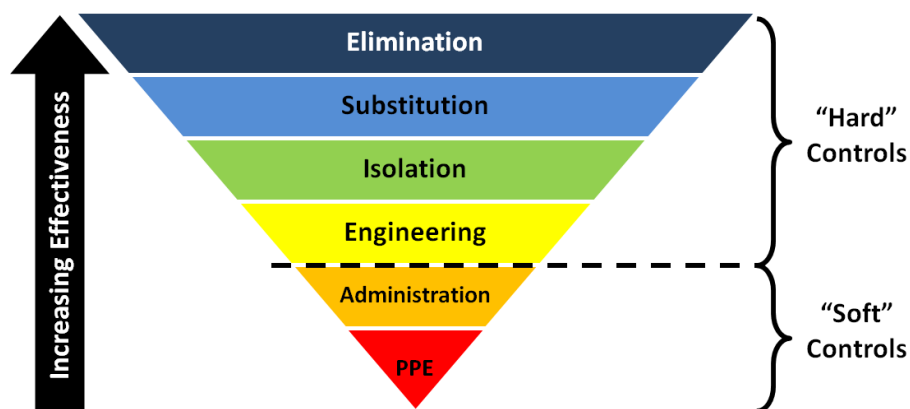
Biological	bacteria, viruses, contagious diseases, natural poisons, etc.
Chemical	coal, gases, fuels, lubes, degreasers, solvents, paints, etc.
Electrical	high voltage, low voltage, batteries, etc.
Gravitational (objects)	falling coal, rock, tools, components, structures, etc.
Gravitational (people)	falling from or into equipment, structures, ladders, sumps, etc.
Machine (Fixed)	powered by electrical, hydraulic, pneumatic, combustion, etc.
Machine (Mobile)	haulage trucks, LHDs, service vehicles, gen sets, tools, etc.
Magnetic (handling metal objects in strong magnetic fields),
Noise	from machines and other sources,
Object	pressurised systems, cylinders, springs, chains, flying bits, etc.
People	slip, trip, lift strain, push/pull sprain, repetitive /postural strain,
Thermal	conducted (contact), convected (airstreams), radiation,
Vibration	from vehicles, equipment, tools, etc.
Other	friction, wind, animal, bio-chemical.

6.11 Hierarchy of Controls

In occupational health and safety risk management there is a hierarchy of controls referred to as the Safety Precedence Sequence for Barriers/Controls. This lists the types of control and their effectiveness in descending order.

The most effective controls are those that eliminate the hazard. If a hazard cannot be eliminated it should be minimised to an acceptable level. This may be achieved through a system of engineering controls, often referred to as ‘hard’ barriers down to administrative controls usually referred to as ‘soft’ barriers. Hard barriers actually prevent or minimise the risk of contact with the hazard whereas soft barriers may rely on policies and procedures and their enforcement, training, skills and experience, work organisation and the wearing of personal protective equipment (PPE). These controls are primarily based on controlling human behaviour and are subject to human error. Therefore they may be less effective in preventing exposure to hazards. Nevertheless, there is a place for both hard and soft barriers in any risk management plan.

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The effectiveness and place of each control on the 'hierarchy' is considered at all times when identifying and suggesting controls for hazards. Existing controls are considered and where necessary, additional controls are recommended

6.12 Risk acceptability

Risk acceptability and risk management is one of the most challenging concepts in risk management concerns the establishment of risk acceptability. There is no zero risk if a hazard is truly or potentially present. Risk must be managed to a level that is as low as reasonably practicable (ALARP).

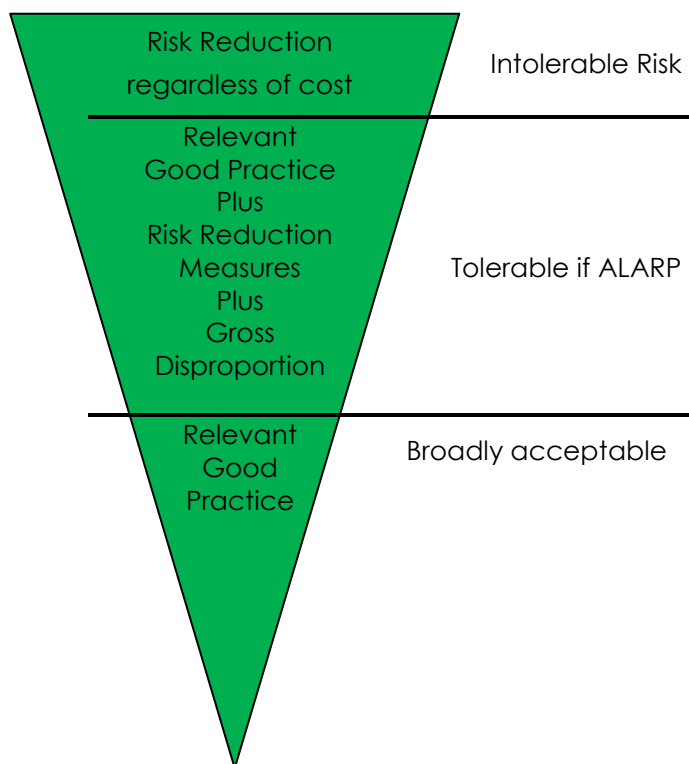


Diagram – Risk Acceptability

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7. RISK METHODOLOGY

Wollongong Coal Ltd Risk Methodology - (as reference).

Consequence Severity

Loss Type (Additional 'Loss Types' may exist for an event; identify and rate accordingly)	Consequence Definitions (Where a scenario has more than one 'Loss Type', choose the one with the maximum credible rating)				
	1 Insignificant	2 Minor	3 Moderate	4 High	5 Major
Harm to People Safety & Health (S/H)	First aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Loss of quality of life / Irreversible impact on health	Single or multiple fatalities / Impact on health ultimately fatal
Environmental Impact (EI)	Negligible impacts such as small spill or leak immediately contained or recovered. One adverse local public complaint	Minor environmental harm such as large release of contaminant to land that is contained and readily recoverable using pumps or mobile plant. Recovery and clean up costs less than \$5,000. Minor complaint from local resident/s likely easily rectified	Moderate, environmental harm e.g. release of contaminant into storm drain or soil causing deep or moderate contamination. Possible cumulative impact event such as nutrient/sediment runoff. Recovery /clean up and or legal costs up to \$50,000. Numerous public complaints from community moderately difficulty address	Significant off-site release of contaminant to land/water/air. Difficult to recover and major environmental harm or potential harm expected e.g. fish kill, human health with recovery/ clean up /legal costs up to \$250,000. Numerous ongoing public complaints / government lobbying difficult and costly to address	Uncontrolled release of toxic contaminant to land/water/air off-site with significant and long-term environmental harm. Clean up costs over \$250,000. Widespread and serious public outcry/ government lobbying difficult and costly to address



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Business Interruption/ Damage and Other Losses (BI/MD)	No disruption to operation/ < \$150k (effect NPBT)	Brief disruption to operation / \$150k to \$750k	Partial shutdown / \$750k to \$3m	Partial loss of operation / \$3m to \$5m	Substantial or total loss of operation / > \$5m
Legal and Regulatory (L&R)	Low level legal issue	Minor legal issue; non-compliance and breaches of the law	Serious breach of law; investigation/report to authority, prosecution and/or moderate penalty possible	Major breach of the law; considerable prosecution and penalties	Very considerable penalties & prosecutions. Multiple law suits & jail terms
Impact on Reputation / Social / Community (R/S/C)	Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	State impact - state public concern	National impact - national public concern

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7.1 Probability Chart

The probability that the consequence will occur or re occur.

Level	Descriptor	Description
A	Almost Certain	Expected to occur in most circumstances Multiple / 12 months (> 80% probability)
B	Likely	Will probably occur in most circumstances Once / 12 months (61% to 80% probability)
C	Possible	Might occur within 1-2 year time period Once / 12 months – 2 years (41% to 60% probability)
D	Unlikely	Could occur during specified time period Once / 12 months – 5 years (21% to 40% probability)
E	Rare	May only occur in exceptional circumstances Once > 5 years (20% probability)

7.2 Risk Matrix

	CONSEQUENCE				
	Insignificant	Minor	Moderate	High	Major
PROBABILITY	1	2	3	4	5
A Almost Certain	M11	S16	S20	E23	E25
B Likely	M7	M12	S17	E21	E24
C Possible	L4	M8	S13	S18	E22
D Unlikely	L2	L5	M9	S14	S19
E Rare	L1	L3	M6	M10	S15

Risk Ranking Legend

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7.3 Safety Standard to be achieved

Selection of controls to reduce risks are made with due regard to their reliability. That is, installing engineering modifications is a superior control to operator training, education or warning signs. Removing the hazard altogether is the most effective control of all.

In every case the effectiveness of the controls in place was considered and assessed by the team for adequacy. In this manner the Risk Control Effectiveness (RCE) was assessed by the team using the risk rank and potential consequences of each hazard to ensure that the controls bring the risk to an acceptable level as low as reasonably practicable (ALARP).

Risk Rating	Risk Level	Guidelines for Risk Rating Matrix
E21 to E25	(E) – Extreme	Eliminate, avoid, implement specific action plans/procedures to manage and monitor – elevate to Senior Management Team for consideration prior to activity – must include improvements to decrease level of risk
S13 to S20	(S) – Significant	Proactively manage with systems and approval of same by Senior Management Team – must include improvements to decrease level of risk
M6 to M12	(M) – Medium	Actively manage
L1 to L5	(L) - Low	Monitor and manage as appropriate

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7.31 Table 1:

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment					Cons		Prob	Rating	Action	Responsible Person	Due Date	Cons
Exploration	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna.	WCL EC PLN 003 Traffic Management Plan WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL EC PRO 011 Drill Hole Sealing And Capping Procedure WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW) Review of environmental factors document WCL EC TRN 001 Remote Work & Special Area Land (Managed by WaterNSW) Access Induction Assessment WCL EC FRM 003 WaterNSW Access for Works Permit WCL EC PRO 015 Special Area Land (Managed by WaterNSW) Access Procedure WCL EC PRO 017 Catchment Monitoring Biological Hygiene Control Procedure v2	WCL EC PLN 002 Incident Response MP for Surface Drilling (Water NSW) WCL EC PLN 001 Incident Response Management Plan Special Area Managed by WaterNSW WWC EC PLN 001 Pollution Incident Response Management Plan	The exploration program is being finalised for the next 12 months No exploration is undertaken without a Part 5 EP&A Act approval issued by the WNSW. This process involves detailed assessment of the potential impacts of the activity on surface water in the affected areas with production of agreed management plans for disturbed areas. Once the exploration program has been developed, a Review of Environmental Factors (REF) is proposed to be carried out for all proposed holes for WNSW's approval prior to commencement of drilling. Rated for Environmental Impact (EI)	2	C	M 8	Yes	Review the current exploration program at Russell Vale for possible improvements and future engagement at Wongawilli and Avondale.	Devendra Vyas	July 2021	2	C	M 8
Construction	Environmental damage, poor roads, access issues and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna. Community impacts such as noise, dust traffic	EMS STD 001 Environmental Management Strategy and sub-plans WCL HS PLN 001 Contractor Management Plan	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response	Infrastructure construction works will be undertaken for the coal clearance system, site services and portal. All ROM coal will be transported by train to PKCT. Stone material will be re-used on-site or disposed of in the underground workings Rated for Environmental Impact (EI)	2	C	S1 3	Yes	Review and update as required the existing site management plans Existing screening and crushing	Peter Roser	March 2021	2	C	S1 3

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		WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas	Management Plan							plant to be removed and relocated underground.	Peter Roser	Prior to running coal to the stockpile area			
Mining Operations	Dust, noise, water balance changes, materials handling, waste, water, ecological impacts	EMS STD 001 Environmental Management Strategy and sub-plans WCL HS FRM 005 Change Management Approval		Mining activities during this MOP period subject to approvals are granted by the DPIE. Rated for Environmental Impact (EI)	2	C	M 8	Yes							
Rock Emplacement				No Rock will be emplaced during the period covered by this MOP.						Not Rated					
Processing Residues and Tailings				No processing residues or tailings will be generated on-site.						Not Rated					

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Waste Management	Spills on site and during transportation, truck noise.	WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan	All waste management is undertaken by a licenced waste management contractor who provides information to WCL regarding wastes removed each month. In addition, the waste management contractor undertakes waste tracking in accordance with the Protection of the Environment Operations (Waste) Regulation 2014. All waste is classified and disposed of to a suitably licenced facility. Rated for Environmental Impact (EI)	2	D	L5	Yes							
Decommissioning and Demolition Activities	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan	Redundant surface infrastructure identified in a structural audit will be removed during this MOP period in accordance with the standard. No.3 and 4 shaft infrastructure will be removed over a 3 year period. Rated for Environmental Impact (EI)	2	D	L5	Yes	A program is being prepared to carry out the rehabilitation of No.3 and 4 shafts over the next 3 years. See progressive rehabilitation below	Peter Roser	June 2021				
Temporary Stabilisation	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements EMS-MP-006 Surface	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan	There is no temporary stabilisation foreseen to be taking place over this MOP period. Rated for Environmental Impact (EI)	2	D	L5	Yes	Review and upgrade the Site water management program.	Peter Roser	January 2021	2	D	L5	

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		Water Management Plan EMS MP 011 Air Quality & GHG Management Plan													
Progressive Rehabilitation and Completion	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements EMS-MP-006 Surface Water Management Plan EMS MP 001 Air Quality & Greenhouse Gas Management Plan Water carts	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan WCL EC PRO 002 Community Complaints & Enquiries Procedure	With the cessation of mining operations from the Nebo area in 2019, the majority of the old mine workings covering the Wongawilli and Nebo mine areas were closed, power disconnected, and mine ventilation removed. The two Nebo shafts in the catchment area (No 3 and 4) are now redundant and will be addressed in the mine's rehabilitation program from 2021 to 2023. Since 2019, the two shaft sites have been addressed to minimise risks associated with the facilities being on C&M. The primary objective of post-mining rehabilitation works will be to create a stable final landform that is free draining with acceptable post-mining land use capability. All rehabilitation works will be scheduled to occur progressively as soon as practicable after mining disturbance and decommissioning of infrastructure. Rated for Environmental Impact (EI)	2	C	M 8	Yes	Prepare a detailed plan for the rehabilitation and access (year 1) Rehabilitate No.3 Shaft (Year 2) Rehabilitate No.4 Shaft (Year 3)	Peter Roser	January 2021	2	C	M 8	
Rehabilitation – Geology and Geochemistry				WC is located in the NSW Southern Coalfield. The economic coal seams in the Southern Coalfield are located within the Illawarra Coal Measures, which contain a number of workable coal seams. The surface geology comprises Cordeaux Crinanite with isolated areas of Hawkesbury Sandstone, Bulga Sandstone, Bald Hill Claystone, Newport Formation and the Garie Formation. The major geological feature across WC is the Cordeaux Crinanite intrusion. This is a large igneous sill which intruded into the Triassic sediments of both the Narrabeen Group and the Hawkesbury Sandstone. The Crinanite acts as a shield for the sediments above and the subsidence impact is predicted to be minimal where this intrusion occurs.					Not Rated						

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Material Prone to Spontaneous Combustion	Oxidation of Coal	WWC MIN PHMP 026 Spontaneous Combustion Management Plan	WWC MIN PLN 015 Emergency Response Control Plan	Wongawilli and Bulli seams coal has a low propensity to self-heat, based on analytical results. Furthermore, the low likelihood for spontaneous combustion is confirmed by: <ul style="list-style-type: none">No instances of spontaneous combustion having been recorded in the ninety-year life of Wongawilli Seam mines in the NSW Southern Coalfield ;No change in chemical properties of the coal in the proposed extraction area has been recognised, which could potentially increase the risk of spontaneous combustion; andPeriodic testing of core samples of the Wongawilli Seam which indicates that the roof section has a low to low-medium susceptibility to spontaneous combustion, whilst the working section has a low-medium to medium susceptibility. Rated for Environmental Impact (EI)	2	E	L3	Yes							
Material Prone to Generating Acid Mine Drainage				Acid mine drainage has not been identified and is not foreseen to be likely to occur in the future at the WC and therefore is not applicable to the MOP.					Not Rated						
Mine Subsidence	Extraction of coal in 2 overlaying seams			Wongawilli Pit Top and Avondale Pit Top. There is no mine subsidence at these locations as there is no underground mining. Approved Mining Areas (excluding Pit Top Activities) Mine subsidence is an important consideration for the ongoing operations at WC. The potential for subsidence impacts on natural and manmade features has been assessed for areas which may potentially be affected by mine subsidence and a number of protection and monitoring measures have been implemented in these areas. Subsidence monitoring will be subject to Mod 2 consent conditions. Mining will be first workings only with negligible	1	E	L1	Yes	Review the MOD 2 conditions and apply change management if required	Peter Roser	August 2021	1	E	L1	

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				subsidence effects Rated for Environmental Impact (EI)										
Erosion and Sediment Control - Wongawilli Colliery Pit Top	High rainfall events, breach of barriers	EMS-MP-006 Surface Water Management Plan WWC EC PLN 008 Integrated Wastewater Management Plan Monthly environmental inspection work order. Erosion sediment controls (sedimentary fence, sand bags) Maintenance of stormwater drains	WWC EC PLN 001 Pollution Incident Response Management Plan	Wongawilli Colliery Pit Top - WCL has management practices and structures in place to assist with the appropriate management of erosion and sedimentation from areas disturbed by operational activities. Avondale Pit Top - Avondale Pit Top has been decommissioned and rehabilitated. The only remaining infrastructure at the Avondale Pit Top is two portal entrances. There are no activities at the Avondale Pit Top that would result in an increased risk of erosion from the site. Rated for Environmental Impact (EI)	2	B	M 12	Yes						
Erosion and Sediment Control - Other Approved Mining Areas (excluding Pit Top Activities)	High rainfall events, subsidence			Post mining inspections have been concluded and closed out. Monitoring will be undertaken subject to Mod 2 approvals.					Not Rated					
Soil Types and Suitability	Contamination of soil, dust generated, erosion, sediment	Environmental Assessment undertaken for WC (ERM, 2010)		There is no plan to disturb soil at the Wongawilli Pit Top, Avondale Pit Top or within the other approved mining areas during the MOP period. If the temporary stabilisation of the stockpile and coal processing area requires topsoil, it will be appropriately sourced and applied as required. Rated for Environmental Impact (EI)	3	D	M 9	Yes						
Flora - Wongawilli Colliery Pit Top	Lack of weed management, feral animals	EMS MP 007 Biodiversity Management Plan		Wongawilli Colliery complies with the Biosecurity Act 2015 No 24. Threatened flora is managed in accordance with the approved Biodiversity Management Plan. Ongoing operations in historically disturbed areas of the pit top site have no potential effects on threatened aquatic or terrestrial vegetation as none have been identified close to these areas. At a minimum, due diligence assessments are undertaken prior to construction activities that have the potential to impact upon vegetation.	2	D	L5	Yes						

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				This ensures that no unauthorised disturbance of endangered aquatic or terrestrial species occurs during construction. Rated for Environmental Impact (EI)											
Flora and Fauna - Avondale Pit Top	Increased deer numbers	EMS MP 007 Biodiversity Management Plan		No disturbance is anticipated at Avondale pit top during the MOP period and therefore there will be no impact to flora and fauna. Wongawilli Colliery complies with the Biosecurity Act 2015 No 24. Rated for Environmental Impact (EI)	2	C	M 8	Yes	Review the Biodiversity Management Plan for alignment with the new Deer Management Plan	Justin Merdith	February 2021	2	C	M 8	
Flora - Other Approved Mining Areas (excluding Pit Top Activities)	Lack of weed management, feral animals, mobility of seeds due to human activities.	EMS MP 007 Biodiversity Management Plan WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW) Review of Environmental Factors Inspection of drilling sites prior to drilling Vegetation Clearance APZ Zones MMI0013 am12 - Vegetation Clearance Management		Vegetation clearing around the firebreaks at the shaft sites involves management of regrowth areas only and does not impact upon threatened species. An REF for approval to conduct ongoing vegetation management around WC infrastructure in the Catchment Lease Area remains in place with the WNSW. There are no noxious weed related issues associated with SMP and catchment lease areas. Rated for Environmental Impact (EI)	2	D	L3	Yes							

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Fauna – Wongawilli Colliery Pit Top	Disturbance of habitat, impact of vehicles	EMS MP 007 Biodiversity Management Plan		<p>As with the management of flora at the site, threatened fauna are managed in accordance with the approved Biodiversity Management Plan.</p> <p>In accordance with the Local Land Services (LLS) Act 2013, WCL are required to control all declared pest species on their land. Currently declared pests in NSW that are potentially relevant to WC are:</p> <ul style="list-style-type: none">• Wild rabbits• Wild dogs• Feral pigs• Foxes• Deer. <p>WCL will implement control actions to assist in the management of these species as necessary. Control actions may include a combination of baiting or trapping, and will be conducted in accordance with consultation with LLS officers as required. WCL manages a deer culling program that is currently conducted by members of the Sporting Shooters Association of NSW in close consultation with Wollongong Coal staff. The purpose of the program is to reduce the overall population of deer at the Colliery. WCL record the number, approximate age, sex and species of deer removed in the program.</p> <p>WCL is also working with the LLS to develop a fox and rabbit baiting program onsite. This involves close consultation with local land holders to place approved baits in locations of know fox and rabbit activity with the aim of reducing overall populations and limiting their effects on threatened flora and fauna.</p> <p>Rated for Environmental Impact (EI)</p>	2	B	M 12	Yes							
Fauna - Other Approved Mining Areas (excluding Pit Top Activities)	Disturbance of habitat, impact of vehicles	EMS MP 007 Biodiversity Management Plan		<p>There has been no activity that could impact threatened fauna species at the ventilation shaft sites.</p> <p>Rated for Environmental Impact (EI)</p>	2	D	L5	Yes	Review and update the Biodiversity Management Plan subject to Mod 2	Justin Merdith	February 2021	2	D	L5	

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Slopes and Slope Management	Erosion, design, high rain events, maintenance of slopes	WWC MIN PHMP 004 New Strata Failure MHMP MSMP 041 WW Slope Stability & Stockpile Management Plan		Rated for Environmental Impact (EI)	3	C	S1 3	Yes	Implement a slope monitoring program to determine the level of movement Review the Mod 2 approval for the requirement for a Public Safety MP	Kudret Tutuk Peter Roser	August 2021 August 2021	3	C	S1 3
Air Quality - Wongawilli Colliery and Avondale Pit top	High wind events, poor maintenance of sprays, hot/dry weather conditions	EMS MP 001 Air Quality & Greenhouse Gas Management Plan Implementation of a stockpile water spray system. This facility can be automatically activated according to pre-set wind speed and direction controls A water truck to wet down operational areas of the mine Covering stockpile areas with dust suppressant material Community Consultation Committee (CCC)	WCL EC PRO 002 Community Complaints & Enquiries Procedure	Air quality at WC is managed in accordance with the Air Quality & Greenhouse Gas Management Plan. Air quality monitoring will continue to be undertaken as per EPA's dust deposition requirements under EPL 1087. In addition to dust deposition monitoring, an extensive real time air and noise monitoring system has been installed on-site. This system allows WCL to continuously monitor weather conditions and alter pit top operations where appropriate. There are no activities at the Avondale Pit Top that will impact upon air quality during the MOP period. Rated for Impact in Reputation / Social / Community (R/S/C)	2	C	M 8	Yes						
Air Quality - Other Approved Mining Areas (excluding Pit Top Activities)	High wind events, hot/dry weather conditions	EMS MP 001 Air Quality & Greenhouse Gas Management Plan WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist		The only activities in these areas that have the potential to adversely affect air quality are related to exploration drilling, SMP and EP inspections and the operation of ventilation shafts. The impacts from these activities are: <ul style="list-style-type: none">Exhaust air from the ventilation fansParticulate emissions from motor vehicles and other fuel powered machineryDust from drilling activities. These impacts will be managed in accordance with the overarching Air Quality and Greenhouse Gas Management Plan, and include those measures implemented at the Wongawilli Pit Top.	2	D	L5	Yes						

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		WCL HS PRO 002 WCL Contractor HST Requirements		In addition, mitigation measures specified in REFs prepared prior to exploration drilling will address air quality impacts as required by WNSW. Rated for Impact in Reputation / Social / Community (R/S/C)											
Surface Water – Wongawilli and Avondale Colliery Pit top	High rainfall events, poor maintenance of drainage structures, contamination of water	WWC EC PLN 008 Integrated Wastewater Management Plan EMS MP 006 Surface Water Management Plan	WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan	Wongawilli Pit Top - WC will maintain all existing pollution control structures and storage dams on-site during this MOP period to capture and treat surface water on-site. Avondale Pit Top - No impact on surface water quality is anticipated during the MOP period as there is no disturbance proposed. Rated for Environmental Impact (EI)	2	C	M 8	Yes							
Surface Water - Other Approved Mining Areas (excluding Pit Top Activities)	High rainfall events	EMS MP 006 Surface Water Management Plan WaterNSW deny access at 10mm of rain		All activities occur in the Metropolitan Special Area managed by WNSW. No exploration is undertaken without a Part 5 EP&A Act approval issued by the WNSW. This process involves detailed assessment of the potential impacts of the activity on surface water in the affected areas with production of agreed management plans for disturbed areas. Rated for Environmental Impact (EI)	2	D	L5	Yes							
Ground Water – Wongawilli and Avondale Colliery Pit top	High rainfall events, poor maintenance of pumps, inadequate inspections	WWC EC PLN 008 Integrated Wastewater Management Plan Work order system for pump maintenance	WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan	Wongawilli Colliery Pit Top -Groundwater that is discharged from the mine is pumped back into the closed mine or is diverted to the mine dam system. Some of the water from the mine dam is used for dust suppression in the stockpile area and overflow from the mine dam discharges to Robins Creek via LDP 2. Avondale Pit Top - There has been no activity at the Avondale pit top and hence there is no impact on groundwater. Rated for Environmental Impact (EI)	2	C	M 8	Yes							
Ground Water - Other Approved Mining Areas (excluding Pit Top Activities)	Subsidence	Ground water monitoring program		Groundwater monitoring is undertaken in these areas on a regular basis and in accordance with SMP and EP approval requirements. The results of groundwater monitoring undertaken at WC are reported in the Annual Review. Rated for Environmental Impact (EI)	2	D	L5	Yes							

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Contaminated Land – Wongawilli and Avondale Colliery Pit top	Spills, lack of containment	NRE 020 Hazardous Substances and Dangerous Goods Bunding Vehicle wash down bay including an oil separator Monthly Environmental Inspections	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan	The only confirmed contamination location within this area has been identified at an archaeological site (the old coking beds) located at the Lower Pit Top. A detailed contaminated land assessment will be undertaken during the decommissioning phase of operations, combined with the development of a remediation action plan, prior to rehabilitation works at the end of mine life. Contamination resulting from environmental incidents (e.g. spills) and areas of high risk associated with hydrocarbon storage infrastructure will be maintained and appropriately managed (e.g. remediated or disposed off-site by an authorised waste contractor) as soon as possible after they occur. No contaminated land has been identified in these areas. Rated for Environmental Impact (EI)	2	D	L5	Yes						
Contaminated Land - Other Approved Mining Areas (excluding Pit Top Activities)	Spills, lack of containment	NRE 020 Hazardous Substances and Dangerous Goods Bunding Inspections WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL EC PRO 011 Drill Hole Sealing And Capping Procedure	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan	No contaminated land has been identified in these areas. Rated for Environmental Impact (EI)	2	D	L5	Yes	Update and register NRE 020 Hazardous Substances and Dangerous Goods	Justin Merdith	February 2021	2	D	L5
Hazardous Materials	Spills, lack of containment, transporting	NRE 020 Hazardous Substances and Dangerous Goods SDS Register Chemwatch database Specialist storage systems WWC MIN MPHP 061 Roads and Other Vehicle	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation WWC EC PLN 001 Pollution Incident Response Management Plan	Wongawilli Colliery Pit Top - WC maintains a register of Safety Data Sheets (SDS) for all chemicals used on-site. A database system known as 'Chem Watch' is used to provide the most current versions of documents and records are available for inspection on request. All dangerous goods are stored in accordance with the WorkCover NSW Notification of Dangerous Goods requirements. Other hazardous materials located at WC	2	D	L5		Health control plan risk assessment has actions relating to hazardous substances Conduct a site review subject to Mod 2	Justin Merdith	August 2021	2	D	L5

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		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment								Action	Responsible Person	Due Date	Cons	Prob	Rating
		Operating Areas		include compressed gases, flammable and combustible liquids, poisonous substances and corrosive substances, none of which exceed the acceptable holding limits. Avondale Pit Top - No hazardous materials are located within this region. Rated for Harm to People Safety and Health (S/H)											
Greenhouse Gases, Methane Drainage / Venting	Poor drilling standards, capping standards, variation in coal seam gas contents	MSMP 002 Ventilation and Gas Management Control Plan MSMP 017 WW Outburst Management Plan EMS MP 001 Air Quality & Greenhouse Gas Management Plan		Greenhouse gases are managed in accordance with the Air Quality & Greenhouse Gas Management Plan for the site. Rated for Environmental Impact (EI)	1	D	L2	Yes							
Blasting	Incorrect storage and usage of explosives	WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements		There is no underground or surface blasting required to be undertaken as part of the MOP term. Rated for Harm to People Safety and Health (S/H)	2	E	L3	Yes							
Noise – Wongawilli and Avondale Colliery Pit top	Vehicle movements, starting and reversing vehicles, conveyors and fans noise, poor maintenance practices	Community Consultation Committee (CCC) Continuous unattended real time noise monitors with audio capture and real time alerts Operator attended noise monitoring at surrounding sensitive receivers on a quarterly basis Noise attenuation provided by a six metre high concrete wall that separates the nearest residences from the coal Stockpile Area. This wall	High earth bund wall WCL EC PRO 002 Community Complaints & Enquiries Procedure	Noise impacts will be managed in accordance with the Noise Management Plan. Avondale Pit Top There will be no noise generating activity at Avondale pit top during the MOP period. During this MOP period, there will be curfew restrictions on loading coal and transporting coal. Rated for Impact in Reputation / Social / Community (R/S/C)	2	C	M8	Yes	Review the Noise Management Plan subject to MOD 2	Justin Merdith	August 2021				

Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
Type	Risk Assessment	Date Published	27/11/2020
Doc Title	Mining Operations Plan (MOP) Risk Assessment		

Risk Identification		Risk Analysis and Evaluation							Management Action Plan							
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		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment					Cons		Prob	Rating	Action	Responsible Person	Due Date	Cons	Prob	Rating
		also provides visual attenuation Limiting the hours of operation for heavy machinery loading trains within the Stockpile Area to 7am to 6pm Monday to Friday and 8am to 4pm Saturday, with no loading on Sundays and Public Holidays Front end loaders and dump trucks which have exhaust systems that meet manufacturer specifications operating in the Stockpile Area Speed limit restrictions, particularly close to Wongawilli residences;														
Noise - Other Approved Mining Areas (excluding Pit Top Activities)		EMS MP 0010 Noise Management Plan		Due to the absence of potentially affected receivers, noise management is not required in these areas.					Not Rated							
Visual and Lighting – Wongawilli and Avondale Colliery Pit top	Bright light	Any lighting required will be located and orientated in a manner which minimises the potential impact upon surrounding properties, in accordance with Australian Standards 4292:2019 Utilisation and maintenance of existing buffers, visual screens and landscaped areas		Wongawilli Colliery Pit Top - Light from WC is either directly or indirectly visible to the local community as well as to the regional community within the view shed. The site is visible to a large area of the southern Wollongong and Shellharbour Local Government Areas due to its location on the escarpment. Avondale Pit Top - There are no structures or lighting visible to the public at this site. Rated for Impact in Reputation / Social / Community (R/S/C)	1	E	L1	Yes	Review lighting requirements subject to MOD 2	Peter Roser	August 2021	1	E	L1		

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Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating			
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment					Cons		Prob	Rating	Action	Responsible Person	Due Date	Cons	Prob
Visual and Lighting - Other Approved Mining Areas (excluding Pit Top Activities)				The lights at the ventilation shaft are only turned on when required. There is no requirement for management of visual impact or stray light in these areas.					Not Rated						
Aboriginal Heritage – Wongawilli and Avondale Colliery Pit top		WWC EC PLN 004 Heritage Management Plan		Wongawilli Pit Top - The Colliery Pit Top is listed in the Wollongong LEP 2009 and the Wollongong LEP (West Dapto) 2010 as having heritage significance, including Aboriginal heritage. Aboriginal Heritage is managed in accordance with the approved Heritage Management Plan for the mine. General operations at the Colliery Pit Top will have no impact on Aboriginal archaeological sites as the Wongawilli Colliery Pit Top has already been extensively disturbed. Avondale Pit Top -Cultural heritage is managed in accordance with the overarching Heritage Management Plan for the Colliery					Not Rated						
Aboriginal Heritage - Other Approved Mining Areas (excluding Pit Top Activities)	Disturbance of sites, lack of training and awareness	WWC EC PLN 004 Heritage Management Plan EMS MP 008 Heritage Management Plan WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment		Aboriginal and European Heritage Monitoring is undertaken in mining and catchment lease areas, in accordance with SMP and EP approval requirements subject to MOD 2. Rated for Environmental Impact (EI)	2	D	L5	Yes							
Spontaneous combustion	Oxidation of coal	WWC MIN PHMP 026 Spontaneous Combustion Management Plan	WWC MIN PLN 015 Emergency Response Control Plan	No instances of spontaneous combustion have been recorded at Wongawilli Colliery or in the 90 years of mining the Wongawilli Seam in the NSW Southern Coalfields. Rated for Environmental Impact (EI)	1	E	L1	Yes							

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		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment				Cons	Prob		Rating	Action	Responsible Person	Due Date	Cons	Prob
Bushfire – Wongawilli and Avondale Colliery Pit top	Dry vegetation, lightning, arson, ignition sources	Vegetation Clearance Surface Infrastructure DR2 SBD-Bushfire-Mgt-Plan Ongoing clearing of undergrowth around the general pit top operational areas and stockpile area. This will continue to be undertaken during the MOP period. Ongoing maintenance of a firebreak along the pit top access road to ensure the emergency evacuation route remains safe Continued access to a firefighting water main on the site, boosted by a pressure pump WCL EC PRO 016 Vegetation Clearing in Special Area Land (Managed by WaterNSW) Procedure	WWC MIN PLN 015 Emergency Response Control Plan Emergency Services NSW Rural Fire Service WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan	Wongawilli Pit Top - A Bushfire Management Plan has been developed to ensure land owned by WC is managed to minimise bushfire risk and to reduce the risk of fire originating on WC owned land spreading to adjacent properties. Avondale Pit Top - There is no activity on this site that may increase bushfire risk. Rated for Environmental Impact (EI)	4	C	S18	Yes	Review the APZ for Wongawilli and/or Wollongong Coal	Justin Merdith	August 2021	4	C	S18
Bushfire - Other Approved Mining Areas (excluding Pit Top Activities)	Dry vegetation, lightning, arson, ignition sources	Vegetation Clearance Surface Infrastructure DR2 SBD-Bushfire-Mgt-Plan WCL EC PRO 016 Vegetation Clearing in Special Area Land (Managed by WaterNSW) Procedure	WWC MIN PLN 015 Emergency Response Control Plan Emergency services WWC EC PLN 001 Pollution Incident Response Management Plan WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan WCL EC PLN 001 Incident Response Managaement Plan	A firebreak that that has been cleared around the site perimeter fence line of the main ventilation shaft site provides an asset protection zone as well as catchment bushfire protection. This firebreak will be maintained as required during this MOP period. Construction will be limited to outside the bushfire season (October to March) Rated for Environmental Impact (EI)	2	C	M8	Yes						

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		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment				Cons	Prob		Rating	Action	Responsible Person	Due Date	Cons	Prob
			Special Area Managed by WaterNSW											
Post Mining Land Use - Regulatory Requirements	Regulatory requirements do not meet Post Mining Land Use.	As described in Section 5 of the WW MOP		Post-mining land-use options at Wongawilli Colliery may be confined by limitations such as infrastructure, mining methods and features, as well as other physical or operational limitations and stakeholder requirements. The actual final land use for the Colliery will be assessed against these limitations at the time of final rehabilitation or mine closure. Rated for Environmental Impact (EI)	3	D	M 9	Yes						
Post Mining Land Use - Mining Lease Requirements		As described in Section 5 of the WW MOP		The primary objective of post-mining rehabilitation works is to create a stable final landform that is consistent with the surrounding natural landscape with acceptable post mining land use capability. The post-mining land use will include the progressive rehabilitation to self-sustaining locally occurring vegetation communities, which aims to emulate the pre-mining environment, enhance local and regional ecological linkages and provide for a sustainable final land use option. All rehabilitation works will be scheduled to occur progressively as soon as practicable following disturbance and rehabilitation of infrastructure areas will occur as soon as practical following decommissioning. This approach will also minimise the total disturbed area at any one time while reducing the potential environmental and visual impact of mining operations. Rated for Environmental Impact (EI)	3	D	M 9	Yes						
Development Consent Requirements	Non-compliance with development consent requirements	WWC-EC-STD-001-Environmental-Management-Strategy Plans made under the above Compliance Tracking Program		The mine operates under an approval under the Environmental Approval act 1979. Approval requirements are independently audited every 3 years, last completed at the end of 2019. Rated for Legal and Regulatory Impact (L&R)	2	C	M 8	Yes						

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Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating			
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment					Cons		Prob	Rating	Action	Responsible Person	Due Date	Cons	Prob
Environmental Protection Licence Requirements	Non-compliance with EPL 1087 Non-compliance with EPL 12442	EMS STD 001 Environmental Management Strategy Monitoring as per licence requirements		The EPA administers and regulates EPLs under the POEO Act. WCL holds EPL 1087 and 12442 in relation to water quality and general environmental protection measures at the Wongawilli and Avondale Collieries. There are no specific requirements in these Licences that relate to mine rehabilitation. These licences will be relinquished as part of the rehabilitation process. WCL will need to consult with EPA with regard to the cancellation of these EPLs. Rated for Legal and Regulatory Impact (L&R)	2	C	M 8	Yes							
Post-Mining Land Use Goal	Non-compliance with Post-Mining Land Use Goal	As described in Section 5 of the WW MOP		The preferred post mining land use for the Russell Vale Colliery site is to rehabilitate the majority of disturbed areas back to natural bushland in imitation of the surrounding environment and in compliance with Mining Lease and Wollongong LEP allocated zone objectives. If areas are not zoned for environmental protection works then dwellings will be the preferred allocated land-uses. Refer to domain 3 rehab section of current MOP Rated for Legal and Regulatory Impact (L&R)	2	D	L5	Yes							

Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
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8. ACTION PLAN

Issue Hazard / Risk	Action	Safety / Production / Compliance	Responsibility	Department / Area	Due Date
Exploration	Review the current exploration program at Russell Vale for possible improvements and future engagement at Wongawilli and Avondale.	Compliance	Devendra Vyas	Technical Services	July 2021
Construction	Review and update as required the existing site management plans.	Compliance	Peter Roser	Operations	March 2021
Construction	Existing screening and crushing plant to be removed and relocated underground.	Compliance	Peter Roser	Operations	Prior to running coal to the stockpile area
Decommissioning and Demolition Activities	A program is being prepared to carry out the rehabilitation of No.3 and 4 shafts over the next 3 years. See progressive rehabilitation below	Compliance	Peter Roser	Operations	June 2021
Temporary Stabilisation	Review and upgrade the Site water management program.	Compliance	Peter Roser	Operations	January 2021
Progressive Rehabilitation and Completion	Prepare a detailed plan for the rehabilitation and access (year 1) Rehabilitate No.3 Shaft (Year 2) Rehabilitate No.4 Shaft (Year 3)	Compliance	Peter Roser	Operations	January 2021
Mine Subsidence	Review the MOD 2 conditions and apply change management if required.	Compliance	Peter Roser	Operations	August 2021
Flora and Fauna – Avondale Pit Top	Review the Biodiversity Management Plan for alignment with the new Deer Management Plan	Compliance	Justin Merdith	Environment	February 2021
Fauna - Other Approved Mining Areas (excluding Pit Top Activities)	Review and update the Biodiversity Management Plan subject to Mod 2	Compliance	Justin Merdith	Environment	February 2021
Slopes and Slope Management	Implement a slope monitoring program to determine the level of movement	Geotechnical	Kudret Tutuk	Technical Services	August 2021
Slopes and Slope Management	Review the Mod 2 approval for the requirement for a Public Safety MP	Compliance	Peter Roser	Operations	August 2021



Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
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Issue Hazard / Risk	Action	Safety / Production / Compliance	Responsibility	Department / Area	Due Date
Contaminated Land - Other Approved Mining Areas (excluding Pit Top Activities)	Update and register NRE 020 Hazardous Substances and Dangerous Goods	Compliance	Justin Merdith	Environment	February 2021
Hazardous Materials	Conduct a site review subject to MOD 2	Compliance	Justin Merdith	Environment	August 2021
Noise – Wongawilli and Avondale Colliery Pit top	Review the Noise Management Plan subject to MOD 2	Compliance	Justin Merdith	Environment	August 2021
Visual and Lighting – Wongawilli and Avondale Colliery Pit top	Review lighting requirements subject to MOD 2	Compliance	Peter Roser	Operations	August 2021
Bushfire – Wongawilli and Avondale Colliery Pit top	Review the APZ for Wongawilli and/or Wollongong Coal	Compliance	Justin Merdith	Environment	August 2021

Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
Type	Risk Assessment	Date Published	27/11/2020
Doc Title	Mining Operations Plan (MOP) Risk Assessment		

9. REFERENCES

EMS MP 001 Air Quality & Greenhouse Gas Management Plan

EMS MP 0010 Noise Management Plan

EMS MP 006 Surface Water Management Plan

EMS MP 006 Surface Water Management Plan

EMS MP 007 Biodiversity Management Plan

EMS MP 008 Heritage Management Plan

EMS MP 011 Air Quality & GHG Management Plan

EMS STD 001 Environmental Management Strategy

EMS-MP-006 Surface Water Management Plan

MMI0013 am12 - Vegetation Clearance Management

MSMP 002 Ventilation and Gas Management Control Plan

MSMP 017 WW Outburst Management Plan

MSMP 041 WW Slope Stability & Stockpile Management Plan

NRE 020 Hazardous Substances and Dangerous Goods

NREW EMS MP0022 Bushfire Management Plan

WCL EC FRM 003 WaterNSW Access for Works Permit

WCL EC PLN 001 Incident Response Management Plan Special Area Managed by WaterNSW

WCL EC PLN 002 Incident Response MP for Surface Drilling (Water NSW)

WCL EC PLN 003 Traffic Management Plan

WCL EC PRES 004 Spill Response Presentation

WCL EC PRO 002 Community Complaints & Enquiries Procedure

WCL EC PRO 011 Drill Hole Sealing And Capping Procedure

WCL EC PRO 015 Special Area Land (Managed by WaterNSW) Access Procedure

WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW)

WCL EC PRO 017 Catchment Monitoring Biological Hygiene Control Procedure v2

WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment

WCL EC STD 003 Spill Kit Standard

WCL EC TRN 001 Remote Work & Special Area Land (Managed by WaterNSW) Access Induction Assessment

WCL HS FRM 005 Change Management Approval

WCL HS FRM 008 Specialised Contractor Pre Works Checklist

Site	Wongawilli Colliery	DOC ID	WWC EC RA 007
Type	Risk Assessment	Date Published	27/11/2020
Doc Title	Mining Operations Plan (MOP) Risk Assessment		

WCL HS PLN 001 Contractor Management Plan

WCL HS PRO 002 WCL Contractor HST Requirements

WWC EC PLN 001 Pollution Incident Response Management Plan

WWC EC PLN 002 Avondale Colliery Pollution Incident Response Management Plan

WWC EC PLN 008 Integrated Wastewater Management Plan

WWC MIN MPHP 061 Roads and Other Vehicle Operating Areas

WWC MIN PHMP 004 New Strata Failure MHMP

WWC MIN PHMP 026 Spontaneous Combustion Management Plan

WWC MIN PLN 015 Emergency Response Control Plan

10. CONTROL AND REVISION HISTORY

PROPERTY	VALUE
Approved by	Chief Operating Officer (COO)
Document Owner	Environmental Manager
Effective Date	27 th November 2020

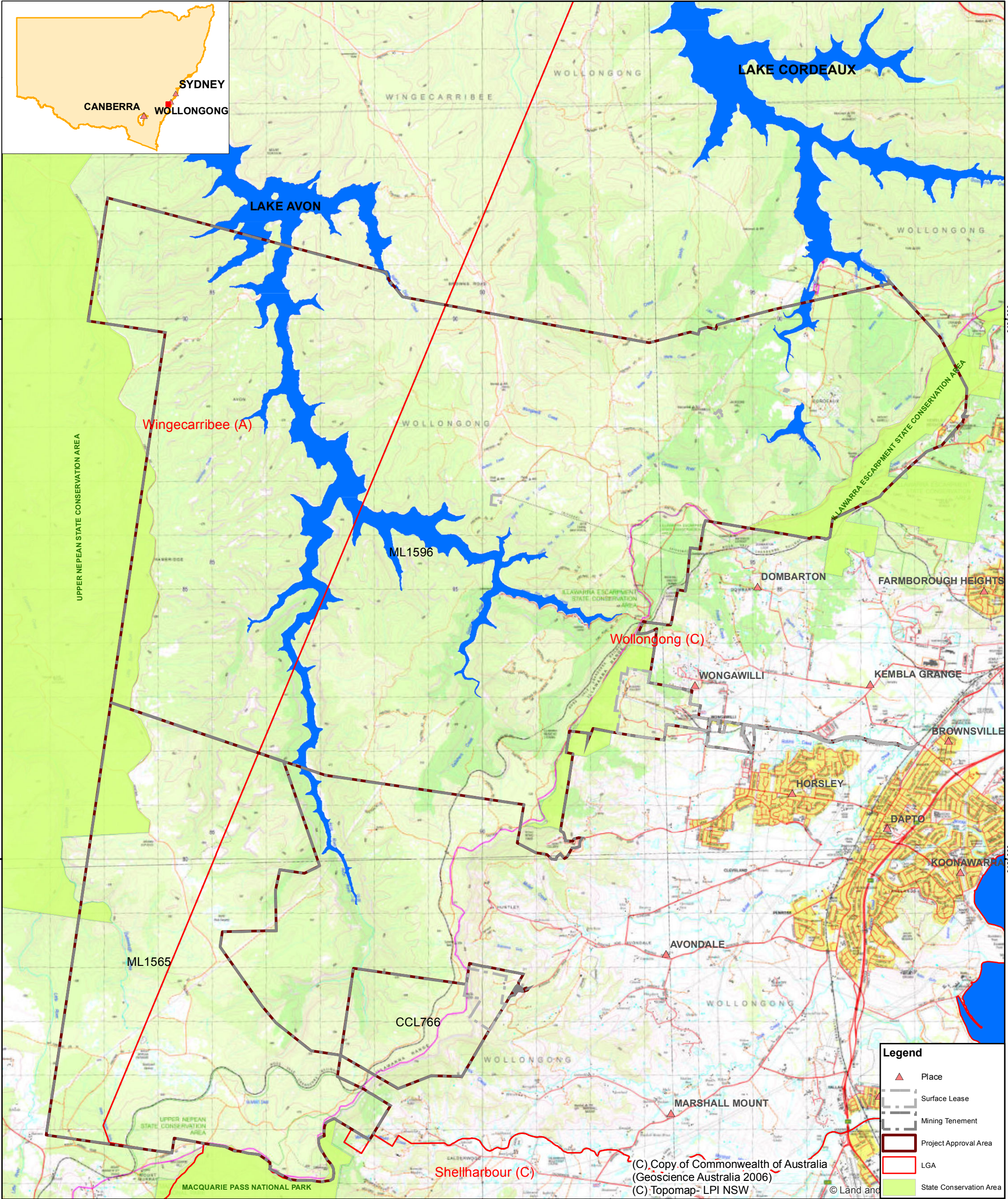
Revisions

VERSION	DATE REVIEWED	REVIEW TEAM (CONSULTATION)	NATURE OF THE AMENDMENT
1	18/11/2020	Dave Moore; Peter Roser Richard Sheehan Wayne Sly Eladio Perez Paul Evert Sasa C	New RA
2			
3			



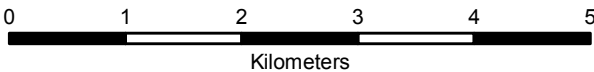
Site	Wongawilli Colliery	DOC ID
Type	Plan	Date Published
Doc Title	MINING OPERATIONS PLAN	

Appendix D – MOP Plans



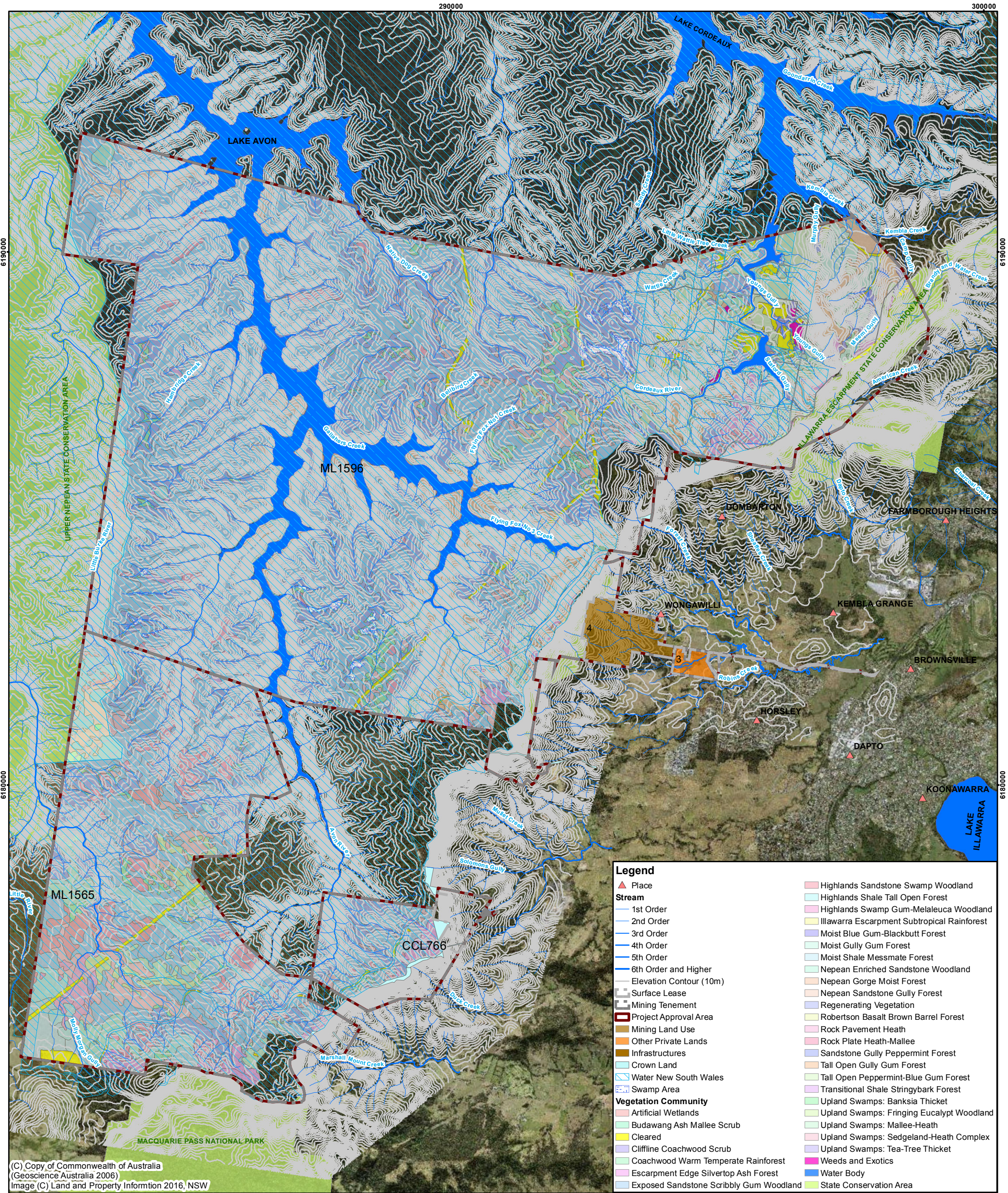
I, Neil Marvell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.



Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

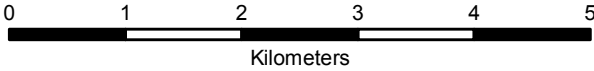
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REV	DESCRIPTION	DATE	DRN	CKD	NAME	DATE	TITLE
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					CKD		MINING OPERATION PLAN
					APP		PLAN 1A- PRE MINING
					SCALE	1:65,000 @A3	ENVIRONMENT- PROJECT LOCALITY
					NTS		DRAWING NUMBER
							WWC-MOP-001
							REV
							0





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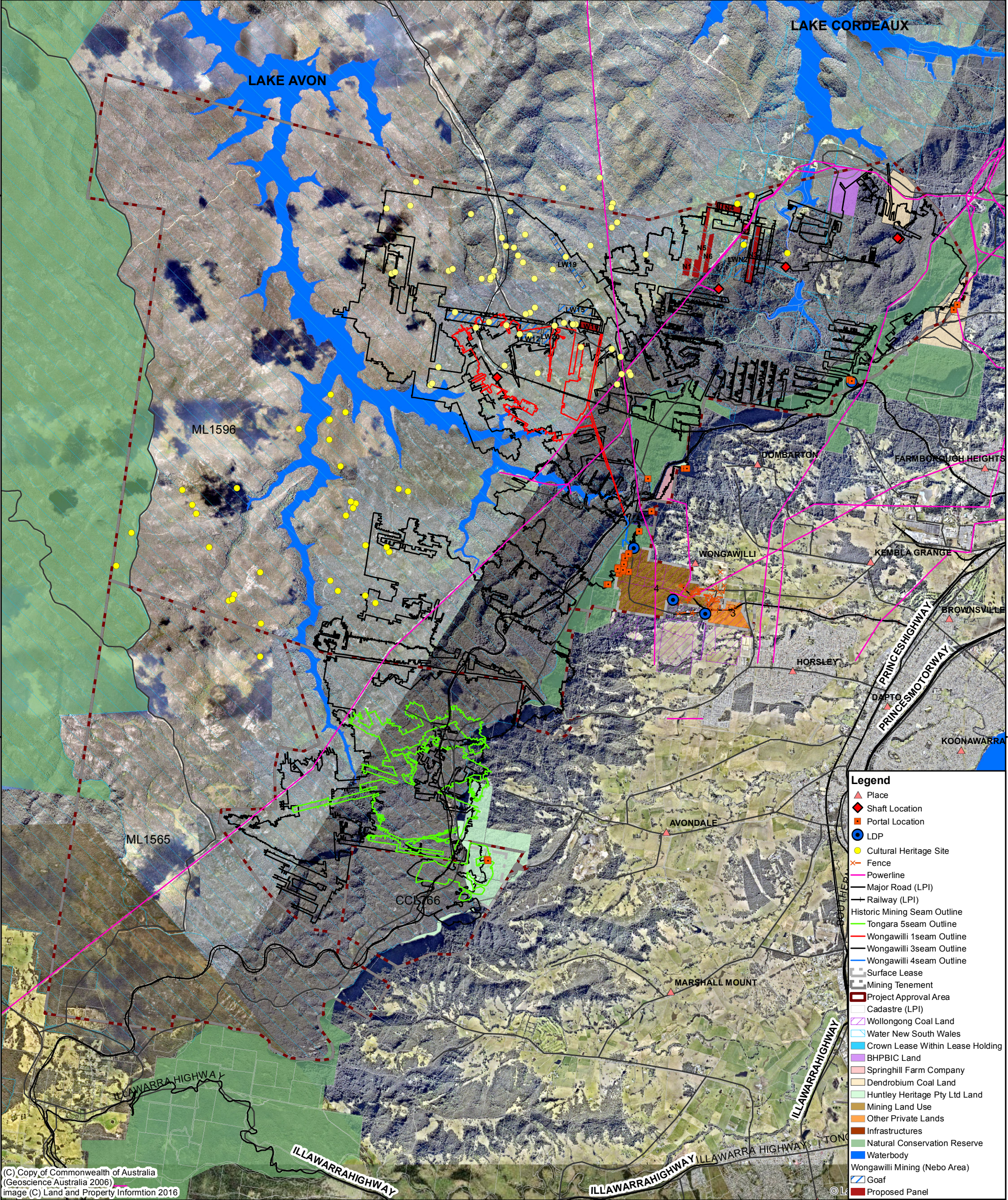
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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

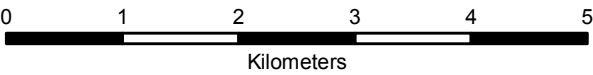
Mine Manager		Date		Registered Mining Surveyor		Date		Projection: Transverse Mercator Datum: GDA 1994			
REV	DESCRIPTION	DATE	DRN	CKD	<div></div> <div>WCL WONGAWILLI COLLIERY SBD SERVICES PTY LTD</div>		NAME	DATE	TITLE		
						DRN	RT	23/03/17	MINING OPERATION PLAN		
						CKD			PLAN 1B- PRE MINING ENVIRONMENT-		
						APP			NATURAL ENVIRONMENT		
						SCALE	1:65,000 @A3		DRAWING NUMBER		REV
						NTS			WWC-MOP-002		0





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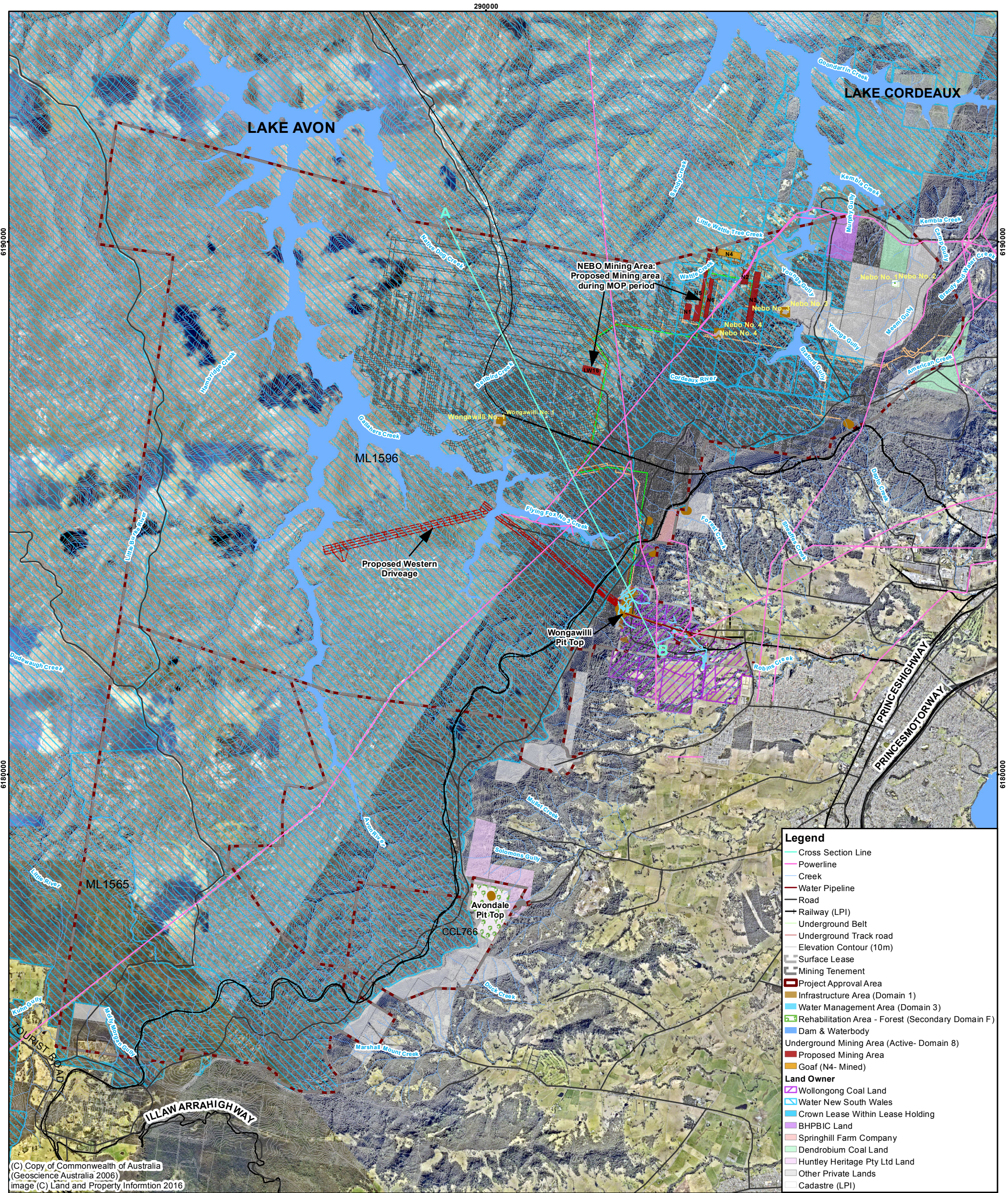
I, Neil Mavell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.



Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

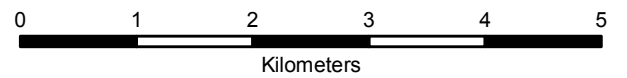
Mine Manager		Date		Registered Mining Surveyor		Date		Projection: Transverse Mercator Datum: GDA 1994			
REV	DESCRIPTION	DATE	DRN	CKD	<div></div> <div>WCL WONGAWILLI COLLIERY SBD SERVICES PTY LTD</div>		NAME	DATE	TITLE		
						DRN	RT	23/03/17	MINING OPERATION PLAN		
						CKD			PLAN 1C- PRE MINING ENVIRONMENT-		
						APP			BUILT ENVIRONMENT		
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						NTS			WWC-MOP-003		



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I, Neil Marvell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.

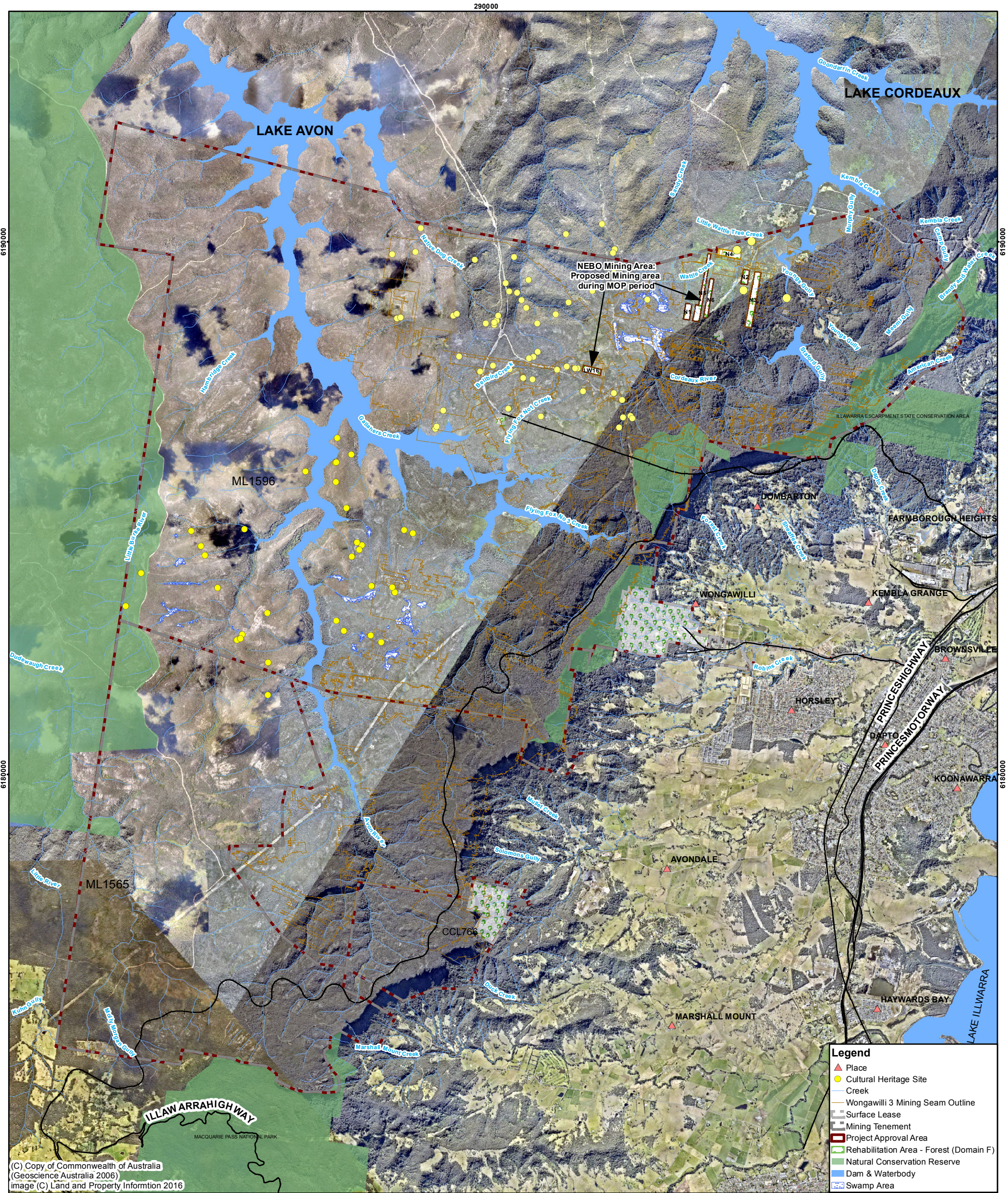


Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994



Mine Manager _____ Date _____

Registered Mining Surveyor _____ Date _____

REV	DESCRIPTION	DATE	DRN	CKD				
					<div> WCL WONGAWILLI COLLIERY SBD SERVICES PTY LTD</div>			
						NAME	DATE	TITLE
					DRN	RT	23/03/17	MINING OPERATION PLAN
					CKD			PLAN 2- MINE DOMAINS AT COMMENCEMENT OF MOP
					APP			
					SCALE	1:65,000	@A3	DRAWING NUMBER
					NTS			WWC-MOP-004



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<p>I, Neil Marvell, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.</p>					<p>I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.</p>					<p>0 1 2 3 4 5 Kilometers</p> <p>Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator Datum: GDA 1994</p>				
Mine Manager		Date			Registered Mining Surveyor		Date							
REV	DESCRIPTION	DATE	DRN	CKD	 					DRN	NAME	DATE	TITLE	
					WCL WONGAWILLI COLLIERY SBD SERVICES PTY LTD					RT	23/03/17	MINING OPERATION PLAN		
										CKD			PLAN 4- FINAL REHABILITATION AND MINING LANDUSE	
										APP				
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										NTS	WWC-MOP-006		0	

