

Mining Operations Plan

United Collieries



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MOP Period: 1 January 2017 to 12 July 2020

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MOP Period: 1 January 2017 to 12 July 2020

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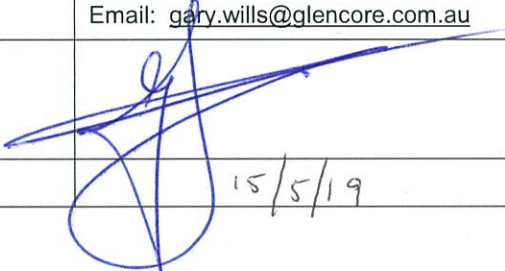
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ABBREVIATIONS

AEMR	Annual Environmental Management Report
BBRA	Broad Brush Risk Assessment
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CHPP	Coal Handling and Preparation Plant
DECCW	NSW Department of Environment, Climate Change and Water (former)
DII	NSW Department of Industry and Investment (former)
DOP	NSW Department of Planning (former)
DPI-MR	NSW Department of Primary Industries, Mineral Resources Division (former)
DRG	DTIRIS Division of Resources and Energy
DSC	Dams Safety Committee
DTIRIS	NSW Department of Trade and Investment, Regional Infrastructure and Services
EA	Environmental Assessment
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EPL	Environmental Protection Licence
GDP	Ground Disturbance Permit
GHG	Greenhouse Gas
HVO	Hunter Valley Operations
LHPA	Livestock Health and Pest Authority
MOP	Mining Operations Plan
NPWS	National Parks and Wildlife Service
NOW	NSW Office of Water (now known as DPI Water)
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
RAP	Remediation Action Plan

RCE	Rehabilitation Cost Estimate
REA	Reject Emplacement Area
ROM	Run of Mine
SEE	Statement of Environmental Effects
SIP	Social Involvement Plan
TARP	Trigger Action Response Plan
TSC Act	Threatened Species Conservation Act 1995

1 INTRODUCTION

This Mining Operations Plan (MOP) outlines the proposed operational and environmental management activities planned for United Colliery (United) for the period of 1 January 2017 to [12 July 2020](#) (aligned to the expiry of the cessation of mining approval). This MOP has been prepared to satisfy conditions of Consolidated Coal Lease (CCL) 775 and Development Consent DA-410-11-2002-i. This MOP has been prepared in accordance with the Department of Trade and Investment Regional Infrastructure and Services (DTIRIS), Division of Resources and Energy (DRE) (now [NSW Department of Planning and Environment \(DP&E\), Resources Regulator](#) guideline *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013* (ESG3).

Mining operations at United were suspended on 29 January 2010, with this MOP prepared to cover the continued period of care and maintenance, including:

- Activities required to maintain the integrity of surface facilities which may be utilised for future mining operations. This includes measures that will be adopted to prevent access and exposure to underground workings and reduce safety and environmental risks associated with these facilities;
- Scope of further mine closure planning activities to be undertaken during the MOP period including proposed of the future capping of tailings dam and contamination and hazardous materials assessments; and
- Rehabilitation activities that will be undertaken during the MOP term.

1.1 United Project

The United Wambo Open Cut Coal Mine Project - SSD 15_7142 (the United Project) Preliminary Environmental Assessment (PEA) was submitted to the Department of Planning and Environment (DP&E) on 30 June 2015. The United Project Development Application and Environmental Impact Statement (EIS) was lodged with the NSW Department of Planning and Environment (DP&E) on 11 August 2016.

This is a completely separate project to the current United Care and Maintenance Operations. If the Project was given state and federal approval, a new MOP would be required to be prepared prior to any work being completed under the proposed new approval.

1.2 Discussion on Operating and Care and Maintenance Scenarios

Following a meeting with Neil McElhinney at the **Resources Regulator** on 21 July 2016, there was a requirement to further outline potential operating and care and maintenance scenarios during the reporting period. These are outlined in **Table 1** below:

Table 1 Operating and Care and Maintenance Scenarios for United

Operating and Care and Maintenance Scenario	Comment
Site is managed under Care and Maintenance during this MOP period	This will be detailed under this MOP. If activities were to remain in accordance with the current Development Consent then there are no updates required to this MOP.
The United Project is not approved and a decision is made for final closure at United	If a decision is made for closure at United, this would not be covered under this MOP. This MOP only covers Care and Maintenance activities, with a new Detailed Closure MOP required to be prepared in the case of Final Closure.
The United Project is approved and the site plan to operate	United would need to prepare a new MOP if operations were to recommence in accordance with the Development Consent for the yet to be approved United Project.

In summary, this MOP only covers Care and Maintenance activities, and if the site were to commence operations again under a new Development Consent or a decision was made for Final Closure, both these scenarios would require the completion of new MOP's.

1.3 History of Operations

United is located approximately 16 kilometres (km) west of Singleton in the Upper Hunter Valley of New South Wales (NSW) (refer to **Figure 1**). United is owned and operated by United Collieries Pty Limited (United Collieries).

An Authorisation to prospect was granted over part of the existing mining lease in 1980. Development Consent and the mining lease were granted in the early 1980s, with mining operations commencing in 1989.

From July 1989 until July 1992, United Collieries operated a small open cut (including auger mining) extracting the Whynot and Wambo seams. In 1991 a resource swap was affected with the neighboring Wambo Coal (Wambo), which enabled Wambo to secure greater open cut reserves and United Collieries to secure greater underground reserves.

Underground mining operations commenced in January 1992 within the Woodlands Hill Seam using a continuous miner with shuttle cars. In May 1994, bord and pillar development with the 'Cut and Flit' mining system was introduced. Pillar extraction operations commenced in October 1995 using a continuous miner, shuttle cars and mobile roof supports. In late 1996 the mine expanded to two development units and one pillar extraction unit. In 1997, a chain haulage system was introduced to increase production.

United was purchased by Xstrata Coal Australia (now Glencore Xstrata Australia (Glencore)) in 1997 and, as of December 1999, has been owned in a joint venture comprising 95% Glencore and 5% Construction, Forestry, Mining and Energy Union.

In May 2002, longwall mining commenced at United utilising a continuous shearer, armoured face conveyor and hydraulic roof supports. The underground mining operations of United lie beneath the United Colliery surface holding and Wambo Open Cut Operations and extend north towards the Wambo Underground.

United processed run of mine (ROM) coal onsite at the Coal Handling and Preparation Plant (CHPP). Product coal was initially hauled by road to Mt Thorley and then trucked via a private haul road to the Wambo coal rail loader, and transported to the port of Newcastle for export.

Due to geotechnical and market constraints, the completion of Longwall 10 in January 2010 exhausted the economically recoverable underground reserves within the approved mining areas in CCL 775. Subsequently, United submitted a notice of the 'Suspension of Operations' to the (former) Department of Industry and Investment (DII) on 19 January 2010 and after receiving approval under section 70 and section 168 of the *Mining Act 1992*, United entered a period of suspension of operations on 4 June 2010.

Consent to continue mining operations under Development Consent DA-410-11-2002-i expired on 31 December 2012. However, Development Consent DA-410-11-2002-i continues to apply for all other respects other than the right to continue mining, until such time as rehabilitation is completed.

Concurrently with development consent to undertake mining operations, CCL 775 expired on 31 December 2012. United lodged an application to renew CCL 775 with the **Resources Regulator** on 28 November 2011. In December 2013 the **Resources Regulator** approved renewal of CCL 775. An application for suspension of mining operations and suspension of conditions is currently with the **Resources Regulator** for an extension to care and maintenance operations under CCL 775.

Since entering suspension of operations, the key operational activities undertaken at United have been associated with the:

- Salvage of underground plant and equipment, and establishing temporary laydown and storage areas at the pit top prior to sale or recycling of salvaged equipment;
- Decommissioning and removal of underground diesel tanks;
- Rationalisation of pit top hydrocarbon storage infrastructure and depletion of all consumable chemical and hydrocarbon stocks;
- Maintenance of remaining surface facilities;
- Sealing of the underground workings;
- Decommissioning of ventilation facilities;
- Implementation of public safety and security measures, including sealing the South East 1 and South East 2 headings;
- Sealing of the borehole at the gas flaring plant; and
- Ongoing environmental management, monitoring, and rehabilitation maintenance.

1.3.1 **Amendment A**

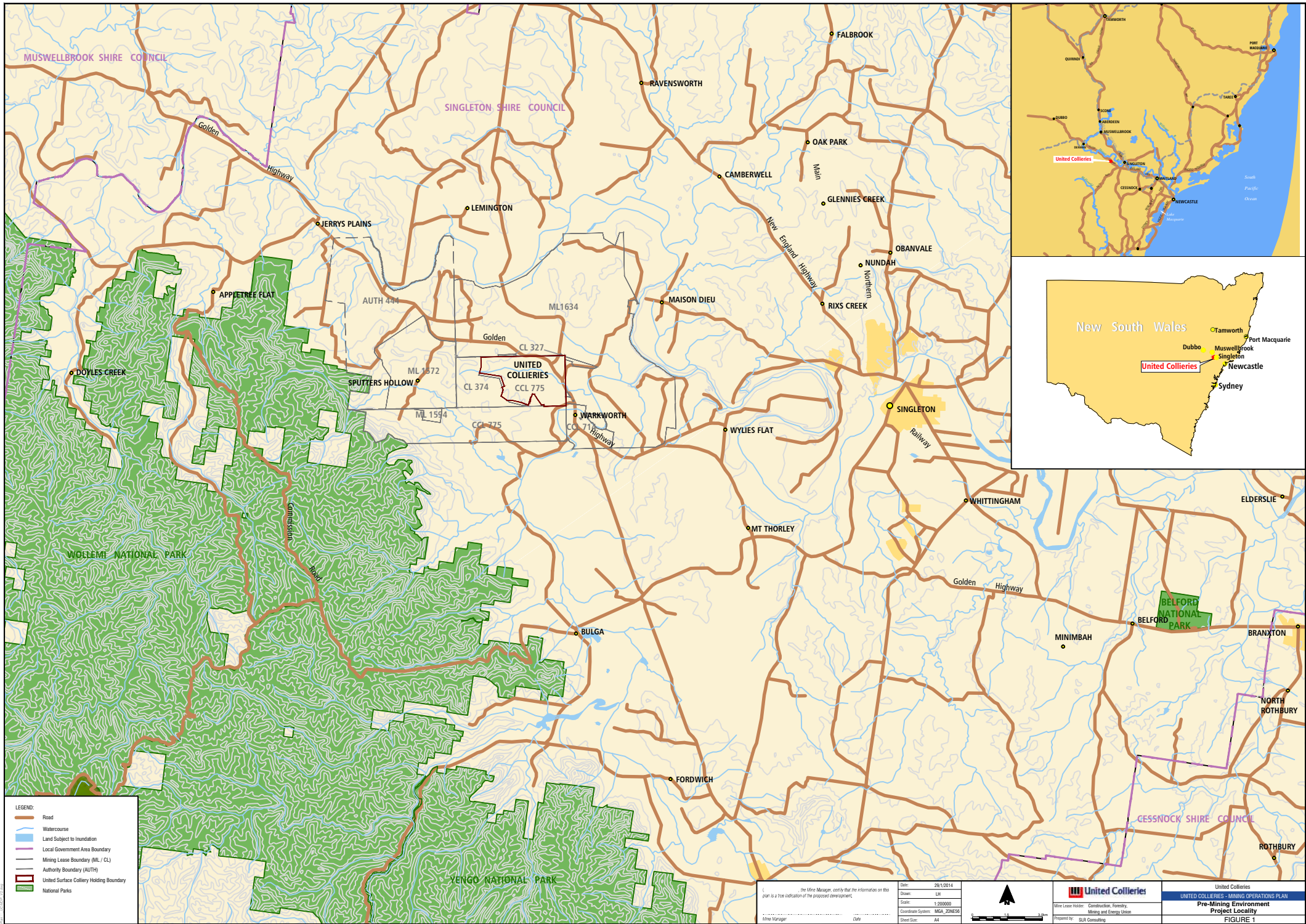
In a letter dated 4 July 2018 (see **Appendix D**), Resources Regulator requested the submission of a MOP amendment to incorporate the decommissioning plan and Box Cut Emplacement remediation plan. Resources Regulator also requested that the calculated rehabilitation liability be revised to include a contingency for the repair of the Box Cut Emplacement.

The United Collieries Decommissioning Strategy is provided in **Appendix D**. The Box Cut Emplacement remediation plan is covered in **Section 7.2**.

Additionally, the MOP has been revised to incorporate the proposed decommissioning of some infrastructure during this MOP term. Details are provided in **Section 2.2.9**.

1.3.2 **Amendment B**

The MOP has been revised to extend the date of the MOP approval period until 12 July 2020, which aligns with the current date of expiry of the Suspension of Operations. Due to the assessment process taking a longer period than forecast, determination of the Project may not be received during the current MOP term. The extension of the MOP period will provide sufficient time for a determination to be made on the United Project and a new MOP to be developed, for either the proposed United Project operations or a Detailed Mine Closure MOP.



United operations have been undertaken in accordance with the MOPs listed in **Table 2**

Table 2: History of MOPs at United

Detail	Granted	Authority	Status	Expiry
Care and Maintenance MOP Amendment Sealing Underground workings	2016	Resources Regulator	Current (to be superseded by new MOP)	December 2016
Care and Maintenance MOP April 2014 to March 2016	2014	Resources Regulator	Superseded	March 2016
Suspension of Operations MOP – Amendment A January 2013 to December 2013	2013	Resources Regulator	Superseded	March 2014
Suspension of Operations MOP June 2010 to December 2012	2010	Resources Regulator	Superseded	December 2012
MOP June 2008 to June 2013	2008	Resources Regulator	Superseded	June 2013
MOP January 2005 to January 2010	2005	Resources Regulator	Superseded	January 2010

1.4 Current Consents, Authorisations and Licences

Leases, licences and approvals that regulate operations at United are listed in **Table 3**. Previous approvals which have expired such as Subsidence Management Plan approvals have expired and have been removed from the approvals list.

Table 3 Approvals Related to United

Regulatory Authority	Instrument	Date of Issue	Expiry Date	Comments
Division of Resources and Energy	CCL 775	2 September 1992	2 March 2033	
	S.100 Emplacement Area Augmentation C99/0845	15 July 2008	-	Tailings Dam 2 Raise Level
	s.126 Emplacement Area – New waste emplacement area C99/0845	9 March 2005	Not Specified	Emplacement Area 2
	s.126 Emplacement Area – Extension to area	30 Jan 2001	Not Specified	Emplacement Area 1
	s.126 Emplacement Area Approval C99/0845	22 October 1999	Not Specified	Emplacement Area 1 – emplacement activities until December 2002
	Sublease Agreement	21 November 2003	N/A-	Relates to CCL743 and ML1402. Continues until the expiration of either the Wambo or United leases. Renewal has been submitted to the Resources Regulator.

Regulatory Authority	Instrument	Date of Issue	Expiry Date	Comments
Department of Planning and Environment	Development Consent DA 410-11-2002i	21 November 2003	December 2012	Eight modifications have been made to DA 410-11-2002i. Mining was not permitted after 2012 however the consent remains current until the site has been rehabilitated.
Office of Environment and Heritage (OEH)	Environment Protection Licence (EPL) 3141	30 November 1999	Anniversary Date: 30 November	Licence is current
	Sewage Transpiration Area Approval 92/244H	20 May 1992	Not Specified	Issued by the Environment Protection Authority
	S87 Care and Control Permit #3062	05 March 2009	Not Specified	ISEMS/AHIMS Permit #: 10913446/2997
DPI Water	WAL 18445 Redbank Creek Bywash pump	14 March 2008	13 March 2023	Replaces 20SL050992 200ML 20WA208714 Industrial
	WAL 10541 Hunter River Pump	01 January 2007	Perpetuity	Replaces 20SL060222 300ML 20WA200928 Water Supply
	WAL 18549 Wollombi Brook Pump	05 November 2007	19 November 2022	Replaces 20SL050670 100ML 20WA208706 Industrial
Singleton Council	Sewage Treatment Plant Approval 4094/2010	1 July 2016	30 June 2017	Office Administration
	Sewage Management System Approval No. ST 4/2002	16 March 2004	Not Specified	CHPP haulage Contractor facilities

1.5 Land Ownership and Land Use

The Upper and Central Hunter Valley has been largely cleared of native vegetation, primarily for agriculture and other land uses including mining, power generation and urban development.

A plan showing the land ownership within and surrounding the United Colliery holding is shown on **Plan 1C**. Land surrounding the existing United operation is primarily owned by mining companies including Wambo and Coal and Allied. United owns land to the south-east of the surface colliery holding. This land includes the Morgan Property and Shearing Shed. The Morgan Property is located on land owned by Jerry's Plains Coal Terminal, which is wholly owned by Glencore. A schedule of land ownership within the Colliery holding is provided in **Appendix B**.

Non-mining land uses include bushland, agriculture (grazing) and the residential area of Warkworth Village, which is located approximately three kilometres to the west of the site.

United is bordered to the north and, east by Coal and Allied's open cut Hunter Valley Operations (HVO) and to the south by Peabody's Wambo operations. The United site is characterised by previous open cut mining operations, rehabilitated overburden emplacement areas, coarse rejects and tailings emplacements facilities and the surface infrastructure associated with the suspended underground mining operation. Undisturbed areas at United consist of remnant native vegetation and areas previously cleared for agriculture. Natural and built features at United are depicted on **Plan 1B** and **Plan 1C**.

1.5.1 Historic Land Use

Historic land use for the site prior to mining was dryland grazing, with rural land capability classes of Class III and Class IV with a small area of the site being subject to extensive cropping (primarily feed stock) (Dames and Moore, 1981).

1.5.2 Future Land Use

Future land use for the area will likely involve further mining activities as part of the proposed United Project. As outlined in **Section 1.1**, Glencore is in the process of seeking the relevant approvals to develop the United Project.

In the event that the United Project does not proceed, United intends to progress to full mine closure. If full mine closure was required a new Detailed MOP would be prepared to outline full Mine Closure.

Notwithstanding the above, this MOP proposes a final land use for areas disturbed by mining to be a combination of grazing pasture and native woodland. Native woodland communities will be established to provide enhanced ecological linkages to adjacent remnant woodland areas and rehabilitation at the adjacent mines. The preferred final land use for the rehabilitated rejects and tailings emplacement areas is a return to grazing pasture.

1.6 Stakeholder Consultation

Stakeholder consultation is undertaken in accordance with the United Collieries Environmental Management Strategy (EMS) and this will continue to be implemented during the MOP term.

United operates a 24 hour Community Complaints and Enquiries Hotline (1800 801 440) to ensure that any community concerns can be recorded and responded to, as soon as possible. The number is advertised on the United website and in the United Community Newsletter. Any complaints received are managed in accordance with the site's EMS. The United Environment and Community Coordinator is responsible for the management of all complaints. Details of the complaints are recorded in the GCP database.

United operates a Community Consultative Committee (CCC) in accordance with DA-410-11-2002-i. It is intended that the United CCC meetings will continue to meet during the MOP term (pending the availability of committee members) and will discuss environmental performance, exploration activities, rehabilitation, suspension of operations and the potential for future mining at the site. Minutes from these CCC meetings are publicly available on the United website (www.unitedcollieries.com.au).

In addition, the United website is maintained to provide current and relevant information to the general public. Documents available on the United website include the EMS, site Management Plans, CCC meeting minutes, and community newsletters.

Community Newsletters are published and distributed by United to inform the local community and stakeholders of activities undertaken and planned by United. Information included in the Community Newsletter includes United's environment and community projects as well as current and planned mining and exploration activities. Community newsletters may be distributed during the MOP term if necessary.

1.6.1 Consultation with Resources Regulator

United has consulted with **Resources Regulator** during the development and preparation of this MOP. A meeting was held at **Resources Regulator** offices on 21 July 2016.

Key topics discussed during consultation included:

- Proposed activities and rehabilitation progress during the MOP period;
- Proposed MOP period (7 years);
- **Resources Regulator** requested outlining the requirement to outline potential scenarios relating to continued care and maintenance, operations under the proposed United Project and full closure. See **Section 1.2** for details; and
- Additional details relating to tailings management and site contamination.

The MOP will also be discussed at the next CCC meeting.

A letter requesting additional information was sent from the **Resources Regulator** to United dated 5 December 2016. This letter stated:

1. References to Authorisation 444 (Mining Act 1973) should be removed from the title block.
2. The Mining Operations Plan cannot approve exploration activities within exploration authorisations. Either:
 - a) Remove references to Authorisation 444 (Mining Act 1973); or
 - b) Amend references to Authorisation 444 (Mining Act 1973) to reflect approval of exploration activities via the Common Exploration Activity / Non Common Exploration Activity process.
3. The Mining Operations Plan term be amended to expire 4 June 2019, aligning with the suspension of title conditions.

The MOP was updated to include the information requested by the **Resources Regulator**.

1.6.2 Stakeholder Consultation Regarding Final Land Use and Rehabilitation

As previously discussed in **Section 1.1**, United submitted an EIS in August 2016 for the United Project with a view to re-commence mining operations at the site.

Although it is not covered in this MOP, it should be noted that an alternate final landform has been proposed as part of the project application. As previously outlined, if the United Project was approved and activities were to commence under the new Project Approval, a new MOP will be prepared.

This MOP does not propose any modifications to the previously proposed final landuse. As shown in **Plan 4**.

United will continue to engage all relevant stakeholders throughout this MOP period to address their interests and concerns in the closure planning process. There are a number of key stakeholder activities associated with the final land use anticipated for this MOP term. These include:

- Continued liaison with neighboring operations including discussions regarding current operations and future plans;
- Continued discussion on the status of United at the CCC meetings; and
- Ongoing stakeholder engagement related to the closure planning.

2 PROPOSED ACTIVITIES DURING THE MOP TERM

2.1 Primary Domains

For the purposes of this MOP, primary domains have been defined as the set of discrete areas that have a particular operational or functional purpose. All areas previously disturbed by mining at United, or proposed to be subject to the activities described in the sections below, have been assigned to an appropriate primary domain. Primary domains at United are defined in **Table 4** depicted on **Plan 2**.

The primary domains will not be altered as a result of this MOP amendment.

Table 4 United Primary Domains

Domain	Description	Code
Infrastructure Area	Existing infrastructure and facilities including the pit top, workshops, administration buildings, access roads, haul roads, hardstand/laydown areas, topsoil stockpiles, and underground infrastructure (ventilation shafts, and boreholes).	1
Rejects and Tailings Emplacement Area	Includes the current tailings emplacement areas (Tailings Dams 1 and 2, and the partially rehabilitated REA).	2
Water Management Area	The network of dams and associated water management infrastructure.	3
Box Cut	Mining access to this area is no longer required.	4
Overburden Emplacement Area	The footprint for the former overburden emplacement areas currently undergoing rehabilitation, namely the Box Cut Dump and the Eastern Emplacement Area.	5
Subsidence Management Area	Surface area anticipated to be impacted by subsidence longwall panel LW10.	6
Compensatory Habitat Area	An 18.5 hectare of remnant native vegetation in the north-west corner of the site managed to compensate for habitat disturbed by mining.	7

2.2 Key Activities over the MOP Term

As outlined in **Section 1.1**, after receiving ministerial approval to suspend operations on 26 May 2010, the **Resources Regulator** approved to suspend the conditions of CCL 775 on 4 June 2010 and United entered a phase of suspension of operations.

2.2.1 Exploration

Drilling activities associated with the United Project pre-feasibility resource assessment will continue during the MOP term. Drilling activities may include cored and non-cored drilling to assess coal seam depth and quality, structural definition, and geological analysis.

Exploration will be undertaken in accordance with site specific environmental controls documented on a Ground Disturbance Permit (GDP) approved by the United Environment and Community Department. Where exploration activities are proposed on land owned by Wambo, an Exploration Site Permit will be obtained from Wambo prior to the commencement of works.

Due diligence will be undertaken for any proposed exploration programs against the locations of known artefacts, conservation areas, remnant or mature native vegetation areas and other sensitive environmental features that may be present. This is to prevent impacts as much as practicable.

A series of controls are to be employed at each drilling location. These will be implemented prior to commencement of works, and will generally include:

- Installation of appropriate erosion and sediment controls;

- Implementation of measures to minimise noise and dust emissions;
- Undertaking ecological and archaeological due diligence inspections / surveys by suitably qualified specialists, and implementing any recommended impact mitigation strategies;
- Seeking relevant approvals, such as where disturbance to areas of significance is required;
- Sealing of boreholes in accordance with **Resources Regulator** guidelines; and
- Rehabilitation of all areas disturbed for exploration.

Upon completion of exploration activities, all boreholes will be sealed and rehabilitated in accordance with the **Resources Regulator** guideline *EDG01 Environmental Management Guideline for Industry Borehole Sealing Requirements on Land: Coal Exploration* (NSW Department of Mineral Resources, 1997). All exploration will be carried out in accordance with the requirements of the *Mining Act 1992* and relevant leases.

Rehabilitation of exploration holes will include backfilling all excavations, re-spreading topsoil salvaged during site preparation and re-vegetation utilising the topsoil seed-bank and sterile cover crops where required (i.e., on sites where the risk of runoff from sediment laden water is considered high).

All erosion and sediment controls will remain in place until the site has been adequately revegetated and sites will be maintained (e.g. weed management, additional supplementary seeding, etc.) until site inspections confirm rehabilitation is complete.

2.2.2 Construction Activities

No significant construction is proposed during this MOP term. Only minor construction associated with site care and maintenance activities are proposed during this MOP term.

2.2.3 Land Preparation

Only minor disturbance associated with any exploration activities and site care and maintenance activities are proposed during the MOP term. Land preparation activities, including topsoil stripping and stockpiling and installation of erosion and sediment controls will be undertaken in accordance with site GDPs as described in **Section 2.2.3**.

2.2.4 Gas Flaring

The predominant source of greenhouse gas (GHG) emissions at United has been fugitive emissions vented from the underground workings. The site's fugitive emissions significantly decreased with the cessation of mining in January 2010 and the subsequent suspension of operations and sealing of part of the underground workings.

Gas generated in the sealed portion of the mine increases the pressure on the seals and has the potential to leak into the ventilated portion of the underground and increase GHG emissions. Subsequently, prior to this MOP United had constructed a gas flaring plant gas (including two individual 550 litres per second (L/s) flares and associated infrastructure) to flare gas collected from the sealed portion of the mine and reduce GHG emissions.

The gas flaring plant is no longer operational following the sealing of the flares borehole. The surface infrastructure will remain in place until further decommissioning is undertaken.

2.2.5 Waste Management

General Waste

Waste management practices at United are based on the waste management hierarchy whereby waste is minimised in the first instance, reused / recycled in the second instance and disposed of as a last resort.

Sewage

United has two sewage treatment systems onsite. The primary system is an Envirocycle system which services the main pit top facilities including the administration area, stores and bathhouse. The second sewage treatment system is a smaller Garden Master unit which services the lunch room at the CHPP (currently not in use). Both sewage systems are serviced on a regular basis by licensed contractors.

Hydrocarbon Waste Disposal

Hydrocarbons stored in 20 litre drums have been reduced to minimal levels and consolidated in one central storage bund. Hydrocarbon wastes are removed by a licenced waste contractor.

Coarse and Fine rejects

No coarse or fine rejects will be produced at the site in the MOP term.

2.2.6 Site Security

United maintain stringent site security measures to minimise the potential for public injury or acts of vandalism during suspension of operations. Security measures include:

- Regular licensed security contractor patrols during hours of non-operation;
- Closed circuit television surveillance of key areas of site;
- Lockable gates across the drift portal and site access road;
- Perimeter fencing;
- Compulsory surface and underground inductions for those working on site;
- Maintaining a visitor sign-in register and United personnel accompanying all visitors when on site; and

- Maintaining a contractor management system. The contractor management system requires all contractors to log in and out when entering and exiting site, and monitors the status of contractor's induction.

2.2.7 CHPP Management

If operations were to commence under the United Project, the current CHPP would need to be decommissioned. A more detailed decommissioning plan will be developed during the MOP period to cover built infrastructure and services.

2.2.8 Progressive Rehabilitation and Completion

No additional rehabilitation is proposed during the MOP term; with ongoing monitoring and maintenance within existing rehabilitation areas to be undertaken in accordance with the rehabilitation monitoring program (refer to **Section 8.1**). On this basis the rehabilitation activities include:

- Continuation of the existing environmental and rehabilitation monitoring programs;
- Weed and feral animal control within rehabilitation and offset areas;
- Erosion control maintenance works (as required);
- Maintenance fertilising (as required); and
- Maintenance of fence lines, access tracks and other general related land management activities.

As outlined in **Section 2.2.2** it is anticipated that exploration drilling may be undertaken during the MOP term. Any short term disturbance required for drill sites will be rehabilitated and as described in **Section 2.2.2**.

2.2.9 Decommissioning of Infrastructure

United may commence works to decommission the coal stockpile areas and associated overhead conveyors during the MOP term. These works include environmental and safety assessments and planning, decommissioning and demolition, and will be undertaken in accordance with the Decommissioning and Demolition Plan (**Appendix 4**).

2.2.10 Material Production Schedule during the MOP Term

As stated in **Section 1.1**, and **Section 2.2.7**, no mining, coal processing, or additional rehabilitation works will occur during the MOP period. A material production schedule during the MOP period is provided in **Table 5**.

Table 5 Material Production Schedule during the MOP Term

Item	Unit	2017	2018	2019	2020
Stripped Topsoil	m ³	0	0	0	0
Rock/Overburden	m ³	0	0	0	0
ROM Coal	Mt	0	0	0	0
Reject Material	m ³	0	0	0	0
Product Coal	Mt	0	0	0	0

2.3 Mine Closure Planning

United will continue to undertake mine closure planning in the MOP term to facilitate preparation of a Closure MOP in the event that the United Project is not deemed feasible. The key objectives of mine closure planning activities to be undertaken in this MOP term are:

- To undertake consultation with stakeholders through the preparation of Annual Reviews and CCC meetings as outlined in **Section 1.6.2** regarding post mining landform and land use; and
- Scope and undertake any additional technical studies that may be required to fill knowledge gaps related to closure (see **Appendix C – Risk Assessment**).

Table 6 provides a summary of the proposed mine closure planning activities proposed to be completed in the MOP term, and the sections within the MOP that include additional information.

Table 6 Mine Closure Planning Activities for the MOP Term

Activity	Commencement	Completion	Section of the MOP
Develop a Tailings Dam Capping Strategy during the MOP Period. Note this strategy will be related to the United Project being approved and commencing and not specifically for care and maintenance operations.	2017	Completed	Section 3.4.9
Develop a Decommissioning and Demolition Plan for built infrastructure and services.	2019	Completed	Section 3.4.7
Complete earthworks to allow surface water runoff from rehabilitated area at United to be discharged back into the environment via Redbank Creek.	2017	Completed	Section 3.3.2
Phase 1 contamination assessment at the site. Additional Phase 2 assessment completed as required.	2017	Phase 1 Completed	Section 3.3.4
Hazardous materials assessment at the site.	2019	2019	Section 3.3.4
Storage and maintenance of plant and equipment salvaged from underground workings at the pit top. Removal of equipment not required during care and maintenance.	Ongoing	Ongoing	Section 2.2
Rehabilitation monitoring and maintenance.	Ongoing	Ongoing	Section 8
Undertake an assessment of the options to lower the water level within Dam 1 (clean water dam) in order to return surface flows to Redbank Creek	2017	Completed	Section 3.3.2
United may commence works to decommission the coal stockpile areas and associated overhead conveyors during the MOP term.	2018	Ongoing	Section 2.2.9

These mine closure activities only cover the care and maintenance phase of United. If the United Project was approved there would be additional closure activities required to implement the United Projects Project Approval.

A revised Rehabilitation Cost Estimate (RCE) has been prepared in conjunction with this MOP to provide an estimate of the costs to undertake all rehabilitation works to achieve lease relinquishment. A summary of the key demolition and rehabilitation activities required for final closure has been costed in the RCE is provided in **Section 2.4** below.

2.4 Asset Register

The asset register (**Table 7**) provides a summary of the key features of each primary domain (see **Section 2.1**), and principal activities required for rehabilitation. This asset register is intended to provide a suitable level of context for United's Rehabilitation Cost Estimate (RCE). The areas for each primary domain represent the total disturbance footprint for each domain during the MOP period as depicted on **Plan 3**.

Table 7 Asset Register

Major Assets	Use	Demolition / Rehabilitation Activities for Closure	Approvals Required	Area / Length
Domain 1 – Infrastructure: 38.8 hectares				
Administration buildings, workshops, sheds, switch room, gas monitoring building, solcenic tanks, compressor sheds and water tanks.	Currently used for care and maintenance activities.	Disconnect services, demolish and remove infrastructure, remove concrete pads, remove carbonaceous material and dispose of in box cut void.	None	7,135m ²
Car parks and roads	Entry to site and office car park. Currently utilised.	Remove bitumen and dispose of in box cut void.	None	5,223 m ²
Overhead conveyors and gantries	Transporting coal to the ROM stockpile, CHPP and product stockpile. Not in use.	Demolish and remove overhead conveyors and gantries.	None	770m
CHPP	Washing and sizing coal for dispatch offsite. Not in use.	Disconnect services, demolish and remove CHPP, and remove concrete pads and footings, remove carbonaceous material and dispose of in box cut.	None	2,000 m ²
Reclaim tunnel	Tunnel beneath coal stockpile used for reclaiming coal from the stockpile. Not in use.	Excavate material to expose reclaim tunnel, demolish concrete roof of reclaim tunnel and allow to collapse into tunnel, remove conveyor from reclaim tunnel and fill tunnel with additional locally sourced fill material.	None	87m
Hardstand and laydown areas for the storage of mine equipment and materials	Storage of equipment. Currently used.	Remove concrete pads, remove carbonaceous material and dispose of in boxcut.	None	8,768m ²
Fuel farm	Not currently in use. Treatment of contaminated soils.	Remove any contaminated material to a suitable licenced treatment facility or undertaken bio-remediation activities on the site.	None	0.6 ha
Sewage treatment plant and spray irrigation area	Treatment of sewage from amenities on site. Currently utilised.	Disconnect sewage treatment plant, remove spray irrigation infrastructure and demolish sewage treatment plant.	None	480 m ²

Major Assets	Use	Demolition / Rehabilitation Activities for Closure	Approvals Required	Area / Length
66 kilovolt (kV) electricity supply and distribution infrastructure including the 11 kV switchyard	Provides electricity to the site. Currently utilised.	Disconnect switchyard, remove powerlines, remove power poles.	None	5.8km
Explosive Magazine	Storage of explosives. Not currently in use.	Demolish and remove explosives magazine.	None	0.02ha
Sealed and unsealed roads including the internal private haul road to the Wambo rail loader	Access tracks across site and internal haul road to Wambo rail loader to dispatch product coal offsite. Currently in use for site inspections.	Remove roads and tracks, remove carbonaceous material and dispose of in box cut.	None	11.3ha
Gas flaring plant	Not currently in use	Gas flaring borehole has been sealed. At final closure the removal of infrastructure is required.	None	1 ha
Surface pipelines (water)	Transport water around the site. Currently in use.	Demolish and remove pipelines; backfill trenches where required.	None	21,323m
Surface pipelines (gas)	Transport gas from underground to gas flaring plant. Currently in use.	Demolish and remove pipelines; backfill trenches where required.	None	2,661m
Domain 2 – Tailings Emplacement Area: 51.9 hectares				
Tailings Dam 1	Previously used for storage of tailings and coarse rejects from the CHPP. No tailings disposal is currently occurring.	Cap with stockpiled coarse reject and imported fill, and re-vegetate.	Section 101 Approval Coal Mine Health and Safety Act 2002;	51.9 ha
Tailings Dam 2	Previously used for storage of tailings and coarse rejects from the CHPP following Tailings Dam 1 reaching capacity. No tailings disposal is currently occurring.	Cap with stockpiled coarse reject and imported fill and re-vegetate.	Section 101 Approval Coal Mine Health and Safety Act 2002 Dam Safety Committee sign off for rehabilitation design, de-prescription	
Domain 3 – Water Management Area: 28.4 hectares				
Dams 3, 7, 9, 10, 13 and 14,11, 15, 15a, 15b,	Clean water dams on site. Currently in use.	Make safe and minor earthworks; completed minor revegetation for stability.	None	12.2 ha

Major Assets	Use	Demolition / Rehabilitation Activities for Closure	Approvals Required	Area / Length
Dams 4, 5, 6, and Turkeys Nest dam	Dirty water dams on site. Currently in use.	Drain dams, minor earthworks as required, remove sediment to the boxcut or tailings dam and convert to clean water dams. Completed minor revegetation for stability.	None	
Dams 2 and 12	Dirty water dams on site. Currently in use.	Drain dams, minor earthworks as required to infill dams. Completed minor revegetation for stability.	None	
Dam 1	Onsite clean water dam constructed across Redbank Creek. Currently in use.	Undertake detailed design to lower the dam spillway. Earthworks to lower the spillway and restore Redbank Creek.	NSW Office of Water Controlled Activity approval	16.2 ha
Domain 4 – Box Cut: 2.7 hectares				
Drift Portal	Previously used for access to underground. Drift portal has been sealed and box cut is used as part of the water management system to store water.	<p>Prior to closure the area should be dewatered.</p> <p>At closure a single void will exist in the final landform at the location of the current box cut. The void will be blasted or dozed to a suitable slope, partially backfilled and will be rehabilitated with woodland species.</p>	<p>None</p> <p>Resources Regulator sign off already received for capped entry</p>	N/A
Domain 5 – Overburden Emplacement Areas: 42.3 hectares				
No building or plant located within this domain	N/A	N/A	Nil	N/A
Domain 6 – Subsidence Management Area: 56.3 hectares				
Following the suspension of operations underground plant and equipment was salvaged. Some salvaged plant and equipment has been sold to other mining operations or has been recycled. The remainder is stored on hardstand areas and is accounted for in Domain 1. Note no evidence of subsidence in recent years at United.	N/A	N/A	Nil	N/A

Major Assets	Use	Demolition / Rehabilitation Activities for Closure	Approvals Required	Area / Length
Domain 7 – Compensatory Habitat Area: 18.5 hectares				
No building or plant located within this domain. Existing fences are proposed to be retained following closure.	N/A	N/A	Nil	N/A

2.4.1 Rehabilitation Cost Estimate

The RCE prepared for this MOP submission has been calculated to undertake the necessary works to achieve the desired final land use (refer to **Section 4** and **Plan 4**). The RCE provides for:

- Decommissioning and demolition of all surface infrastructure;
- Rehabilitation of all areas disturbed by mining as depicted in **Plan 3**, with the exception of dams to be retained for post mining use;
- Mobilisation costs, project management and contingencies; and
- Contingency for the repair of the Box Cut Emplacement rehabilitation.

3 ENVIRONMENTAL MANAGEMENT

3.1 MOP Risk Assessment

The key risks associated with the proposed activities at United during the term of this MOP have been identified and assessed in accordance with Glencore's Risk and Change Management Standard which establishes a qualitative risk assessment methodology in accordance with the requirements of the Joint Australian and New Zealand Standard *AS/NZS 31000:2009 Risk Management – Principles and Guidelines*. The United Care and Maintenance MOP Risk assessment was undertaken on 17 August 2016.

The method used for the risk assessment encompassed the following key steps:

- Identifying the related risks, including what could happen, when and where;
- Analysing the risks using a qualitative risk approach (i.e. identifying existing controls, determining specific consequences/likelihoods and then determining the residual level of risk);
- Evaluating the risks to determine the significant issues. The purpose of risk evaluation is to make decisions based on the outcomes of the risk assessment about which of the risks need controls or the implementation of a mitigation strategy;
- Establishing controls to mitigate/treat the risks identified as part of the process;
- Review of existing risk from the most recent Broad Brush Risk Assessment (BBRA); and
- Addition of new risks associated with rehabilitation and closure based on Section 3.2 of the MOP Guidelines.

The MOP Risk Assessment is appended to this MOP (**Appendix C**).

3.2 Risk Management

United continually evaluates and monitors its environmental performance and legislative compliance to minimise impacts on the surrounding community through its Environmental Management System (EMS). The United EMS will be maintained throughout the MOP period. The major components of the EMS that have been developed and implemented on site include the following:

- Environmental and community commitments and policies;
- Legal and other requirements;
- Identification of environmental aspects and impacts;
- Environmental targets and objectives;
- Environmental management plans;
- Organisational structure, roles and responsibilities;
- Communications, documentation and reporting;
- Environmental incident response;
- Evaluation, review, corrective action and continual improvement;
- Training including inductions, toolbox talks and environment and community awareness competency based training sessions; and
- A complaint recording and management system.

In 2015, United liaised with the DP&E to streamline and rationalise site environmental management plans as the site continues to remain on care and maintenance.

The approved environmental management plans (Approved by DP&E on 4 December 2015) and monitoring programs included in the United EMS are:

- Environmental Management Strategy;
- Erosion and Sediment Control Plan;
- Environmental Monitoring Program;
- Pollution Incident Response Management Plan; and
- Compensatory Habitat Management Plan.

3.3 Environmental Issues Management

The following sections outline the key environmental aspects at United for the MOP term and also include some detail on the proposed management measures to be employed. As part of the United Project EIS (2016) specialists assessments have been completed for several key aspects, however these studies referred to the new project, not the current care and maintenance activities.

3.3.1 Air Quality

Air quality is monitored in accordance with the United Environmental Monitoring Program. This monitoring program includes depositional dust gauges and high volume air samplers as shown on **Plan 1**.

The principal sources of atmospheric dust emissions from activities at United during the MOP term are associated with:

- Disturbance for exploration and drilling works;
- Wind-blown dust from exposed surfaces; and
- Vehicle movements on the internal unsealed hardstand areas or access roads around the site.

Despite the limited activity, United will continue to monitor air quality in accordance with the relevant approvals during the MOP term. The results of air quality monitoring will be assessed against the relevant criteria from the United Development Consent and EPL. Results will be provided in the Annual Review and EPL Annual Return.

3.3.2 Surface and Ground Water

Surface and ground water is managed in accordance with the Erosion and Sediment Control Plan, which details the onsite water management system.

Since entering the suspension phase, United requires water for the vehicle wash down pad, site facilities including firefighting, dust suppression, exploration drilling and rehabilitation maintenance only.

Following a decision on future mining operations, United may need to apply to modify EPL 3141 and water licences to reflect any future operations or closure activities.

The principal objectives of surface water management (during suspension) are to:

- Operate the water management system in a manner which minimises the potential for the discharge of dirty water;
- Maintain adequate water supply for firefighting purposes;
- Continue desiccation of tailings dams by actively decanting following rain events;

- Designate accountabilities for pumping;
- Provide a means for transferring water to the neighbouring operations;
- Capture reliable data for compliance and management purposes; and
- Meet relevant statutory requirements.

Surface Water Monitoring

United will continue to monitor water quality in accordance with the approved Environmental Monitoring Program and regulatory requirements, including EPL 3141 throughout the MOP period. The surface water monitoring program incorporates:

- Stream Monitoring;
- Surface Water Storage Monitoring;
- Surface Water Usage Monitoring;
- Surface Water Extraction Monitoring;
- Oil and Water Separator Monitoring, and
- Potable Water Monitoring.

In accordance with DA-410-11-2002-i surface water quality is monitored in five creek locations. In addition, monitoring of surface water dams, Wollombi Brook and North Wambo Creek is undertaken on a monthly basis. All sampling and analysis is undertaken by an independent contractor on behalf of United. Water samples are analysed for pH, Electrical Conductivity (EC), Total Suspended Solids (TSS) and Total Dissolved Solids (TDS).

Additional monitoring locations for environmental purposes include Dams 1, 2, 3, 6 and 8 which are tested annually for arsenic, cadmium, chromium, copper, lead, nickel and zinc.

Erosion and Sediment Control Management

United will continue to maintain the clean water and dirty water management systems including the network of dams and pumping infrastructure during this MOP term. United's water management system is designed and managed to:

- Capture dirty water run-off from disturbed areas;
- Segregate clean water and dirty water; and
- Provide water to service activities including firefighting, vehicle wash down and road watering.

Proposed Upgrades to Surface Water Management

An investigation report was completed by SLR Consulting in November 2015 relating to completing some changes to surface water management at site. [The works were completed in 2016.](#)

The diversion works are shown in **MOP Plan 3B** and [involved](#):

- Divert sediment laden runoff from the minor localised disturbed areas (approximately 3.5ha) away from Dam 12 and into Dam 5 which forms part of United's dirty water management system; and
- Allow clean surface water runoff to continue to flow into Dam 12 and then flow into Redbank Creek.

The works involved lowering of the spillway and blocking flowpath from an existing drain to ensure that all overflows from Dam 12 flow over the excavated section of the dam embankment and into Redbank Creek.

A meeting was held with DP&E in September 2016 and approval was provided to undertake the proposed works as detailed in the ESCP.

An assessment was conducted to review options to lower the water level within Dam 1. Dam 1 is a cleanwater bywash dam that Redbank creek currents flows into. The assessment sought to enable United to maintain a lower water level within the dam as the site progresses towards either mine closure or indeed the approval of the United Wambo joint venture project.

The assessment determined that the discharge of water through the proposed works would potentially be in breach of regulatory requirements and any works to lower the maximum water level of Dam 1 has not proceeded. As of May 2019, the water level in Dam 1 remains low due to lower than average rainfall and the pumping of water to Wambo.

Post mining Surface Water Management

Since entering suspension of operations United uses a relative small volume of water from both the clean and dirty water systems. United manages its dam network to maintain required water storage capacities to allow for storm events and prolonged rainfall in accordance with EPL 3141.

During periods of excess water, United manages its dam volumes by utilising all available storage dams and maximising surface area for evaporation. United also uses an irrigation area on the CHPP ROM and Product coal pads to enhance evaporation. United also has an agreement with neighbouring Wambo mines to transfer excess water to the Wambo C11 void.

At closure dams that are not required in the final landform will be decommissioned and the area regraded to produce a free draining landform. Dams retained in the final landform will be de-silted and any minor earthworks necessary will be undertaken to stabilise embankments and spillways.

Preliminary completion criteria for rehabilitation of water management structures are provided in **Section 6**.

Groundwater Monitoring and Management

United's groundwater monitoring network covers the following four aquifer systems:

- North Wambo Creek Alluvium;
- Wollombi Brook Colluvium/Alluvium;
- Weathered (shallow) Coal Measures; and
- Deeper Coal Measures.

United is required to ensure that workings are long term stable and do not cause any induced hydraulic connections with the Wollombi Brook, associated alluviums or any other alluvial groundwater resources on site.

A piezometer network is monitored quarterly across the site. Three vibrating wire piezometers were installed near Wollombi Brook to identify any potential impacts on the aquifer as part of first workings. Despite there being no mining on site at present, the vibrating wire piezometers are downloaded quarterly.

3.3.3 Waste Management

Waste management practices are based on the waste management hierarchy, whereby waste is:

- Minimised in the first instance;

- Reused or recycled in the second instance; and
- Disposed of, as a last resort.

The overall aim of the waste management system at United is to minimise waste being disposed from the site, but also to maximise resource use where possible. Waste is managed, tracked and reported monthly to the United Environment and Community Coordinator and also entered into the Glencore GCP Database for tracking and reporting purposes.

Waste management activities and volumes of waste generated from United will be reported on in the Annual Review.

Sewage Treatment and Disposal

United currently has two sewage treatment systems onsite. The primary system is an Envirocycle system which services the main pit top facilities including the administration area, stores and bathhouse. The second sewage treatment system onsite is a smaller Garden Master unit which services the lunch room at the CHPP. All sewage systems are serviced on a regular basis by licensed contractors.

Oil and Water Separator

The current wash down bay, within the surface facilities area, is equipped with an oil and water separator, which separates water from oils, greases and solids. Runoff from the service, fuelling and workshop areas is directed to the separator. Waste oil and oily water is harvested and taken off-site to a treatment facility by a licensed waste oil contractor. With the site being on care and maintenance operations, the oil water separator is infrequently used.

During the MOP term, the water from the oil water separator will continue to be sampled bi-monthly in accordance with the Environmental Monitoring Program.

3.3.4 Hazardous Materials Management

United utilises the Chemaalert system to manage the handling, storage and disposal of all chemicals that are used on site. The system is available on all computers onsite and provides access to a database of all substances on site including handling, disposal, chemical properties and first aid treatment. The use of this system will continue during the MOP term.

Following the suspension of operations, all non-necessary hazardous materials were removed from site (including bulk chemicals and explosives) by licensed contractors in accordance with regulatory requirements. During the MOP period, a hazardous materials assessment will be completed by a qualified consultant prior to any demolition activities with focus being the area of the CHPP and workshop.

Hydrocarbon Management

Since the suspension of mining operations, there has been a significant reduction in the number of vehicles located on site and therefore a reduced need for diesel and hydrocarbons storage or use. Stores of diesel and other hydrocarbons have been depleted since entering suspension of operations and the storage facilities for hydrocarbons has been rationalised.

Subsequently, the risk of land contamination resulting from hydrocarbon spills is considered to be low in this MOP term. Any incidences of hydrocarbon contamination will be managed in accordance with the spill response procedures described in the Waste Management Plan.

The following hydrocarbon management controls will be employed throughout the MOP term:

- Maintaining spill kits in the workshop and around hydrocarbon storage locations;

- Providing personnel with spill response training in the site induction process; and
- Minimising volumes of hydrocarbons to be stored on site.

During 2016 United undertook a Phase 1 contamination assessment of the site. The assessment found that the overall likelihood for significant chemical contamination to be present at United is considered to be low, however there is potential for some chemical contamination to be present within some areas. The areas will be further assessment prior to their decommissioning or demolition.

Radiation Gauges

Radiation gauges associated with United have been deregistered and removed from site.

3.3.5 Noise Management

The nearest residential receptors to United are located in Warkworth Village. Warkworth Village is surrounded by open cut mining operations including Wambo, HVO and Mt Thorley Warkworth Operations. During this MOP term noise generating activities at United will generally be limited to light vehicles and any exploration. Subsequently, potential noise impacts at sensitive receivers during the MOP term will be negligible, and accordingly the DP&E have approved the suspension of noise monitoring.

Detailed mine closure planning will include an assessment of potential noise impacts associated with the demolition of infrastructure as well as the rehabilitation works at United, however this would be covered under a Closure MOP.

3.3.6 Flora and Fauna

Threatened Fauna

Five threatened fauna species, listed as vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act), have been previously recorded at United. These include:

- Diamond firetail (*Stagonopleura guttata*);
- Glossy black-cockatoo (*Calyptorhynchus lathami*);
- Grey-crowned babbler (*Pomatostomus temporalis temporalis*);
- Hooded robin (*Melanodryas cucullata cucullata*); and
- Speckled warbler (*Pyrholaemus sagittatus*).

Surveys have found two groups (troops) of the threatened Grey-crowned Babblers occurring on the site. As a result, the United Development Consent (DA-410-11-2002i) required United to establish an 18.5 hectare Compensatory Habitat Area as well as to prepare an associated Compensatory Habitat Plan. United has prepared the Compensatory Habitat Plan in accordance with the conditions of development consent (DA-410-11-2002i).

Additionally, five threatened fauna species have been recorded within United holdings during the 2009 monitoring surveys, comprising the speckled warbler (*Chthonicola sagittata*), varied sittella (*Daphoenositta chrysoptera*), eastern freetail-bat (*Mormopterus norfolkensis*), eastern bentwing-bat (*Miniopterus schreibersii oceanensis*) and large-eared pied-bat (*Chalinolobus dwyeri*).

Flora

A number of ecological surveys have been undertaken at since the commencement of mining operations in 1981. Six vegetation communities have been identified at United as shown on **Plan 1B**. These include:

- Central Hunter Box – Ironbark Woodland;
- Central Hunter Bulloak Forest Regeneration;
- Central Hunter Swamp Oak Forest;
- Hunter Valley River Oak Forest;
- River-flat Eucalypt Forest (located on Morgan Property); and
- Planted Areas.

Threatened Flora

No threatened flora species have been identified at United as part of ecological monitoring programs undertaken to date. One endangered ecological community, the Central Hunter Box – Ironbark Woodland, is listed as an endangered ecological community under the TSC Act.

Compensatory Habitat Management Area

As defined by DA-410-11-2002i (Consent conditions 48, 49 and 50) United were required to establish a Compensatory Habitat Management Area to conserve 18.5 hectares of woodland vegetation to offset the disturbance to native vegetation communities associated with mining activities.

The Compensatory Habitat Management Area is shown on **Plan 2** and **Plan 3**. In the north, the area extends from 200 m north of Wambo's mine lease to the United mine lease boundary. In the west, the area extends from Wambo's mine lease boundary to 100 m west of United's ventilation fan. A Compensatory Habitat Management Plan has been developed by United in accordance with the requirements of the Development Consent.

3.3.7 Weeds and Pests

Weeds

Weed management for United includes an annual walkover with a suitably experienced person to identify areas for weed eradication and control. Other spraying for weeds occurs in the various electrical compounds to reduce the potential for fire.

Feral Animal Control

The biennial biodiversity monitoring undertaken for United includes an assessment of feral animal activity across site. These surveys have previously identified low levels of feral animal activity, usually consisting of small feral dog populations.

During the period of this MOP, United will continue to monitor feral animal activity on site and, where appropriate, implement baiting programs. Any baiting programs will be developed in consultation with the Hunter Local Land Services (LLS).

3.3.8 Land Capability

Pre-mining land capability and land use at United is depicted on **Plan 1B**. Pre-mining land use at United was predominantly dry-land grazing, with a small area subject to cropping (feed stock) and areas with remnant native vegetation (Dames and Moore, 1981). Pre-mining land capability at United was Rural Land Capability Classes III (suitable for regular cultivation) and IV (suitable for grazing but not cultivation).

The rejects and tailings emplacement areas are proposed to be rehabilitated to sustain a grazing post mining land use that integrates with proposed post mining grazing areas at Wambo. Detailed mine

closure planning in this MOP term will identify, in consultation with stakeholders including regulators and Wambo, appropriate land capability objectives for grazing rehabilitation areas at United.

A significant portion of land at United associated with the Redman Creek floodplain has not been disturbed by mining, however has been intersected by linear infrastructure including haul roads and tracks (refer to **Plan 2**). Mine closure planning will address activities required to preserve, and where practicable enhance, the pre-mining land capability associated with former dryland grazing land associated with the Redbank Creek floodplain.

3.3.9 Aboriginal Heritage

Aboriginal and cultural heritage is managed as part of the approved EMS.

The Aboriginal sites identified at United are typical of those recorded in the Upper Hunter Valley, indicating Aboriginal people intensely occupied and used the resources of the larger water sources (such as Wollombi Brook and Redbank Creek) (HLA ENSR, 2008). The majority of sites within the United Collieries mining lease are low density stone scatters of low significance due to their lack of integrity, absence of rare characteristics and lack of demonstrated research potential.

To enable the preservation of Aboriginal cultural heritage, following the identification of a number of the Aboriginal sites, a number of Section 90 salvage programs have been undertaken to collect the Aboriginal artefacts prior to their disturbance. Previous Section 90 salvage programs have been undertaken to allow for the construction of the coal preparation plant in 2001, and the internal haul road in 2007. The artefacts which have been collected during these salvage programs have been provided to the relevant Aboriginal groups who are holding the artefacts in accordance with the (then) Department of Environment, Climate Change and Water (DECCW) Care and Control Permits.

Two additional salvage programs have been undertaken for the construction of the reject emplacement area in 2008 and for the mining of Longwall 10 in 2009. Following the 2008 salvage program, the Aboriginal stakeholders stated that they no longer wanted to store the artefacts obtained during salvage programs. Subsequently, all artefacts which were obtained during the following salvages were buried within the Compensatory Habitat Management Area within the north-western portion of the United Surface Colliery Holdings. United have also obtained the artefacts that were being held by the Aboriginal stakeholders and are now storing them in an educational cabinet located within the United administration building. A Care and Control permit has been obtained by United for this activity.

Disturbance during the MOP term will be limited to minor disturbance for exploration drilling. Prior to disturbance, a GDP will be completed and approved by the United Environment and Community Department. If required an archaeological due diligence assessment will be undertaken by suitably experienced consultant. If the works are likely to disturb a known site, the activity will be moved to an alternative location where possible. Where this cannot be achieved, a permit for disturbance of an Aboriginal site will be sought from OEHL in consultation with the relevant Aboriginal stakeholders.

All contractors working at United are made aware of their responsibilities regarding protection of Aboriginal heritage. If any suspected Aboriginal heritage objects are discovered during the MOP period, works within the area will cease until appropriate investigations are conducted and any necessary permits or management processes are in place. Any Aboriginal heritage sites identified, or disturbed during the MOP term will be reported on in the Annual Review.

There are no plans for additional disturbance as part of the care and maintenance period.

3.3.10 European Heritage

There are no sites of recorded European heritage at United. There are however, three heritage sites located above the former underground mining workings. Each site has been subject to subsidence monitoring and has not been impacted by subsidence. The sites are described in **Table 8**.

Table 8 European Heritage Items

Site Name	Brief Description	Significance	Location (in relation to Longwall Panels)
Grain Silo A	Grain silo, hay shed and a low concrete tank	No significance	Longwall Panel 4
Grain Silo B	Grain silo and hay shed	No Significance	Longwall Panel 7
Wambo Homestead Complex	Eight buildings including kitchen dated back to c1830, stud masters cottage, new house, servant's wing, carriage house with stables an granary, slab horse boxes and mounting yard boxes.	Listed on the State Heritage Register	Longwall Panels 7 and 8

In the unlikely event that any items of European heritage were to be found during the MOP period, works within the area will cease until appropriate permits or management processes are in place.

Any impacts to European heritage at United during the MOP term would be reported in the Annual Review.

3.3.11 Public Safety

A number of safety measures have been adopted on site to ensure employee and public safety throughout all aspects of operations at United. These mainly relate to the implementation of site security measures, which are detailed in **Section 2.2.8**

3.3.12 Bushfire

Bushfire risk mitigation is undertaken in accordance with the United EMS. The bushfire reduction measures adopted on site include:

- A surface slashing program is undertaken regularly to reduce the risk of fire around critical infrastructure;
- Roadways and tracks are also maintained around the operations in order to provide an effective fire break;
- Surface water facilities are available on site to be used for bushfire management; and
- A ring main fire system is in place to respond to any fires that occur on the surface.

3.4 Specific Risks Relating to Rehabilitation

The following sections describe key risks to rehabilitation identified in the BBRA revised for this MOP (**Appendix C**), and management and mitigation measures proposed for this MOP term.

3.4.1 Geology and Geochemistry

The generation of Acid rock drainage (ARD) at the Overburden Emplacement Area, REA or tailings dams is considered a low risk. Water quality testing results and visual inspections indicate no occurrences of ARD at United.

An assessment of potential acid mine drainage was assessed for the United Project EIS (2016) with there being a low potential to encounter acid producing material. Analysis was undertaken by Geoterra Pty Ltd (Geoterra) to assess the acid rock drainage (ARD) potential of the materials to be mined for the United Project (2016). The vast bulk of overburden, interburden and floor materials represented by the samples tested are unlikely to be acid producing or release significant salinity and will be acid consuming. This information will be useful for overburden areas within the current United Project Approval Area, however additional material characterisation will be required prior to additional rehabilitation activities at United.

3.4.2 Material Prone to Spontaneous Combustion

Spontaneous Combustion at Stockpiles

No coal will be processed at United during this MOP term. Subsequently, ROM and product coal has been removed from all coal stockpile areas.

Spontaneous Combustion at Rejects Emplacements

The risk of spontaneous combustion in the REA is considered to be low due to there being no instances of spontaneous combustion over the long history of operations at United. Current controls to minimise the potential for spontaneous combustion at the REA are:

- Encapsulating rejects under a minimum of 1 m of inert capping material;
- Material compaction and moisture content is optimised to prevent oxidising conditions required for ignition; and
- Surface water drainage and revegetation with a mix of pasture species to minimise potential for the capping to be breached.

Material characterisation and a geological investigation was completed for the United Project EIS (2016) to identify potential spontaneous combustion risks for the project United Project. Based on the geological investigation undertaken by for the EIS, the propensity for spontaneous combustion in the strata to be mined is low, and therefore with appropriate management measures in place the risk of adverse air quality impacts associated with spontaneous combustion is low.

3.4.3 Mine Subsidence

Mining was suspended in January 2010, with there being minimal evidence of subsidence in recent years. In the unlikely event that environmental inspections indicated evidence of new subsidence, this would be recorded, remediated and monitored as per the previous SMP Approvals.

3.4.4 Erosion and Sediment Control

General erosion and sediment control principals for the site are outlined in **Section 3.3.2**. Erosion and Sediment Control is undertaken in accordance with the approved Erosion and Sediment Control Plan.

There are no activities resulting in significant disturbance during the MOP term. Therefore, risks related to erosion and sedimentation during this MOP term will primarily be associated with:

- Minor disturbance for exploration activities;
- Unshaped and partially rehabilitated areas of the REA; and
- Other existing disturbance areas including unsealed roads and rejects stockpiles.

ESC for Exploration Drilling

As outlined in **Section 2.2.3**, all proposed disturbance to facilitate exploration drilling will be undertaken in accordance with a GDP, approved by the United Environment and Community Department. The GDP will include site specific erosion and sediment controls to be implemented prior to commencement of drilling works and maintained until disturbance at drilling locations is rehabilitated.

ESC Maintenance at Rehabilitation Areas

All erosion and sediment control structures on rehabilitation areas are inspected on a monthly basis and following significant rainfall events in accordance with the Erosion and Sediment Control Plan. Inspections include all drainage channels and drop structures, sediment traps and sediment dams.

Remediation works will be undertaken where required in accordance with the triggers and responses described in the MOP Trigger Action Response Plan (TARP) (**Section 9.2**). Sedimentation dams will be routinely inspected in the MOP period to monitor dam integrity.

3.4.5 Soil Type and Suitability

Soils in the vicinity of the internal haul road were characterised by GSS Environmental (GSSE) (2005) for the *Haul Road Statement of Environmental Effects* (SEE) (Umwelt, 2005a). It is considered that this information is generally indicative of all areas unaffected by mining activities at United.

Soil type(s) and Suitability for Rehabilitation

Two soil types have been recorded in areas previously undisturbed by mining, being Yellow Soloths and Yellow Solodics, and are considered to be representative of soil resources at the site (GSSE, 2005). Soils have been assessed to be slightly dispersive (Yellow Solodic soils dominant on mid to upper slopes) to highly dispersive (Yellow Soloths associated with drainage lines and depressions) (GSSE, 2005).

The results of the soil survey indicate that topsoils are generally suitable for use in rehabilitation. Soil testing undertaken by GSSE (2005) indicated that the subsoils are more dispersive than the upper layers, and that appropriate erosion and sediment controls and soil amelioration is required for re-use in rehabilitation (GSSE, 2005).

Topsoil Rehabilitation Resources

As outlined in **Section 2.3** United will investigate sources of suitable topsoil and topsoil substitutes during this MOP term due to the lack of topsoil resources available on site to complete site rehabilitation. It is anticipated that due to the anticipated volumes of material required, in final rehabilitation topsoil substitutes will be used to facilitate timely and cost effective rehabilitation.

Although additional investigations will be completed into soil resources and topsoil substitutes during the MOP period, there is no proposed rehabilitation during the MOP period.

3.4.6 Flora and Fauna

This section provides some additional details relating to biodiversity management in rehabilitation.

Woodland Habitat Corridors

Two east-west habitat corridors are proposed in the final landform, as depicted on **Plan 4**. A northern habitat corridor will be established to connect remnant native vegetation at the Compensatory Habitat Management Area to remnant native vegetation at the eastern boundary of the site. A southern habitat corridor will link existing woodland rehabilitation. The proposed locations of woodland habitat corridors have been selected to optimise linkages with woodland corridors proposed for the Wambo final landform and meet the objectives of the Synoptic Plan.

Habitat Augmentation

Woodland rehabilitation areas will include features to enhance habitat opportunities for native fauna in juvenile woodland rehabilitation areas.

3.4.7 Infrastructure Decommissioning and Demolition

Infrastructure, plant and equipment, and the total footprint (area) for each primary domain at United is listed in the MOP Asset Register (refer to **Section 2.4**). It is proposed that all surface infrastructure, plant and equipment will be decommissioned and removed from site at closure. United **has developed** a Decommissioning and Demolition Plan for built infrastructure and services (**Appendix D**).

United may commence works to decommission the coal stockpile areas and associated overhead conveyors during the MOP term. These works include environmental and safety assessments, planning, decommissioning and demolition. All activities will be undertaken in accordance with the Decommissioning and Demolition Plan (**Appendix D**).

Environmental Risk Assessment

Prior to commencement of any decommissioning and demolition activities, risk assessments will be undertaken to identify risks and nominate the controls to be implemented to eliminate or minimise environmental impacts of decommissioning and demolition works.

Contamination Assessments

Section 3.3.4 outlines the commitment to complete a hazardous materials assessment and a new Phase 1 contamination assessment during the reporting period. Additional assessments may be required based on the initial assessment, with this work to be undertaken as part of the Decommissioning and Demolition Plan.

3.4.8 Box Cut Rehabilitation

As part of final closure MOP there would be a requirement to prepare a final a Final Void Design and Final Void Management Plan. United will consult with the **Resources Regulator** and relevant stakeholders during preparation of the Final Void Design. The design will take into account a surface water assessment and water balance for the final void and geotechnical assessment of the stability of the highwalls and low walls. At closure a single void will exist in the final landform at the location of the current box cut. The void will be blasted or dozed to a suitable slope, partially backfilled and will be rehabilitated with woodland species.

There is no closure activities planned for the box cut area during the period of this MOP.

3.4.9 Rejects and Overburden Emplacement Areas Rehabilitation

Existing waste emplacement areas at United are three overburden emplacements (Box Cut Dump, West Open Cut Dump and the East Open Cut Dump), the coarse rejects emplacement area (REA) and the tailings storage facility (Tailings Dam 1 and 2) (refer to **Plan 2**). At the commencement of this MOP term the overburden emplacement areas and REA have previously been rehabilitated. Rehabilitation has not yet commenced at the tailings dams.

Tailings

Since tailings emplacement ceased in 2010, Tailings Dams 1 and 2 have been managed to permit desiccation until the commencement of rehabilitation. Further desiccation is required through this MOP term prior to capping and rehabilitating the tailings emplacement area. United actively monitor the tailing dams following rain events and decant the dams as required to progress desiccation of the tailings.

During this MOP term monitoring will continue at the tailings dams in accordance with the requirements of the Dam Safety Committee Guidance Sheet DSC3F (DSC, 2012) and conditions of the Emplacement Area 2, Cell 1 Section 126 Approval (2005). Monitoring requirements are documented in the approved Tailings and Reject Management Plan. Tailings dam monitoring inspections to be undertaken during this MOP period will include:

- Regular Routine Visual Inspections conducted by a suitably trained delegate;
- Annual Intermediate Surveillance Inspections conducted by suitably qualified and experienced dam engineers;
- Comprehensive Surveillance Inspections undertaken every five years by suitably qualified and experienced dam engineers and relevant specialists to verify the safety of the dam; and
- Independent Inspections, undertaken every three years by independent engineers to assess the tailings holdings structures in accordance with **Resources Regulator** requirements.

United has prepared a [Conceptual Closure Strategy for Tailings Dam \(ATC Williams 2017\)](#). The Strategy provides details on the capping processes for two scenarios: the United Wambo Project is approved; and the Project does not proceed. The capping of the tailings will be undertaken by 2024 as identified by Scenario 1 of the Strategy, regardless whether the Project receives approval or not. The Dewatering Management Plan that has been implemented by United will be maintained until an appropriate cap has been developed. Further studies regarding the strength of tailings at depth will be carried out to achieve a suitable cap by 2024.

Key aspects of the final rehabilitation of Tailings Dams 1 and 2 are:

- The final rehabilitated landform will be constructed in accordance with **Resources Regulator** guidelines. The final grade of the capped tailings dams will vary between 0.5% to 1.5% and would generally slope to the north and north east, where surface water runoff will be conveyed to Dam 6 via a defined flow path (refer to Plan 4).
- Outer batters of the existing tailings dam wall and adjacent Wambo overburden emplacement will be shaped to a maximum 10 degree slope. It is proposed to rehabilitate the capped tailings storage area and reshaped batters with perennial pasture species to minimise potential for the capping to be breached, and integrate with the Wambo final landform. Preliminary completion criteria for the Rejects and Tailings Emplacement Area domain are documented in **Section 6**.
- The capping and rehabilitation profile of the emplacement area shall be in accordance with the 1998 Section 126 Approval and the 2002 EA :
 - 1.5 m of compact coarse rejects;
 - 1m of inert borrow material (clay/select weathered rock); and
 - 150 mm of topsoil on suitable topdressing medium.

Overburden Emplacement Areas

The three existing overburden emplacement areas have been previously rehabilitated with woodland native vegetation (refer to **Plan 2**). During this MOP term rehabilitation monitoring and maintenance activities (as required) will continue at the overburden emplacement areas. Rehabilitation monitoring results indicate variable rehabilitation success at the overburden emplacement areas that is suspected to be the result of capping material chemical and structural deficiencies. Additional material characterisation was completed for the United EIS (2016), with this information to be reviewed for future rehabilitation and maintenance.

4 POST MINING LAND USE

4.1 Regulatory Requirements for Rehabilitation

A summary of all known regulatory requirements for post mining land use and rehabilitation at United are listed in **Table 9**. This list includes commitments that were included in some of the early approval documentation that may have been superseded by subsequent modifications of the Development Approval.

Table 9 Regulatory Requirements for Rehabilitation and Post Mining land Use

Condition / Commitment	Requirement	Area
EIS / EA Commitments		
2002 EA (Section 5.8)	United will undertake capping of the rejects emplacement area in accordance with DMR requirements. Current requirements contained in the 1998 Section 126 approval are: <ul style="list-style-type: none"> • 1.5 m thickness of compacted coarse CWR; • m thickness inert borrow material (being clay/select weathered rock); and • 150 mm thickness of topsoil on suitable topdressing medium. 	Reject Emplacement Area
2002 EA (Section 5.10)	United's landuse objective for CCL775 which United has surface control over, is to create and maintain a stable, erosion free landform, so that on cessation of mining activities the land can be fully utilised for grazing purposes.	Entire Site
2002 EA (Section 5.10)	Rehabilitation will be in accordance with DMR and taking into account the <i>"Synoptic Plan-Integrated Landscape for Coal Mine Rehabilitation in the Hunter Valley of NSW"</i> .	Entire Site
2002 EA (Section 5.11)	At the completion of mining, the remaining emplacement area will be profiled to final shape and rehabilitated. All runoff from rehabilitated areas will be excluded from the dirty water areas, and after passing through purpose designed sediment control structures, will be released into existing (clean water) drainage channels.	Emplacement Areas
2002 EA (Section 9.2.2)	Once mining is complete, the underground access will be blasted and dozed in, to a form a stable, safe, revegetated depression. Alternatively, if required at the time of abandonment and subsequent to any necessary investigation, the void may be offered as a land fill or washery reject site.	Underground Access
2003 SEE Mod 1 (Section 3.3.3.2)	Slurry from the CHPP is pumped to the reject emplacement area where it is emplaced in prepared cells. As each tailings cell is filled, it is covered with coarse reject material, capped with overburden and rehabilitated.	Emplacement Areas
2005 SEE Mod 2 (Section 6.2.1)	The pipeline and flare infrastructure is also temporary infrastructure and will be removed and the area rehabilitated once underground mining operations cease.	Infrastructure Areas
2005 SEE Mod 2 (Section 6.2.1)	Due to the minimal disturbance required for the establishment of this infrastructure, all affected land not disturbed by subsequent open cut mining will be readily rehabilitated to its existing agricultural suitability.	Infrastructure Areas
2005 SEE Mod 3 (Section 5.2.2)	Once mining operations cease the haul road will be removed and the area rehabilitated as part of the decommissioning process, with the project therefore unlikely to have any long term impact on land capability.	Haul Road
2005 SEE Mod 3 (Section 5.12)	The proposed internal haul road will be used for the duration of United's mining operations and will then be decommissioned and rehabilitated as part of the closure of United's operations.	Haul Road

Condition / Commitment	Requirement	Area
2005 SEE Mod 3 (Section 5.12)	The current decommissioning plan for United identifies a post-mining land use of grazing combined with areas of native vegetation. The majority of the area disturbed for construction of the internal haul road will be returned to native vegetation, with the aim of re-establishing the pre-disturbance communities.	Haul Road
2007 SEE Mod 6 (Section 5)	The [haul road] site will be integrated into United's existing mine closure plan and rehabilitated in accordance with DPI requirements.	Haul Road
2008 SEE Mod 5 (Section 4.6.4)	The [gas drainage] sites are sealed and rehabilitated once they are removed as per DPI-MR requirements.	Gas drainage sites
2008 SEE Mod 5 (Section 5.10)	It is anticipated that there may be some surface cracking due to subsidence, which may require surface rehabilitation works. This modification application is therefore also seeking approval for these rehabilitation works, such as re-grading to seal cracks, prevent ponding and realignment of drainage lines.	Underground Mining Areas
2008 SEE Mod 5 (Section 6.14)	In accordance with the approved Mining Operations Plan (MOP) and DPI-MR procedures, the post mining rehabilitation will restore the ground topography and soils to substantially the pre-mining conditions and will include the rehabilitation of the site in accordance with the United Mine Closure Plan (GSSE, 2007). The potential post mining land uses are described in the United Mine Closure Plan. The Study Area is currently planned to be retained as Bushland post mining.	Entire Site
2009 EA Mod 8 (Section 3.8)	Any rehabilitation required within United's surface Lease boundary will be undertaken by United.	Entire Site
2009 EA Mod 8 (Section 3.8)	Any rehabilitation required within Wambo's lease area will be undertaken by Wambo in consultation with United as set out in commercial agreements between the two operations.	Wambo Lease
2009 EA Mod 8 (Section 6.14)	The current final land use plan for the site is the establishment of native vegetation areas over disturbed areas at United, as illustrated in Figure 6.4.	Entire Site
Development Consent DA-410-11-2002i		
DA-410-11-2002-i Condition 9	The applicant shall ensure that all demolition work is carried out in accordance with AS2601-2001: The Demolition of Structures or its latest version.	Infrastructure Areas
DA-410-11-2002-i Condition 45	The applicant shall establish at least 18.5 hectares of compensatory habitat on the surface colliery holding to the satisfaction of the Director-General.	Compensatory Habitat Area
Consolidated Coal Lease 775		
CC 775 Condition 7	The registered holder shall comply with any direction given, or which may be given by the District Inspector Coal Mines regarding the stabilisation and revegetation of any dumps of coal, minerals, mine residues, tailings or overburden, situated on the subject area.	Emplacement Areas
CCL 775 Condition 11	Subject to any specific condition of this concession providing for rehabilitation of any particular part of the subject area affected by mining or activities associated therewith, the registered holder shall: <ul style="list-style-type: none"> Reinstate, level, regrass, reforest and contour to the satisfaction of the Minister, any part of the subject area that may, in the opinion of the Minister have been damaged or deleteriously affected by mining operations and ensure such areas are permanently stabilised, and Fill in, seal or fence, to the satisfaction of the Minister, any excavation within the subject area. 	Entire Site

Condition / Commitment	Requirement	Area
CCL 775 Condition 13	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this concession or any renewal thereof, the registered holder shall remove from such surface such buildings machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Entire Site
CCL 775 Condition 16	The registered holder shall provide and maintain to the satisfaction of the Minister efficient means to prevent contamination, pollution, erosion or siltation of any stream or watercourse or catchment area or any undue interference to fish or their environment and shall observe any instruction given or which may be given by the Minister with a view to preventing or minimising the contamination, pollution, erosion or siltation of any stream, watercourse or catchment area, or any undue interference to fish or their environment.	Entire Site
CCL 775 Condition 18	The registered holder shall plant such grasses, trees or shrubs or such other vegetation as may be required by the Minister and care for same during the currency of this concession or any renewal thereof to the satisfaction of the Minister.	Entire Site
CCL 775 Condition 20	The registered holder shall cover with topdressing material, to the Ministers satisfaction, such parts of the subject area as may be stipulated by the Minister and shall plant and maintain, to the Ministers satisfaction, such grasses, trees or shrubs or such other vegetation as may be required by the Minister.	Entire Site
CCL 775 Condition 22	The registered holder shall conduct operations in such a manner as not to cause or aggravate soil erosion and the registered holder shall observe and perform any instructions given or which may be given by the Minister with a view to minimising or preventing soil erosion.	Entire Site
CCL 775 Condition 23	The registered holder shall ensure that any topsoil or other material suitable for topdressing purposes which may be disturbed during operations shall be removed separately for replacement as far as may be practicable and the registered holder shall plant or sow such grasses, shrubs or trees in the replaced surface materials as may be considered necessary by the Minister to control or prevent soil erosion.	Entire Site
CCL 775 Condition 24	In the event of any excavations being made the registered holder shall ensure that such are refilled and the topsoil previously removed is replaced and levelled. All such refilling and levelling shall be done to the satisfaction of the Minister.	Entire Site
CCL 775 Condition 25	The registered holder shall ensure that the runoff from any disturbed area including the overflow from any depression or ponded area is discharged in such a manner that it will not cause erosion.	Entire Site
Tailings Dam Approvals		
1998 Section 126 Approval Condition 4	The capping and rehabilitation profile of the emplacement area shall be: <ul style="list-style-type: none">• 1.5 m of compact coarse rejects;• 1m of inert borrow material (clay/select weathered rock); and• 150 mm of topsoil on suitable topdressing medium.	Emplacement Area
2008 Section 100 Approval Condition 4	Rehabilitation of the site will be commensurate with the objectives of the accepted Mining Operations Plan.	
2005 Section 126 Approval Condition (e)	Section 127 of the Coal Mines Regulation Act, 1982 is required to be complied with. This application will address decommissioning activities over “Emplacement Area 1”	
Prescribed Dams		

Condition / Commitment	Requirement	Area
Tailings Dam 2	Submit a 'notice of intention to design or modify a dam' supported by details of the proposed filling and capping techniques to the Dams Safety Committee for review and comment prior to the commencement of work. Following completion of the filling and capping of the dam, submit an application to the Dams Safety Committee to de-list the dams as 'prescribed' under Schedule 1 of the Dams Safety Act 1978. The application will require an 'as-constructed' drawing prepared by a suitably qualified engineer, which demonstrates that the dam has been adequately decommissioned and that it no longer constitutes a dam.	Prior to decommissioning Tailings Dam 2

4.2 Post-Mining Land Use Goal

A post mining land use options assessment was undertaken by Umwelt in 2009, which considered a number of options for the site, including:

- Future mining;
- Open Bushland/Conservation or Biobanking;
- Conservation of Aboriginal/European heritage;
- Industrial Development;
- Rural Land Use;
- Recreational; and
- Energy Production/Methane Gas Utilisation.

The current post mining land use goal for United is to progressively return areas disturbed by mining to a combination of native woodland and pasture. The aim of rehabilitation is to:

- Provide ecological linkage to adjacent remnant woodland areas and rehabilitation areas at adjacent mining operations;
- Establish a sustainable grazing post mining land use on areas disturbed for rejects and tailings emplacement;
- Retain and enhance the rural land capability of grazing areas on the Redbank Creek floodplain; and
- Provide for the long term protection and management of the Compensatory Habitat Management Area.

A conceptual final landform design and rehabilitation plan which details land use is shown on **Plan 4**.

4.3 Rehabilitation Objectives

The preliminary closure goal for United is to return mine disturbed areas predominantly to native woodland with the aim of providing enhanced ecological linkages to adjacent operations and remnant woodland areas. The rehabilitated emplacement areas on site will be rehabilitated as sustainable grazing areas in accordance with the United EIS (HLA 2002).

At final closure the box cut highwalls are proposed to be blasted and/or dozed to achieve geotechnically stable grades and the void partially backfilled with inert materials sourced from infrastructure areas. The final void design will be prepared by a geotechnical consultant.

Current rehabilitation objectives at United are provided in **Table 10**. Several of these rehabilitation objectives were covered by the previous Mine Closure Plan, however this has been superseded by this MOP. Rehabilitation objectives specific to primary domains and final land use land units (secondary domains) are discussed in **Section 5.2**.

Table 10 Rehabilitation Objectives

Feature	Objective	Source
Decommissioning and demolition	All on site built infrastructure is decommissioned and removed from site.	This MOP (Covered by previous Mine Closure Plan)
	All remote surface infrastructure (i.e. on Wambo owned land) is removed and any associated surface disturbance is rehabilitated to the satisfaction of Wambo.	This MOP
	Surface layers are to be free of any hazardous materials.	This MOP
Landform	The reject emplacement area will be progressively reshaped to form a stable, non-eroding landform with self-sustaining vegetation cover.	This MOP
	Rehabilitated slopes are generally less than 10 degrees with a maximum of 14 degrees (subject to Resources Regulator approval)	This MOP
	Undertake earth works to ensure site is stable and free draining to local watercourses	This MOP
	Final void highwalls and low walls will be re-profiled in accordance with geotechnical assessment to grades that will achieve long term stability.	This MOP
	Tailings emplacement areas will be rehabilitated to a free draining landform varying in longitudinal grade from 0.5 to 10 degrees	This MOP
Erosion and Sediment Control	Contour banks will be stable and there is no evidence of overtopping or significant scouring as a result of runoff	This MOP
	Erosion does not present a safety hazard or compromise the post mining land capability	This MOP
Growth Media Development	Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer)	This MOP
	Soil pH to be in the range of analogue sites after 5 years	This MOP
	Topsoil or a suitable alternative has been spread uniformly over rehabilitation areas at an appropriate depth for the final land use.	This MOP
Surface Water	Runoff water quality from rehabilitation areas is within the range of water quality data recorded from analogue sites and does not pose a threat to downstream water quality	This MOP
	Reduce the capacity of Dam 1 and re-establish flows to Redbank Creek.	This MOP
Bushfire Management	Appropriate bushfire hazard controls have been implemented on the advice from the NSW Rural Fire Service	This MOP
Heritage	Potential items of European or Aboriginal Heritage will be managed in accordance with the approved heritage management plans for United.	This MOP

Feature	Objective	Source
Vegetation Communities	Woodland rehabilitated areas provide a range of vegetation structural habitats (e.g. eucalypts, shrubs, ground cover, developing litter layer etc.)	This MOP
	More than 75% of trees are healthy and growing as indicated by long term rehabilitation monitoring	This MOP
	Retained vegetation is managed to improve condition and existing flora and fauna habitat values	This MOP
	Woodland rehabilitation areas contain an appropriate diversity of flora species that are comparable to native vegetation community	This MOP
	Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites	This MOP
	There are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum	This MOP
Sustainable grazing	Rejects and tailings emplacement areas will be rehabilitated to a sustainable grazing final land use	This MOP

5 REHABILITATION PLANNING AND MANAGEMENT

5.1 Domain Selection

Primary and secondary domains have been defined in accordance with the methodology prescribed in ESG3 (Resources Regulator 2013). Primary domains are discussed in **Section 2.1** and depicted on **Plan 2 and 3**.

Secondary Domains are land management units with similar post mining land use objectives, such as woodland communities and native grasslands. Secondary domains at the commencement of the MOP are shown in **Plan 2**, and are listed in **Table 11**.

As outlined in **Section 2.1** it is anticipated that primary domains will require a different rehabilitation methodology to achieve the intended post mining land use. Accordingly, domains for United have been defined considering the operational function and specific final land use objectives. The United colliery holding area has been divided up into seven primary domains and five secondary domains. These are shown in **Plan 3**. Domains cover areas that have a like rehabilitation outcome and closure criteria.

Table 11 United Secondary Domains

Domain	Description	Code
Rehabilitation - Woodland	Areas to be rehabilitated with woodland species commensurate with adjacent remnant vegetation. Includes rehabilitation to be undertaken on some existing infrastructure areas, and the overburden emplacement areas.	A
Compensatory Habitat Area	The current compensatory habitat area will remain in place following mine closure.	B
Rehabilitation – Sustainable Grazing	Areas to be rehabilitated to an appropriate land capability to sustain grazing. The domain will be rehabilitated with a mix of pasture species and coincides with the rejects and tailings emplacement area.	C
Final Void	A single void will exist in the final landform at the location of the current box cut. The void will be blasted or dozed to a suitable slope, partially backfilled and will be rehabilitated with woodland species.	D
Water Management Area	Various dams and surface water management structures to be retained in the final landform as farm dams and to provide fauna water resources.	E

5.2 Domain Rehabilitation Objectives

Rehabilitation Domains require specific management objectives to realise the desired final land use outcome due to the distinct geophysical features associated with the current land function. Domain specific rehabilitation objectives are listed in **Table 12**.

Table 12 Preliminary Domain Rehabilitation Objectives

Domain	Rehabilitation Objectives
Primary Domains	
Domain 1 Infrastructure	<p>All surface infrastructure and services will be removed prior to closure.</p> <p>All hazardous and/or contaminated materials will be identified and removed or appropriately remediated.</p> <p>Disturbed areas will be re-graded to produce free draining landforms.</p> <p>Drainage structures will be designed and constructed where required in accordance with Blue Book requirements.</p> <p>Infrastructure areas will be rehabilitated with native woodland species compatible with analogue vegetation communities.</p>
Domain 2 Rejects and Tailings Emplacement Area	<p>All hazardous materials and contaminated materials will be identified and removed or appropriately remediated.</p> <p>All tailings pumping infrastructure will be removed prior to closure.</p> <p>The tailings dam will be backfilled, capped and rehabilitated to produce a geotechnically stable, free draining landform that integrates with the adjacent Wambo final landform.</p> <p>The tailings dam will be backfilled and capped with at least:</p> <ul style="list-style-type: none"> • 1.5 m of compact coarse rejects; • 1 m of inert borrow material (clay/select weathered rock); and • 150 mm of topsoil or suitable topdressing medium (unless otherwise agreed following geotechnical assessments and detailed capping design). <p>The tailings and coarse rejects capping will be designed and constructed to minimise the potential for AMD or spontaneous combustion.</p> <p>The rejects and tailings emplacement area will be rehabilitated with perennial pasture species, comparable to analogue sites.</p>
Domain 3 Water Management Area	<p>Clean water will be diverted around operational areas, where practical.</p> <p>Mine water and sediment laden (dirty) water runoff from disturbance areas will be captured and diverted to mine water and dirty water dams.</p> <p>Mine water and dirty water will be preferentially used for operational requirements such as dust suppression and earthworks.</p> <p>No mine water will be discharged from site.</p> <p>Water management structures will be designed and constructed prior to disturbance, in accordance with Best Practice and “the Blue Book”.</p> <p>Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is similar to comparable undisturbed landforms.</p>
Domain 4 Box Cut	<p>All hazardous materials and contaminated materials will be identified and removed or appropriately remediated.</p> <p>The final void will be minimised by backfilling the box cut with inert demolition waste.</p> <p>The box cut high walls and low walls will be blasted and /or dozed (if required) to produce a geotechnically stable landform in accordance with the approved Final Void Design.</p> <p>Any final void remaining will be made safe with perimeter bunds and fencing.</p> <p>The box cut will be rehabilitated with native woodland species consistent with analogue vegetation communities.</p>

Domain	Rehabilitation Objectives
Domain 5 Overburden Emplacement Area	<p>Post mining landforms will be geotechnically stable, non-polluting and compatible with the surrounding landscape.</p> <p>Overburden emplacement areas will be adequately drained and incorporate drainage structures designed and constructed in accordance with “the Blue Book” to minimise erosion.</p> <p>Overburden emplacement areas will be rehabilitated with native woodland species consistent with analogue vegetation communities.</p> <p>Outer batters of overburden emplacement areas will generally be constructed to a maximum of 10 degrees and no more than 14 degrees unless otherwise approved.</p>
Domain 6 Subsidence Management Area	<p>All surface cracks due to subsidence will be identified and remediated appropriately.</p> <p>Subsidence features will be remediated to seal cracks and re-grade depressions (where required) to minimise localised ponding and long term impacts to catchment areas.</p>
Domain 7 Compensatory Habitat Area	<p>18.5 hectares of remnant vegetation will be managed to preserve and enhance biodiversity value.</p> <p>Eroded and unstable drainage lines within the Compensatory Habitat Area will be remediated.</p>
Secondary Domains	
Domain A - Rehabilitation Area – Woodland	<p>Approximately 89.7 hectares of open woodland will be established on areas disturbed by mining at closure.</p> <p>Domain A species composition will be compatible with adjacent undisturbed remnant vegetation communities.</p> <p>Woodland Rehabilitation Areas will contribute to habitat linkage objectives of the ‘Synoptic Plan’ by linking with native vegetation rehabilitation at Wambo and HVO (where appropriate), and remnant native vegetation to produce east-west habitat corridors.</p> <p>All completion criteria have been met.</p>
Domain B – Compensatory Habitat Area	<p>At least 18.5 hectares of remnant native vegetation will be retained in the Compensatory Habitat Area to compensate for native fauna habitat disturbed by the project.</p>
Domain C – Rehabilitation Area – Pasture	<p>Approximately 57.9 ha of perennial pasture will be established on areas disturbed by mining at closure.</p> <p>Pasture rehabilitation areas will be consistent with Land Capability Class VI land, capable of supporting sustainable grazing.</p> <p>Pasture rehabilitation areas will be top-dressed with appropriate topsoil (or topsoil substitutes), rock raked and ameliorated to produce a growing media with properties capable of sustaining pasture growth.</p> <p>Pasture areas are vegetated with a mix of native and exotic perennial pasture species.</p> <p>Management inputs required to sustain grazing will not be significantly greater than analogue sites.</p> <p>All completion criteria have been met.</p>
Domain D - Final Void	<p>The final void will be safe, stable and non-polluting.</p> <p>The final void highwalls will be blasted and/or dozed to be geotechnically stable in accordance with an approved final void design.</p> <p>Surface water inflows to the final void will be managed through appropriate landform design to minimise long term surface water impacts and erosion.</p> <p>Native vegetation will be established in the final void, comparable to analogue sites.</p> <p>All completion criteria have been met.</p>

Domain	Rehabilitation Objectives
Domain E - Water Management Area	<p>The final landform drainage will integrate with the surrounding catchments and will achieve long term geomorphic stability and minimise erosion.</p> <p>Sediment dams identified for retention in the final landform will be decontaminated and preserved as clean water farm dams or water sources for native fauna.</p> <p>The spillway of Dam 1 will be lowered to re-establish flows in Redbank Creek and reduce the footprint of Dam 1.</p> <p>Disturbed areas of the Redbank Creek banks and bed associated with the Dam 1 spillway will be rehabilitated with riparian species to enhance channel stability and riparian habitat.</p> <p>All completion criteria have been met.</p>

5.3 Rehabilitation Phases

The ultimate rehabilitation and closure objective for United is to create stable, non-polluting post mining landforms that allow the achievement of the post mining land use. This will be achieved through a series of conceptual stages which are described in **Table 13**.

Table 13 Rehabilitation Phases

Phase	Description
Phase 1: Decommissioning	The process of removing infrastructure, hardstands, plant, equipment, buildings and other structures and all contaminated and hazardous materials.
Phase 2: Landform Establishment	The process of shaping unformed rock or other sub-stratum material into a desired land surface profile including final landform drainage features. This phase includes substrate material characterisation, hazardous material encapsulation and earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics.
Phase 3: Growth Medium Development	The process of establishing and enhancing the physical structure, chemical properties and biological properties of a soil stratum suitable for plant growth. This includes placing and spreading soil and applying ameliorants.
Phase 4: Ecosystem and Land Use Establishment	The process of seeding, planting and transplanting plant species. Incorporates management actions such as weed and feral pest control to achieve species establishment and growth to juvenile communities, and habitat augmentation.
Phase 5: Ecosystem and Land Use Sustainability	The process of applying management techniques to encourage an ecosystem to grow and develop towards a desired and sustainable post mining land use outcome. Incorporates features including species reproduction, nutrient recycling and community structure.
Phase 6: Land Relinquishment	Completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

The status of current rehabilitation areas associated with the overburden emplacement areas and rehabilitated portions of the REA are in Phase 5 – Ecosystem and Land Use Sustainability. No surface infrastructure decommissioning or additional rehabilitation is proposed during the MOP term. Subsequently the status of rehabilitation is not anticipated to change during the MOP term. In agreement with the **Resources Regulator** during preparation of the previous MOP, the status of rehabilitation can be depicted on a single plan (**Plan 3**) rather than the standard series of annual plans for the MOP term.

Indicators and completion criteria for each rehabilitation phase and domain are provided in **Section 6**. Activities associated with ongoing maintenance and monitoring of existing rehabilitation areas are discussed in **Section 8.1**.

Table 14 below provides a summary of the completed phases for each domain at the end of the MOP period.

Table 14 Summary of Rehabilitation Phase Completion in the MOP Term

Domain Rehabilitation Phase	Infrastructure Area/ Rehabilitation – Woodland – 1A	Water Management Area/ Rehabilitation – Woodland – 3A	Overburden Emplacement Area/ Rehabilitation – Woodland – 5A	Compensatory Habitat Area/Compensatory Habitat Area – 7B	Rejects and Tailings Emplacement Area /Rehabilitation – Pasture – 2C	Subsidence Management Area/Rehabilitation – Pasture 6C	Box Cut/Final Void – 4D	Water Management Area/Water Management Area – 3E
Active	✓	✓	✗	NA	✓	✓	✓	✓
Phase 1 – Decommissioning	✗	✗	✓	NA	✗	✗	✗	✗
Phase 2 – Landform Establishment	✗	✗	✓	NA	✗	✗	✗	✗
Phase 3 – Growing Media Development	✗	✗	✓	NA	✗	✗	✗	✗
Phase 4 – Ecosystem and Landuse Establishment	✗	✗	✓	✓	✗	✗	✗	✗
Phase 5 – Ecosystem and Landuse Sustainability	✗	✗	✓	✓	✗	✗	✗	✗
Phase 6 – Rehabilitation Complete	✗	✗	✗	✗	✗	✗	✗	✗

6 PERFORMANCE INDICATORS AND COMPLETION CRITERIA

6.1 Preliminary Rehabilitation and Closure Criteria

The following tables present preliminary rehabilitation indicators and closure criteria that must be met to demonstrate that the rehabilitation objectives for each domain have been achieved. United will demonstrate achievement of all completion criteria for each phase of rehabilitation prior to seeking relinquishment.

These criteria will be reviewed in the United detailed mine closure planning process to be undertaken in the MOP term (refer to **Section 2.3**). Indicators and completion criteria may also be further refined in response to rehabilitation and biodiversity monitoring events, outcomes of rehabilitation trials, and review of baseline data from analogue sites (refer to **Section 8.2.2**). There has been no change to the proposed criteria in **Section 6** from the previously approved MOP.

Previous to this MOP there was a separate Mine Closure Plan for United, however this became superseded and replaced by the MOP on 4 December 2015. The DP&E approved the rationalising of several management plans, with these management plans outlined in **Section 3.2** of this MOP. References to the now superseded Mine Closure Plan, have now been updated as 'This MOP'.

Therefore key commitments from the former Mine Closure Plan have been covered in this MOP.

Table 15 Phase 1 – Decommissioning Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
Domain 1 - Infrastructure Area						
Removal of all surface infrastructure.	Demolition of infrastructure	All demolition work has been carried out in accordance <i>with AS2601-2001: The Demolition of Structures</i> or its latest version.	DA-410-11-2002-i Condition 9	No	Not commenced.	Not commenced.
	Removal of infrastructure at the Pit Top	All surface infrastructure that is not required as part of the post-mining land use has been demolished and removed from the site (including shafts, buildings and fixed plant, conveyors, open drains, sewage treatment plant, light and heavy vehicle wash pads, ROM and product stockpiles, bitumen car parks, explosive magazines, fuel farm and waste oil/lubricant storage areas, pipelines, subsidence monitoring pegs and all wastes).	This MOP (previously in now superseded Mine Closure Plan) and CCL775 Condition 13	No	Not commenced.	Not commenced.
	Disconnect Services	All site services have been removed (electricity, telecommunications etc.).	This MOP	No	Not commenced	Not commenced
	Removal of gas drainage pipelines and flares	All gas drainage and flare infrastructure has been removed as per Resources Regulator requirements.	This MOP 2005 SEE Mod 2, Section 6.2.1 and 2008 SEE Mod 5 Section 4.6.4.	No	Borehole has been sealed, but infrastructure remains.	Borehole has been sealed, but infrastructure remains.
	Removal of exploration infrastructure	All drill holes (and excavations that remain abandoned from previous mining or exploration), have been backfilled and sealed in accordance with <i>EDG01 – Borehole Sealing Requirements on Land</i> .	<i>EDG01 – Borehole Sealing Requirements on Land</i>	No	Not complete.	Not complete
All hazardous and contaminated materials area appropriately	Carbonaceous Material	All carbonaceous material has been removed from the footprint of the ROM and product stockpile areas and disposed of in the void.	This MOP	No	Not commenced	Not commenced
		The surface is free of any hazardous materials (e.g. petroleum, chemicals and explosive products).	This MOP	No	Commenced	Not complete

Domain Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
removed or remediated.	Removal of hazardous materials	A contamination assessment has been undertaken and any contaminated areas have been remediated.	This MOP	No	Commenced	Not complete
	Removal of roads and tracks	The internal haul road, roadways around the CHPP, and any other bitumen roads have been removed.	This MOP 2005 SEE Mod 3 Section 5.2.2, and CCL775 Condition 27	No	Active	Active
Domain 2 - Rejects and Tailings Emplacement Area						
No proposed decommissioning activities in the rejects and tailings emplacement area.						
Domain 3 – Water Management Area						
Mine water dams and sediment dams are decontaminated prior to removal or re-use as clean water dams in the final landform.	Removal of hazardous materials	Sediments accumulated in mine water and sediment dams is removed from the dam floor and emplaced in the final void.	This MOP	No	Active	Active
	Removal of water management structures not required in final landform	All water management structures that are not required as part of the post-closure land use have been demolished and removed from the site. All pumps and associated infrastructure is decommissioned and removed from site.	This MOP CCL775 Condition 13	No	Active	Active
Domain 4 – Box Cut						
The portal entry is sealed.	Seal portal entry	The portal entry has been sealed in accordance with Resources Regulator guidelines and the Mine Sealing Plan.	MOP Section 2.3	Yes	Portal has been sealed (complete)	Portal has been sealed (complete)
Domain 5 – Overburden Emplacement Area						
No proposed decommissioning activities in existing overburden emplacement areas.						
Domain 7 – Compensatory Habitat Area						
No proposed decommissioning activities in the Compensatory Habitat Area.						

Table 16 Phase 2 – Landform Establishment

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Com plete (Yes/ No)	Progress at start of MOP	Progress at end of MOP
Domain 1 - Infrastructure Area						
	Slopes	All rehabilitated slopes are less than 10 degrees (or are between 10 and 14 degrees with Resources Regulator approval).	This MOP. Consistent with other Glencore operations.	No	Operations ongoing	Operations ongoing
	Stability	Earth works have been undertaken and the site is assessed to be geotechnically stable and free draining to local watercourses.	This MOP CCL775 Condition 11a	No	Operations ongoing	Operations ongoing
	Landform compatible with final land use	All excavations have been filled in or sealed.	CCL775 Condition 11b	No	Operations ongoing	Operations ongoing
		Exploration areas have been shaped to a stable and permanent form suitable for post mining land use.	EDG01 – Borehole Sealing Requirements on Land	No	Operations ongoing	Operations ongoing
Domain 2 - Rejects and Tailings Emplacement Area						
Final landforms are safe, stable, non-polluting and free-draining.	Cap tailings emplacement area	The rejects emplacement area has been capped in accordance with Resources Regulator requirements, with at least: <ul style="list-style-type: none">1.5 m of compacted coarse waste rejects1.0 m inert material (being clay/select weathered rock) unless otherwise approved by the Resources Regulator.	2002 EA (Section 5.8)	No	Operations ongoing	Operations ongoing
	Slopes	The final rehabilitated landform has longitudinal grades up to 10 degrees unless otherwise approved by the Resources Regulator.	This MOP. Consistent with other Glencore operations.	No	Operations ongoing	Operations ongoing
	Stability	Earth works have been undertaken to ensure the site is stable and free draining to local watercourses.	This MOP	No	Operations ongoing	Operations ongoing

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Com plete (Yes/ No)	Progress at start of MOP	Progress at end of MOP
	Erosion	There is no evidence of slumping or uncontrolled erosion.	Tailings and Reject Management Plan Section 4.4	No	Operations ongoing	Operations ongoing
		Active erosion is assessed to be minimal.	CCL775 Condition 11	No	Operations ongoing	Operations ongoing
	Spontaneous Combustion	There is no evidence of spontaneous combustion.	This MOP	No	Not commenced	Not completed
	AMD	There is no evidence of AMD generation.	This MOP	No	Not commenced	Not completed
Domain 3 – Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Final landform drainage design	Final landform drainage structures including drains, banks, drop structures and dams (dams 1, 7, 9, 10, 13 and 14) have been designed and constructed in accordance with Blue Book requirements.	DECC 2008 ACARP C13048	No	Not commenced	Not commenced
	Geomorphic stability	Drainage structures are assessed to be stable with no active gully heads, tunnel erosion or bank failure.	DECC 2008 ACARP C13048	No	Not commenced	Not commenced
Domain 4 – Box Cut						
Area to be safe, stable and non-polluting.	Slopes	The box cut highwalls have been blasted and dozed (if required) to geotechnically stable grades in accordance with the approved Final Void Design and Resources Regulator requirements.	This MOP 2002 EA (Section 9.2.2)	No	Operations ongoing	Operations ongoing
	Safety	The final void batters have been assessed by a qualified geotechnical engineer to validate that it is stable and does not pose a safety risk.	This MOP. Consistent with other Glencore operations.	No	Operations ongoing	Operations ongoing
		Underground access portal has been filled in or sealed.	CCL775 Condition 11	No	Operations ongoing	Operations ongoing
Domain 5 – Overburden Emplacement Area						

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Com plete (Yes/ No)	Progress at start of MOP	Progress at end of MOP
Final landforms are safe, stable, non-polluting and free-draining.	Slopes	Rehabilitated slopes are generally less than 10 degrees and not more than 14 degrees without Resources Regulator approval.	This MOP	Yes	Complete	Complete
	Landform Stability	Landforms are assessed to be stable and free draining to local watercourses.	This MOP	Yes	Complete	Complete
	Erosion	There is no evidence of slumping or uncontrolled erosion.	DECC 2008	Yes	Rehabilitation established	Phase 5
		Active erosion is assessed to be minimal.	CCL775 Condition 11	Yes	Rehabilitation established	Phase 5
Domain 6 – Subsidence Management Area						
All subsidence impacts from United workings are rehabilitated.	subsidence cracks	Any surface cracking due to subsidence has been rehabilitated by re-grading to seal cracks.	2008 SEE Mod 5 (Section 5.10)	No	Subsidence remediation complete	Subsidence remediation complete
	Free draining landforms	Drainage lines are restored and there is no evidence of ponding.	2008 SEE Mod 5 (Section 5.10)	No	Subsidence monitoring and remediation ongoing	Subsidence expected to be complete
Domain 7 – Compensatory Habitat Area						
No proposed landform establishment in the Compensatory Habitat Area.						

Table 17 Phase 3 – Growth Medium Development

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains						
Use of topsoil effectively to assist in improved rehabilitation.	Topsoil depth	Topsoil or a suitable alternative has been spread uniformly at the specified depth appropriate for the final land use.	This MOP	No	Commenced	Not Complete
Topsoils are characterised and ameliorated for use in woodland and grazing land uses.	Topsoil characterisation	Topsoils and topsoil substitutes have been tested to assess suitability for post mining land use.	This MOP	No	Commenced	Not Complete
	Amelioration	Appropriate soil ameliorants (e.g. gypsum, fertilisers, mulch) have been applied in accordance with specifications.	This MOP	No	Commenced	Not Complete
Erosion is minimised.	Temporary ESC	Temporary ESCs are installed prior to topsoil re-spreading.	This MOP	No	Commenced	Not Complete
		Topsoiled rehabilitation areas are sown with a non-persistent cover crop at recommended sowing rate / ha.	DECC 2008	No	Commenced	Not Complete
Domain A – Woodland Rehabilitation Areas						
Habitat features are salvaged and re-used in woodland rehabilitation to provide fauna habitat resources.	Habitat features	Habitat features are incorporated into woodland rehabilitation areas (including within watercourses and retained dams) where appropriate.	This MOP	No	Not Commenced	Not Commenced
Domain C – Pasture Rehabilitation Areas						
Pasture rehabilitation areas will be capable of sustainable grazing.	Surface rock density	Surface spoils and soils are rock raked to remove rocks and produce a friable surface.	This MOP	No	Not Commenced	Not Commenced

Table 18 Phase 4 – Ecosystem and Land Use Establishment

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains						
Weeds are controlled on United lands.	Weed presence	There are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum.	This MOP	No	Ongoing	Ongoing
Feral animal pests are controlled on United lands.	Feral animal density	Feral animal pests are controlled in accordance with legislation and the MOP.	This MOP	No	Ongoing	Ongoing
Management measures will be implemented to minimise bushfire risks in rehabilitation areas.	Bushfire risk management	Bushfire mitigation actions including managing fuel loads, maintaining fire-breaks and firefighting access are implemented in accordance with the Bushfire Management Plan.	This MOP	No	Not commenced	Not complete
Erosion does not present a safety hazard or compromise the post mining land capability.	Erosion and Sediment Control	No evidence of significant erosion.	This MOP	No	Commenced	Not Complete
Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer).	Soil Quality	Soil characteristics (pH, EC, ESP is in the range of analogue sites after 5 years.	This MOP	No	Commenced	Not Complete
	Surface cover	Ground cover (vegetation, leaf litter, mulch) greater than 70% at Year 5.	This MOP	No	Commenced	Not Complete
Domain A – Woodland Rehabilitation Areas						
Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community.	Vegetation health	More than 75% of trees are healthy and growing as indicated by rehabilitation monitoring.	This MOP	No	Operations ongoing.	Operations ongoing.
	Species composition	Species diversity for each stratum (canopy, mid storey and ground cover) is comparable to analogue sites at Year 5.	This MOP	No	Commenced	Not Complete
Domain C – Grazing Rehabilitation Areas						
Land capability of grazing areas will be comparable to pre-mining land capability.	Erosion and Sediment Control	No significant erosion is present that constitutes a safety hazard or compromises the capability of the supporting the end land use.	This MOP	No	Commenced	Not Complete

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
	Soil Quality	Soil pH is in the range of analogue sites after 5 years.	This MOP	No	Commenced	Not Complete
	Species composition	A mix of native and exotic perennial pasture species are sown at the recommended rate per hectare in accordance with approved specifications.	This MOP	No	Commenced	Not Complete
Domain E – Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Discharge water quality	Discharge water quality meets EPL 3141 requirements.	EPL 3141	No	Commenced	Not Completed
	Geomorphic stability	Drainage structures are assessed to be stable at Year 10.	DECC 2008 ACARP C13048	No	Not commenced	Not commenced
Domain B – Compensatory Habitat Management Area						
18.5 hectares of native vegetation retained to compensate for habitat disturbed by the project.	Biodiversity values	Retained vegetation is being managed to improve condition and existing flora and fauna habitat values.	This MOP	No	Operations ongoing	Operations ongoing
	Area	18.5 hectares of compensatory habitat have been established on the surface colliery holding to the satisfaction of the Secretary.	DA-410-11-2002-i Condition 45	Yes	Operations ongoing	Operations ongoing

Table 19 Phase 5 – Ecosystem and Land Use Sustainability

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
All Domains						
Weeds are controlled on United lands.	Weed presence	There are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum.	This MOP	No	Ongoing	Ongoing
Feral animal pests are controlled on United lands.	Feral animal density	Feral animal pests are controlled in accordance with legislation and the MOP.	This MOP	No	Ongoing	Ongoing
Management measures will be implemented to minimise bushfire risks in rehabilitation areas.	Bushfire risk management	Bushfire mitigation actions including managing fuel loads, maintaining fire-breaks and firefighting access are implemented in accordance with the Bushfire Management Plan.	This MOP	No	Not commenced	Not complete
Erosion does not present a safety hazard or compromise the post mining land capability.	Erosion and Sediment Control	Net annual soil loss is comparable to analogue sites at Year 10.	This MOP	No	Commenced	Not Complete
Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer).	Soil Quality	Soil characteristics (pH, EC and ESP) are in the range of analogue sites at Year 10.	This MOP	No	Commenced	Not Complete
	Surface cover	Ground cover (vegetation, leaf litter, mulch) is in the range of analogue sites at Year 10.	This MOP	No	Commenced	Not Complete
Domain A – Woodland Rehabilitation Areas						
Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community.	Vegetation health	More than 75% of trees are healthy and growing as indicated by rehabilitation monitoring.	This MOP	No	Operations ongoing	Operations ongoing
	Species composition	Woodland rehabilitation areas contain an appropriate diversity of flora species for each stratum (canopy, mid-story, ground cover) comparable to analogue sites at Year 10.	This MOP	No	Not commenced	Not complete
		Species diversity for each stratum (canopy, mid storey and ground cover) is comparable to analogue sites at Year 10.	This MOP	No	Operations ongoing.	Operations ongoing.

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
	Reproduction	Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites.	This MOP	No	Operations ongoing	Operations ongoing
Woodland Rehabilitation Areas will contribute to habitat linkage objectives of the 'Synoptic Plan'.	Biodiversity	Woodland rehabilitation area features are compatible with the objectives of the "Synoptic Plan-Integrated Landscape for Coal Mine Rehabilitation in the Hunter Valley of NSW".	2002 EA (Section 5.10)	No	Not commenced	Not complete
		Woodland rehabilitation areas provide a range of structural habitats (e.g. eucalypts, shrubs, ground cover, developing litter layer etc.).	This MOP	No	Not commenced	Not complete
	Native fauna presence	Native fauna species diversity and abundance is trending toward analogue site at Year 10.	This MOP	No	Not commenced	Not complete
Domain C – Grazing Rehabilitation Areas						
Land capability of grazing areas will be comparable to pre-mining land capability.	Erosion and sediment control	No significant erosion is present that constitutes a safety hazard or compromises the capability of the supporting the end land use.	This MOP	No	Commenced	Not Complete
	Species composition	At least 75% of species surveyed are representatives of the specified perennial pasture species mix.	This MOP	No	Commenced	Not Complete
		There is evidence of second generation pasture plants.		No	Commenced	Not Complete
	Land Capability	Grazing areas are assessed to have a Rural Land Capability Class VI or better.	This MOP	No	Commenced	Not Complete
Domain 3 – Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion	Water Quality	Discharge water quality meets EPL 3141 requirements.	EPL 3141	No	Commenced	Not Completed
	Geomorphic stability	Drainage structures are assessed to be stable at Year 10.	DECC 2008 ACARP C13048	No	Not commenced	Not commenced
Domain 7 – Compensatory Habitat Management Area						

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Progress at start of MOP	Progress at end of MOP
18.5 hectares of native vegetation retained to compensate for habitat disturbed by the project.	Biodiversity values	Retained vegetation is being managed to improve condition and existing flora and fauna habitat values.	This MOP	No	Operations ongoing	Operations ongoing
	Area	18.5 hectares of compensatory habitat have been established on the surface colliery holding to the satisfaction of the Secretary.	DA-410-11-2002-i Condition 45	Yes	Operations ongoing	Operations ongoing

7 REHABILITATION IMPLEMENTATION

7.1 Status at MOP Commencement

Table 20 describes the status of each domain at the commencement and end of this MOP period. This information is also presented graphically in **Plan 2** and **Plan 3**. The asset register (**Section 2.3**) provides a summary of the total area and key features of each domain in the MOP period.

Table 20 Rehabilitation Status and Proposed Activities at MOP Commencement

Domain	Status at MOP Commencement	Activities During the MOP term
Primary Domains		
Domain 1 – Infrastructure Area	This domain is currently active. The key surface infrastructure associated with this domain is listed in the Asset Register (Section 2.4)	Surface infrastructure will be retained and maintained during this MOP term. Rehabilitation activities in the MOP term will be associated with rehabilitating temporary short term disturbance for exploration activities as described in Section 2.2.1 .
Domain 2 – Rejects and Tailings Emplacement Area	This domain is currently active.	No rehabilitation of this domain is proposed during the MOP term. Additional studies will be completed in terms of capping.
Domain 3 – Water Management Area	This domain is currently active.	No rehabilitation of this domain is proposed during the MOP term. There will be some changes to water management which are outlined in Section 3.3.2 .
Domain 4 – Box Cut	This domain is currently active. The domain is currently used for water storage.	No rehabilitation of this domain is proposed during the MOP term.
Domain 5 – Overburden Emplacement	At the commencement of the MOP this domain is in Phase 5 of rehabilitation.	During the MOP term rehabilitation monitoring and maintenance activities will continue over these emplacement areas.
Domain 6 – Subsidence Management Area	Subsidence remediation is complete and there is anticipated to be no new subsidence at the site.	No further subsidence is anticipated on the MOP term. Should any further subsidence related cracking be identified during the MOP period, United will rehabilitate the area as soon as practicable.
Domain 7 – Compensatory Habitat Area	At MOP commencement, 18.5 hectares of compensatory habitat have been established at United.	There will be some additional planting completed during the MOP period in the compensatory habitat area.
Secondary Domains		
Domain A – Rehabilitation - Woodland	Rehabilitation of this domain has commenced with the revegetation of approximately 31.2 ha woodland rehabilitation at the open cut overburden dumps.	No additional areas will be rehabilitated with woodland during the MOP term. Rehabilitation monitoring and maintenance will continue at this domain.
Domain B – Compensatory Habitat Area	As per Domain 7.	As per Domain 7.

Domain	Status at MOP Commencement	Activities During the MOP term
Domain C – Rehabilitation - Pasture	Rehabilitation of this domain has commenced with 27.7 ha of pasture established on portions of the REA.	No additional areas will be rehabilitated with pasture during the MOP term. During the MOP term rehabilitation monitoring and maintenance will continue at this domain.
Domain D – Final Void	The box cut is active at the commencement of this MOP.	No rehabilitation of this domain is planned for the MOP term.
Domain E – Water Management Area	Water management structures for the final landform have been constructed on the rehabilitated overburden dumps and rehabilitated portions of the REA.	No further rehabilitation of water management structures or construction of additional structures proposed for the final landform will occur in this MOP term.

7.2 Box Cut Emplacement Rehabilitation Area Remediation Plan

The Box Cut Emplacement Area rehabilitation has been identified as being in poor condition, due to high levels of invasive weed species (particularly African olive (*Olea europaea subsp. cuspidata*), saffron thistle (*Carthamus lanatus*) and galenia (*Galenia pubescens*)), lack of native canopy flora species cover, lack of soil development and lack of habitat structure.

United proposes the following management actions for the current MOP term:

- Continuation of targeted weed control program in Spring 2018 and Autumn 2019. The program will focus on African olive and galenia across the entire rehabilitation area.
- Remediation of identified surface cracking areas (completed in 2019) and ongoing quarterly inspections of all drainage structures.
- Preparation of a detailed Remediation Action Plan for the rehabilitation. This plan will assess and identify key controls to be implemented, including:
 - improvement of soil development, through use of biosolids or other medium, prior to revegetation
 - development of a staged revegetation plan which allows for the development of native canopy species prior to the removal of the non-endemic canopy species sugar gums (*Eucalyptus cladocalyx*) which currently provide some habitat value
 - review of effectiveness of weed control program and assessment of invasive management measures, including scalping of the soil in weed infested areas
 - development of habitat structure, including placement of logs and rocks

The Remediation Action Plan will be developed by the end of the MOP period and submitted to the Resources Regulator.

In the event that the United Project is approved prior to this date, the Plan will not be developed as the Box Cut Emplacement Rehabilitation Area will be mined through by the proposed United Open Cut. Weed management and the remediation of soil cracking and erosion will be continued prior to its disturbance.

7.3 Proposed Rehabilitation Activities during the MOP Term

With the site remaining on care and maintenance, there is no proposed additional rehabilitation during the MOP period.

Where rehabilitation monitoring confirms that the rehabilitation is not successful or is limited, maintenance works will be undertaken. This may include the following:

- Re-seeding and, where necessary the application of specialised rehabilitation treatments to areas with poor vegetation establishment;
- Repair of erosion and sediment control structures within rehabilitation areas; and
- Implementation of weed management program and feral animal program as per **Section 3.3.6** of this MOP.

7.4 Summary of Rehabilitation Areas during the MOP Term

Table 21 outlines the changes in the size of areas of rehabilitation in each domain during the MOP period.

Table 21 Summary of Rehabilitation Proposed during the MOP Period

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)
Infrastructure Area (1)	Rehabilitation – Woodland (A)	1A	Active	38.8	38.8
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem and Land Use Sustainability	0	0
			Land Relinquishment	0	0
			Infrastructure Total	38.8	38.8
Rejects and Tailings Emplacement Area (2)	Rehabilitation – Pasture (C)	2C	Active	24.2	24.2
			Decommissioning	0	0
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment		
			Ecosystem and Land Use Sustainability	27.7	27.7
			Land Relinquishment	0	0
			Rejects and Tailings Emplacement Areas Total	51.9	51.9
Water Management Area (3)	Rehabilitation – Woodland (A)	3A	Active	8.2	8.2
			Decommissioning	0	0
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment		
			Ecosystem and Land Use Sustainability		
			Land Relinquishment		
			Total	8.2	8.2

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)
	Water Management Area (E)	3E	Active	20.2	20.2
			Decommissioning	0	0
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment		
			Ecosystem and Land Use Sustainability		
			Land Relinquishment		
			Total	20.2	20.2
Water Management Area Total:				28.4	28.4
Box Cut (4)	Final Void (D)	4D	Active	2.7	2.7
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem and Land Use Sustainability	0	0
			Land Relinquishment	0	0
			Box Cut Total	2.7	2.7
Overburden Emplacement Area (5)	Rehabilitation – Woodland (A)	5A	Active (Temporary Rehab)	11.1	11.1
			Decommissioning	0	0
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment	31.2	31.2
			Ecosystem and Land Use Sustainability		
			Land Relinquishment	0	0
			Overburden Emplacement Area Total	42.3	42.3
Subsidence Management Area (6)	Rehabilitation – Pasture (C)	6C	Active	56.3	56.3
			Decommissioning	N/A	N/A
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment		
			Ecosystem and Land Use Sustainability		
			Land Relinquishment		
			Subsidence Management Area Total	56.3	56.3
		7B	Active	18.5	18.5

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)
Compensatory Habitat Area (7)	Compensatory Habitat Area (B)		Decommissioning	N/A	N/A
			Landform Establishment		
			Growth Medium Development		
			Ecosystem and Land Use Establishment		
			Ecosystem and Land Use Sustainability		
			Land Relinquishment		
			Compensatory Habitat Area Total	18.5	18.5
TOTAL:				238.9	238.9

7.5 Relinquishment Phase Achieved During the MOP Term

United will continue in a care and maintenance state during the MOP term. It is planned that no final rehabilitation will be undertaken, and consequently no areas are anticipated to meet the required rehabilitation obligations for lease relinquishment.

In the event that future mining options at United are not progressed, the subsequent MOP will detail closure and lease relinquishment activities.

8 REHABILITATION MONITORING AND RESEARCH

8.1 Rehabilitation Monitoring

United has implemented a rehabilitation monitoring program which is undertaken in accordance with Glencore Procedure *11.16 Completion Criteria Development and Rehabilitation Monitoring* procedure. The rehabilitation monitoring program includes indicators and methods that:

- Provide a good indication of the status of the environmental value that the operation aims to protect;
- Are relatively simple to measure and are reproducible; and
- Are cost effective.

Where relevant, the scope of the monitoring program is to cover each phase of the mining operation including:

1. Pre-Mining Baseline Surveys;
2. Active Mining;
3. Rehabilitation; and
4. Post-Rehabilitation.

In accordance with the Glencore Procedure *11.16 Completion Criteria Development and Rehabilitation Monitoring*, United has developed and implemented a specific rehabilitation monitoring program. Rehabilitation monitoring includes a review of rehabilitation activities on previously disturbed land, and activities within the Compensatory Habitat Management Area.

8.1.1 Active Mining Monitoring Records

During active mining operations, United maintained records of processes that had the potential to affect the success of rehabilitation on site. This information provides a valuable baseline for comparison with later rehabilitation monitoring outcomes. Records that are maintained on site include:

- Detailed rehabilitation procedures;
- A register of contaminated sites;
- Records of production wastes and other waste streams including where they are located on site;
- Environmental monitoring records, including surface and groundwater quality;
- A register of topsoil and or soil substitute stockpiles (e.g. biosolids); and
- Environmental incident records.

8.1.2 Records of Rehabilitation

United has recorded the details of each rehabilitation campaign undertaken to date. This information will be retained so that it is available for later interpretation of rehabilitation monitoring results with the aim to continually improve rehabilitation standards on site.

8.1.3 Post Rehabilitation

In accordance with the Glencore procedure *11.16 Completion Criteria Development and Rehabilitation Monitoring* United's approach to post-mining rehabilitation monitoring includes the following:

- Annual Rehabilitation Inspection;
- Long Term Rehabilitation Monitoring; and
- Verification assessment prior to sign-off.

Annual Rehabilitation Inspection

In accordance with Glencore Procedure *11.16 Completion Criteria Development and Rehabilitation Monitoring*, United has implemented an internal annual rehabilitation inspection schedule to evaluate rehabilitation progress. The inspection incorporates existing and recently completed rehabilitation areas at United, and is undertaken by appropriately qualified personnel.

Outcomes of the annual rehabilitation inspection are recorded and any mitigation actions that are identified as part of the inspection are entered into the sites action based reporting tool for implementation. Where necessary, rehabilitation procedures will be amended to improve rehabilitation standards. In the event that rehabilitation failure has occurred, further investigations to establish a cause and appropriate remediation strategy(s) will be undertaken.

It is proposed to continue to undertake these annual rehabilitation inspections during the MOP period.

Long Term Rehabilitation Monitoring

Long term rehabilitation monitoring is undertaken at United to evaluate the success of rehabilitation and United's progress towards fulfilling long term land use objectives. The monitoring program will continue within rehabilitation areas until all rehabilitation closure criteria are satisfied, as well as the requirements of United's joint venture partners and the **Resources Regulator**.

A total of seven permanent monitoring sites have been established throughout United's land holdings to monitor flora, fauna, landscape function and habitat values aimed at assessing ecosystem function in remnant vegetation (including Compensatory Habitat Management Area) and rehabilitation areas. Four sites are located in remnant vegetation and three sites are located in rehabilitated areas. Monitoring of these sites is undertaken on a biennial program, which will be continued throughout the MOP period. Monitoring of these sites assesses:

- Plant community structural attributes;
- Cover, species density, height and structural diversity;
- Species richness (the number of plant species present in each structural layer of each vegetation community);
- The presence and abundance of any weed species; and
- Assessment of natural regeneration/recruitment of new species.

The findings of this monitoring program are used to assist in management recommendations for appropriate rehabilitation works within United holdings. Where necessary, rehabilitation procedures are amended accordingly to continually improve rehabilitation standards.

Verification Assessment Prior to Sign Off

Following a detailed review of the rehabilitation monitoring data, if the United Environment and Community Department considers that the rehabilitation is suitable for sign-off, the following steps will be undertaken:

- A suitably qualified and experienced consultant will be engaged to complete a final rehabilitation inspection and record the findings on the Annual Rehabilitation Inspection Form to determine that all rehabilitation objectives and completion criteria have been met;
- All relevant records, including monitoring and research data, previously completed Rehabilitation Establishment and Methodology Record Forms, Annual Rehabilitation Inspection Forms, and long term rehabilitation monitoring reports will be collated. This information will be used as supporting information as part of a Lease Relinquishment Report, which is to be prepared by United for submission to the **Resources Regulator**;
- A meeting will be arranged with the **Resources Regulator** to discuss any outcomes of its review of the Lease Relinquishment Report in order to identify and address any potentially outstanding issues that may exist; and
- A close-out inspection with the relevant government agencies (e.g. DP&E, **Resources Regulator**, OEH, Council, DPI Water and other relevant stakeholders) will be undertaken to obtain consensus that the necessary requirements have been fulfilled and that no further work is required. As part of the meeting, justification (e.g. rehabilitation monitoring results) as to how closure criteria have been met will be presented to the government agencies.

8.1.4 Post Closure

Following closure of the site, the existing environmental monitoring program as per requirements of the Development Consent (DA410-11-2002i) and EPL 3141 will be maintained until all decommissioning and rehabilitation works have been completed. Notwithstanding this, there may be the need to establish some additional monitoring sites depending on the nature of the decommissioning works and also in response to finding possible sources of pollutants to the environment.

The post closure monitoring and measurement program will be similar to that undertaken during the care and maintenance phase at United. Post closure monitoring will be conducted for up to five years after decommissioning and final rehabilitation has been completed, or until such time as monitoring records demonstrate that the site is no longer contributing, nor has the potential to contribute, pollutants to the surrounding environment, and that rehabilitation has achieved a satisfactory stage of maturity and ground cover.

8.2 Rehabilitation Trials and use of Analogue Sites

8.2.1 Rehabilitation Trials

There are no rehabilitation trials proposed during the MOP period. Rehabilitation monitoring will continue during the MOP period in accordance with **Section 8.1** of the MOP.

8.2.2 Analogue Sites

Glencore Procedure 11.16 *Completion Criteria Development and Rehabilitation Monitoring* requires monitoring within rehabilitation areas to be compared with carefully selected reference sites (analogues) within the surrounding locality. To date, four remnant vegetation monitoring sites have been established and are monitored on a biennial basis. Information from this monitoring is used to determine suitable species within the rehabilitation mix; compare performance of rehabilitated sites and to assist in the development and refinement of closure criteria.

9 INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 Threats to Rehabilitation

Risks associated with rehabilitation at United are outlined in the BBRA (**Section 3.1**) and discussed in **Section 3.4**. The scope of rehabilitation monitoring includes the relevant parameters required to assess the effectiveness of nominated controls for risks to rehabilitation (refer to **Section 3.4**). United has developed a TARP to assess whether these key rehabilitation parameters are trending toward rehabilitation success or failure. The TARP is discussed in **Section 9.2** below.

9.2 Trigger Action Response Plan

This TARP has been developed to provide an initial framework to manage potential key risks to rehabilitation. United will notify **Resources Regulator** and other relevant stakeholders of any incident resulting in major impacts to rehabilitation, with these likely to be identified through rehabilitation monitoring.

The TARP includes:

- Identification of the principal contributing factors and impacts for each major risk to rehabilitation;
- Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and
- Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.

The TARP provides management responses for lower (first tier) and upper (second tier) trigger values. First tier trigger values identify opportunities for closer monitoring or early intervention that may mitigate potential impacts before notable impact to rehabilitation occurs. Second tier trigger values identify when indicators have reached a threshold that requires more substantive or widespread remedial actions to remediate or mitigate rehabilitation failure.

The TARP is provided as **Table 22** and will be reviewed and may be revised as conditions at United change or new risks to rehabilitation are identified. This TARP only covers activities during the care and maintenance phase of the site. If operations were to recommence under the United Project or a decision was made for full closure, then a new MOP would be prepared, with a new TARP developed to reflect the scenario.

Table 22 Rehabilitation TARP (Covering the Site During Care and Maintenance)

Aspect/Category	Key Element	Trigger/Response	1st Level Trigger	2 nd Level Trigger
Landform stability	Slope gradient	Trigger	Slopes >10° but <14°, unless assessed to be stable	Slopes >15°, unless assessed to be stable
		Response	Review Mine Closure Plan and make an assessment of the stability of the landform including material characterisation. Undertake stability enhancement works including revegetation if required.	Undertake a review of the landform design, and make an assessment of the stability of the landform including material characterisation. Undertake stability enhancement works including revegetation if required. Consider re-grading to achieve stability.
	Erosion control	Trigger	Minor gully or tunnel erosion present and/or minor rilling.	Slumping and /or significant gully or tunnel erosion present and/or significant rilling.
		Response	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Remediate as appropriate If required, consult with a land management specialist to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable. Review, and update where required, the Erosion and Sediment Control Plan.
	Free Draining Landforms	Trigger	Landforms exhibiting minor ponding.	Landforms exhibiting significant drainage issues, threatening or causing material harm to the environment.
		Response	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to address issues. Remediate as appropriate.	Undertake a review of the landform design, including survey if required. Undertake re-grading and re-vegetation of the area.
	Water Management Structures	Trigger	Water management structures (sediment dams, channels, contour banks) exhibit minor erosion and/or scouring.	Water management structures fail or display significant scouring / erosion.
		Response	An inspection of the site will be undertaken by a suitably trained person. Identify remedial actions such as amelioration, re-vegetation or alternative scour protection.	Remediate as appropriate. If required, consult a water management specialist to develop a site specific remediation plan and review design criteria for water management structures.
	Salinity	Trigger	Increasing trend in soil/ spoil salinity levels.	Presence of salt scalds.

Aspect/Category	Key Element	Trigger/Response	1st Level Trigger	2nd Level Trigger
Soil/overburden Quality	Spoil surface layers chemical characteristics	Response	Undertake soil/spoil testing to verify EC and recommend further soil / spoil amelioration.	Engage a specialist consultant to develop a site specific management report to be implemented to remediate salinity scalds.
		Trigger	Exchangeable sodium percent (ESP) greater than 8 and less than 15%.	Exchangeable sodium percent (ESP) greater 15%.
	Soil EC	Response	Undertake testing to determine required amelioration and undertake amelioration as required.	Review material handling practices. Ameliorate dispersive spoils (for example with coarse gypsum). Re-vegetate if required.
		Trigger	Soil EC greater than 600us/cm.	Soil EC greater than 800us/cm.
	Soil pH	Response	Engage a consultant to recommend appropriate measures to reduce soil EC. Undertake consultant recommendations where possible and viable.	Engage a consultant to recommend appropriate measures to reduce soil EC. Undertake consultant recommendations to reduce EC to an appropriate level.
		Trigger	Soil pH <8.5 but >4.0	Soil pH is <4.0 or > 9.5.
	Soil Depth	Response	Undertake analytical soil testing and evaluation. Where appropriate implement recommendations for amelioration to increase/reduce pH to within rehabilitation guidelines.	Undertake analytical soil testing and evaluation, Where appropriate, implement recommendations for amelioration pH to within rehabilitation guidelines. Undertake evaluation recommendations to achieve soil pH within appropriate range.
		Trigger	Soil depth (topsoil or substitute) is less than design specification for final landuse.	Soil depth (topsoil and ameliorates) is less than 50mm in the Growth Medium Development phase.
Biodiversity (native vegetation areas)	Ground cover percent	Response	Top dress with additional suitable topsoil resource and /or ameliorates.	Undertake a review of the topsoil balance to confirm sufficient material to meet minimum depth requirements. Investigate suitable topsoil resource substitutes (ameliorates) if required.
		Trigger	During Ecosystem Establishment, a minimum of 70% ground cover is not present (or 50% if rocks, logs or other features of cover are present). Bare surfaces >20m ² in area or >10m in length downslope are present.	During Ecosystem Establishment, vegetative cover is 50% or less. Bare surface > 30m ² in area or >20m in length downslope are present.

Aspect/Category	Key Element	Trigger/Response	1st Level Trigger	2nd Level Trigger
		Response	Undertake a field survey to identify likely causes of unsatisfactory germination rates. Determine if additional work is required, or if rehabilitation will improve with general maintenance. Re-seed areas with unsatisfactory cover. Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.	Undertake analytical soil testing and evaluation, Where appropriate implement recommendations for amelioration Implement appropriate management actions including revising rehabilitation procedures if required.
		Trigger	<75% but >55% of shrubs and/or trees are healthy when ranked healthy, sick or dead in during rehabilitation inspections in the Ecosystem Establishment phase.	<55% of shrubs and/or trees are healthy when ranked healthy, sick or dead in during rehabilitation inspections in the Ecosystem Establishment phase.
	Vegetation Health	Response	Undertake a field survey to identify likely causes of vegetation sickness and/or death rates. Re-seed or re-plant areas with high sickness or death rates. Review seeding and/or planting procedures.	Engage a suitably qualified specialist to investigate causes for vegetation sickness and death. Implement appropriate management actions including revising rehabilitation procedures if required.
	Weed Presence	Trigger	> 10% but <25% cover of undesirable species present in Ecosystem Establishment phase.	>25% cover of undesirable species present in Ecosystem Establishment phase.
		Response	Undertake weed management to remove / spray introduced weed species. Treatment of infestations as appropriate to the species.	Undertake weed management to remove introduced weed species. Investigate management measures to reduce weeds including additional soil amelioration, establishment and retention of cover crops until weed presence is at acceptable levels. Implement recommendations as appropriate.
	Pasture Seed Mix	Trigger	Palatable, nutritious pasture grass species cover <70% but >50% during the Growth Medium Development phase.	Palatable, nutritious pasture grass species cover <50% Growth Medium Development phase.
		Response	Undertake a field survey to identify likely causes of unsatisfactory germination and/or growth rates. Re-seed areas with unsatisfactory cover. Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.	Undertake analytical soil testing and evaluation. Where appropriate implement recommendations for amelioration. Implement appropriate management actions including revising rehabilitation procedures if required.

Aspect/Category	Key Element	Trigger/Response	1st Level Trigger	2nd Level Trigger
	Pest animal species presence	Trigger	Pest animal species presence and density increased in annual monitoring events.	Significant numbers of pest animals causing widespread damage to rehabilitation.
		Response	Consult with relevant government agencies (including OEH) to recommend and implement appropriate pest animal control campaign. Consult with neighbouring land owners (eg. Mines, private landowners to discuss joint efforts to control pest animals.	Consult with relevant government agencies (including OEH) to recommend and implement appropriate pest animal control campaign. Update to Land Management Plan.
	Native Fauna Presence	Trigger	Decrease in the number of vertebrate species over successive seasons prior to mine closure.	Continued decline in trend in recorded vertebrate species numbers and/or presence and abundance (allow for natural variation occurring in analogue sites).
		Response	Engage ecologist to undertake investigation to determine the cause of change.	Engage ecologist to undertake investigation to determine the cause of change. Liaise with relevant government agencies.
		Trigger	Loss or deterioration of nest boxes, or pest animal species usage of nest boxes.	Decline in trend in recorded fauna numbers and/or presence and abundance (allow for natural variation occurring in analogue sites).
		Response	Replace damaged / lost nest boxes. Relocate and replace boxes adopted by pests. Additional monitoring.	Engage ecologist to undertake investigation to determine the cause of change. A site specific management report may be prepared and implemented where necessary that aligns with the Mine Closure Plan.
	Native Animal Control	Trigger	Damage to rehabilitation from native fauna.	Continued damage to rehabilitation from native fauna after tree guards and fencing has been installed.
		Response	Options will be incorporated to maintain survival rates.	Liaise with government agencies and consider a culling program in accordance with National Parks and Wildlife Service regulations.

10 REPORTING

External reporting includes preparation of the United Annual Review which assesses rehabilitation progress against the rehabilitation schedule included in the MOP. The Annual Review includes a summary of rehabilitation monitoring and reporting and is sent to **Resources Regulator**, DP&E, OEH and other relevant stakeholders. The Annual Review can be found on the United Collieries website (<http://www.unitedcollieries.com.au>).

11 MOP PLANS

United is classified as a Level 1 Mine, and therefore the following Plans have been prepared:

- Plans 1A – 1C show the location and pre mining/pre MOP natural and physical environment of United Collieries;
- Plan 2 shows the mine domains and mining features at commencement the MOP;
- Plan 3 shows the status of rehabilitation for the MOP period.
- Plan 4 shows the proposed post mining land use and landform at the end of mine life; and
- Plan 5 shows vertical and longitudinal cross sections.

These Plans are contained in **Appendix A**.

12 REVIEW AND IMPLEMENTATION OF THE MOP

12.1 Review of the MOP

This section provides the protocol for periodic review of this MOP. Reviews are conducted to assess the effectiveness of the procedures against the objectives of MOP. The MOP may be reviewed, and if necessary revised, following the submission of the following:

- Annual Review;
- Incident report;
- Audit; or
- Any modification to the conditions of the Project Approval.

This MOP may also be revised due to:

- Deficiencies being identified;
- Results from the monitoring and review program;
- Recommendations resulting from the monitoring and review program;
- Changing environmental requirements;
- Improvements in knowledge or technology become available;
- Change in legislation;
- Where a risk assessment identifies the requirement to alter the MOP; and
- Change in the activities or operations associated with United.

Any major amendments to the MOP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Any amendments would be completed in accordance with the latest MOP guidelines.

12.2 Implementation

Table 23 defines personnel who are responsible for the monitoring, review and implementation of this MOP.

Table 23 Responsibilities for Implementation of the MOP

Name	Title
Project Manager	<p>Implement the procedures referenced in this MOP; Undertake training in relevant Management Plans and procedures as required; Provide resources required and support to implement these procedures; Construct landforms in accordance with this MOP; and Implement the procedures referenced in this MOP; Undertake training in relevant Management Plans and procedures as required; Provide resources required to implement these procedures; and Develop mine plans to allow for progressive rehabilitation of mined land.</p>
Environment and Community Coordinator	<p>Prepare the relevant Management Plans; Implement, monitor and review the programs and procedures linked to this MOP; Consult with regulatory authorities as required; Undertake monitoring as required; Undertake maintenance as required; Provide measures for continual improvement to this MOP and procedures; Ensure all personnel undertaking works in relation to this MOP are trained and competent; and Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Review.</p>

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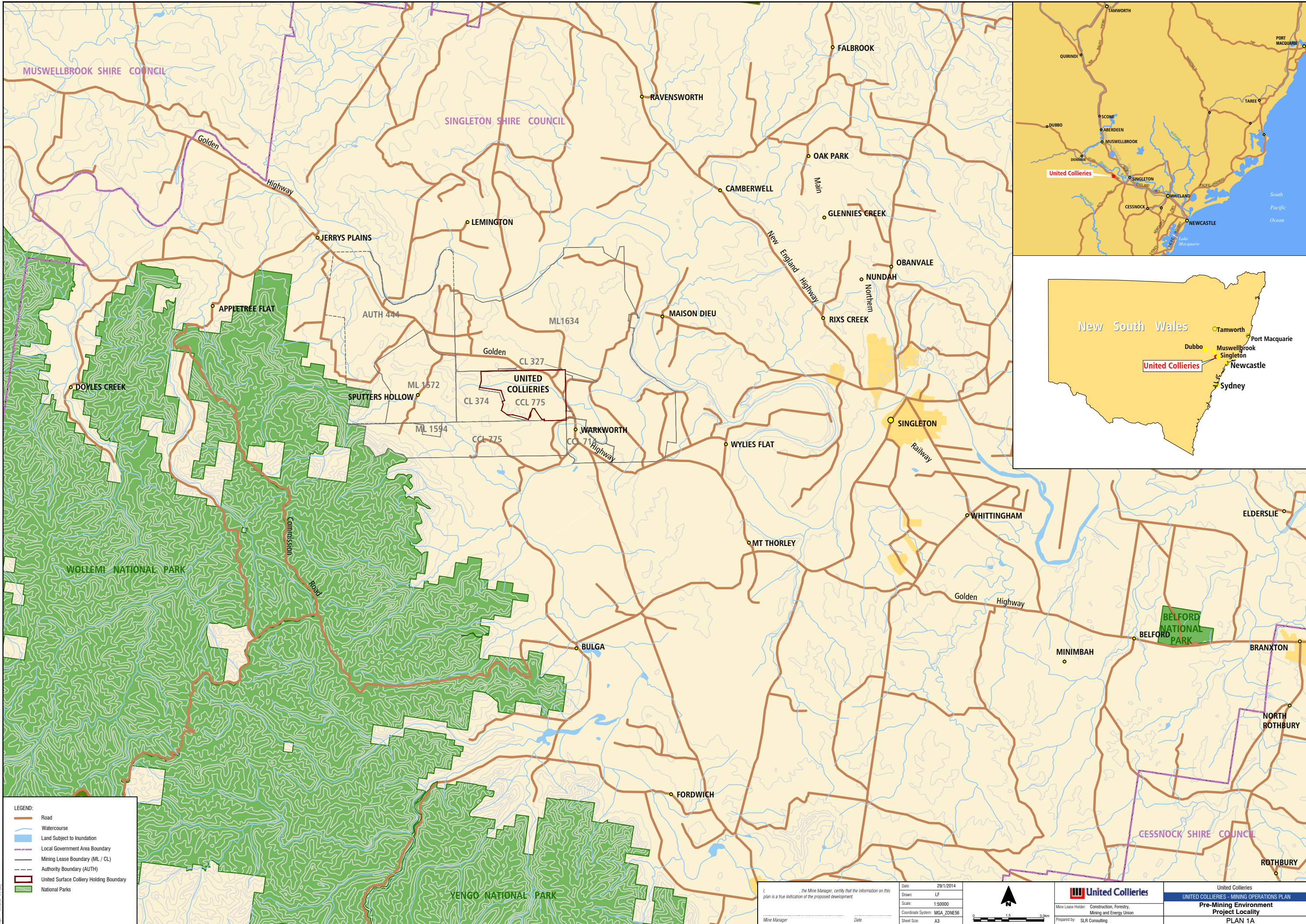
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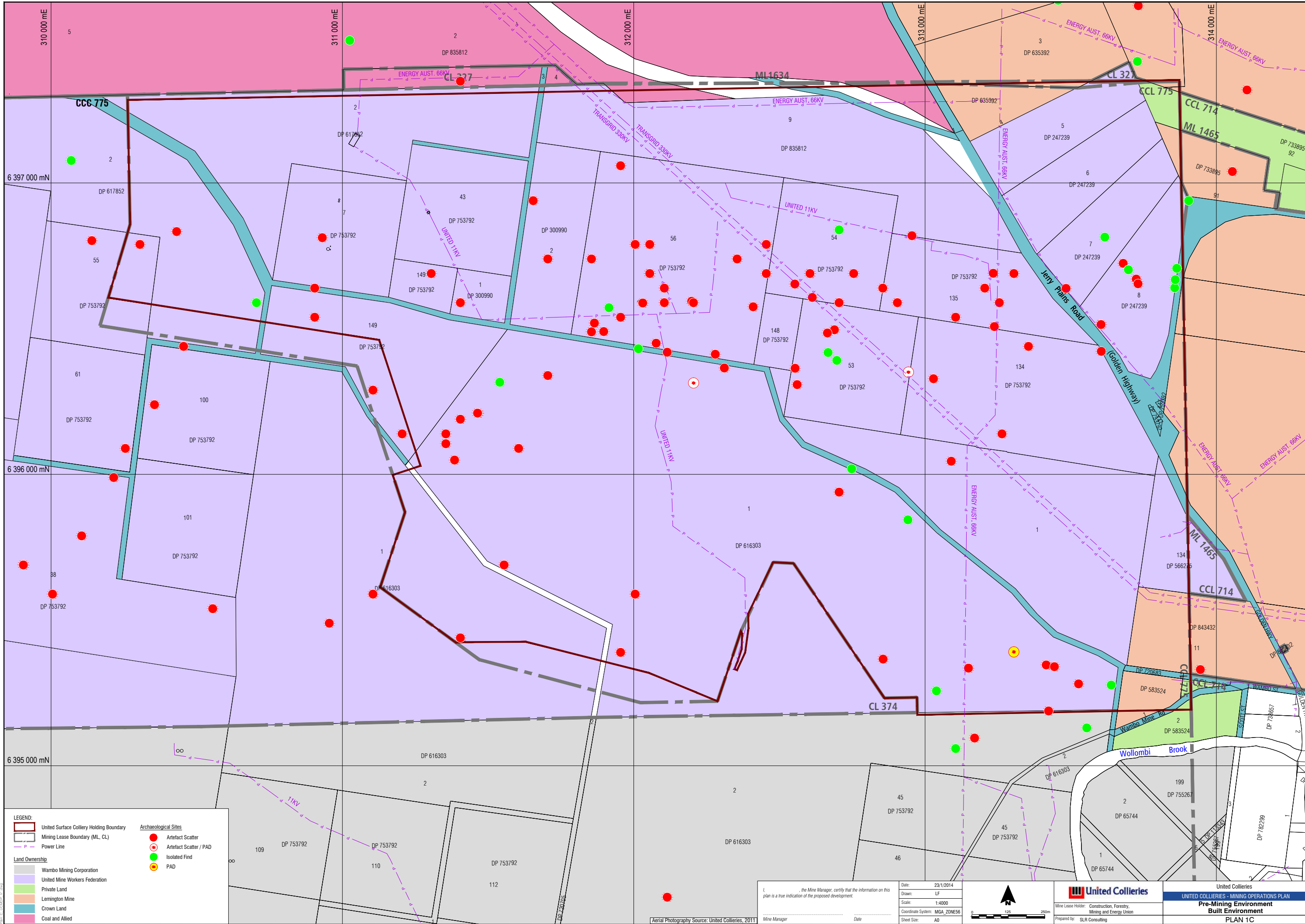
APPENDIX A – MOP PLANS



LEGEND:

- Road
- Watercourse
- Land Subject to Inundation
- Local Government Area Boundary
- Mining Lease Boundary (ML / CL)
- Authority Boundary (AUTH)
- United Surface Colliery Holding Boundary
- National Parks

I, _____, the Mine Manager, certify that the information on this plan is a true indication of the proposed development. Mine Manager _____ Date _____	Date: 29/1/2014	 0 1.5 3.0km	 United Collieries Mine Lease Holder: Construction, Forestry, Mining and Energy Union Prepared by: SLR Consulting	United Collieries
	Drawn: LF			UNITED COLLIERIES - MINING OPERATIONS PLAN
	Scale: 1:50000			Pre-Mining Environment
	Coordinate System: MGA_ZONE56			Project Locality
Sheet Size: A3				PLAN 1A



File: C:\UCAS\Map_Visuals

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

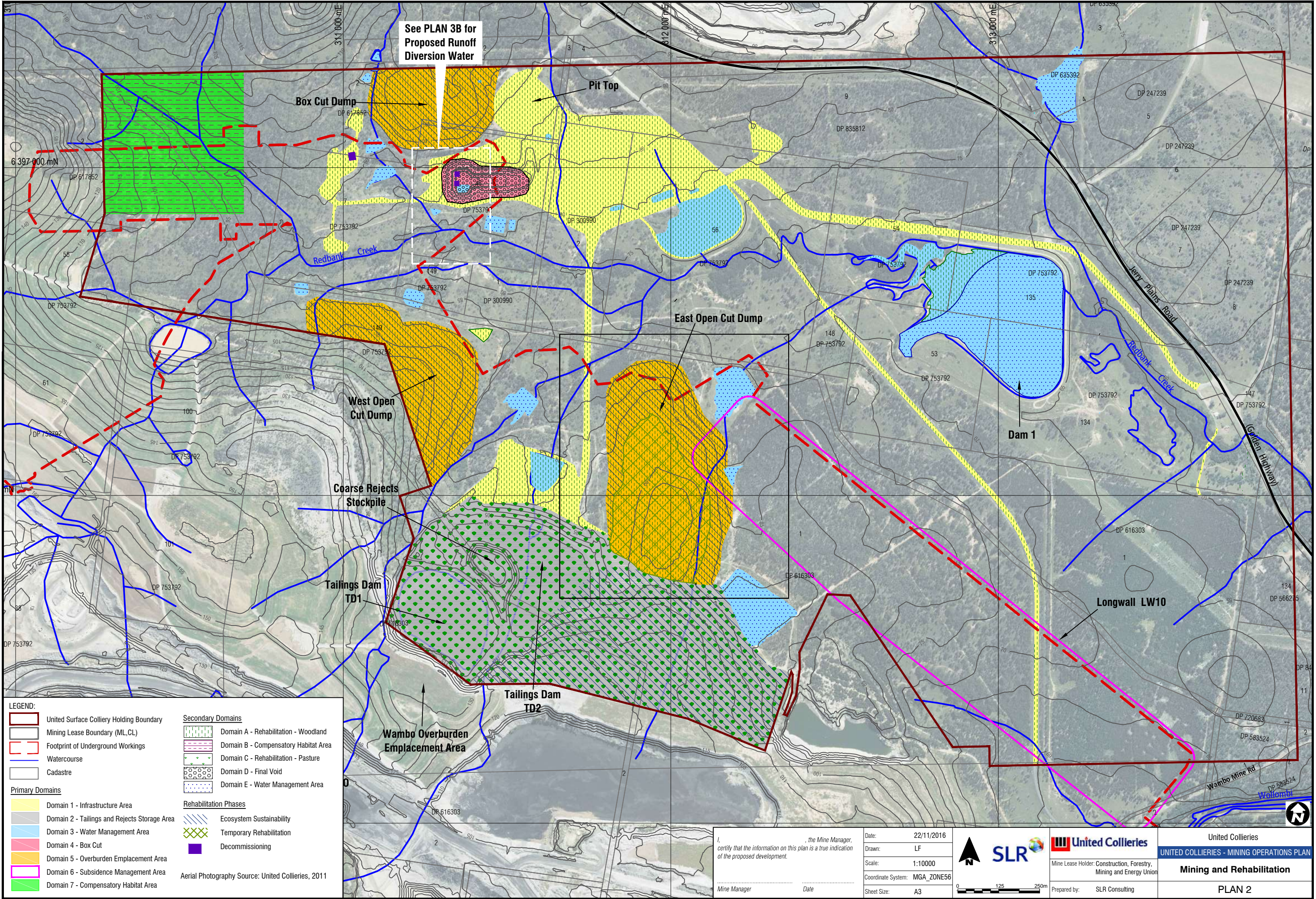
Mine Manager Date

Date: 23/1/2014
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Sheet Size: A0



United Collieries
Mine Lease Holder: Construction, Forestry, Mining and Energy Union
Prepared by: SLR Consulting

United Collieries
UNITED COLLIERIES - MINING OPERATIONS PLAN
Pre-Mining Environment
Built Environment
PLAN 1C



LEGEND:

United Surface Colliery Holding Boundary

Mining Lease Boundary (ML,CL)

Footprint of Underground Workings

Watercourse

Cadastral

Primary Domains

Domain 1 - Infrastructure Area

Domain 2 - Tailings and Rejects Storage Area

Domain 3 - Water Management Area

Domain 4 - Box Cut

Domain 5 - Overburden Emplacement Area

Domain 6 - Subsidence Management Area

Domain 7 - Compensatory Habitat Area

Secondary Domains

Domain A - Rehabilitation - Woodland

Domain B - Compensatory Habitat Area

Domain C - Rehabilitation - Pasture

Domain D - Final Void

Domain E - Water Management Area

Rehabilitation Phases

Ecosystem Sustainability

Temporary Rehabilitation

Decommissioning

Aerial Photography Source: United Collieries, 2011

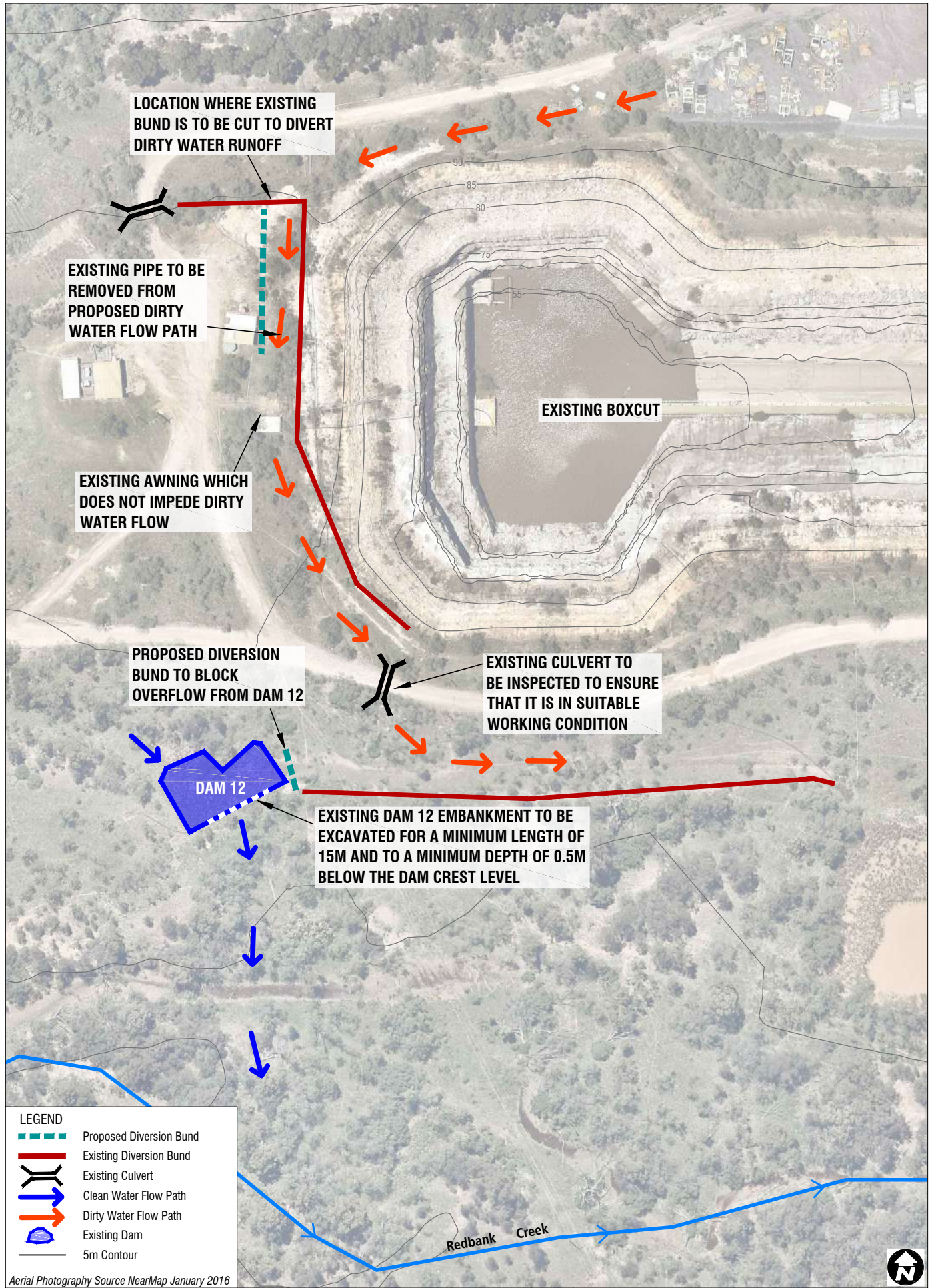
I, _____, the Mine Manager, certify that the information on this plan is a true indication of the proposed development.

Mine Manager _____ Date _____

Date: 22/11/2016
Drawn: LF
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United Collieries
Mine Lease Holder: Construction, Forestry, Mining and Energy Union
Prepared by: SLR Consulting

United Collieries
UNITED COLLIERIES - MINING OPERATIONS PLAN
Mining and Rehabilitation
PLAN 2



LOCATION WHERE EXISTING BUND IS TO BE CUT TO DIVERT DIRTY WATER RUNOFF

EXISTING PIPE TO BE REMOVED FROM PROPOSED DIRTY WATER FLOW PATH

EXISTING AWNING WHICH DOES NOT IMPEDE DIRTY WATER FLOW

EXISTING BOXCUT

PROPOSED DIVERSION BUND TO BLOCK OVERFLOW FROM DAM 12

EXISTING CULVERT TO BE INSPECTED TO ENSURE THAT IT IS IN SUITABLE WORKING CONDITION

DAM 12

EXISTING DAM 12 EMBANKMENT TO BE EXCAVATED FOR A MINIMUM LENGTH OF 15M AND TO A MINIMUM DEPTH OF 0.5M BELOW THE DAM CREST LEVEL

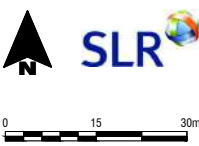
- LEGEND**
- Proposed Diversion Bund
 - Existing Diversion Bund
 - Existing Culvert
 - Clean Water Flow Path
 - Dirty Water Flow Path
 - Existing Dam
 - 5m Contour

Aerial Photography Source NearMap January 2016

I, _____, the Mine Manager, certify that the information on this plan is a true indication of the proposed development.

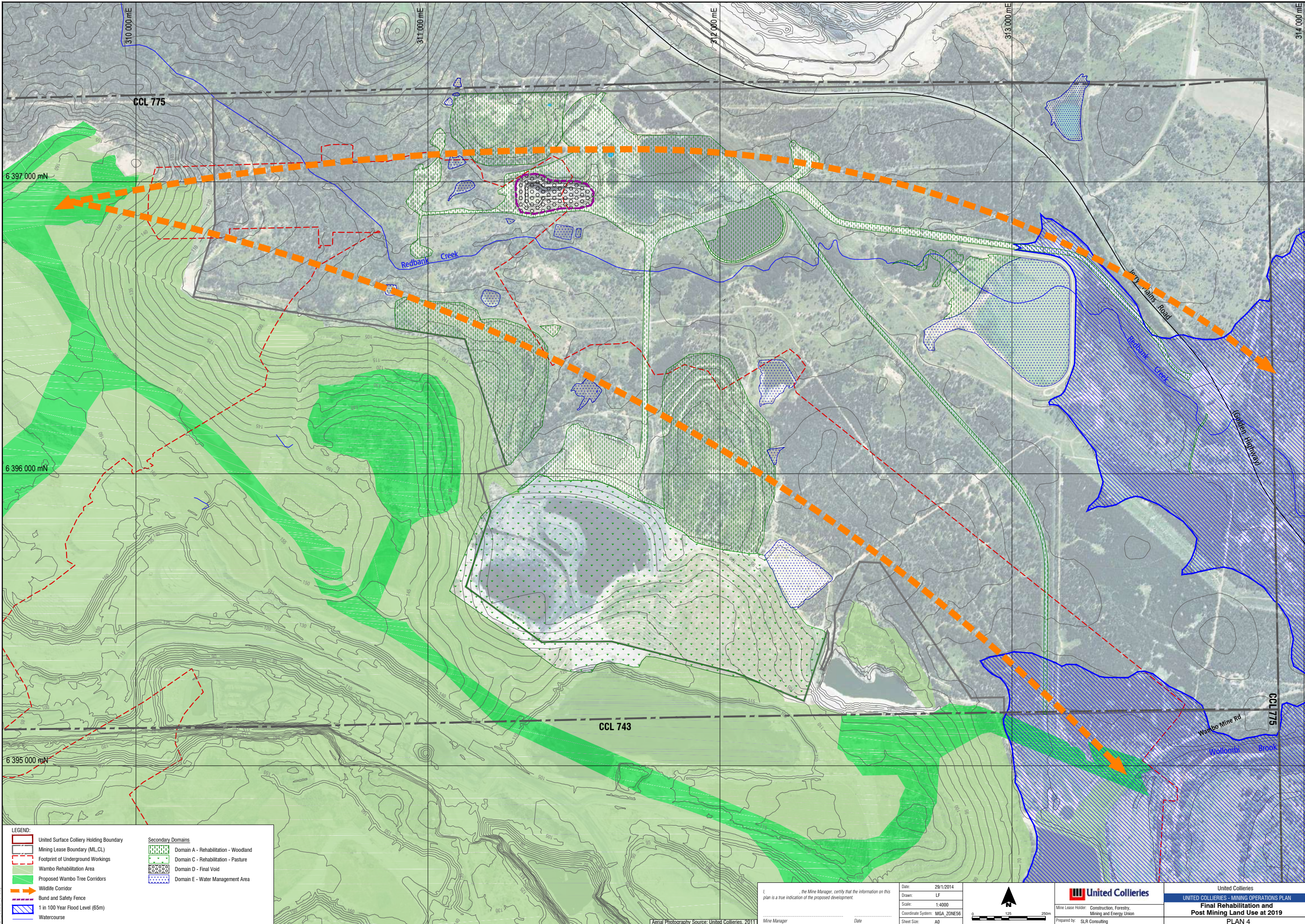
Mine Manager _____ Date _____

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Mine Lease Holder: Construction, Forestry, Mining and Energy Union
Prepared by: SLR Consulting

United Collieries
UNITED COLLIERIES - MINING OPERATIONS PLAN
Mining and Rehabilitation Proposed Runoff Diversion Water
PLAN 3B



LEGEND:

	United Surface Colliery Holding Boundary		Secondary Domains
	Mining Lease Boundary (MLCL)		Domain A - Rehabilitation - Woodland
	Footprint of Underground Workings		Domain C - Rehabilitation - Pasture
	Wambo Rehabilitation Area		Domain D - Final Void
	Proposed Wambo Tree Corridors		Domain E - Water Management Area
	Wildlife Corridor		
	Bund and Safety Fence		
	1 in 100 Year Flood Level (65m)		
	Watercourse		

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

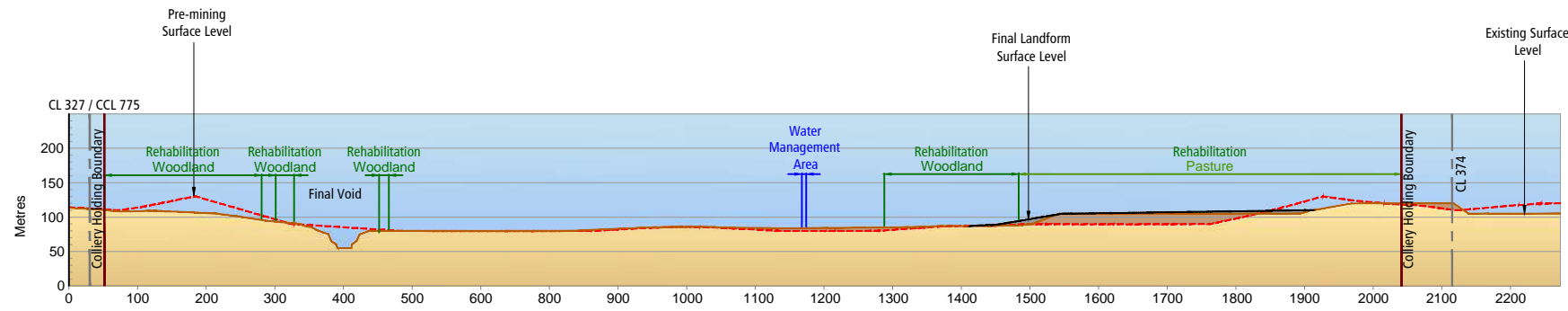
Mine Manager: _____ Date: _____

Date: 29/1/2014
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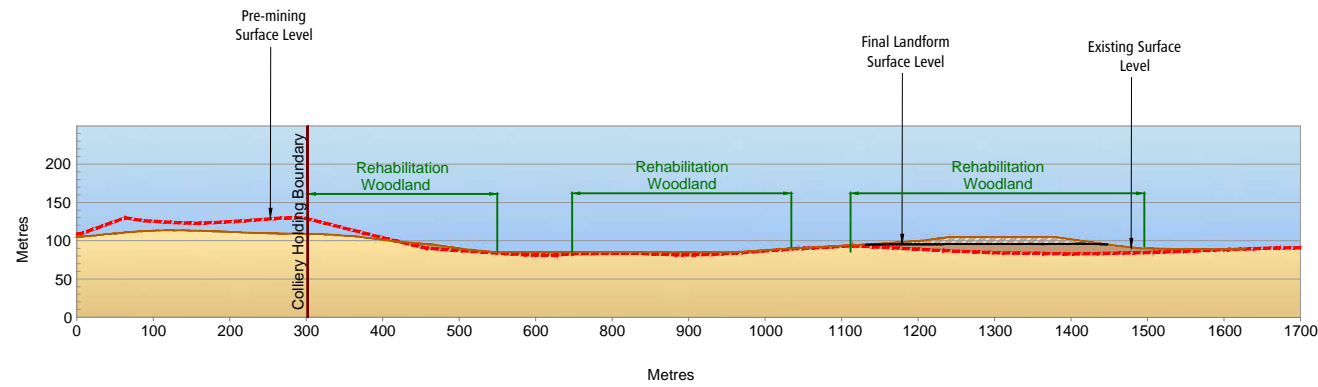


United Collieries
Mine Lease Holder: Construction, Forestry, Mining and Energy Union
Prepared by: SLR Consulting

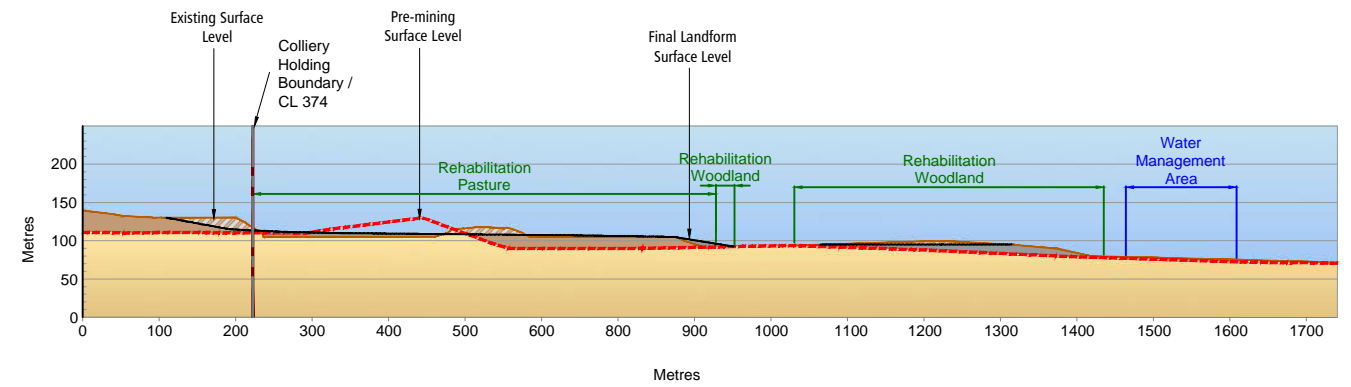
United Collieries
UNITED COLLIERIES - MINING OPERATIONS PLAN
Final Rehabilitation and Post Mining Land Use at 2019
PLAN 4



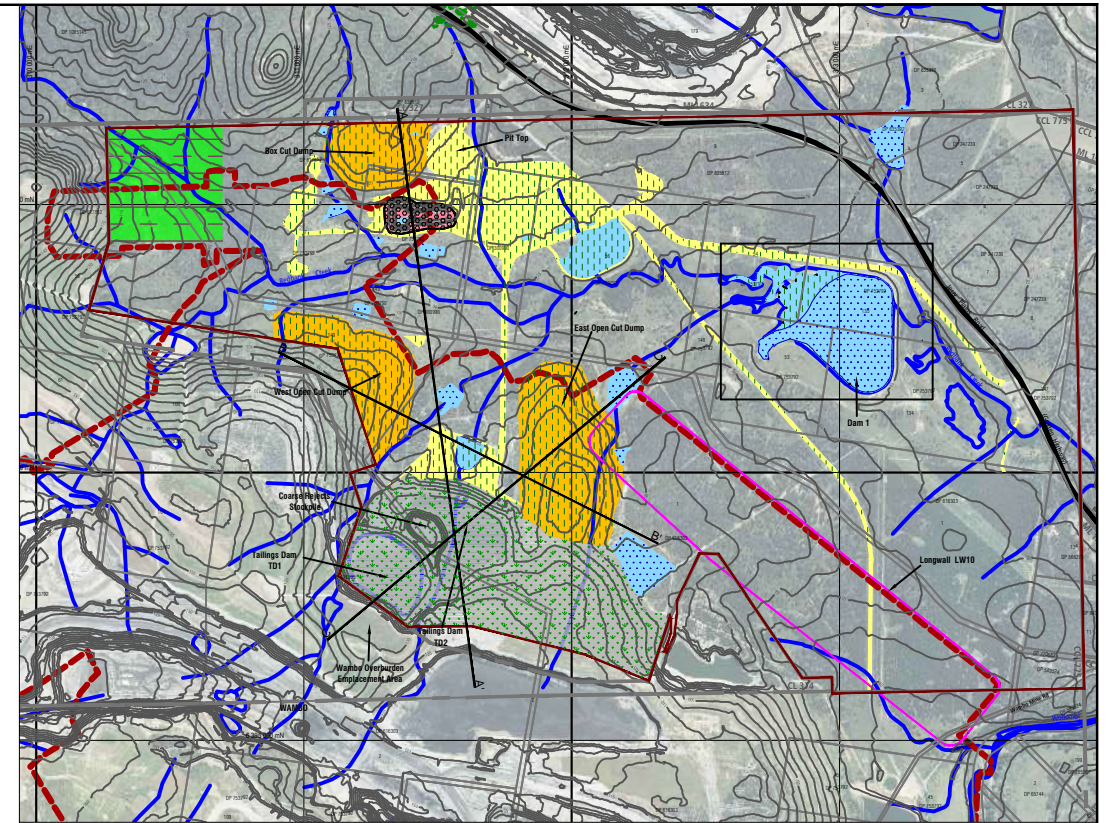
SECTION A - A'



SECTION B - B'



SECTION C - C'



LEGEND:

- Mining Lease boundary (ML / CL)
- United Surface Colliery Holding Boundary
- Pre-Mining Landform
- Current Landform (2014)
- Final Landform

APPENDIX B – SCHEDULE OF LAND OWNERSHIP

Appendix B – Schedule of Landownership	Lot	DP	Occupancy
Maher and Vickers / Construction Forestry Mining and Energy Union – Held on behalf of United Collieries	2	617852	
	7	753792	
	38	753792	
	39	753792	
	43	753792	
	53	753792	
	54	753792	
	55	753792	
	56	753792	
	60	753792	
	61	753792	
	100	753792	
	101	753792	
	135	753792	
	134	753792	
	9	853812	
	1	709722	
	1	616303	
	1	300990	
	134	566275	
	5	247239	
	6	247239	
	7	247239	
	8	247239	
	4	635392	
	2	300990	
	148	753792	
	149	753792	
Coal & Allied	1	783484	
	2	783484	
	1	720683	
	91	733895	
	3	635392	
	179	823775	
	1	719879	
	1	857021	
	5	1085145	
	2	719879	
	133	753792	
	11	843432	
	1	583524	
Wambo Mining Corporation Pty Ltd	7	3030	
	45	753792	

Appendix B – Schedule of Landownership	Lot	DP	Occupancy
	46	753792	
	103	753792	
	104	753792	
	109	753792	
	110	753792	
	111	753792	
	112	753792	
	131	753792	
	2	709722	
	C	33149	
	2	583524	
	199	755267	
	6	113343	
	8	113343	
	9	113343	
	1	65744	
	2	65744	
Wambo Coal Pty Limited	1//11	759053	
	2//11	759053	
	1//17	759053	
	2//17	759053	
	82	548749	
	83	548749	
	4	542226	
	5	542226	
	2	720705	
	3	720705	
	4	720705	
	113	753817	
	1	241316	
	2	616303	
	3	1085145	
	1//16	759053	
	7	113343	
	1	720705	
	208	753817	
Johnson Woods & Co Pty Ltd	147	753729	
Hunter Valley Gliding Club Co-operative Limited	92	733895	
Singleton Shire Council	180	823775	

APPENDIX C – MOP RISK ASSESSMENT

Risk Assessment Detail		GLENCORE
Project Name:	United Care and Maintenance MOP	
Date of BBRA:	17-08-2016	
Risk Assessment Name	United Care and Maintenance MOP Risk Assessment	
Scope of Risk Assessment		
This risk assessment is to review the Care & Maintenance Risk Assessment that was conducted in 2016. Additional items have been added for this MOP Risk Assessment to meet the requirements of the MOP Guidelines. The MOP Risk Assessment specifically focusses on environmental management at United during the period of the Care and Maintenance MOP.		
Background		
This risk assessment is to review the Care & Maintenance Risk Assessment that was conducted in 2016. Additional items have been added for this MOP Risk Assessment to meet the requirements of the MOP Guidelines.		
Objectives		
Identify relevant risks associated with the current situation at United (Care and Maintenance during the MOP Period)		

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks			Determine RCE	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				PMC	Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Frequency	Competency	Risk Control Effectiveness	Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	PMC	Treatment plans/tasks (Description)
Environmental	Cultural Heritage	Disturbance of existing Cultural Heritage site	Environmental harm	<ul style="list-style-type: none"> - Personnel unaware of existing cultural heritage sites. - Personnel unaware of what to do if they identify a cultural heritage site. 	Environmental Management System (Cultural Heritage) <ul style="list-style-type: none"> - Environmental awareness (Site Familiarisation). - Ground Disturbance Permit - Access roads demarcated for no entry into area where new sites have been identified. - Cultural Heritage sites marked on a Plan. - Plan displayed in prominent location. 	N/A	Familiarisation of relevant parts of the site Environmental Management System to all personnel (Site Familiarisation)	Requires Improvement	Legal & Compliance	2	C	8	2	1. Review the Site Familiarisation to include the Cultural Heritage Plan along with relevant parts of the Environmental Management System (Cultural Heritage). 2. Review to be conducted to identify if Cultural Heritage sites are marked (flagged). 3. Documents for review - Environmental Management System inclusion of cultural heritage elements and site Cultural Heritage Plan of identified sites. 4. TNA to be updated to reflect the relevant parts of the EMS (site familiarisation)
Environmental	Water Management (including dams overflow)	Discharge of water offsite	Environmental harm	<ul style="list-style-type: none"> - Inadequate inspection of existing dams. - No additional inspections during rain events. - Less than adequate frequency of inspection for water transfer pipe line. 	Erosion & Sediment Control Plan <ul style="list-style-type: none"> - Runoff from disturbed catchments directed to dirty water storages - Agreement to utilise Wambo C11 Void in periods of excess water. Environmental Monitoring Program (EMP) <ul style="list-style-type: none"> - Frequency of inspections of all dams outlined 	Monthly Environmental Inspections - SAP	Environmental personnel - Monthly Inspection Familiarised in the site Erosion & Sediment Control Plan for Environmental Personnel Familiarised in relevant parts of the Erosion and Sediment Control Plan for all personnel (Site Familiarisation) Familiarised in the Environmental Monitoring Program (EMP) for all Environmental Personnel	Satisfactory	Legal & Compliance	2	D	5	3	1. TNA to be reviewed to reflect - Erosion & Sediment Control Plan for Environmental Positions. - Environmental Monitoring Program for Environmental Positions. 2. Review Site Familiarisation to include relevant parts of the Erosion & Sediment Control Management Plan. 3. Review to be conducted to ensure that the Monthly Environmental Inspection is set up in SAP. 4. Documents for Review: - Pumping Plan 5. TNA to be updated to reflect the requirement of Environmental Personnel for Environmental Monitoring Program and Erosion & Sediment Control Plan.
Environmental	Water Management (Dam Failure)	Dam wall Failure	Injury to personnel Damage to Equipment Environmental harm	<ul style="list-style-type: none"> - Inadequate inspections of dam wall. - Weather conditions - Structural integrity of wall 	Erosion & Sediment Control Plan <ul style="list-style-type: none"> - Monthly Dam wall inspections (part of monthly Environmental Inspection). - Informal - weekly operational inspection of dam water levels. 	Informal - weekly operational inspection of dam water levels Monthly Environmental Inspection (CMO)	Environmental personnel - Monthly Inspection Competent Personnel - Weekly Operational Inspection Dam Safety Awareness Training (external provider) for site competent personnel.	Satisfactory	Legal & Compliance	2	D	5	3	1. Annual Tailings Dam Inspection to be set up in SAP. 2. Review to be conducted to ensure that the Monthly Environmental Inspection is set up in SAP. 3. Document for review: - MOP
Environmental	Water Management (Pumping)	Pipeline/Pump Failure	Environmental damage	<ul style="list-style-type: none"> - No scheduled inspections conducted - Contact by equipment - Wear and tear of pipeline - pumping dirty water through the clean water diversion 	<ul style="list-style-type: none"> - Inspection of pumps and set up - 3 times per day when in use. - Weekly inspection of pumps - Pipeline on site services plan. 	Physical inspection of pumps when in use.	Site personnel familiarised in the inspection requirements for pumping dirty water through the clean water	Satisfactory	Legal & Compliance	2	D	5	3	1. Documents to be reviewed - Water Transfer Procedure. 2. TNA to be updated to include familiarisation of Pumping Inspection for site competent personnel.
Environmental	Pipeline Management (within clean water catchment)	Pipeline Failure	Environmental damage	<ul style="list-style-type: none"> - No scheduled inspections conducted - Contact by equipment - Wear and tear of pipeline - pumping dirty water through the clean water catchment with no double protection on pipeline 	Water Transfer through Clean Water Catchment Procedure <ul style="list-style-type: none"> - Inspection of pipelines within clean water catchment. - SWMS for Water Transfer - Area moved to allow visibility of pipeline. - Pipeline on site services plan. 	Physical inspection of Pipeline conducted when in use.	Site personnel familiarised in the Water Transfer through Clean Water Catchment Procedure	Satisfactory	Legal & Compliance	2	D	5	3	1. Convert the JSEA to a Procedure for the Water Transfer through the Clean Water Catchment 2. TNA to be updated to include the Water Transfer through Clean Water Catchment Procedure for personnel conducting task. 3. Site Services plan to be uploaded onto Sharepoint.
Environmental	Tailings Dam Management	Tailings Dam wall Failure	Injury to personnel Environmental harm	<ul style="list-style-type: none"> - No inspection conducted. - Structural integrity of wall - Weather conditions 	Erosion & Sediment Control Plan <ul style="list-style-type: none"> - Monthly Dam wall inspections (part of monthly Environmental Inspection). - Annual Tailings Dam Inspections by third party. 	Monthly Environmental inspection (CMO) Annual Tailings Dam Inspection (SAP)	Environmental personnel - Monthly Inspection Dam Safety Awareness Training (external provider) for site competent personnel. Qualified Geotech External Provider - Annual Tailings Dam Inspection	Satisfactory	Legal & Compliance	3	D	9	3	1. Documents to be reviewed - Monthly Environmental Inspection Sheet (inclusion of Tailings Dam) - Tailings Dam Operations Manual 2. TNA to be updated to include Dam Safety Awareness Training for Dam Inspection competent person. 3. Piezo maintenance to be updated in SAP
Environmental	Hydrocarbons	Hydrocarbons - Spills	Environmental damage (spill)	<ul style="list-style-type: none"> - Inadequate storage, use or transport of hydrocarbons. - inadequate maintenance of equipment. 	Environmental Management Strategy <ul style="list-style-type: none"> - Hydrocarbons stored in banded areas. Equipment Introduction to Site <ul style="list-style-type: none"> - Maintenance regime for all equipment prior to being used on site. - Inspection of equipment prior to approval to use on site. Defect Management <ul style="list-style-type: none"> - Pre-start inspection on all equipment prior to use each shift. Hazardous Substance Procedure <ul style="list-style-type: none"> - Spill kits to contain the spill - Site plan location of spill kits. 	Monthly inspection of spill kits (SAP)	Environmental personnel - Monthly Inspection Familiarisation of relevant parts of the Environmental Management Strategy (hydrocarbons) for all personnel (Site Familiarisation) Familiarisation of the Environmental Management Strategy for all Management Team	Satisfactory	Environment	2	D	5	2	1. Documents to be reviewed - Hazardous Substances Procedure 2. Review site familiarisation to include relevant parts of the Environmental Management Strategy for Hydrocarbons 3. TNA to be updated to include - Familiarisation of Environmental Management Strategy for all Management Team personnel. - Familiarisation of relevant parts of the Environmental Management Strategy for all personnel (Site Familiarisation)
Environmental	Erosion & Sediment	Disturbance of ground	Environmental damage	<ul style="list-style-type: none"> - no erosion and sediment control put in place prior to conducted disturbance activities. - Lack of awareness 	Erosion & Sediment Control Management Plan <ul style="list-style-type: none"> - Ground Disturbance Permit requirements - Erosion & sediment control Management Principles. Work Authorisation & Permit System <ul style="list-style-type: none"> - Authorised Task Coordinators - Ground Disturbance Permit - Excavation Permit - Work Authorisation Form. 	Monthly Enviro Inspection	Familiarisation in relevant parts of the GCAA Work Authorisation & Permit System for all personnel (GCAA Generic Induction) Familiarisation in the Work Authorisation and Permit System for all Task Coordinators Familiarisation in the Work Authorisation and Permit System for all Supervisor level and above (Supervisor Training Package)	Satisfactory	Legal & Compliance	2	D	5	2	1. TNA to be updated to include - Relevant parts of the Work Authorisation & Permit System for all personnel (GCAA Generic Induction) - Familiarisation in the Work Authorisation & Permit System for Task Coordinators. - Relevant parts of the Work Authorisation & Permit System for all Supervisory roles and above (Supervisor Training Package) 2. Review Site Familiarisation to include relevant parts of the Erosion & Sediment Control Management Plan.

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks			Determine RCE	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				PMC	Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Frequency	Competency	Risk Control Effectiveness	Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	PMC	Treatment plans/tasks (Description)
Environmental	Land Management (including weeds)	Fine/Penalty from Authority	Legal	- LTA maintenance of buffer areas. - LTA inspections of areas	Environmental Management Strategy - Monthly inspections - Weed spraying during spring and autumn.	Weed spraying Autumn and Spring Monthly Environmental Inspection	Qualified contractor for the Weed Spraying. Familiarisation of the Environmental Management Strategy for all Management Team	Satisfactory	Legal & Compliance	2	D	5	2	1. TNA to be updated to include - Familiarisation of Environmental Management Strategy for all Management Team personnel.
Environmental	Dust	Dust exceedance/complaint	Legal	- weather conditions (dry, wind etc) - vehicle use on site - Exposed areas	Environmental Monitoring Program - air quality monitoring - boundary of lease area. Transport Management Plan - speed limits - Limited operations	Monthly monitoring collected by external providers.	Familiarisation of relevant parts of the Environmental Monitoring Program for all personnel (Site Familiarisation) Familiarisation of the Environmental Monitoring Program for all Management Team	Satisfactory	Legal & Compliance	2	E	3	2	1. Review Site Familiarisation to include relevant parts of the Environmental Monitoring Program (dust monitoring).
Environmental	Waste	Inappropriate waste disposal	Environmental damage	- Lack of awareness - Inadequate facilities for disposal - Unapproved waste disposal contractors	Environmental Management Strategy - Waste Tracking Spreadsheet - Licensed contractor engaged for regular removal of waste and scrap. - Contaminated wastes assessed specifically and managed appropriately. Environmental Inspections	Weekly general waste removal Monthly Environmental Inspection	Familiarisation of the Environmental Management Strategy for all Management Team Familiarisation of relevant parts of the Environmental Management Strategy (Waste) for all personnel (Site Familiarisation)	Satisfactory	Legal & Compliance	2	D	5	2	1. TNA to be updated to include - Familiarisation of Environmental Management Strategy for all Management Team personnel. - Relevant parts of the Environmental Management Strategy (Waste) for all personnel (Site Familiarisation) 2. Review Site Familiarisation to include relevant parts of the Environmental Management Strategy (Waste).
Environmental	Approvals	Expiry of Approvals	Legal	- Poor record management	- All expiries recorded and managed through the CMO database.			Satisfactory	Legal & Compliance	2	D	5	2	
Environmental	Community	Complaints	Reputation	- Dust - Water discharge - Land management	Environmental Management Strategy - Complaints hotline - Conflict resolution process Community Consultative Committee (CCC) meetings - Ongoing Consultation with planned Project work	- CCC 6 monthly	Familiarisation of the Environmental Management Strategy for all Management Team Familiarisation of relevant parts of the Environmental Management Strategy (Community Complaints) for all personnel (Site Familiarisation)	Satisfactory	Community/Reputation	1	D	2	2	1. TNA to be updated to include - Familiarisation of Environmental Management Strategy for all Management Team personnel. - Relevant parts of the Environmental Management Strategy (Community Complaints) for all personnel (Site Familiarisation) 2. Review Site Familiarisation to include relevant parts of the Environmental Management Strategy (Community Complaints).
Potential Emergency	Fires - Bushfire - Equipment - Building - Gas Flare - Spon Com - Electrical - Tyres - Aerials - Hot Work	Uncontrollable Fire	Injury to personnel Damage to equipment	LTA emergency response (resources, plans etc)	Emergency Response Control Plan. - Activate Emergency over two-way or mobile phone. - Call for external services if required - Evacuation Process - Emergency assembly areas - External Services (Rural Fire Service) - Chief Fire Warden Duty Card - Warden Duty Card - Escort Duty Card - Main Gate Duty Card - Fire Extinguishers - Training in the suite of Duty Cards - Fire Extinguisher Training - Follow procedure Action to be taken when a Fire is Discovered - Fire Risk Assessment conducted External Emergency Services Rural Fire Service - Jerry's Plains approx 22km - Bulga approx 20km NSW Fire Service - Singleton approx 25km - Muswellbrook approx 40km	Annual Fire Extinguisher Training Annual simulation drill	Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation with all Project Personnel in the suite of Duty Cards for site. Qualified External Emergency Services	Satisfactory	Health & Safety	1	D	2	2	1. TNA to be updated to reflect - Emergency Response Control Plan for all Project Personnel. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation). - Annual Training in Fire Extinguisher Use for all Project personnel. - Duty Card training - IMT Training for Management Team 2. Site Familiarisation to be reviewed to include the Emergency activation requirements. 3. conduct IMT training with Project team.

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks			Determine RCE	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				PMC	Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Frequency	Competency	Risk Control Effectiveness	Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	PMC	Treatment plans/tasks (Description)
Potential Emergency	Injuries - Vehicle accident, - Fall from heights. - Electrocuton - High Pressure Injection - Burns - Sprains & Strains - Exposure to hazardous substances. - Snake Bites	Escalation of initial injury	Injury to Personnel	LTA emergency response (resources, plans etc)	Emergency Response Control Plan - Activate Emergency over two-way or mobile phone. - Call for external services if required. - Competent and Trained First Aiders on site. - Fully equipped first aid room. - Inspections of first aid room supplies. - First Aid Duty Card - Scene Controller Duty Card - Escort Duty Card - Main Gate Duty Card - Helipad Duty Card - First Aid Emergency Response - High Pressure Injection Procedure - Electric Shock Procedure External Emergency Services Road NSW Ambulance Service - Singleton approx 25km - Muswellbrook approx 40km Air - Westpac Helicopter from Newcastle	Annual simulation drill Monthly inspection of first aid supplies.	Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation with all Project Personnel in the suite of Duty Cards for site. Familiarisation of the First Aid Emergency Response Procedure with all appointed First Aiders. Familiarisation of the High Pressure Injection Procedure with all appointed First Aiders. Familiarisation of the Electric Shock Procedure with all appointed First Aiders. Injury Management Team Training Qualified External Emergency Services	Satisfactory	Health & Safety	2	D	5	4	1. Conduct IMT Training with Project team. 2. Document for Review - First Aid Room Contents 3. TNA to be reviewed for inclusion of - Emergency Response Control Plan for all Project Team. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation) - Duty Cards for all Project team. - First Aid Emergency Response for First Aiders. - High Pressure Injection Procedure for First Aiders. - Electric Shock Procedure for First Aiders - IMT Training for Management Team 4. Site Familiarisation to be reviewed to include relevant parts of the Emergency Response Control Plan.
Potential Emergency	Property Damage - Structural Failure - Contact by Mobile equipment	Personnel enter structure or under structure prior to structural assessment or securing of structure	Injury to personnel	- LTA demarcation of the exclusion zones. - No assessment conducted of the structure prior to entry. - Rescue of trapped personnel	Emergency Response Control Plan - No entry within barricaded area until structural assessment conducted by qualified person. First Aid Emergency Response - immediate incident area to be safe before attempting to render any assistance	Annual simulation drill Annual structural inspections.	Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation with all Project Personnel in the suite of Duty Cards for site. Familiarisation of the First Aid Emergency Response Procedure with all appointed First Aiders. Injury Management Team Training	Satisfactory	Health & Safety	2	D	5	3	1. Conduct IMT Training with Project team. 2. Document for Review - Emergency Response Management Plan for inclusion of structural emergency. 3. TNA to be reviewed for inclusion of - Emergency Response Control Plan for all Project Team. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation) - Duty Cards for all Project team. - IMT Training for Management Team 4. Site Familiarisation to be reviewed to include relevant parts of the Emergency Response Control Plan.
Potential Emergency	Highwall failure	Escalation of initial injury of personnel trapped	Injury to personnel	LTA emergency response to assist in an emergency situation.	Emergency Response Control Plan External Emergency Services Mines Rescue or Police Rescue - Singleton approx 25km - Newcastle approx 85km		Qualified External Emergency Services	Satisfactory	Health & Safety	3	E	6	4	
Potential Emergency	Dam Failure	Uncontained spillage in creek or causeway	Community Complaints / Fines	LTA emergency response to contain the water discharge.	Emergency Response Control Plan - Pollution Incident Response Management Plan - Environmental Incident Response (major water discharge) - Portable pumping infrastructure External Emergency Services		Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation of the Environmental Incident Response - major water discharge with Project Personnel Familiarisation with all Project Personnel in the suite of Duty Cards for site. Qualified External Emergency Services	Satisfactory	Environment	3	D	9	3	1. Conduct IMT Training with Project team. 2. Document for Review - Emergency Response Management Plan for inclusion of Environmental Incident Response - major water discharge. 3. TNA to be reviewed for inclusion of - Emergency Response Control Plan for all Project Team. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation) - Duty Cards for all Project team. - Environmental Incident Response - major water discharge. - IMT Training for Management Team 4. Site Familiarisation to be reviewed to include relevant parts of the Emergency Response Control Plan.

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks			Determine RCE	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				PMC	Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Frequency	Competency	Risk Control Effectiveness	Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	PMC	Treatment plans/tasks (Description)
Potential Emergency	Tyre & Rim Failure	Escalation of initial injury of personnel trapped	Injury to personnel	LTA emergency response to assist in an emergency situation.	Emergency Response Control Plan <ul style="list-style-type: none"> - Activate Emergency over two-way or mobile phone. - Call for external services if required. - Competent and Trained First Aiders on site. - Fully equipped first aid room. - Inspections of first aid room supplies. - First Aid Duty Card - Scene Controller Duty Card - Escort Duty Card - Main Gate Duty Card - Helped Duty Card - First Aid Emergency Response - High Pressure Injection Procedure - Electric Shock Procedure - Tyre & Rim Management Plan External Emergency Services Road <ul style="list-style-type: none"> - NSW Ambulance Service - Singleton approx 25km - Muswellbrook approx 40km Air <ul style="list-style-type: none"> - Westpac Helicopter from Newcastle 		Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation with all Project Personnel in the suite of Duty Cards for site. Familiarisation of the First Aid Emergency Response Procedure with all appointed First Aiders. Injury Management Team Training Qualified External Emergency Services	Requires improvement	Health & Safety	3	D	9	4	1. Conduct IMT Training with Project team. 2. Documents for review: - Tyre & Rim Management Plan 3. TNA to be reviewed for inclusion of - Emergency Response Control Plan for all Project Team. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation) - Duty Cards for all Project team. - First Aid Emergency Response for First Aiders. - Relevant parts of the Tyre & Rim Management Plan for all Project Team 4. Site Familiarisation to be reviewed to include relevant parts of the Emergency Response Control Plan.
Potential Emergency	Environmental - Hazardous Substance Spill - Hazardous Substance spill into waterways.	Major chemical spill on ground or into water ways.	Community Complaints / Fines	LTA emergency response to contain chemical spill on ground. LTA emergency response to contain chemical spill in waterway.	Emergency Response Control Plan <ul style="list-style-type: none"> - Pollution Incident Response Management Plan - Spill kits with snakes - Portable pumping infrastructure - Spill Response External Emergency Services NSW Fire Brigade <ul style="list-style-type: none"> - Singleton approx 25km - Muswellbrook approx 40km 		Familiarisation of the Emergency Response Control Plan with all Project personnel. Familiarisation of relevant parts of the Emergency Response Control Plan with all personnel (site familiarisation) Familiarisation of the Pollution Incident Response with Project Personnel Familiarisation of the Spill Response with Project Personnel Familiarisation with all Project Personnel in the suite of Duty Cards for site. Qualified External Emergency Services	Satisfactory	Environment	2	D	5	3	1. Conduct IMT Training with Project team. 2. Document for Review - Emergency Response Management Plan for inclusion of Spill Response 3. TNA to be reviewed for inclusion of - Emergency Response Control Plan for all Project Team. - Relevant parts of the Emergency Response Control Plan for all personnel (Site Familiarisation) - Duty Cards for all Project team. - Pollution Incident Response for all Project team. - Spill Response for all Project team - IMT Training for Management Team 4. Site Familiarisation to be reviewed to include relevant parts of the Emergency Response Control Plan.

Appendix A - GLENCORE COAL ASSETS AUSTRALIA RISK MANAGEMENT MATRIX

GLENCORE COAL ASSETS AUSTRALIA RISK MATRIX

CONSEQUENCE [potential foreseeable outcome of the event]						LIKELIHOOD [of the event occurring with that consequence]					
	Health & Safety	Environment	Financial Impact	Image & Reputation / Community	Legal & Compliance	Basis of Rating	E - Rare	D - Unlikely	C - Possible	B - Likely	A – Almost Certain
	Multiple fatalities Multiple cases of permanent total disability / health effects	Environmental damage or effect (permanent; >10 years) Requires major remediation	>\$600M investment return >\$100M operating profit >\$20M property damage	Negative media coverage at international level Loss of multiple major customers or large proportion of sales contracts Loss of community support Significant negative impact on the share price	Major litigation / prosecution at Glencore corporate level Nationalisation / loss of licence to operate	LIFETIME OR PROJECT OR TRIAL OR FIXED TIME PERIOD OR NEW PROCESS / PLANT / R&D	Unlikely to occur during a lifetime OR Very unlikely to occur OR No known occurrences in broader worldwide industry	Could occur about once during a lifetime OR More likely <u>NOT</u> to occur than to occur OR Has occurred at least once in broader worldwide industry	Could occur more than once during a lifetime OR As likely to occur as not to occur OR Has occurred at least once in the mining / commodities trading industries	May occur about once per year OR More likely to occur than not occur OR Has occurred at least once within Glencore	May occur several times per year OR Expected to occur OR Has occurred several times within Glencore
5 Catastrophic						5 Catastrophic	15 (M)	19 (H)	22 (H)	24 (H)	25 (H)
4 Major	Fatality or permanent incapacity / health effects	Long-term (2 to 10 years) impact Requires significant remediation	\$60-600M investment return \$20-100M operating profit \$2-20M property damage	Negative media coverage at national level Scrutiny from government and NGOs Complaints from multiple "final" customers Loss of major customer Loss of community support Negative impact on share price	Major litigation / prosecution at Division level	4 Major	10 (M)	14 (M)	18 (H)	21 (H)	23 (H)
3 Moderate	Lost time / disabling injury / occupational health effects / multiple medical treatments	Medium-term (<2 years) impact Requires moderate remediation	\$6-60M investment return \$2-20M operating profit \$200K-2M property damage	Negative media coverage at local / regional level over more than one day Complaint from a "final" customer Off-spec product Community complaint resulting in social issue	Major litigation / prosecution at Operation level	3 Moderate	6 (L)	9 (M)	13 (M)	17 (H)	20 (H)
2 Minor	Medical Treatment Injury (MTI) / occupational health effects Restricted Work Injury (RWI)	Short-term impact Requires minor remediation	\$600K-6M investment return \$200K-2M operating profit \$10-200K property damage	Complaint received from stakeholder or community Negative local media coverage	Regulation breaches resulting in fine or litigation	2 Minor	3 (L)	5 (L)	8 (M)	12 (M)	16 (M)
1 Negligible	First Aid Injury (FAI) / illness	No lasting environmental damage or effect Requires minor or no remediation	<\$600K investment return <\$200K operating profit <\$10K property damage	Negligible media coverage	Regulation breaches without fine or litigation	1 Negligible	1 (L)	2 (L)	4 (L)	7 (M)	11 (M)

Consequence Category	Consequence Type	Ownership	Action
Cat. 5	Catastrophic Hazard	Divisional / Functional / Operational / Asset Leadership	Quantitative or semi-quantitative risk assessment required. Capital expenditure will be justified to achieve ALARP ('As Low As Reasonably Practicable'). Catastrophic Hazard Management Plans (CHMP) must be implemented where practical, Crisis Management Plans (CMP) tested and Catastrophic Event Recovery Plans (CERP) developed.
Cat. 4 (Health & Safety consequence)	Fatal Hazard	Divisional / Functional / Operational / Asset Leadership	Glencore SafeWork Fatal Hazard Protocols or appropriate management plans must be applied. Capital expenditure will be justified to achieve ALARP.
Risk Rank	Risk Rating	Ownership	Action
17 to 25	High Risk	Divisional / Functional / Operational / Asset Leadership	Install additional HARD and SOFT controls to achieve ALARP. Capital expenditure will be justified to achieve ALARP.
7 to 16	Medium Risk	Operational / Asset Leadership	install additional HARD and SOFT controls if necessary to achieve ALARP. Capital expenditure may be justified.
1 to 6	Low Risk	Operational / Asset Leadership	Install additional controls if necessary to achieve ALARP. Capital expenditure is not usually justified.

Table 3-3 - Risk Control Effectiveness (RCE)

RCE	Guide
Poor or no existing controls	<ul style="list-style-type: none">Significant control gaps or no credible control;Either controls do not treat root causes, are non-existent or, if they exist, they are ineffective;Management has no confidence that any degree of control is being achieved due to poor control design;Very limited or no operational effectiveness.
Require improvement	<ul style="list-style-type: none">Most controls are designed correctly and are in place and effective;Controls may only treat some of the root causes of the risk, and/or are not currently effective and/or there may be an over-reliance on “reactive” controls;Management has doubts about operational effectiveness and reliability;More work is required to improve operating effectiveness.
Satisfactory	<ul style="list-style-type: none">Controls are well designed and appropriate for the risk;Controls are largely “preventative” and address the root causes;Management believes that they are effective and reliable at all times;Nothing more to be done except review and monitor the existing controls.

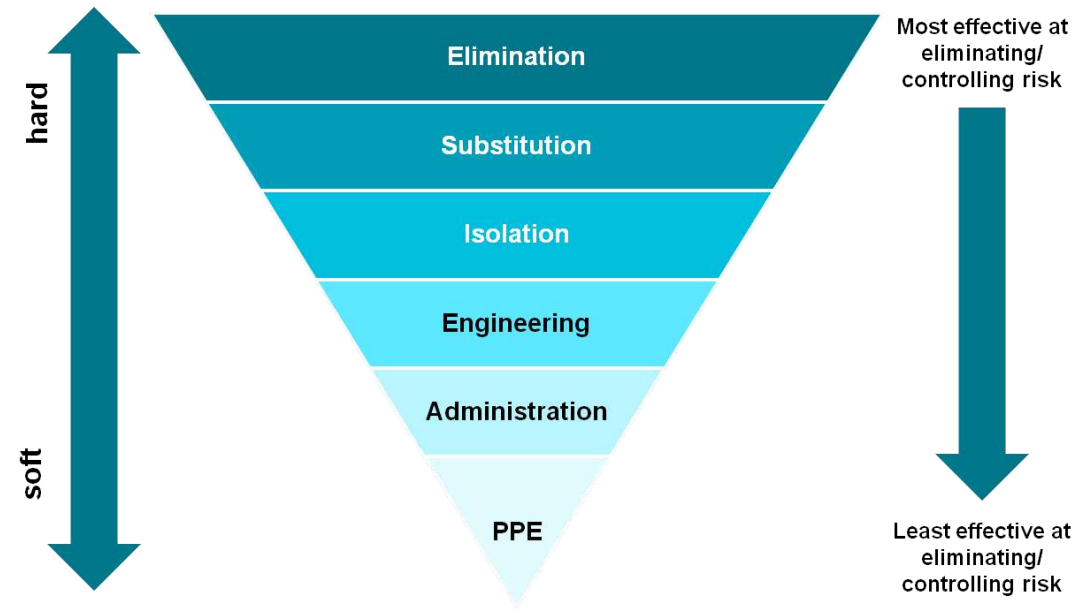


Figure 3-4 – Hierarchy of control

Table 3-4 - Priority for risk treatment authority for continued toleration of risk
(applicable for risk assessment level 3 and 4)

Current risk rank	Action	Timing for authority	Authority for continued toleration of current level of risk
23 to 25	The activity must be stopped immediately until action to reduce the level of risk to less than 23 is undertaken or authority to continue is received.	Immediately to within 24 hours.	CE/COO Notification to CE prior to granting of authority to continue
17 to 22	The activity must be stopped immediately until action to reduce the level of risk to less than 17 is under taken or authority to continue is received.	The activity must be stopped immediately until action to reduce the level of risk to less than 17 is under taken or authority to continue is received.	Directors/COO Notification to COO prior to granting of authority to continue
10 to 16	Take action to reduce the level of risk to less than 10 or authority to continue is received.	Within 1 month.	General Managers / Operations Managers / Project Managers
7 to 9	Take action to reduce the level of risk to less than 7 or authority to continue is received.	Within 1 month.	Superintendents/ Managers / Project Team
1 to 6	Tolerable risk unless circumstances change	Ongoing control as part of a management system.	N/A

APPENDIX D – UNITED COLLIERIES DECOMMISSIONING AND DEMOLITION PLAN

UNITED WAMBO

JOINT VENTURE

GLENCORE



United Collieries Decommissioning and Demolition Plan

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1 Introduction

1.1 Purpose

This Plan has been prepared to provide detail on the decommissioning and demolition of the surface infrastructure associated with the former United Collieries underground mining operations.

1.2 History of Operations

United is located approximately 16 kilometres (km) west of Singleton in the Upper Hunter Valley of New South Wales (NSW) (refer to **Figure 1**). United is owned and operated by United Collieries Pty Limited (United Collieries).

An Authorisation to prospect was granted over part of the existing mining lease in 1980. Development Consent and the mining lease were granted in the early 1980s, with mining operations commencing in 1989.

From July 1989 until July 1992, United Collieries operated a small open cut (including auger mining) extracting the Whynot and Wambo seams.

Underground mining operations commenced in January 1992 within the Woodlands Hill Seam using a continuous miner with shuttle cars. In May 2002, longwall mining commenced at United utilising a continuous shearer, armoured face conveyor and hydraulic roof supports.

The underground mining operations of United lie beneath the United Colliery surface holding and Wambo Open Cut Operations and extend south towards the Wambo Underground.

United processed run of mine (ROM) coal onsite at the Coal Handling and Preparation Plant (CHPP). Product coal was initially hauled by road to Mt Thorley and then trucked via a private haul road to the Wambo coal rail loader, and transported to the port of Newcastle for export.

Due to geotechnical and market constraints, the completion of Longwall 10 in January 2010 exhausted the economically recoverable underground reserves within the approved mining areas in CCL 775. Subsequently, United entered a period of suspension of operations on 4 June 2010.

Consent to continue mining operations under Development Consent DA-410-11-2002-i expired on 31 December 2012. However, Development Consent DA-410-11-2002-i continues to apply for all other respects other than the right to continue mining, until such time as rehabilitation is completed.

Since entering suspension of operations, the key operational activities undertaken at United have been associated with the:

- Salvage of underground plant and equipment, and establishing temporary laydown and storage areas at the pit top prior to sale or recycling of salvaged equipment;
- Decommissioning and removal of underground diesel tanks;

- Rationalisation of pit top hydrocarbon storage infrastructure and depletion of all consumable chemical and hydrocarbon stocks;
- Maintenance of remaining surface facilities;
- Sealing of the underground workings;
- Decommissioning of ventilation facilities;
- Sealing of the borehole at the gas flaring plant; and
- Ongoing environmental management, monitoring, and rehabilitation maintenance.

What the document covers, written as an overview statement, should be short introduction.

2 Future Land Use Options

2.1 United Wambo Project

The United Wambo Open Cut Coal Mine Project - SSD 15_7142 (the Project) combines the existing open cut operations at Wambo with a new open cut coal mine at United. The Project is seeking approval to extract up to 10 million tonnes per annum (mtpa) of Run of Mine (ROM) coal from the combined Wambo Open Cut and United Open Cut. All coal will transported and processed through the Wambo Coal Handling and Processing Plant (CHPP) and transported by rail from Wambo to the Port of Newcastle for export.

United Wambo is a 50:50 joint venture between neighbouring mines operated by United Collieries Pty Limited (United), and Wambo Coal Pty Limited (Wambo). Open cut mining is to be managed by United on behalf of the Joint Venture, whilst Wambo manages the CHPP and train loading facilities as well as Wambo's continued underground operations.

All existing site infrastructure is located within the proposed disturbance boundary for the Project and will be removed. The majority of the infrastructure is located within the footprint of the United Open Cut pit shell. The location of the site infrastructure in relation to the proposed United Open Cut is shown in **Figure 2-1**.

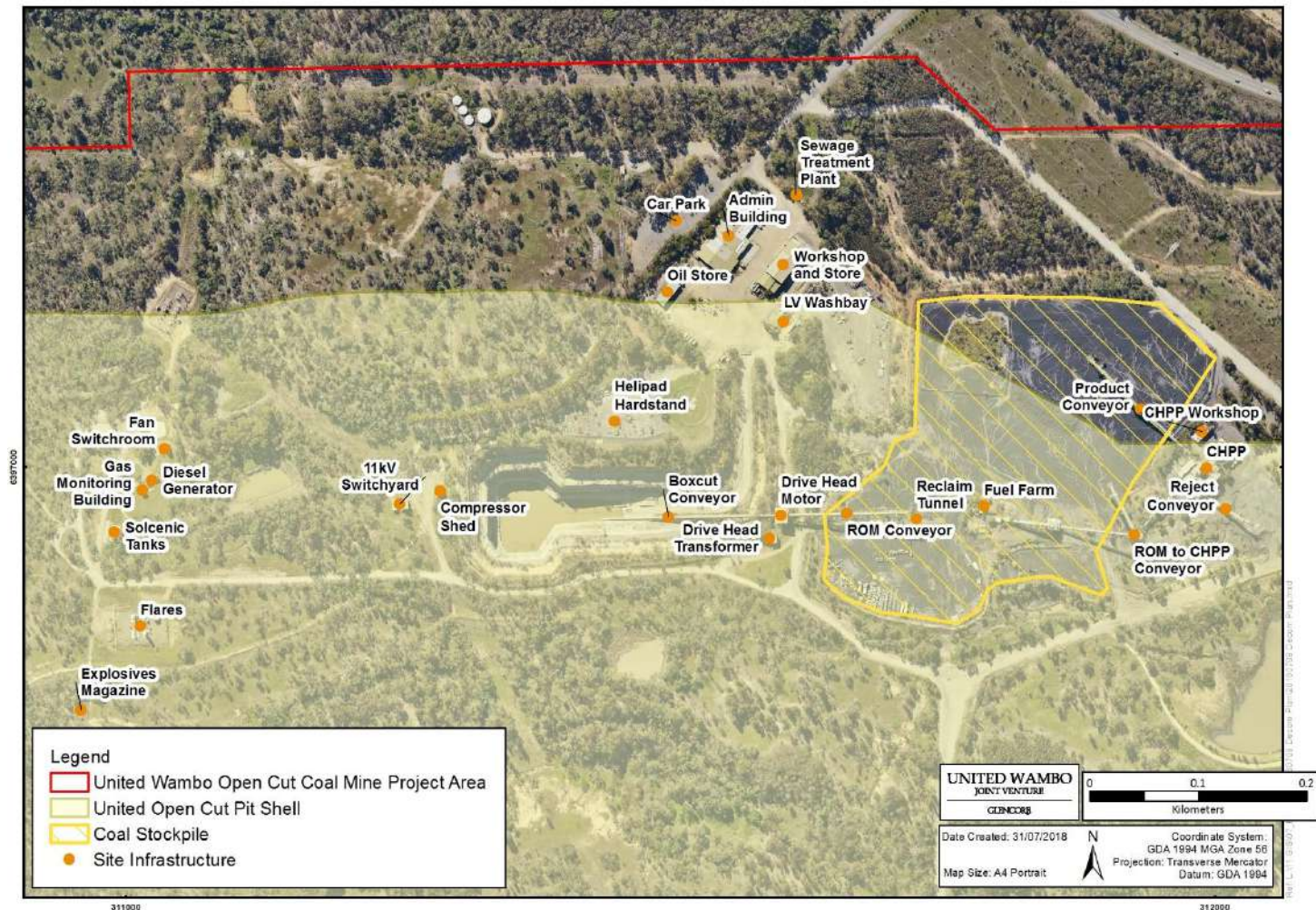


Figure 2-1 - United Collieries Site Infrastructure Locations

2.2 No Future Mining

In the event that the Project is not approved, United will commence detailed mine closure planning. The mine closure process will involve consultation with the community, regulators and other stakeholders to determine the final land use for the Project. This will include identification of any beneficial use for the existing site infrastructure.

Any infrastructure deemed not to have future beneficial use will be decommissioned and demolished by 2025. A detailed schedule will be developed as part of the mine closure planning process.

3 Decommissioning Strategy

Table 3-1 describes the key built infrastructure and services at United Collieries, their proposed future use as part of the Project, methods of decommissioning and the year that they are proposed to be removed should the Project be approved.

Table 3-1 - Proposed Decommissioning Methods

Asset	Proposed Future Use	Decommissioning Methods	Year Removed by the Project
Administration Office Building	The office buildings will be utilised for the Project.	The buildings are not proposed to be removed as part of the Project.	N/A
Box Cut Conveyor	No future use proposed. Section of conveyor currently underwater.	The conveyors will be decommissioned and demolished in accordance with Section 3.1.	2026
CHPP Workshop	No future use proposed	The buildings will be decommissioned and demolished in accordance with Section 3.1.	2024
Coal Handling and Preparation Plant	No future use proposed. The CHPP may be sold to another operation.	The buildings will be decommissioned and demolished in accordance with Section 3.1.	2024
Coal Stockpile Area	Some areas of the coal stockpile area may be utilised as a maintenance and laydown area for the Project. These areas would be used within the first 12 months of the Project.	Scalping of the ROM and product coal stockpile areas will be undertaken. Assessment will be undertaken on the carbonaceous material to determine whether re-processing and recovery of coal is practicable. Should re-processing be determined to be viable, suitable regulatory approvals will be sought. Carbonaceous material not to be re-processed will be transported to the existing Tailings Dams for disposal or will be placed at depth with the Project open cut pits.	2019
Drive Head Transformer	No future use proposed	Transformer is to be removed and reutilised or disposed of.	2026
Flares	The flares will be retained for potential use in gas management of the United underground workings.	The buildings and flares will be decommissioned and demolished in accordance with Section 3.1.	2028
Fuel Farm	No future use proposed	Undertake bio-remediation activities on the site or remove any contaminated material to a suitable licenced treatment facility.	2025

Asset	Proposed Future Use	Decommissioning Methods	Year Removed by the Project
Helipad Hardstand Area	The Helipad Hardstand Area will be used as a laydown are for the Project.	Removal of all equipment and waste stored on hardstand area.	2028
Main Hardstand Area	The Main Hardstand Area will be used as a laydown are for the Project.	Removal of all equipment and waste stored on hardstand area.	2026
Oil Store	The oil store will be utilised as part of the Project.	The buildings will be decommissioned and demolished is accordance with Section X.	2027
Product Conveyor	No future use proposed	The conveyors will be decommissioned and demolished is accordance with Section 3.1.	2025
Reclaim Tunnel	No future use proposed	Excavation of surface material to expose reclaim tunnel. The concrete roof of reclaim tunnel will be demolished and removed. Conveyor from reclaim tunnel will be removed and salvaged.	2025
Reject Conveyor	No future use proposed	The conveyors will be decommissioned and demolished is accordance with Section 3.1.	2024
ROM Conveyor	No future use proposed	The conveyors will be decommissioned and demolished is accordance with Section 3.1.	2025
ROM to CHPP Conveyor	No future use proposed	The conveyors will be decommissioned and demolished is accordance with Section 3.1.	2025
Solcenic Tanks	No future use proposed	Tanks and concrete pad will be removed and disposed of.	2028
Wash Bay	The wash bay will be utilised for the Project.	The wash bay will be decommissioned and demolished in accordance with Section 3.1.	2028
Workshop and Store	The workshop and store will be utilised for the Project.	The buildings will be decommissioned and demolished is accordance with Section 3.1.	2027

Asset	Proposed Future Use	Decommissioning Methods	Year Removed by the Project
Sewage Treatment Plant	The STP will be utilised for the Project.	Disconnect sewage treatment plant, remove spray irrigation infrastructure and demolish sewage treatment plant.	2027
Gas Monitoring Building	No future use proposed	The buildings will be decommissioned and demolished in accordance with Section 3.1.	2028
Switch Room	No future use proposed	The buildings will be decommissioned and demolished in accordance with Section 3.1.	2028
Water Tanks	Tanks supply potable water from use in admin building and non-potable water for use in fire system	The buildings will be decommissioned and demolished in accordance with Section 3.1.	Post 2028
Car Parks And Access Road	Existing access road and car park will be utilised for the Project	Roadways and car parks will be removed (unless required for a post mining land use) with inert waste material (e.g. bitumen, concrete) being placed and capped in the tailings/overburden emplacement areas.	Post 2028
Electricity Supply and Distribution Infrastructure	Some existing transmission lines and switch yards will be utilised for the Project.	Electrical infrastructure will be decommissioned and removed progressively over the life of the Project as they no longer become required.	From 2019
Explosive Magazine	No future use proposed	The buildings will be decommissioned and demolished in accordance with Section 3.1.	2028
Sealed and Unsealed Roads	Some existing roads will be utilised for the Project.	Internal roads will be decommissioned progressively over the life of the Project as they no longer become required.	From 2019
Pipelines	Some existing pipelines will be utilised for the Project.	Pipelines will be decommissioned and removed progressively over the life of the Project as they no longer become required.	From 2019

3.1 Decommissioning and Demolition of Built Infrastructure

The decommissioning of built infrastructure will generally include the following:

- Updating the HSEC Management Plan as required;
- Liaising with service providers for scheduling;
- Decommissioning, depressurising and isolating energy sources;
- Diverting services where required;
- Purging service lines air, water, fuel, etc.;
- Identification and removal of hazardous materials;
- Draining and bleeding tanks, lines, machinery, storage vessels, motors, etc.;
- Removing redundant cabling, conduits, pipework, etc. as appropriate;
- Recording disconnection of services and completed decommissioning activities e.g. purged vessels, disconnected electricity;
- Salvaging items, plant and infrastructure;
- Disposing of decommissioning wastes; and
- Updating the site service plan as required.

Demolition of identified infrastructure to be removed will generally be undertaken as follows:

- Type 3 demolition survey and removal of hazardous materials including asbestos as per HAZMAT Plan;
- Development of detailed demolition project management plans to address key aspects including quality, waste management, hazmat, traffic management and health and safety;
- Mobilisation of plant and equipment to the various sites requiring demolition;
- Site establishment including installation of safety signage, temporary fencing, etc.;
- Risk assessment prior to commencement and determine structural engineering requirements where applicable;
- Segregating and recovering scrap and salvage materials as practicable for recycling, etc.;
- Demolition of above ground fixed plant and infrastructure down to ground level, and removal of hardstands and footings to a depth of 1.5m;
- General site grading upon completing removal of footings;
- Segregation of demolition wastes and debris to facilitate disposal to licenced offsite landfill and/or burial in the open cut pits; and

- Demobilisation of plant and equipment.

All demolition work will be carried out in accordance with *AS2601-2001: The Demolition of Structures* or its latest version.

3.2 Decommissioning and Demolition of Roads

Roadways and car parks will be removed (unless required for a post mining land use) with inert waste material (e.g. bitumen, concrete) being placed and capped in the tailings/overburden emplacement areas.

4 Environmental Management

4.1 Contaminated Land

A Phase 2 contamination assessment was undertaken in 2010 in preparation for the suspension of operations. The Phase 2 assessment was generally undertaken within the pit top area of the site. A Remediation Action Plan was developed and implemented to remove contaminated soils.

A Phase 1 contamination assessment was undertaken in 2017 for the entire United Collieries site. The Phase 1 assessment identified areas that have a potential to be contaminated. These areas will be the focus of more detailed assessment prior to decommissioning.

Prior to decommissioning, United will undertake a detailed Phase 2 assessment of the infrastructure locations. Any contamination present will be removed and either remediated onsite or transported to an appropriately licenced facility.

4.2 Surface Water

Existing site surface water management infrastructure will remain in place during the decommissioning stage to contain any potential dirty water runoff. The water management infrastructure will continue to be maintained and managed in accordance with the existing program, and monitored as per the relevant site management plans to ensure that it is effective at treating upslope runoff.

4.3 Waste

Waste generated during the decommissioning and demolition of site infrastructure will be managed in accordance with **Table 4-1**.

Table 4-1 - Waste Management Matrix

Waste Material/ Source	Waste Component	Regulatory Classification	Collection Process	Management/ Destination	Tracking/ Licence Requirement
Light vehicle tyres	Rubber & steel	Special waste, tyres	Stockpile	Repair or disposal to landfill	Tracking not required if disposed of in NSW.
Earthmoving vehicle tyres	Rubber & steel	Special waste, tyres	Stockpile (300t max)	Repair or disposal to landfill or approved in-pit area	Tracking not required if disposed of in NSW. EPA approval required for in-pit disposal
Coolant	Glycol	Liquid	Collection by contractor	Reused by supplier	Tracking required
Oil	Hydrocarbons	Liquid	Collect in oil trolleys, oil water separators, collection by contractor	Recycled	Tracking required. Waste data form and consignment authorisation number not required if destined for recycling
Scrap steel	Steel	General solid waste (non- putrescible)	Collect in scrap steel bins for collection by contractor	Re-smelted and recycled	Tracking not required
Scrap timber, Timber Pallets	Timber	General solid waste (non- putrescible)	Collect in scrap timber bin for collection by contractor	Recycled for re- use	Tracking not required
Batteries (wet cell)	Lead, acid & plastic	Hazardous	Store on spill proof pallets under cover for collection by contractor	Re-smelted and recycled or landfill	Tracking required
Grease	Hydrocarbons	Hazardous	Collect in sealed 205 L drums and store on banded pallets	Recycled or disposed to a licensed landfill	Tracking required

Waste Material/ Source	Waste Component	Regulatory Classification	Collection Process	Management/ Destination	Tracking/ Licence Requirement
General waste	Plastics, paper, metals & glass	General solid waste (putrescible)	Environmental bins	Recycled or disposed to landfill	Tracking required
Oily rags	Rags & hydrocarbons	Hazardous	Oily rag carts	Disposed to restricted landfill	Tracking required
Oily water from wash down bay	Hydrocarbons & water	Liquid	Oily water tank	Recycled for re- use	Tracking required
Hydraulic hoses	Hydrocarbon, steel & rubber	Hazardous	Collect in hydraulic hose bin for collection by contractor	Disposed to landfill	Tracking required
Sharps & medical waste	Metals & plastics	Special waste, Clinical Hazardous	Sealed container	Micro-wave decontamination, shredded and disposed of at secured landfill	Tracking not required
Septic	Solids	Special waste, Clinical Hazardous	Storage tanks for collection by contractor	Off site Sewage treatment Plant	Tracking not required
Contaminated soil	Hydrocarbons	Hazardous	Collect in a sealed bin for collection by contractor	Disposed to landfill, restricted landfill or hazardous landfill	Tracking required
Empty drums & containers (grease, oil, chemicals)	Steel, plastic & hydrocarbons	Hazardous	Collect and store on site for collection by contractor	Steel re-smelted and recycled. Oil, grease & chemical reused by supplier	Tracking required
Paper & Cardboard	Paper & Cardboard	General solid waste (non- putrescible)	Collect and store on site for collection by contractor	Recycled	Tracking not required
Sediment from sediment dams (no contamination)	Sediment/ soil (no free liquid)	General solid waste (non- putrescible)	Stockpiled and disposed on site	Co-disposal with overburden in overburden emplacement areas	Tracking not required

Waste Material/ Source	Waste Component	Regulatory Classification	Collection Process	Management/ Destination	Tracking/ Licence Requirement
Sediment (hydrocarbon contaminated)	Hydrocarbons	Hazardous	Stockpiled in lined & bunded area for treatment or collection by contractor	Disposed to landfill, restricted landfill or hazardous landfill	Tracking required

4.4 Rehabilitation

If the Project is approved, the decommissioned infrastructure will be removed and mined through by the United Open Cut. Temporary rehabilitation may be undertaken in the event that there is a substantial period of time between demolition and disturbance for mining.

If the infrastructure is removed as part of the mine closure process, the sites will be rehabilitated to the approved final land use as per the MOP. Rehabilitation will be undertaken immediately following the removal of the infrastructure.

5 Document Information

5.1 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 5-1** below. Example detail shown below.

Table 5-1 – Change Information

Version	Date	Change Summary
1.0	17 August 2018	New document