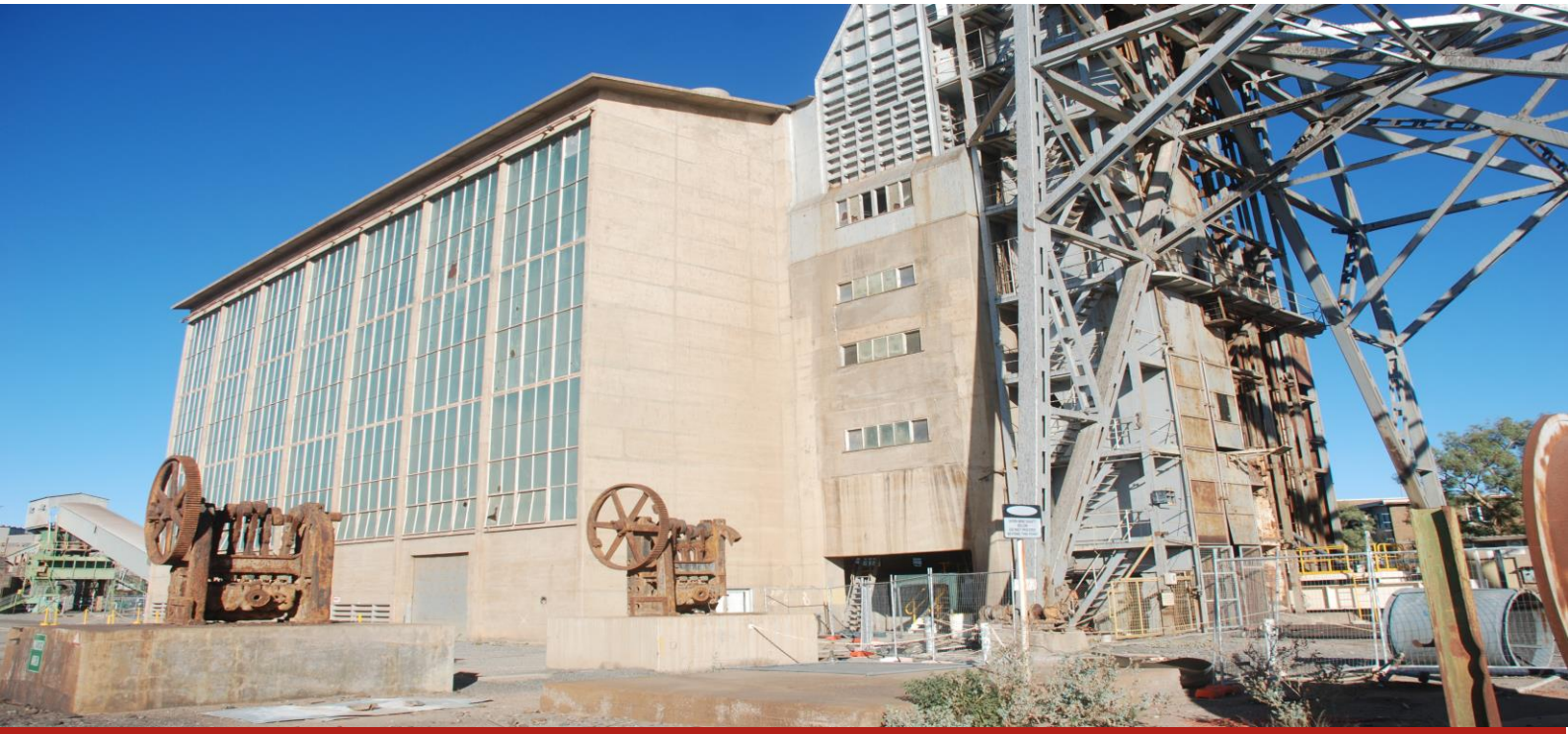
perilya

ABN: 46 099 761 289



Rehabilitation Management Plan

for the

Broken Hill North Mine

Prepared by:

RWCorkery&co

July 2023

ACKNOWLEDGEMENT

R.W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands comprising NSW and Australia on which our projects are located. We appreciate the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.

ABN: 46 099 761 289

Rehabilitation Management Plan

for the

Broken Hill North Mine

Prepared for:

Perilya Broken Hill Limited
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Summary Table

Name of Mine		Broken Hill North Mine		
RMP Commencement Date		1 August 2022		
Mineral Authorities		CML 4	**Expiry Date**	23 June 2024
		CML 5		06 June 2038
Name of Leaseholder		Perilya Broken Hill Limited (ABN: 46 099 761 289)		
Version	**Author**	**Purpose**	**Approved by**	**Date of Submission**
1	J. Flanagan	Rehabilitation Management Plan	G. Hender	19 May 2021
2	A. Weihart	Rehabilitation Management Plan	G. Hender and J. Hannigan	8 August 2022

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LIST OF ACRONYMS

AHD	Australian Height Datum
AMD	acid mine drainage
BHRSC	Broken Hill Rehabilitation Steering Committee
CML	Consolidated Mining Lease
DA	Development Application
DPIE	Department of Planning, Industry and Environment
EC	electrical conductivity
EFA	ecosystem function analysis
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
LFA	landscape function analysis
LEP	Local Environmental Plan
ML	Mining Lease
MOP	Mining Operations Plan
NAF	non-acid forming
NAG	net acid generation
NSW	New South Wales
PAF	potentially acid forming
PCT	plant community type
RMP	Rehabilitation Management Plan
ROM	run-of-mine
SHHMP	Strategic Historic Heritage Management Plan
TARP	Trigger Action Response Plan
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
WRE	waste rock emplacement
XRD	x-ray diffraction
XRF	x-ray fluorescence

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1. Introduction to Mining Project

This Rehabilitation Management Plan (RMP) has been prepared in accordance with the following documents and guidelines.

- *Form and Way: Rehabilitation Management Plan for Large Mines (July 2021).*
- *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines (July 2021).*
- *Guideline 1: Rehabilitation Risk Assessment (July 2021).*
- *Guideline 2: Rehabilitation Records (July 2021).*
- *Guideline 3: Rehabilitation Controls (July 2021).*
- *Guideline 5: Rehabilitation Objectives and Rehabilitation Completion Criteria (July 2021).*

1.1 History of Operations

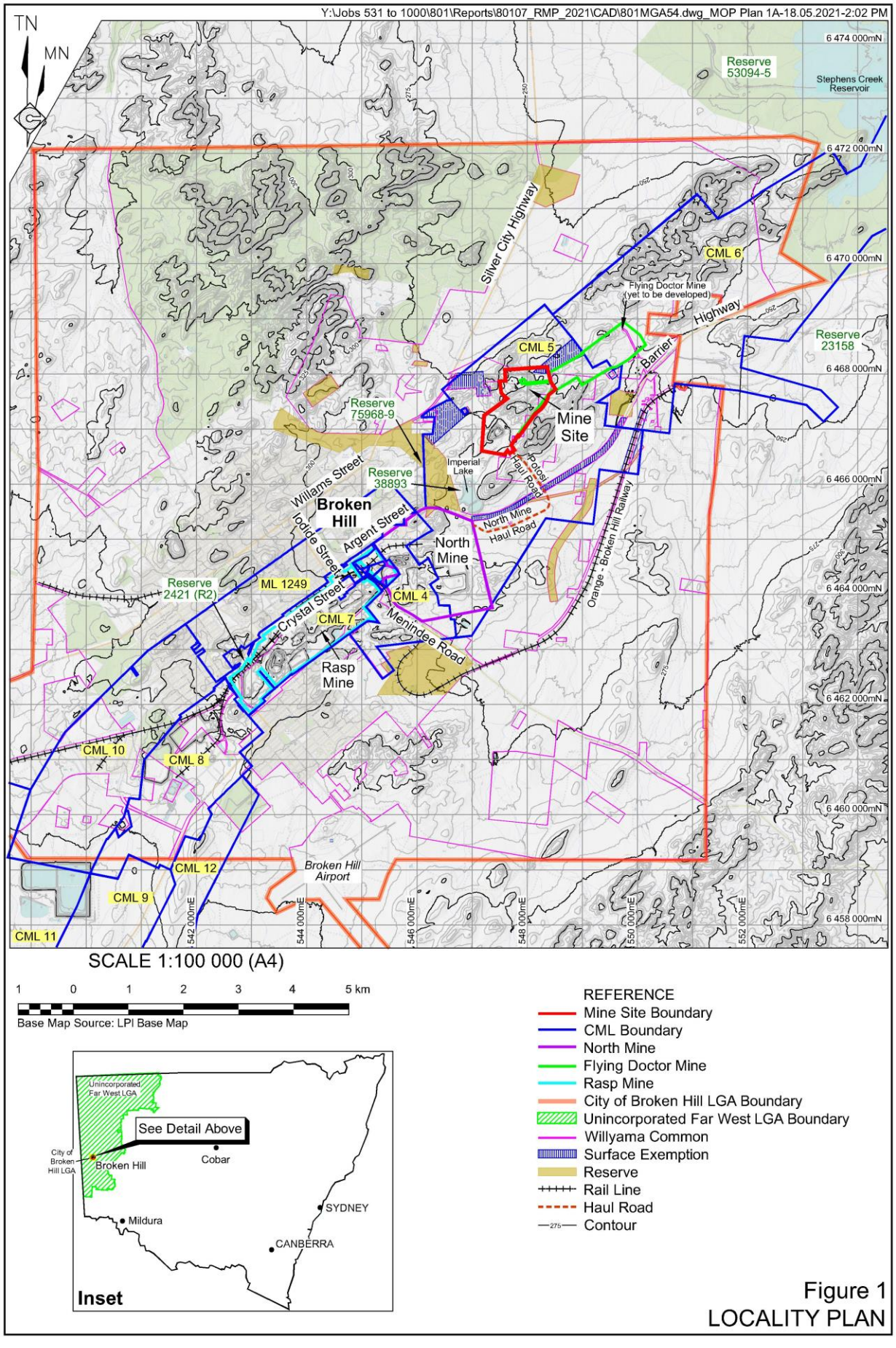
The Broken Hill North Mine (the Mine) is located immediately southeast of Broken Hill on the Line of Lode (**Figure 1**). The Mine is owned and operated by Perilya Broken Hill Limited (the Company). The Company, a wholly owned subsidiary of Perilya Limited, acquired the Mine from Pasminco Limited in 2002.

All activities associated with the Mine are undertaken within an area identified as the "Mine Site" (**Figure 2**). The Mine Site is located within Consolidated Mining Leases (CML) 4 and 5 and is situated adjacent to the Barrier Highway and Menindee Road. Under SSD 7538, the current approved life of the Mine is 25 years from the commencement of construction, with SSD 7538 continuing to apply during rehabilitation operations following the cessation of mining operations.

1.1.1 Discovery of the Line of Lode – pre-1900

Charles Rasp collected the first mineral samples from the Line of Lode. On 21 September 1883, Rasp and six other collaborators were granted seven 40 acre leases along the Line of Lode and in 1885 the Broken Hill Proprietary Company was formed. High metal concentrations funded rapid development of the Line of Lode, with a rail line constructed in 1884 to connect Broken Hill to Port Pirie and concentrating plants constructed in 1889.

"Block 17", located at the northeastern end of the original Line of Lode leases, was pegged in 1883 and was known originally as the "Cosmopolitan Mine". The Mining Lease was sold to the Broken Hill North Silver Mining Company in 1885 and was renamed as the "North Mine". Two shafts were sunk and carbonate ore was discovered in 1888. A concentrator to treat the carbonate ore was constructed on site in 1890. However, in 1894, easily treatable carbonate ore was largely exhausted and the operators were unable to treat the sulphide ore. As a result, operations ceased and the mine was sold to Broken Hill North Silver Mining NL. The North Mine was worked intermittently until approximately 1902 when operations ceased.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TN
MN
6 474 000mN
6 472 000mN
6 470 000mN
6 468 000mN
6 466 000mN
6 464 000mN
6 462 000mN
6 460 000mN
6 458 000mN
542 000mE
544 000mE
546 000mE
548 000mE
550 000mE
552 000mE
Reserve 53094-5
Stephens Creek Reservoir
Silver City Highway
CML 6
Flying Doctor Mine (yet to be developed)
Barrier Highway
CML 5
Reserve 23158
Reserve 75968-9
Mine Site
Imperial Lake
Haul Road
Reserve 38893
Williams Street
Broken Hill
Iodide Street
Argent Street
North Mine
North Mine Haul Road
Orange - Broken Hill Railway
Reserve 2421 (R2)
ML 1249
CML 4
Crystal Street
CML 7
Menindee Road
Rasp Mine
CML 10
CML 8
CML 12
CML 9
CML 11
Broken Hill Airport
SCALE 1:100 000 (A4)
1 0 1 2 3 4 5 km
Base Map Source: LPI Base Map
Unincorporated Far West LGA
See Detail Above
City of Broken Hill LGA
Broken Hill
Cobar
Mildura
SYDNEY
CANBERRA
Inset
REFERENCE
Mine Site Boundary
CML Boundary
North Mine
Flying Doctor Mine
Rasp Mine
City of Broken Hill LGA Boundary
Unincorporated Far West LGA Boundary
Willyama Common
Surface Exemption
Reserve
Rail Line
Haul Road
Contour
Figure 1
LOCALITY PLAN

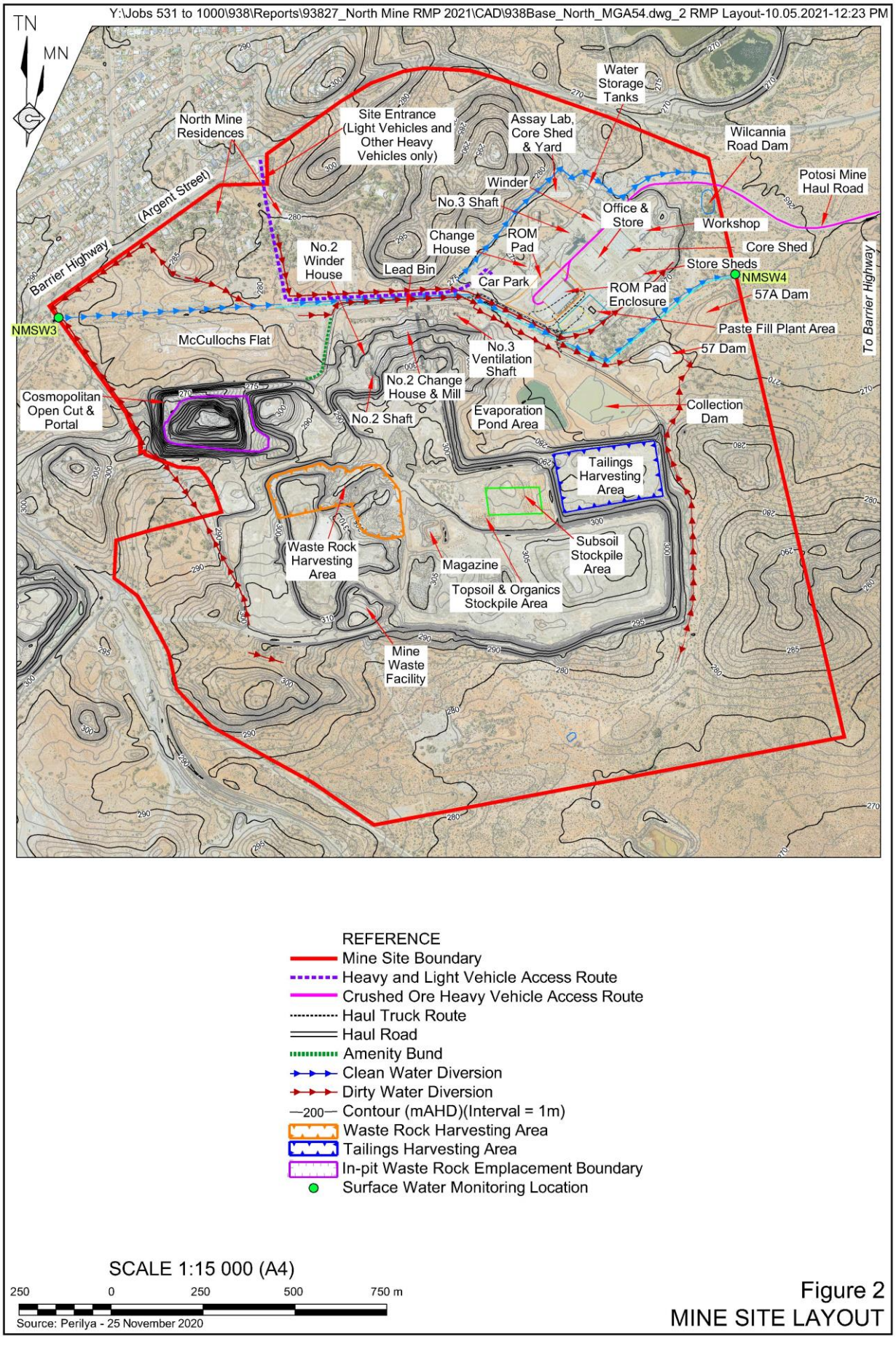


Figure 2
MINE SITE LAYOUT

1.1.2 Mining Operations – 1900 to 1914

Several zinc concentration techniques were trialled in at Broken Hill mines in the early 1900s, including a pilot treatment plant at the North Mine constructed in 1905. The new processing techniques were a breakthrough that allowed more complex ores at greater depths at Broken Hill to be processed, as well as allowing the reprocessing of tailings.

Between 1907 and 1909 there was an extensive reconstruction of the North Mine, including a new mill, electrical plant, boilers, offices, and ventilation fans, allowing mining at greater depth. No. 1 Shaft at the Broken Hill North Mine was worked in the early 1900s. By 1912, mining was occurring at a depth of approximately 1 400 feet (425m).

1.1.3 Mining Operations – 1914 to 1945

The commencement of Word War 1 caused a dramatic cut in production at Broken Hill due to sales of concentrate to Germany ceasing. To allow continuing production, a cooperative, including the Broken Hill North Mine, was set up to purchase the Port Pirie smelters to refine lead and zinc, enhancing mineral processing capacity. In addition, a long-term contract was secured to sell product to the British Government. In 1918, the North Mine erected its own flotation mill, and during the 1920s and early 1930s acquired surrounding mines, securing an important section of the Line of Lode. As the company expanded, lease holdings were pushed to the northeast, with a further shaft (No. 2 Shaft) completed at the North Mine in 1934. During the 1930s, No. 1 Mill was extensively refitted to install an all-flotation process, a crusher was erected, and a new mill (Mill No. 2) was constructed.

New contracts to sell zinc, including from the North Mine, were secured in 1930, and a central power supply for Broken Hill mines was commissioned in 1931. Rail infrastructure continued to be developed during this period.

World War 2 resulted in substantially less disruption to mining operations in Broken Hill than World War 1, with adequate manpower the principal constraint. At the end of World War 2, the North Mine, Broken Hill South and the Zinc Corporation were the only operational mines in Broken Hill.

1.1.4 Mining Operations – 1945 to 2002

A further shaft at Broken Hill North Mine, No. 3 shaft, was constructed between 1948 and 1956, with the first working level at 3 070 feet (935m). Mining operations were relocated to the area around No. 3 shaft, including construction of a ventilation shaft, conveyors, and surface workshops, offices, and amenities. Mining remained focussed on developing the Line of Lode to the north.

In 1958, the No. 2 Mill was modified to an all-flotation process.

In 1976, the North Mine was restructured, becoming North Broken Hill Holdings Limited. The Company merged with the Australian Smelting and Mining Company in 1988 to form Pasminco Limited, with assets including three zinc mines and three smelters in Australia.

Most of the infrastructure at the No. 1 Mill was demolished to allow development of an open cut mine in 1990. The Fitzpatrick area, a newly discovered ore body located at depth and to the north of the previous workings, kept the mine operating until the mid-1990s. Mining ceased at the North Mine in 1998. Pasminco became insolvent, and in 2002 Perilya Limited acquired Pasminco's Broken Hill assets, including the North and South Mines.

1.1.5 Mining Operations – 2002 to Present

Between 2003 and 2008, the Company operated the North Mine under DA54/2003 granted by Broken Hill City Council on 6 March 2003. The consent permitted the following activities.

- Underground mining operations within the upper levels of the existing mine for a period of approximately two years.
- Crushing of the ore within the existing Cosmopolitan Open Cut.
- Transportation of crushed ore to the Company's Broken Hill Southern Operations via the existing rail network.

The North Mine was placed under care and maintenance following operational restructuring in August 2008.

Since the completion of activities under DA54/2003 in 2008, the North Mine has been under care and maintenance. Activities undertaken within the Mine Site have been consistent with those permitted under the rights conferred by CML4 and CML5 and have included the following.

- maintenance of surface and underground infrastructure, including pumps, electrical infrastructure, security fencing, etc; and
- use of buildings for the storage of drill core and maintenance of vehicles.

Approval was granted by the then Division of Resources and Energy on 5 April 2016 for prospecting activities within CML4 and CML5. The purpose of the proposed activities is to:

- permit further drilling to define the extent of remanent ore within the upper sections of the mine; and
- to enable extraction of a bulk sample for metallurgical and other testing at the Southern Operations.

An Environmental Impact Statement (EIS) for the recommencement of mining operations at the Mine was prepared in February 2017 and SSD 7538 was subsequently granted on 22 December 2017. Two modifications have since been made to SSD 7538, with the most recent modification (Modification 2 (MOD2)) being granted on 31 July 2019. Operations currently approved under SSD 7538 include the following.

- Mining operations for a period of 25 years (i.e. until December 2042), with rehabilitation operations to occur beyond this if required.
- Extraction of up to 4.2 million tonnes of ore over the life of the Mine.
- Extraction, crushing and transportation of up to 300 000 tonnes of ore per year.

- Generation of up to 32 ore laden truck movements per day, 4 ore laden truck movements per hour and 16 ore laden truck movements per day when averaged over a calendar year.
- Remediation of the existing Cosmopolitan access ramp, portal and decline to the 12 Level (the limit of the existing decline) to facilitate safe and efficient access to the underground workings.
- Restoration of and upgrades to existing electrical, ventilation, air and water services, including on surface and within the decline, No. 2 and No. 3 Shafts, No. 3 Vent Rise.
- Extension of the existing decline from the 12 Level to link with the existing decline between the 32 Level and the 38 Level.
- Exploration drilling from underground to further define remnant ore and identify additional ore lenses and lodes.
- Development of access drives to permit access by modern mining equipment.
- Extraction of remnant ore and ore below the base of previous mining operations, including within the Fitzpatrick Area.
- Transportation of extracted ore to the surface ROM Pad enclosure, a sealed, negative pressure building equipped with a dust collection system, using underground haul trucks, including establishment of a haulage route.
- Transportation of extracted waste rock for placement either within completed stopes underground or within the in-pit waste rock emplacement in the Cosmopolitan Open Cut.
- Extraction of waste rock from the existing surface waste rock emplacement for transportation back underground as required.
- Extraction of tailings from a former Tailings Storage Facility for mixing with water and cement in a pastefill plant for use backfilling completed stopes.
- Re-establishment of surface infrastructure required to support the mining operation, including a ROM pad, office and store, workshop and fuel store, change house and car park, services (power, water, air and communications), surface magazine and ancillary infrastructure.
- Crushing of stockpiled ore within the ROM Pad enclosure using a mobile crusher.
- Loading and transportation of crushed ore to the Southern Operations using A-double road trains via the approved transport route, namely the Potosi Mine Haul Road, Barrier Highway, Iodide Street, Crystal Street and Gypsum Street.
- Processing transported ore within the Southern Operations Concentrator under the continuing use rights held for that operation.
- Dewatering of existing workings and transferal of that water to on-site evaporation ponds or the Southern Operations.

1.1.6 Rehabilitation

1.1.6.1 Historic Rehabilitation Outcomes

Historically, rehabilitation and revegetation works have been completed at the Mine Site and at the Company's Southern Operations site in Broken Hill by the previous Mine operators. These attempts have typically focused on revegetation through the establishment of large trees which are not endemic to the Broken Hill region and are therefore not adapted to survive the range of climatic conditions likely to occur over extended periods. Past efforts have typically also relied upon the installation of irrigation systems to support the establishment and development of revegetated areas.

Whilst the approach adopted by previous mine operators did result in the establishment of tree plantations (and orchard areas at the Company's Southern Operations site), the long-term survival of vegetation in these areas was not possible in the absence of active irrigation. Prolonged drought periods which are characteristic of Broken Hill have ultimately resulted in mortality events as active irrigation and replacement following mortality events have not been maintained (**Plate 1**). Additionally, regeneration following natural mortality during extreme climatic conditions has been limited due to the absence of species which are capable colonising and becoming established without active human intervention.

Photo date: 25 February 2021

Plate 1 Dead trees including eucalyptus and casuarina species within a previously irrigated trial section of McCulloch's Flat following multiple drought periods

Areas in the northern portion of the Mine Site which abut Argent Street and the Barrier Highway have also previously been revegetated using a combination of seed dispersal and seedling planting. The establishment of vegetation in these areas relied upon the installation of reticulated

irrigation systems to deliver water. Following the cessation of irrigation, drought periods and other extreme climatic conditions resulted in the mortality of most trees planted in these areas. Vegetation which has persisted in these areas is largely dominated by chenopod shrubland characteristic of remnant vegetation in the Broken Hill region.

1.1.6.2 2007 Rehabilitation Review

In 2007, the Company conducted a review of existing rehabilitation trials and previous rehabilitation attempts at the Mine and the Company's Southern Operations site (**Figure 1**) (Theoharidis, 2007). The review was conducted as part of the broader implementation of a progressive rehabilitation plan which commenced in 2006, as well as a review of the rehabilitation efforts of the previous mine operator Pasminco Mining Broken Hill. At the time of the review, Theoharidis (2007) reported that most, if not all, of the previous operators' efforts had failed due to poor species selection and inappropriate rehabilitation techniques.

The 2006 rehabilitation plan involved six sites surrounding the North Mine and Southern Operations mine sites which were planted using a combination of direct seeding (including hydromulch) and tube stock, with irrigation systems installed to support vegetation establishment. Theoharidis (2007) reported a 60% success rate after the first summer following seeding and planting, noting that extreme weather and climate events including drought and thunderstorms contributed to a lower than expected success rate.

Theoharidis (2007) identified the following key threats to rehabilitation success based on the review of past rehabilitation efforts.

- Failure to secure a supply of seed and planting material from local producers meant that sources from outside of Broken Hill (and NSW) had to be secured.
- An extreme weather event (50mm rain in 1 hour), combined with poor site drainage, led to a significant loss of seed, plant and hydromulch material at one or more sites.
- Damage to rehabilitation areas from members of the public.
- Damage to rehabilitation infrastructure (irrigation lines) from wildlife activity.
- Failure to consider soil salinity variation in species assemblages.
- Lack of effective weed control programs.
- Issues with growth medium, including insufficient organic matter.
- Soils unable to support heavy equipment required to undertaken rehabilitation activities.

The results of these studies have been used to guide the rehabilitation processes and management and mitigation strategies employed as part of this Plan, with particular focus on the need for effective species selection, weed and pest monitoring and control and strategic ground preparation and rehabilitation planning.

1.1.6.3 Rehabilitation of Slopes

Preliminary rehabilitation of the Waste Rock Emplacement (WRE) at the Company's Potosi Mine, including profiling of final batter slopes and the spreading of growth medium resources, was undertaken by Pasminco in 2000 prior to the acquisition of the site by the Company. Large sections of the Potosi WRE subsequently experienced substantial erosion in the form of gullying because of concentrated rainfall runoff flowing down exposed soil surfaces (**Plates 2** and **3**). In some sections of the Potosi WRE batters, erosional gullies achieved depths exceeding 450mm and exposed underlying waste rock material following the erosion of overlying subsoil and topsoil.

Plate 2 Erosion on the Batter of the Potosi WRE

Plate 3 Erosion on the Batter of the Potosi WRE

Source: Perilya Broken Hill Limited

The depth of topsoil and subsoil resources applied to the Potosi WRE batters (i.e. up to 1m in some areas), combined with the dispersive nature of this material and the absence of vegetation, was identified as a key issue contributing to erosion of the batter surfaces. This issue was addressed by the Company in 2017 and 2018 through the removal of excessive growth medium from these surfaces and the retention of a shallower growth medium profile with a depth of between 150mm and 250mm.

Additionally, the Potosi WRE batters were reprofiled and contour ripped to reduce surface water sheet flow velocity and to integrate the topsoil into the rip lines, thereby creating "run-on" zones to capture both runoff and any sediment prior to the establishment of vegetation (**Plates 4** and **5**).

Source: Google Earth – Imagery date: 03/07/2019

Plate 4 **Aerial view of the Potosi WRE (January 2019) following reprofiling and contour ripping of batters**

Photo date: 25 February 2021

Plate 5 **Contour ripping and integration of growth medium into underlying waste rock material on the eastern Potosi WRE batter**

1.1.6.4 Southern Operations Tailings Storage Facility (TSF) Rehabilitation

An Ecosystem Function Analysis (EFA) assessment was undertaken in December 2020 by GHD Pty Ltd (GHD) in the vicinity of the North Mine and the Company's Southern Operations Mine. This assessment included the establishment of 11 analogue (i.e. control) sites in undisturbed areas (see Section 8.1) in addition to 10 rehabilitation monitoring sites on the rehabilitated surfaces of TSF structures within the Southern Operations mine site. The resulting report is hereafter referred to as GHD (2020). The analogue sites represent a target against which rehabilitated areas can be compared when assessing rehabilitation performance against the rehabilitation completion criteria (see Section 4.1).

The results of GHD (2020) indicate that rehabilitated surfaces of the TSF landform:

- are functioning to a similar level from a floristic, landscape and ecosystem perspective compared to areas of surrounding remnant vegetation;
- were, on average, similar in both cover and richness for native flora species compared to analogue sites; and
- displayed similar or better levels of Landscape Organisation Index and Site Soil Assessment indices compared to analogue sites.

1.2 Current Development Consents, Leases and Licences

Table 1 presents the current development consents, leases, and licenses for the Mine.

Table 1
Current Development Consents, Leases, and Licenses

Page 1 of 2

Consent, Lease or Licence	Authority	Issue Date	Expiry Date	Comment(s)
SSD 7538	NSW Department of Planning, Industry, and Environment	22/12/2017	Approved Mine life of 25 years (plus additional years for rehabilitation operations).	Modification 1 (MOD 1) – 7 September 2018. Modification 2 (MOD 2) – 31 July 2019.
CLM 4	NSW Department of Industry – Trade and Investment	08/07/1987	23 June 2024	Area: 278.4ha
CML5	NSW Department of Industry – Trade and Investment	08/07/1987	6 June 2038	Area: 1336.4ha. An application to vary CML5 to include two ancillary mining activities was granted on 23 December 2020.[1]
EPL 2683	NSW Environment Protection Authority	20/04/2000	Renewed Annually	

Table 1 (Cont'd)
Current Development Consents, Leases, and Licenses

Consent, Lease or Licence	Authority	Issue Date	Expiry Date	Comment(s)
Temporary Licence over Wilyama Common for Sediment Basin and ROM Pad	Broken Hill City Council	20/12/2010	-	Expires following removal from Mining Lease.
Excavation – Groundwater WAL40959	Department of Primary Industries – Office of Water	17/11/2016	-	Associated works approval: 60WA583325 (Issued 11 May 2016 and expires 10 May 2026).
EL 6774	Department of Planning, Industry and Environment	08/05/2007	31/10/2023	Area: 6 units
EL 6689	Department of Planning, Industry and Environment	02/01/2007	02/01/2023	Area: 24 units
EL 5879	Department of Planning, Industry and Environment	25/07/2001	31/10/2023	Area: 5 units
Note 1: Ancillary mining areas include the maintenance, use and rehabilitation of the existing Sediment Control Dam and ROM Pad areas (see **Figure 2**).				

1.3 Land Ownership and Land Use Figures

Table 2 presents the land ownership for land within and adjacent to the Mine Site. In summary, land within the Mine Site consists of Crown land owned by the State of NSW and Crown land owned by the State of NSW and managed by Broken Hill City Council as part of the Willyama Common. Land adjacent to the Mine Site consists of:

- Crown land owned by the State of NSW;
- Crown land owned by the State of NSW and managed by Broken Hill City Council as part of the Willyama Common;
- land within the Orange – Broken Hill railway corridor owned by the State Rail Authority of NSW;
- urban and residential land within Broken Hill owned by various private and commercial landowners; and
- various Crown road reserves.

Land uses within the Mine Site include the following.

- Mining activities associated with the Mine, including underground and open cut mining infrastructure.
- Mine-related residences, collectively referred to at the North Mine Residences.

Table 2
Land Ownership

Lot	Deposited Plan	Tenure	Owner	Leases
Mine Site				
7313	1185108	Crown land	State of NSW	CML4 & 5
7314	1185108	Crown land (Willyama Common)	State of NSW	CML5
4143	757298	Crown land	State of NSW	CML5
7318	1185108	Crown land	State of NSW	CML4 & 5
7319	1185108	Crown land	State of NSW	CML5
3870	757298	Crown land (Willyama Common)	State of NSW	CML5
3871	757298	Crown land (Willyama Common)	State of NSW	CML5
Land Adjacent to the Mine Site				
7314	1185108	Crown land (Willyama Common)	Perilya Broken Hill Pty Ltd	CML5
7319	1185108	Crown land	State of NSW	CML5
3333	757298	Freehold	Private landowner	ML1249
3328	757298	Freehold	Private landowner	ML1249
3327	757298	Freehold	Perilya Broken Hill Pty Ltd	ML1249
Barrier Highway road reserve.				
Menindee Road reserve.				

Land uses in the vicinity of the Mine Site include the following.

- Mining activities associated with the Rasp Mine, located to the west of the Mine Site, the Potosi Mine located approximately 2km to the northeast of the Mine Site and the Southern Operations mine site, located approximately 3km to the southwest of the Mine Site.
- Extraction activities associated with the Mawsons Broken Hill Quarry located immediately to the southwest of the Mine Site.
- Residential/urban development located immediately to the north and northwest of the Mine Site within Broken Hill.
- Transportation infrastructure, including the Barrier Highway, Broken Hill – Parkes Railway, Menindee Road and urban streets within Broken Hill.
- Activities associated with the Willyama Common, including nature conservation, recreation, and rangeland agriculture.

1.3.1 Land Ownership and Land Use Figure

Figure 3 presents land ownership for areas within and surrounding the Mine Site. **Figure 4** presents land uses in the vicinity of the Mine Site. **Figure 5** presents vegetation communities within the Mine Site and within the broader Broken Hill region. **Figure 6** presents land zoning in the vicinity of the Mine Site.

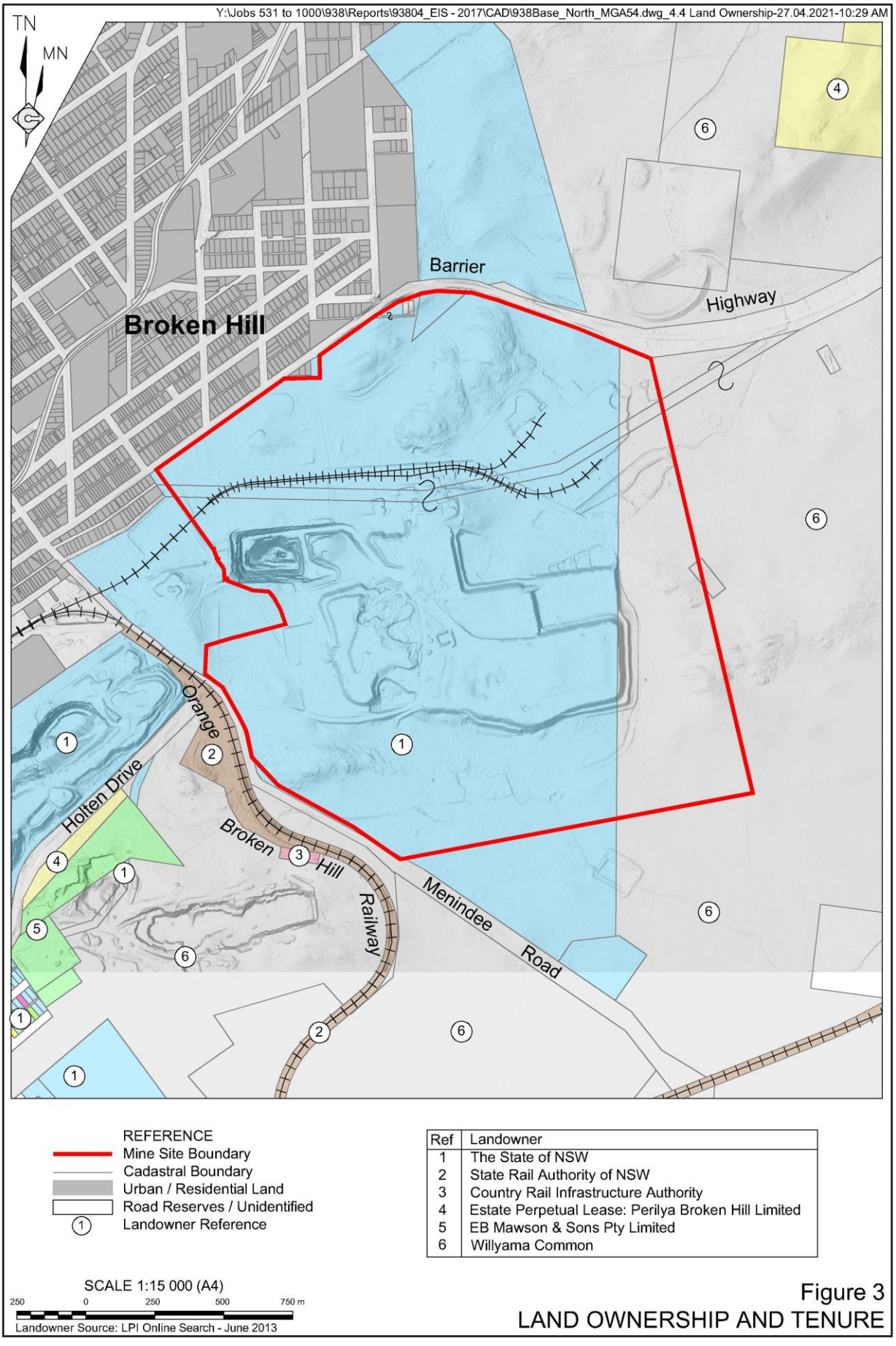
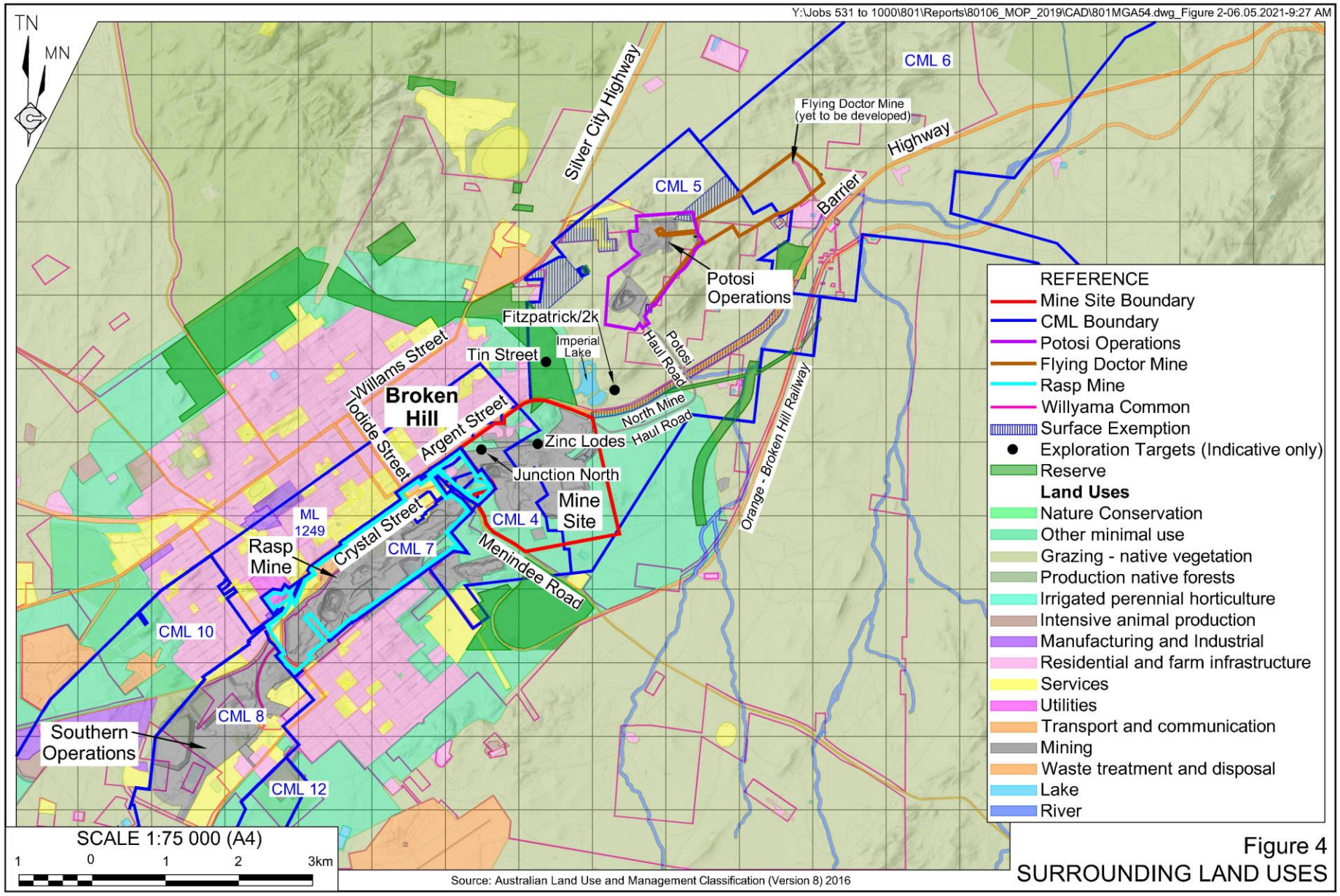


Figure 3
LAND OWNERSHIP AND TENURE


Y:\Jobs 531 to 1000\801\Reports\80106_MOP_2019\CAD\801MGA54.dwg_Figure 2-06.05.2021-9:27 AM
TN
MN
Silver City Highway
CML 6
Flying Doctor Mine
(yet to be developed)
Highway
CML 5
Barrier
Potosi
Operations
Fitzpatrick/2k
Imperial
Lake
Tin Street
Willams Street
Broken
Hill
Iodide Street
Argent Street
Potosi
Haul Road
North Mine
Haul Road
Zinc Lodes
Junction North
Mine
Site
CML 4
ML
1249
Rasp
Mine
Crystal Street
CML 7
Menindee Road
Orange - Broken Hill Railway
CML 10
CML 8
Southern
Operations
CML 12
REFERENCE
Mine Site Boundary
CML Boundary
Potosi Operations
Flying Doctor Mine
Rasp Mine
Willyama Common
Surface Exemption
Exploration Targets (Indicative only)
Reserve
Land Uses
Nature Conservation
Other minimal use
Grazing - native vegetation
Production native forests
Irrigated perennial horticulture
Intensive animal production
Manufacturing and Industrial
Residential and farm infrastructure
Services
Utilities
Transport and communication
Mining
Waste treatment and disposal
Lake
River
SCALE 1:75 000 (A4)
1 0 1 2 3km
Source: Australian Land Use and Management Classification (Version 8) 2016
Figure 4
SURROUNDING LAND USES

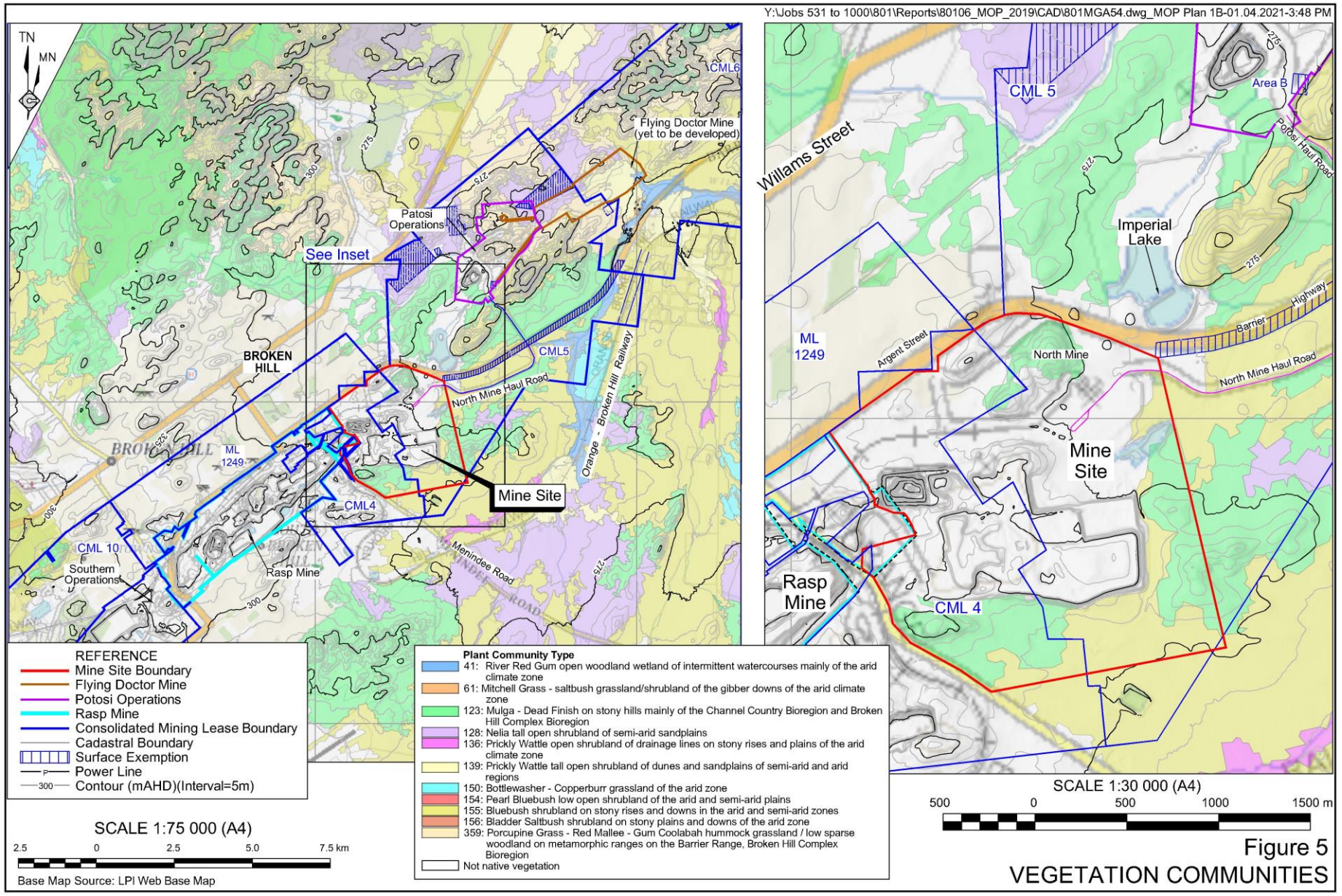


Figure 5
VEGETATION COMMUNITIES

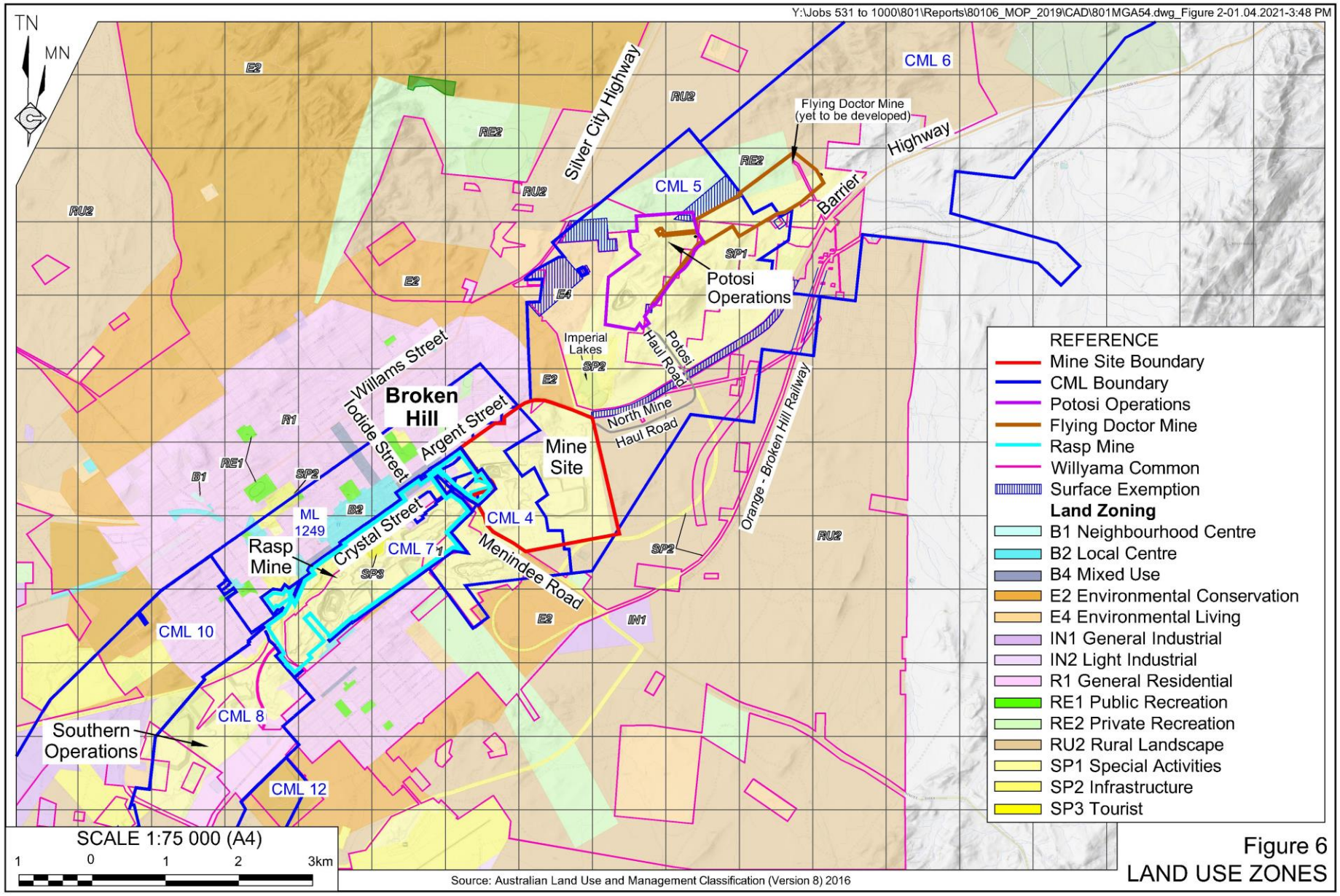


Figure 6
LAND USE ZONES

2. Final Land Use

2.1 Regulatory Requirements for Rehabilitation

Table 3 lists the regulatory requirements relating to rehabilitation of the Mine Site and post-mining land uses. It is noted that the conditional requirements for CMLs within the Mine Site have been adopted from Schedule 8A of the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*, gazetted by the NSW Government on 2 July 2021. It has been assumed that site specific conditions within Mining Authorities relating to rehabilitation have been retained, and the standard conditions have been replaced by those identified in Schedule 8A of the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*. In the event that there are any discrepancies between the conditions identified in this Plan and those included in the Mining Authorities for the Mine Site following updates to the conditions of these Mining Authorities, this Plan will be updated to correct these discrepancies.

Other Relevant Legislation

The following acts may apply to the closure of the Mine, specifically with respect to the divestment of CMLs, land tenure associated with each CML and the rehabilitation of areas within travelling stock reserves.

- *Commons Management Act 1989.*
- *Crown Land Management Act 2016.*
- *Local Land Services Act 2013.*

2.2 Final Land Use Options Assessment

2.2.1 Options Assessment

The Company aims to provide a final landform that is safe, stable, non-polluting, and that recognises the heritage value and potential for socially beneficial post-mining land uses. As no formal requirements for final land uses exist as part of any existing mining leases or development consents, the determination of suitable final land use domains was carried out in consideration of relevant environmental planning instruments and consultation with relevant stakeholders.

Feasible options for post-mining land uses of the Mine Site include the following.

- Nature Conservation – the Mine Site is revegetated to achieve ecological communities consistent with areas of remnant vegetation in the vicinity of Broken Hill.
- Agricultural Use – the Mine Site is rehabilitated to achieve land and soil capability ratings capable of sustain agricultural activities (e.g. grazing, cropping).
- Tourism – the Mine Site is secured and visually appealing areas and/or areas of historic significance are made accessible to tourists.

Table 3
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
SSD 7538 (MOD 3)	1	**Obligation to minimise harm to the environment** In addition to meeting the specific performance criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	Mine Site and surrounds	During construction, operation, and rehabilitation.	6.2
	5	**Mining Operations** The Applicant may carry out mining operations on the site for 25 years from the date of commencement of construction. Note: Under this consent, the Applicant is required to rehabilitate the site and perform additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.	Mine Site	Mining operations approved to December 2041. Rehabilitation operations may occur after this date.	Noted
	44	**Progressive Rehabilitation** The Applicant must rehabilitate the site progressively, that is, as soon as is practicable following disturbance, to the satisfaction of the Secretary.	Mine Site	During operation and rehabilitation.	1.1.6, 9.1
	45	**Rehabilitation Strategy** Within one year of commencing mining operations, unless the Secretary agrees otherwise, the Applicant must prepare a Rehabilitation Strategy for the site to the satisfaction of the Secretary. This strategy must:	Mine Site	Within one year following commencement of operations.	
		(a) be prepared by a team of suitably qualified and experienced experts whose appointment has been endorsed by the Secretary; (b) be prepared in consultation with relevant stakeholders, including the RR, MEG, EPA, NSW Health, DPIE Water, Heritage NSW, Council, the CCC and CBH;			4.2
		(c) define the rehabilitation objectives for the mine site, with consideration of heritage values, dust management, water and leachate management, final voids, surface infrastructure, visual impacts and the community;			4
		(d) include a conceptual final landform and rehabilitation plan; (e) include a life of mine rehabilitation and mining schedule which outlines key progressive rehabilitation milestones form the commencement of operations through to decommissioning and mine closure; and (f) managing and minimising any adverse socio-economic effects associated with mine closure.			5

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
SSD 7538 (MOD 3) (Cont'd)	46	The Applicant must implement the approved Rehabilitation Strategy for the development.		Within one year following commencement of operations.	This Plan
	47	**Rehabilitation Management Plan** The Applicant must prepare and implement a Rehabilitation Management Plan for the development in accordance with the conditions imposed on the mining lease(s) associated with the project under the *Mining Act 1992*.	Mine Site	Within 6 months following approval of the Rehabilitation Strategy.	
CLM 4 & 5	4	**Must prevent or minimise harm to the environment** (1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease. (2) In this clause – ***harm*** to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.	Mine Site	During operation and rehabilitation.	Noted
	5	Rehabilitation to occur as soon as reasonably practicable after disturbance The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by mining activities under the mining lease as soon as reasonably practicable after the disturbance occurs.	Mine Site		Noted
	6	**Rehabilitation must achieve final land use** (1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. (2) The holder of a mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). (3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1) **Note –** clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause.	Mine Site	During rehabilitation.	Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	6 (Cont'd)	(4) In this clause – ***final land use*** for the mining area means the final landform and final land uses to be achieved for the mining area – (a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and (b) for a large mine – as spatially depicted in the final landform and rehabilitation plan, and (c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease – as stated in the condition. ***planning approval*** means – (a) a development consent within the meaning of the *Environmental Planning and Assessment Act 1979*, or (b) an approval under that Act, Division 5.1.			
	7	**Rehabilitation risk assessment** (1) The holder of a mining lease must conduct a risk assessment (a ***rehabilitation risk assessment***) that – (a) identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease – (i) the rehabilitation objectives, (ii) the rehabilitation completion criteria, (iii) for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan, and (b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. (2) The holder of the mining lease must implement the measures identified. (3) The holder of a mining lease must conduct a rehabilitation risk assessment – (a) for a large mine – before preparing a rehabilitation management plan, and (b) for a small mine – before preparing the rehabilitation outcome documents for the mine, and (c) whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and (d) whenever given a written direction to do so by the Secretary.	Mine Site	During construction, operation and rehabilitation.	3

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	8	**Application of Division** This Division does not apply to a mining lease unless— (a) the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or (b) the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.	Mine Site	During construction, operation and rehabilitation.	Noted
	9	**General requirements for documents** A document required to be prepared under this Division must— (a) be in a form approved by the Secretary, and **Note—** The approved forms are available on the Department's website. (b) include any matter required to be included by the form, and (c) if required to be given to the Secretary—be given in a way approved by the Secretary.	Mine Site	During construction, operation and rehabilitation.	Noted
	10	**Rehabilitation management plans for large mines** (1) The holder of a mining lease relating to a large mine must prepare a plan (a rehabilitation management plan) for the mining lease that includes the following— (a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, (b) a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, (c) a summary of rehabilitation risk assessments conducted by the holder, (d) the risk control measures identified in the rehabilitation risk assessments, (e) the rehabilitation outcome documents for the mining lease, (f) a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. (2) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. (3) A rehabilitation management plan is not required to be given to the Secretary for approval.	Mine Site	During construction, operation and rehabilitation.	This Plan

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	10 (Cont'd)	(4) The holder of the mining lease— (a) must implement the matters set out in the rehabilitation management plan, and (b) if the forward program specifies timeframes for the implementation of the matters—must implement the matters within those timeframes.			
	11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved, (b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made, (c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted, whenever given a written direction to do so by the Secretary—in accordance with the direction.	Mine Site	During construction, operation and rehabilitation.	11
	12	**Rehabilitation outcome documents** (1) The holder of a mining lease must prepare the following documents (***the rehabilitation outcome documents***) for the mining lease and give them to the Secretary for approval— (a) the ***rehabilitation objectives statement***, which sets out the rehabilitation objectives required to achieve the final land use for the mining area, (b) the ***rehabilitation completion criteria statement***, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, (c) for a large mine, the ***final landform and rehabilitation plan***, showing a spatial depiction of the final land use. If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.	Mine Site	During construction, operation and rehabilitation.	4.2

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	13	**Forward program and annual rehabilitation report** (1) The holder of a mining lease must prepare a program (a ***forward program***) for the mining lease that includes the following— (a) a schedule of mining activities for the mining area for the next 3 years, (b) a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, (c) a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. (2) The holder of a mining lease must prepare a report (an ***annual rehabilitation report***) for the mining lease that includes— (a) a description of the rehabilitation undertaken over the annual reporting period, (b) a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, (c) a report demonstrating progress made towards the achievement of the following— (i) the objectives set out in the rehabilitation objectives statement, (ii) the criteria set out in the rehabilitation completion criteria statement, (iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan. (3) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. (4) The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary. (5) In this clause— ***annual reporting period*** means each period of 12 months commencing on— (a) the date on which the mining lease is granted, or (b) if the Secretary approves another date in relation to the mining lease— the other date	Mine Site	During construction, operation and rehabilitation.	Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	14	**Amendment of rehabilitation outcome documents and forward program** (1) This clause applies to— (a) a rehabilitation outcome document if it has been approved by the Secretary, and (b) a forward program if it has been given to the Secretary. (2) The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless— (a) the Secretary gives the holder a written direction to do so, or (b) the Secretary, on written application by the holder, gives a written approval of the amendment. (3) The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. (4) Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.	Mine Site	During construction, operation and rehabilitation.	Noted
	15	**Times at which documents must be prepared and given** (1) The holder of a mining lease must do the following before the end of the initial period— (a) prepare a rehabilitation management plan, and (b) prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and (c) prepare a forward program and give it to the Secretary. (2) The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before— (a) 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or (b) a later date approved by the Secretary. (3) A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary.	Mine Site	During construction, operation and rehabilitation.	Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	15 (Cont'd)	(4) The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before— (a) 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or (b) a later date approved by the Secretary. (5) A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). (6) The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause. (7) The holder of the mining lease must comply with the direction. (8) In this clause— initial period means the period commencing when the mining lease is granted and ending— (a) 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or (b) if this Division applies to the mining lease because of an increase in the required security deposit— (i) when the surface of the mining area is disturbed by activities under the mining lease, or (ii) at a later date approved by the Secretary.			
	16	**Certain documents to be publicly available** (1) This clause applies to the following documents— (a) a rehabilitation management plan, (b) a forward program, (c) an annual rehabilitation report. (2) The holder of a mining lease must make a document to which this clause applies publicly available by— (a) publishing it on its website in a prominent position, or (b) if the holder does not have a website— providing a copy of it to a person— (i) on the written request of a person, and (ii) without charge, and (iii) within 14 days after the request is received.	Mine Site	During construction, operation and rehabilitation.	Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
CLM 4 & 5 (Cont'd)	16 (Cont'd)	(3) If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— (a) for a rehabilitation management plan—within 14 days after it is prepared or amended, or (b) for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended, Personal information within the meaning of the *Privacy and Personal Information Protection Act 1998* is not required to be included in a document made available to a person under this clause.			
	17	**Records demonstrating compliance** The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. **Note—** The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.	Mine Site	During construction, operation and rehabilitation.	Noted
	18	**Report on non-compliance** (1) The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with— (a) a condition of the mining lease, or Note— The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. (b) a requirement of the Act or this Regulation relating to activities under the mining lease. (2) The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. (3) The holder of the mining lease must ensure the report— (a) identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and (b) describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and (c) describes the causes or likely causes of the non-compliance, and (d) describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.	Mine Site	During construction, operation and rehabilitation.	Noted

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
Long-term Rehabilitation Objectives					
2017 EIS (RWC, 2017)		Establish a final landform that: • is safe, stable and non-polluting; • requires levels of maintenance commensurate with surrounding land; • minimises the size and depth of final voids; • preserves preserved items of heritage significance in a manner that permits their ongoing conservation; and is suitable for the identified long-term final land uses.	Mine Site	During operations and rehabilitation.	5
		Remove all infrastructure not required for future land use while ensuring that items of heritage significance are retained in a safe condition.	Mine Site	During decommissioning and rehabilitation.	6.2.2
		Contribute to the long-term, non-mining economic viability of Broken Hill.	Mine Site	During operations, rehabilitation and post-rehabilitation.	2
		Relinquish the mining lease(s) over the rehabilitated landform and have the security returned within a reasonable time after the completion of all mining and rehabilitation activities.	Mine Site	Following rehabilitation.	Noted
Legalisation					
Commonwealth Legislation					
Environmental Protection and Biodiversity Conservation Act 1999	s15B-15C	Discusses the requirement for approval for activities that may affect matters of national environmental significance including National Heritage places.	Mine Site	During decommission and rehabilitation works.	6.2.1.13, 9.2.7, 9.2.8

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent / Legislation	Condition No.	Requirement	Area	Timing	RMP Section
NSW Legislation					
Protection of Environmental Operations Act 1997	s42-58	Discusses the provision of Environment Protection Licences.	Mine Site	During operations and rehabilitation works.	1.2, 6
	s89-113	Discusses the application of Clean-up Notices.			
	Chapter 5	Discusses environmental offences including water, air, noise and land pollution.			
Heritage Act 1977	Part 3 (s27-30)	Discusses interim orders for items of State or local significance.	Mine Site	During decommission and rehabilitation works.	6.2.1.13, 9.2.7
	Part 3A (s31-38)	Discusses listing of items, places or buildings on the state heritage register.			
	Part 4	Discusses the effect of interim heritage orders and listings on the State Heritage Register			
	Part 6	Discusses other measures for the conservation of environmental heritage.			
	Division 8	Discusses controlling and restricting harm to buildings, works, relics and places not subject to interim heritage orders or State Heritage Registered listings.			
Mining Act 1992	Division 3	Under these sections the Minister can direct a company to rehabilitate their land, or, should the company not comply with this direction, rehabilitate the land at the Ministers expense and recover the cost from the company.	Mine Site	During rehabilitation works.	Noted
Contaminated Land Management Act 1997	(s11-48)	Discusses investigations and remediation of contaminated lands.	Mine Site	During decommissioning and rehabilitation works.	6.2.2.4
Water Management Act 2000	s60(I)	Identifies the requirement for an access licence for water used in mining activities, included water used for the rehabilitation of land affected by mining.	Mine Site	During operations and rehabilitation works.	1.2
Local Environment Plans					
Broken Hill Local Environmental Plan 2013	s5.10	Discusses the relevant conditions for requirement of consent for works relating to listed heritage items or heritage conservation areas shown on the Heritage Map.	Mine Site	During decommission and rehabilitation works.	6.2.1.13, 6.2.2.2, 6.2.2.3, 6.2.2.5, 9.2.7
	Schedule 5	Lists the items that the Broken Hill City Council has deemed of local heritage significance.			

- Alternative Commercial Use – existing infrastructure within the Mine Site is adapted for alternative uses and/or new infrastructure is constructed to support new commercial or public uses.
- No Change – mining operations cease at the Mine Site and the Mine is placed under care and maintenance until available resources make the recommencement of mining operations viable.

Pending the identification of significant additional mineralisation from ongoing exploration programs, it is not considered likely that resources at the Mine Site would support viable mining operations at the Mine past the anticipated closure date of 2030. Retaining the Mine Site indefinitely under a program of care and maintenance is therefore unlikely.

Agricultural land uses are restricted to pastoral grazing activities in the vicinity of Broken Hill due to limited soil and land capability (see Section 6.2.1) and unfavourable climatic conditions. As such, there is little demand for rehabilitation to achieve land and soil capabilities capable of sustaining grazing activities at the Mine Site and any future agricultural land uses would need to be subject to prescriptive management measures to avoid adverse environmental outcomes within the rehabilitated Mine Site.

The Scope of this Plan is limited to rehabilitation associated with the existing mining land use. The construction of new structures and/or infrastructure to support an alternative commercial or public use at the Mine Site would be subject to approval following the preparation of a separate development application.

Following the consideration of feasible final land use options and consultation with relevant stakeholders (see Section 4.2), the Company has nominated a combination of nature conservation, historic heritage conservation and tourism land uses as the final land use for the Mine Site. The rehabilitation of the Mine Site to achieve this combination of final land uses would achieve the following key objectives.

- Rehabilitation of the Mine Site to achieve a safe, stable, and non-polluting landform.
- Establishment of final landforms and final land uses which require sustainable levels of maintenance and management.
- Improvement and expansion of habitat and associated ecological services provided by adjacent remnant native vegetation and the Willyama Common.
- Conservation of historic heritage items and mining landforms recognised as having local value and broader national value within the context of Broken Hill.
- Provision of long-term, sustainable post-mining economic opportunities in the form of tourism driven by access to visual, educational and historic sites within the Mine Site.

As identified in Section 2.1, the proposed combination of nature conservation, historic heritage conservation and tourism final land uses is consistent with the relevant development consent conditions, mining lease conditions, surrounding land uses and land zoning for the Mine.

The following subsections describe how these final land use goals have been made in consideration of the relevant local governing bodies, stakeholder groups and other relevant parties.

2.2.2 Broken Hill Local Environmental Plan 2013

The proposed final land uses align with the permitted uses as per the *Broken Hill Local Environmental Plan 2013* (LEP). Sections of the Mine Site and associated CMLs are designated as the following land use zones under the LEP, as shown on **Figure 6**.

- SP1 – Special Activities (Mining)
- SP2 – Infrastructure (Water Supply System)
- RU2 – Rural Landscape
- R1 – General Residential

Environmental protection works are permissible without consent within zones SP1 and R1. Additionally, roads are permissible without consent in zones RU2 and SP2.

As rehabilitation works and mining-related tourism are considered incidental or ancillary to mining operations, they are permissible with consent within SP1 where the purpose is indicated to be 'mining'. No changes to any areas identified as SP2 Infrastructure or R1 General Residential are proposed, however it is noted that rail infrastructure within the Mine Site which connects to areas zoned as SP2 Infrastructure (Rail Infrastructure Facility) would be decommissioned during rehabilitation operations unless in contravention of heritage covenants.

It is likely that areas zoned as SP1 Special Activities (Mining) will be rezoned following the completion of rehabilitation operations at the Mine Site. Any rezoning will be completed in consultation with Broken Hill City Council.

2.2.3 Broken Hill Strategic Plans

Broken Hill 2033 Community Strategic Plan

The final land uses for the Mine Site, representing a combination of nature conservation, historic heritage conservation and tourism land uses, are generally consistent with the following key directions and associated objectives identified in the *Broken Hill 2033 Community Strategic Plan* (Broken Hill City Council, 2017).

- Key Direction 1 – Our Community:
  - Objective 1.3 – Our history, culture and diversity is embraced and celebrated.
  - Objective 1.4 – Our built environment supports our quality of life.
  - Objective 1.5 – Our health and wellbeing ensures that we live life to the full.
- Key Direction 2 – Our Economy:
  - Objective 2.1 – Our economy is strong and diversified and attracts people to work, live and invest.
  - Objective 2.2 – We are a destination of choice and provide a real experience that encourages increased visitation.

- Key Direction 3 – Our Environment:
  - Objective 3.1 – Our environmental footprint is minimised.
  - Objective 3.2 – Natural flora and fauna environments are enhanced and protected.
  - Objective 3.3 – Proactive, innovative and responsible planning supports the community, the environment and beautification of the city.

Broken Hill Strategic Tourism Plan 2010 – 2020

The final land uses for the Mine Site are generally consistent with the following key directions and associated objectives identified in the *Broken Hill Strategic Tourism Plan 2010 – 2020* (Broken Hill City Council, 2010).

- Destination Development:
  - 5. Tourism Asset Management: enhance the delivery of authentic visitor experiences and economic viability of BHCC-owned attractions and tourism-related infrastructure.
  - 6. Tourism Product and Experiences: accelerate the development of tourism product and experiences around the 'key' platforms of indigenous, film, art, mining, heritage, sustainable energies and outback.
  - 7. Transport and Access: Improve accessibility for visitors to and within Broken Hill.

Regional Development Australia Far West NSW Regional Plan 2013 – 2023

The final land uses for the Mine Site are generally consistent with the following long-term goal of the *Regional Development Australia Far West NSW Regional Plan 2013 – 2023* (Regional Development Australia Far West NSW, 2013).

- Expansion of the tourism industry to cater for both international and domestic based visitors. Uniquely placed in the domestic tourism market, considerable potential exists for the region to consolidate the industry and expand the regions visitor economy.

2.3 Final Land Use Statement

Final land uses within the Mine Site will include the following.

- Native Ecosystem Areas – revegetated areas containing flora species assemblages and ecosystem characteristics consistent with the Northern Flat, Rocky Ridge and Creek Line vegetation community types (see Section 8.1).
- Infrastructure Areas – includes tourist access roads and lookout areas, a tourist carpark and information area, residences and other buildings, and perimeter access roads.

- Final Void Area – the Cosmopolitan Open Cut final void.
- Heritage Areas – areas containing individual or multiple historic heritage items. These areas are enclosed by security fencing to ensure public safety and prevent unauthorised public access.

Final land use and rehabilitation plans for the Mine Site are presented in Section 5. It is noted that the proposed final land uses would not interfere with the use of existing reserves within the Mine Site.

The final land use for the Mine Site will be subject to consultation with the Broken Hill Rehabilitation Steering Committee (BHRSC) (or an equivalent committee) (see Section 4.2).

2.4 Final Land Use and Mining Domains

The *Form and Way: Rehabilitation Management Plan for Large Mines (July 2021)* guideline defines a domain as follows.

> *"An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use."*

2.4.1 Final Land Use Domains

Table 4 defines the final land use domains for the Mine and **Figure 7** displays the final land use domains for the Mine Site.

Table 4
Final Land Use Domains

Final Land Use Domain	Domain ID[1]	Domain Description
Infrastructure Area	I	Includes all built infrastructure to be retained or constructed for the final land use (e.g. access roads, tourist lookout areas), with the exception of water management infrastructure and infrastructure considered to have heritage value (see relevant domains below).
Water Management Area	F	Includes all water management infrastructure to be retained for the final land use (i.e. the McCulloch Stormwater Drain and clean water diversions).
Native Ecosystem Area	A	Includes areas to be revegetated to form native ecosystems. - Northern Flat - Southern Flat - Rocky Ridge
Final Void Area	J	Includes the Cosmopolitan Open Cut final void which would remain following the completion of mining and rehabilitation activities.
Heritage Area	H	Includes any built infrastructure, objects or sites to be retained due to known historic or cultural heritage value.
Note 1: See **Figure 7**		

2.4.2 Mining Domains

Table 5 defines the mining domains for the Mine Site and **Figure 8** displays the mining domains within the Mine Site.

Table 5
Mining Domains

Mining Domain	Domain ID[1]	Domain Description
Infrastructure Area	1	Includes the Workshop and ROM Pad, site office and amenities buildings, employee carpark, laydown and hardstand areas, magazine, rail infrastructure and miscellaneous infrastructure including access and haul roads, pipelines, water tanks, vent rises, electrical substations and power lines. Incudes material stockpiles (topsoil/subsoil/waste rock/vegetation) Includes mine waste facility Includes areas planned for exploration. Exploration areas within leases including the Junction North, Zinc Lodes, Tin Lodes and Fitzpatrick/2k targets Incudes heritage items mineral processing facilities, rail networks, shafts and headframes, Mine housing and administration buildings Incudes areas where rehabilitation activities have been completed by previous operator
Tailings Storage Area	2	Includes areas where tailings storage has historically occurred at the Mine Site. Note that this domain includes areas where the surface of historic tailings storage area is not currently utilised for operational purposes (i.e. capped surface utilised for other operational purposes)). Other operational purposes incudes Material stockpiles (topsoil/subsoil/waste rock/vegetation) Water management structures Areas where rehabilitation activities have been completed by previous operator Tailings harvesting area
Water Management Area	3	Includes the McCulloch Stormwater Drain, various clean water diversion drains and toe drains, water storage dams and evaporation ponds.
Active Mining Area	5	Includes the Cosmopolitan Open Cut and Portal.
Other	8	Includes topsoil stockpiles and exploration target areas.
Note 1: See **Figure 8**		

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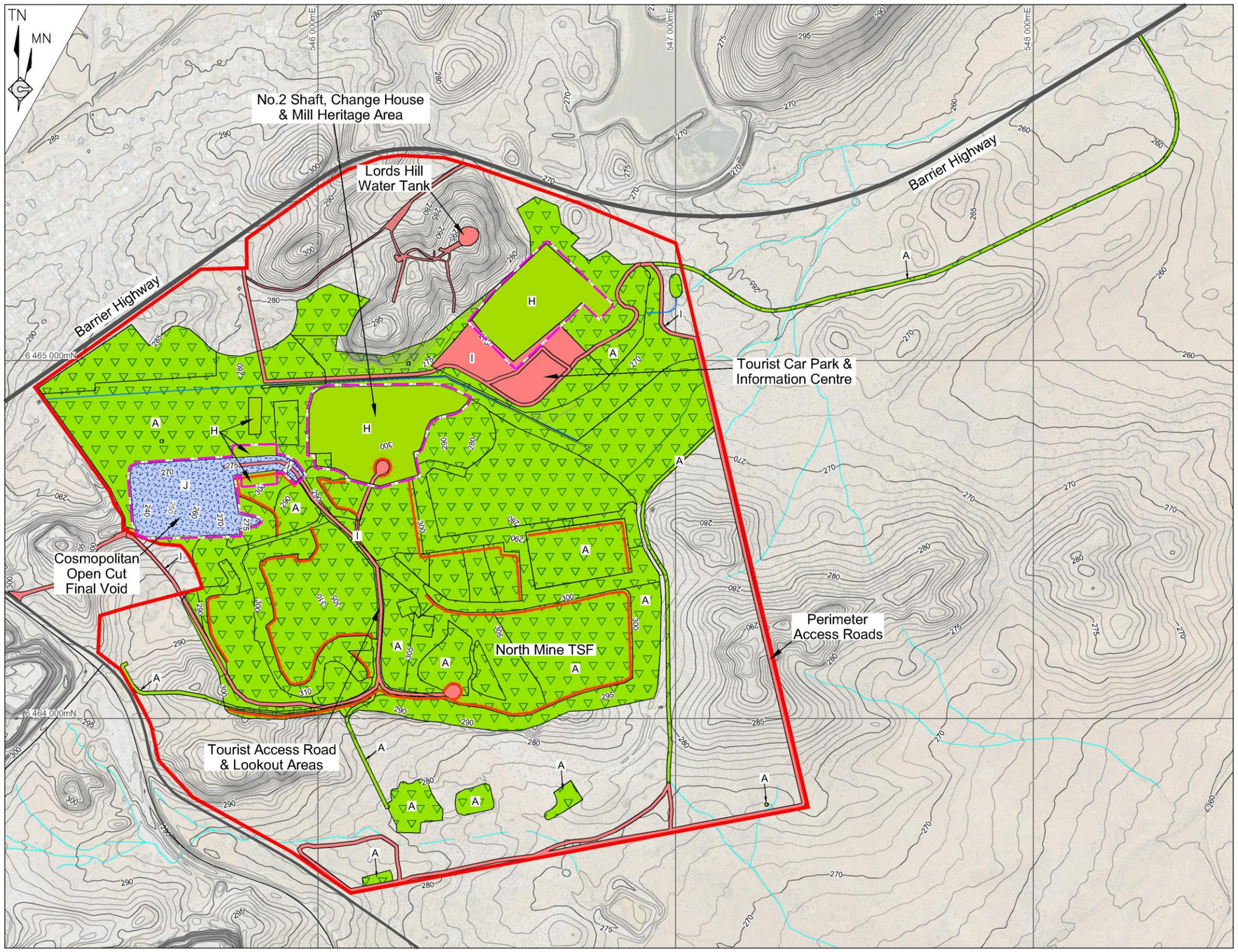


REFERENCE
- Project Approval Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Safety Bund
- Security Fence
- Water Diversion Drain

Final Land Use Domains
- A.Native Ecosystem Area
- F. Water Management Area
- H. Heritage Area
- I.Infrastructure Area
- J.Final Void Area

Note: Coordinates are MGA Zone 54

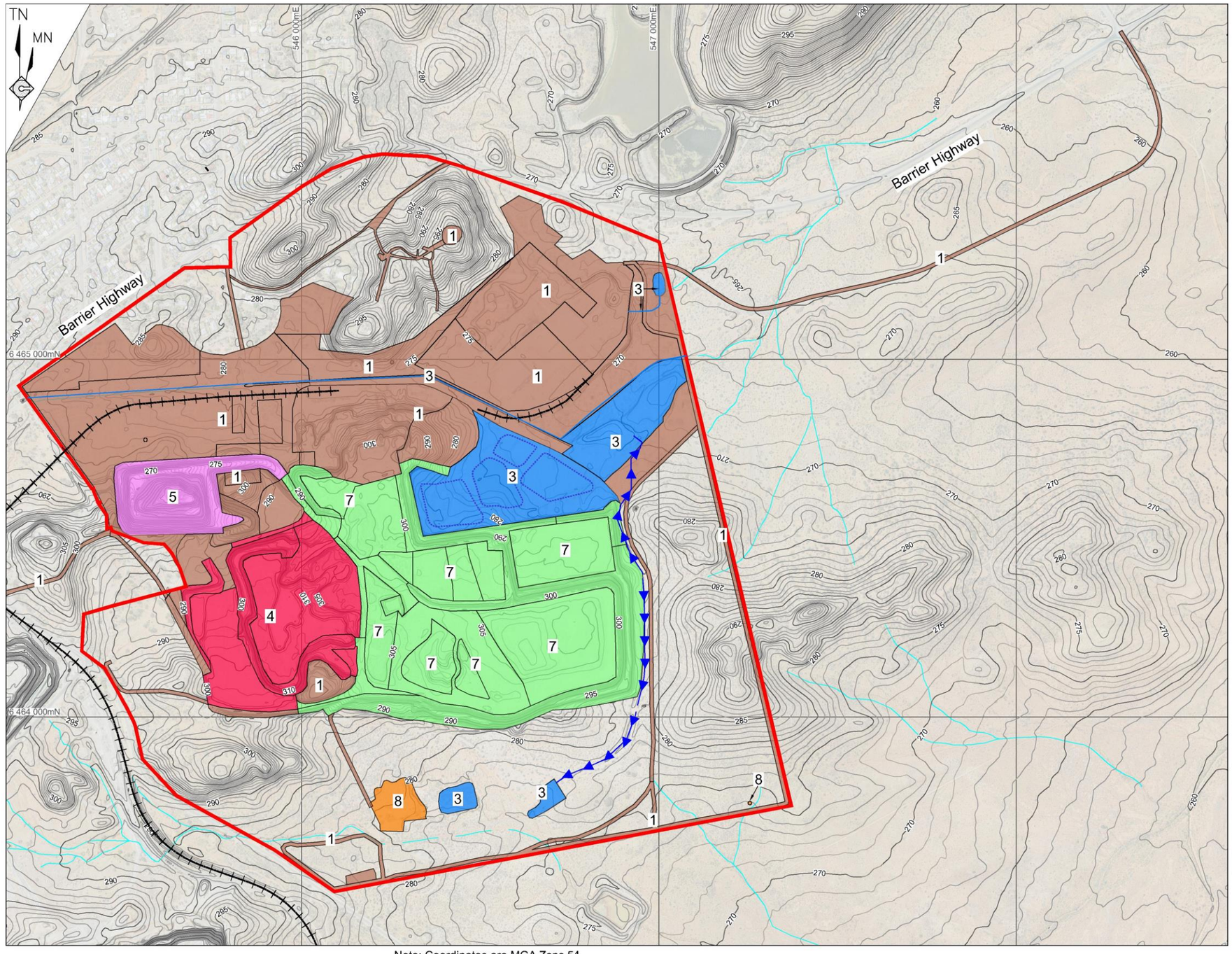
SCALE 1:12 000 (A3)

200 0 200 400 600 m

Source: Perilya - 25 November 2020

Figure 7
FINAL LAND USE DOMAINS

Y:\Jobs 531 to 1000\938\Reports\93840_North Mine RMP - 2022\CAD\93840Base_North_MGA54.dwg_Figure 8-31.07.2023-1:54 PM



REFERENCE
- Project Approval Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Toe Drain
- Rail Line

Mining Domains
- 1. Infrastructure Area
- 3. Water Management Area
- 4. Overburden Emplacement Area
- 5. Active Mining Area (Open cut void)
- 7. Tailings Storage Facility
- 8. Other

Mining Domain	Area (ha)
Infrastructure Area	98.1
Water Management Area	17.8
Overburden Emplacement Area	19.4
Active Mining Area (Open cut void)	7.0
Tailings Storage Facility	45.5
Other	1.6
Total	**189.4**

Note: Coordinates are MGA Zone 54

SCALE 1:12 000 (A3)

200 0 200 400 600 m

Source: Perilya - 25 November 2020

Figure 8
MINING DOMAINS

RWCorkery&co

3. Rehabilitation Risk Assessment

In accordance with Clause 17 of Schedule 8A of the Mining Regulation 2016 a rehabilitation risk assessment will be maintained and be available on site as a record, and upon request. A Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in the rehabilitation risk assessment as having a risk rating of moderate or above is presented in Section 10.

4. Rehabilitation Objectives and Rehabilitation Completion Criteria

4.1 Rehabilitation Objectives and Rehabilitation Completion Criteria

Table 6 presents the objectives and rehabilitation completion criteria and the methods used to validate the criteria for the Mine.

Table 6
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Infrastructure Area	Infrastructure Area, Tailings Storage Facility, Overburden Emplacement Area	I1, I2, I4, I5	All infrastructure and services not required for the final land use are removed.	Presence of infrastructure	All infrastructure removed unless specified to be retained in this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of services	All services disconnected unless required for the final land use.	
				Road width (m)	Roads to be retained are no wider than: • 4m where not required for public access; or • 8m where roads are to be used for public access (i.e. two 4m lanes).	
				Presence of drill cores	All drill cores removed and taken to either an authorized storage location or a disposal location.	Receipt records from storage or disposal location.
			There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination levels (concentration of key parameters)	Contamination levels are consistent with the target values specified under the *Closure Management Plan*.	Single occurrence contamination assessment report prepared by a suitably qualified person in accordance with the Closure Management Plan, with follow up validation testing to be undertaken if required.
				Presence of hazardous materials	Hazardous materials managed in accordance with the *Closure Management Plan*.	Single occurrence hazardous materials audit undertaken in accordance with the *Closure Management Plan*, with follow up inspections to be undertaken if required.
				Presence of waste	All rubbish and waste materials are removed from site or disposed of in areas designated within this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Publicly accessible areas and infrastructure are safe and suitable for use as part of the final land use.	Presence of safety bunds	Safety bunds are constructed to prevent public access to potentially hazardous landforms (e.g. batters) or sensitive rehabilitation areas.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Structural integrity of infrastructure	Structural integrity of retained or constructed infrastructure accessible to the public is determined to be suitable and safe as part of the final land use.	Engineering report including photographs and risk assessment verifying that modes of failure are adequately addressed to minimise risks to public safety or the environment.
			Retained infrastructure is safe, stable and non-polluting.	Presence of potential hazards (e.g. electrical, mechanical)	Potential hazards have been effectively isolated and secured.	Statement provided by suitably qualified contractor(s).
				Presence of appropriate surface materials	All surface materials (i.e. waste rock and growth medium) used to construct surface infrastructure (e.g. safety bunds, retained roads) are considered appropriate for surface use in accordance with the *Waste material and soil characterisation assessment 2022* .	Waste rock testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.
						Soil / growth medium testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.
				Maintenance requirements (cost and frequency of works)	Maintenance levels for retained infrastructure (i.e. access tracks, safety bunds) are commensurate with maintenance requirements for similar structures in Broken Hill.	Annual report detailing infrastructure maintenance costs, including comparison against costs for similar maintenance works within Broken Hill, until relinquishment.
			The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	Visible erosion or land instability.	Minimal erosion that would not require moderate to significant ongoing management and maintenance works. Geotechnical assessment determines that the retained void walls are not likely to actively erode or 'slip' to an extent requiring further earthworks.	Visual inspections undertaken on an annual basis until site relinquishment. Visual inspections undertaken following significant rainfall events (i.e. ≥25mm within 24 hours). Single occurrence geotechnical assessment and report prepared by a suitably qualified person following establishment of final landform, with follow up assessment to be undertaken in the event that further earthworks are required.
				Geotechnical stability of final landform		
			The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Presence of bushfire controls	Appropriate bushfire hazard controls implemented, where required, on the advice from the NSW Rural Fire Service.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.

Table 6 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Infrastructure Area (Cont'd)	Infrastructure Area, Tailings Storage Facility, Overburden Emplacement Area (Cont'd)	I1, I2, I4, I5	Runoff water quality from mine site is similar to, or better than the analogue site upstream.	Levels of electrical conductivity, total suspended solids, major ions, dissolved metals, metalloids and pH.	The monitored parameters are within 10% (or better) of the recorded measurements from the upstream monitoring location, on three consecutive occasions. Surface water monitoring verifies adequate containment of waste materials and that seepage / leachate is not contributing to land or groundwater contamination.	Water quality testing undertaken quarterly on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
			Groundwater quality is consistent with historical groundwater monitoring and in line with anticipated quality in the region.	Groundwater quality (pH, TDS, dissolved metals and metalloids)	Groundwater quality monitoring results demonstrate parameter levels within 10% of baseline groundwater quality monitoring results over four consecutive monitoring periods for final voids containing permanent water bodies.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Impacts to groundwater regime are consistent with historical groundwater monitoring and in line with anticipated levels in the region.	Groundwater levels	Groundwater levels both on and off a mining lease represent an acceptable level of change from baseline groundwater monitoring.	Groundwater level sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Infrastructure being retained will benefit from relevant approvals, licences, permits, and/or agreements.	Necessary approvals/licences/permits/ agreements are in place where infrastructure is to be retained.	Permits, licences, agreements and approval documents for any retained infrastructure are sought and issued.	Copy of relevant approvals, licences, permits, and/or agreements.
Water Management Area	Infrastructure Area, Water Management Area	F1, F3	All infrastructure and services not required for the final land use are removed.	Presence of infrastructure	All infrastructure removed unless specified to be retained.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of services	All services disconnected unless required for the final land use.	
			There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination levels (concentration of key parameters)	Contamination levels are consistent with the target values specified under the *Closure Management Plan*.	Single occurrence contamination assessment report prepared by a suitably qualified person in accordance with the *Closure Management Plan*, with follow up validation testing to be undertaken if required.
				Presence of hazardous materials	Hazardous materials managed in accordance with the *Closure Management Plan*.	Single occurrence hazardous materials audit undertaken in accordance with the *Closure Management Plan*, with follow up inspections to be undertaken if required.
				Presence of waste	All rubbish and waste materials are removed from site or disposed of in areas designated within this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Retained water management structures are safe, stable and provide for long-term water management.	Maintenance requirements (cost and frequency of works)	Maintenance levels for retained water management infrastructure (i.e. sediment dams, water diversion drains, toe drains and creek diversions) are commensurate with maintenance requirements for similar structures in Broken Hill.	Annual report detailing infrastructure maintenance costs, including comparison against costs for similar maintenance works within Broken Hill, until relinquishment.
				Presence of stabilised spillways	Stabilised spillways are present at locations where water is discharged off site from water management structures.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Retained water management structures are non-polluting.	Water quality (pH, EC, total suspended solids, major ions, dissolved metals and metalloids)	Water quality samples from sediment dams, water diversion drains and toe drains demonstrate water quality parameter levels within 10% of analogue site levels (or better) on three consecutive occasions.	Water quality testing undertaken on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
					Water quality samples collected downstream of creek diversions and water diversion drains demonstrate water quality parameter levels within 10% of 'upstream' levels (or better) on three consecutive occasions.	Water quality testing undertaken on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
			The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	Visible erosion or land instability.	Minimal erosion that would not require moderate to significant ongoing management and maintenance works.	Visual inspections undertaken annual until site relinquishment. Visual inspections undertaken following significant rainfall events (i.e. ≥25mm within 24 hours).
				Geotechnical stability of final landform	Geotechnical assessment determines that the retained void walls are not likely to actively erode or 'slip' to an extent requiring further earthworks.	Single occurrence geotechnical assessment and report prepared by a suitably qualified person following establishment of final landform, with follow up assessment to be undertaken in the event that further earthworks are required.

Table 6 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Water Management Area (Cont'd)	Infrastructure Area, Water Management Area (Cont'd)	F1, F3	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Presence of bushfire controls	Appropriate bushfire hazard controls implemented, where required, on the advice from the NSW Rural Fire Service.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Runoff water quality from mine site is similar to, or better than the analogue site upstream.	Levels of electrical conductivity, total suspended solids, major ions, dissolved metals, metalloids and pH.	The monitored parameters are within 10% (or better) of the recorded measurements from the upstream monitoring location, on three consecutive occasions. Surface water monitoring verifies adequate containment of waste materials and that seepage / leachate is not contributing to land or groundwater contamination.	Water quality testing undertaken quarterly on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
			Groundwater quality is consistent with historical groundwater monitoring and in line with anticipated quality in the region.	Groundwater quality (pH, TDS, dissolved metals and metalloids)	Groundwater quality monitoring results demonstrate parameter levels within 10% of baseline groundwater quality monitoring results over four consecutive monitoring periods for final voids containing permanent water bodies.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Impacts to groundwater regime are consistent with historical groundwater monitoring and in line with anticipated levels in the region.	Groundwater levels	Groundwater levels both on and off a mining lease represent an acceptable level of change from baseline groundwater monitoring.	Water quality monitoring reports throughout the life of mine.
			Infrastructure being retained will benefit from relevant approvals, licences, permits, and/or agreements.	Necessary approvals/licences/permits/ agreements are in place where infrastructure is to be retained.	Permits, licences, agreements and approval documents for any retained infrastructure are sought and issued.	Copy of relevant approvals, licences, permits, and/or agreements.
Native Ecosystem Area	Infrastructure Area, Tailings Storage Facility, Water Management Area, Overburden Emplacement Area, Active Mining Area, Topsoil Stockpiles	A1, A2, A3, A4, A5, A8	All infrastructure and services not required for the final land use are removed.	Presence of infrastructure	All infrastructure removed unless specified to be retained.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of services	All services disconnected unless required for the final land use.	
			There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination levels (concentration of key parameters)	Contamination levels are consistent with the target values specified under the *Closure Management Plan*.	Single occurrence contamination assessment report prepared by a suitably qualified person in accordance with the *Closure Management Plan*, with follow up validation testing to be undertaken if required.
				Presence of hazardous materials	Hazardous materials managed in accordance with the *Closure Management Plan* .	Single occurrence hazardous materials audit undertaken in accordance with the *Closure Management Plan*, with follow up inspections to be undertaken if required.
				Presence of waste	All rubbish and waste materials are removed from site or disposed of in areas designated within this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Final landforms are safe, stable and non-polluting and residual waste materials are contained and/or encapsulated and do not pose any hazards or constraints for the final land use.	Presence of safety bunds	Safety bunds are constructed to prevent public access to potentially hazardous landforms (e.g. batters) or sensitive rehabilitation areas.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of appropriate surface materials	All surface materials (i.e. waste rock and growth medium) used to construct surface infrastructure (e.g. safety bunds, retained roads) and final landform surfaces are considered appropriate for surface use in accordance with the *Waste material and soil characterisation assessment 2022*.	Waste rock testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.
						Soil / growth medium testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.
				Landform design specifications	Quality assurance records verify that capping has been constructed in accordance with design specifications relevant to site risks and final land use.	As constructed surveys, quality assurance records for construction, inspection report prepared by a suitably qualified engineer, and geotechnical reports (where required).
					Waste rock emplacement and tailings storage facility top surfaces are profiled to create an undulating surface consisting of "run-off" and "run-on" zones to support store and release capping function.	Single occurrence relinquishment inspection and report, including photographs, following landform profiling and growth medium placement.
				Biophysical process indices	Biophysical process indicators (stability index and infiltration index) are equivalent to or better than those recorded for relevant analogue site types (i.e. Northern Flat, Southern Flat or Rocky Ridge)[2].	Ecosystem Function Analysis surveys undertaken within three years following rehabilitation (subject to two consecutive years of average or above average rainfall conditions), with subsequent surveys undertaken every three years until target values are achieved.

Table 6 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem Area (Cont'd)	Infrastructure Area, Tailings Storage Facility, Water Management Area, Overburden Emplacement Area, Active Mining Area, Topsoil Stockpiles (Cont'd)	A1, A2, A3, A4, A5, A8	Growth medium is suitable for development of native vegetation.	Growth medium depth	Growth medium development in accordance with outcomes of the *Growth Medium Development Study* in areas designated for Northern Flat, Southern Flat and Rocky Ridge[2] vegetation communities, as outlined in this Plan.	Visual inspections, including test pits and photographs demonstrating growth medium depth, growth medium treatment and key biophysical indicators in accordance with the *Growth Medium Development Study*.
				Surface treatment	Growth medium applied to Waste Rock Emplacement batters is integrated into underlying waste rock material through contour ripping.	Visual inspections, including test pits and photographs demonstrating growth medium depth and integration, following growth medium application.
			The composition of rehabilitated vegetation contains species that are typical of native communities in the area.	Vegetation community characteristics and biophysical process indices	Vegetation community characteristics (flora composition and diversity) and biophysical process indicators (landscape organisation index, nutrient index, stability index and infiltration index) are equivalent to or better than those recorded for relevant analogue site types (i.e. Northern Flat, Southern Flat or Rocky Ridge)[2].	Ecosystem Function Analysis surveys undertaken within three years following rehabilitation (subject to two consecutive years of average or above average rainfall conditions), with subsequent surveys undertaken every three years until target values are achieved.
				Plant survival and recruitment	Plant survival and recruitment are suitable for sustaining the target vegetation community type.	
			The vegetation structure of the rehabilitation is similar to native vegetation communities in the area.	Grazing impacts (foliage cover (%) and plant mortality)	Grazing impacts within rehabilitated areas are equal to or less than those observed at analogue sites.	
				Cover and abundance of plant growth.		
			Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Presence of priority weed species (e.g. high threat, noxious, invasive, or weed of national significance) or excessive weed abundance	Weed abundance within rehabilitated areas is equal to or less than that observed at analogue sites.	EFA monitoring to include observed weed occurrence (species and extent). Control measures implemented, until relinquishment.
					Priority weeds (e.g. Weeds of National Significance) are not present within rehabilitation areas.	
			The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	Visible erosion or land instability.	Minimal erosion that would not require moderate to significant ongoing management and maintenance works.	Visual inspections undertaken annual until site relinquishment. Visual inspections undertaken following significant rainfall events (i.e. ≥25mm within 24 hours).
				Geotechnical stability of final void landforms	Geotechnical assessment determines that the retained void walls are not likely to actively erode or 'slip' to an extent requiring further earthworks.	Single occurrence geotechnical assessment and report prepared by a suitably qualified person following establishment of final landform, with follow up assessment to be undertaken in the event that further earthworks are required.
			The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Presence of bushfire controls	Appropriate bushfire hazard controls implemented, where required, on the advice from the NSW Rural Fire Service.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Runoff water quality from mine site is similar to, or better than the analogue site upstream.	Levels of electrical conductivity, total suspended solids, major ions, dissolved metals, metalloids and pH.	The monitored parameters are within 10% (or better) of the recorded measurements from the upstream monitoring location, on three consecutive occasions.	Water quality testing undertaken quarterly on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
					Surface water monitoring verifies adequate containment of waste materials and that seepage / leachate is not contributing to land or groundwater contamination.	
			Groundwater quality is consistent with historical groundwater monitoring and in line with anticipated quality in the region.	Groundwater quality (pH, TDS, dissolved metals and metalloids)	Groundwater quality monitoring results demonstrate parameter levels within 10% of baseline groundwater quality monitoring results over four consecutive monitoring periods.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Impacts to groundwater regime are consistent with historical groundwater monitoring and in line with anticipated levels in the region.	Groundwater levels	Groundwater levels both on and off a mining lease represent an acceptable level of change from baseline groundwater monitoring.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.

Table 6 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem Area (Cont'd)	Infrastructure Area, Tailings Storage Facility, Water Management Area, Overburden Emplacement Area, Active Mining Area, Topsoil Stockpiles (Cont'd)	A1, A2, A3, A4, A5, A8	Infrastructure being retained will benefit from relevant approvals, licences, permits, and/or agreements.	Necessary approvals/licences/permits/ agreements are in place where infrastructure is to be retained.	Permits, licences, agreements and approval documents for any retained infrastructure are sought and issued.	Copy of relevant approvals, licences, permits, and/or agreements.
Heritage Area	Infrastructure Area	H1	All infrastructure and services not required for the final land use are removed.	Presence of infrastructure	All infrastructure removed unless specified to be retained.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of services	All services disconnected unless required for the final land use.	
			There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination levels (concentration of key parameters)	Contamination levels are consistent with the target values specified under the *Closure Management Plan*.	Single occurrence contamination assessment report prepared by a suitably qualified person in accordance with the Closure Management Plan, with follow up validation testing to be undertaken if required.
				Presence of hazardous materials	Hazardous materials managed in accordance with the *Closure Management Plan*.	Single occurrence hazardous materials audit undertaken in accordance with the *Closure Management Plan*, with follow up inspections to be undertaken if required.
				Presence of waste	All rubbish and waste materials are removed from site or disposed of in areas designated within this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	Visible erosion or land instability.	Minimal erosion that would not require moderate to significant ongoing management and maintenance works.	Visual inspections undertaken annual until site relinquishment. Visual inspections undertaken following significant rainfall events (i.e. ≥25mm within 24 hours).
				Geotechnical stability of final void landforms	Geotechnical assessment determines that the retained void walls are not likely to actively erode or 'slip' to an extent requiring further earthworks.	Single occurrence geotechnical assessment and report prepared by a suitably qualified person following establishment of final landform, with follow up assessment to be undertaken in the event that further earthworks are required.
			Infrastructure being retained will benefit from relevant approvals/licences/permits.	Necessary approvals / licences / permits / agreements are in place where infrastructure is to be retained.	Permits, licences, agreements and approval documents for any retained infrastructure are sought and issued.	Copy of relevant approvals, licences, permits, and/or agreements.
Final Void Area	Infrastructure Area, Active Mining Area	J1, J5	Final void landforms are safe and inaccessible.	Presence of safety bunds around final voids	Safety bunds are present around the perimeter of final voids.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of security fences around final voids	Security fences are present around the perimeter of final voids.	
				Presence of capped and/or backfilled portals and shafts	Portals and shafts are sealed with concrete plugs and backfilled to prevent access.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
						Single occurrence relinquishment inspection and report, including photographs, following sealing.
			There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination levels (concentration of key parameters)	Contamination levels are consistent with the target values specified under the *Closure Management Plan*.	Single occurrence contamination assessment report prepared by a suitably qualified person in accordance with the *Closure Management Plan*, with follow up validation testing to be undertaken if required.
				Presence of hazardous materials	Hazardous materials managed in accordance with the *Closure Management Plan*.	Single occurrence hazardous materials audit undertaken in accordance with the *Closure Management Plan*, with follow up inspections to be undertaken if required.
			Final void landforms are non-polluting.	Presence of waste	All rubbish and waste materials are removed from site or disposed of in areas designated within this Plan.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
				Presence of appropriate surface materials	All surface materials (i.e. waste rock and growth medium) used to construct surface infrastructure (e.g. safety bunds, retained roads) are considered appropriate for surface use in accordance with the *Waste material and soil characterisation assessment 2022*.	Waste rock testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.
						Soil / growth medium testing in accordance with the *Waste material and soil characterisation assessment 2022* prior to use for infrastructure construction.

Table 6 (Cont'd)
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria - Southern Operations, North Mine and Potosi Mine

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Proposed Rehabilitation Objective	Indicator	Proposed Rehabilitation Completion Criteria	Validation Method
Final Void Area (Cont'd)	Infrastructure Area, Active Mining Area (Cont'd)	J1, J5	Final void landforms are non-polluting. (Cont'd)	Groundwater quality (pH, TDS, dissolved metals and metalloids)	Groundwater quality monitoring results demonstrate parameter levels within 10% of baseline groundwater quality monitoring results over four consecutive monitoring periods for final voids containing permanent water bodies.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Sufficient licence shares are held in the water source to account for final void water take, where required.	Water approval / licence or advice from relevant government agency	Final void water take is appropriately accounted for.	Confirmation from relevant government agency that water approvals / licences have been granted or are not required.
			The final void landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	Visible erosion or land instability. Geotechnical stability of final void landforms	Geotechnical assessment determines that the retained void walls are not likely to actively erode or 'slip' to an extent requiring further earthworks.	Single occurrence geotechnical assessment and report prepared by a suitably qualified person following establishment of final landform, with follow up assessment to be undertaken in the event that further earthworks are required.
			The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Presence of bushfire controls	Appropriate bushfire hazard controls implemented, where required, on the advice from the NSW Rural Fire Service.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Runoff water quality from mine site is similar to, or better than the analogue site upstream.	Levels of electrical conductivity, total suspended solids, major ions, dissolved metals, metalloids and pH.	The monitored parameters are within 10% (or better) of the recorded measurements from the upstream monitoring location, on three consecutive occasions. Surface water monitoring verifies adequate containment of waste materials and that seepage / leachate is not contributing to land or groundwater contamination.	Water quality testing undertaken quarterly on a campaign basis (i.e. following recorded flows in drainage system or captured in dams).
			Groundwater quality is consistent with historical groundwater monitoring and in line with anticipated quality in the region.	Groundwater quality (pH, TDS, dissolved metals and metalloids)	Groundwater quality monitoring results demonstrate parameter levels within 10% of baseline groundwater quality monitoring results over four consecutive monitoring periods for final voids containing permanent water bodies.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Impacts to groundwater regime are consistent with historical groundwater monitoring and in line with anticipated levels in the region.	Groundwater levels	Groundwater levels both on and off a mining lease represent an acceptable level of change from baseline monitoring data.	Groundwater quality sampling undertaken quarterly for a minimum of two years following the cessation of mining operations.
			Infrastructure being retained will benefit from relevant approvals, licences, permits, and/or agreements.	Necessary approvals/licences/permits/ agreements are in place where infrastructure is to be retained.	Permits, licences, agreements and approval documents for any retained infrastructure are sought and issued.	Copy of relevant approvals, licences, permits, and/or agreements.

Note 1: See **Plan 1**.

Note 2: Preliminary Ecosystem Function Analysis assessments were undertaken in December 2020 across 21 monitoring sites, including 10 rehabilitation sites and 11 control (i.e. analogue) sites, established in the vicinity of the Southern Operations and North Mine sites. Future Ecosystem Function Analysis assessments will be expanded to identify key rehabilitation completion criteria benchmark values for dominant vegetation communities based on their landscape position and species composition (i.e. Southern Flat, Northern Flat and Rocky Ridge).

Note 3: Plans, studies and procedures, referenced in red text have not yet been developed.

4.2 Rehabilitation Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

Table 7 presents a summary of consultation undertaken with relevant stakeholders with regards to the rehabilitation objectives, rehabilitation completion criteria and proposed final land uses and landforms presented in this Plan. Further consultation with relevant stakeholders will be undertaken prior to the cessation of mining operations in 2030 to clarify rehabilitation requirements for specific areas within the Mine Site, ensure optimal rehabilitation outcomes within the broader contact of Broken Hill and confirm requirements for any relinquishment processes. As a minimum, this will include consultation with:

- Broken Hill City Council and the Department of Planning, Industry and the Environment regarding rezoning of SP1 Special Activities (Mining) land within the Mine Site;
- Dams Safety NSW regarding any specific closure requirements for the TSF landform.

Table 7 will be updated with each revision to this Plan to include details of further consultation with relevant and interested stakeholders.

Table 7
Community Consultation Activities

Page 1 of 4

Stakeholder	Consultation Activities
Australian Rail Track Corporation	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Broken Hill City Council	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Broken Hill Local Aboriginal Land Council	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Community Consultative Committee – Broken Hill	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – Following a meeting on 23 April 2021, the CCC confirmed that they have reviewed the Draft Rehabilitation Objectives & Rehabilitation Completion Criteria for the North Mine Rehabilitation Management Plan and would express to the Resource Regulator and anyone else in the NSW Government their support of the plan.

Table 7 (Cont'd)
Community Consultation Activities

Stakeholder	Consultation Activities
Crown Lands	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Department of Premier and Cabinet	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – An email response was provided by the Department of Premier and Cabinet on 6 April 2021 indicating that this consultation letter should be directed to the NSW Department of Planning, Industry and the Environment.
Environmental Protection Authority	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – An email response was received from the Environment Protection Authority (EPA) on 14 April 2021. This response indicated that the EPA did not have any matters for consideration in addition to those identified in the consultation letter. – The response also confirmed that the EPA considers key issues at the Mine to include the minimisation of potentially lead contaminated dust lift off and the retention on site of potentially lead contaminated water as far as is feasible and reasonable. – Measures targeting the minimisation of particulate matter generation, including potentially lead-contaminated particulate matter, and the retention of potentially contaminated water have been incorporated into this Plan.
Essential Energy and Water	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Heritage NSW and Heritage Council	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Mining, Exploration and Geoscience	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.

Table 7 (Cont'd)
Community Consultation Activities

Stakeholder	Consultation Activities
Mining, Exploration and Geoscience (Cont'd)	• Form of Consultation: Meeting (video conference) • Included RR, MEG Strategy Advice and Programs and CBH Resources • Date: 4 May 2023 • Rehabilitation Outcome feedback session • Future steps to determine agreed post-closure land-use for Broken Hill
NSW Health	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
Department of Planning, Industry and Environment	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: – The (then) Department of Planning, Industry and Environment (DPIE) requested that the consultation letter be uploaded to the NSW Major Projects Planning Portal. The letter was uploaded to the Portal on 22 April 2021. – On 26 April 2021 a request for information regarding the status of the Rehabilitation strategy required under Condition 45 of SSD 7538 was provided by DPIE. This request also indicated that DPIE and the Resources regulator should not review the consultation letter until the rehabilitation Strategy has been reviewed and approved. – A response regarding the status of the Rehabilitation Strategy required under Condition 45 of SSD 7538 was uploaded to the NSW Major Projects Planning Portal on 29 April 2021. – Further feedback from DPIE is awaited.
NSW Resources Regulator	• Form of Consultation: Letter (email transmission). • Date: 1 April 2021. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 19 May 2021.
	• Form of Consultation: Draft RMP. • Date: 19 May 2021. • Matters Subject to Consultation: Contents of RMP, including Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: Notice of approval (as MOP until 30 June 2022).
	• Form of Consultation: Meeting (video conference) • Included RR, MEG Strategy Advice and Programs and CBH Resources • Date: 4 May 2023 • Rehabilitation Outcome feedback session • Future steps to determine agreed post-closure land-use for Broken Hill

Table 7 (Cont'd)
Community Consultation Activities

Stakeholder	Consultation Activities
Transport for NSW	• Form of Consultation: Letter (email transmission). • Date: 17 June 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
CBH Resources	• Form of Consultation: Letter (email transmission). • Date: 17 June 2022. • Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans. • Outcomes: No response received by 29 July 2022.
	• Form of Consultation: Meeting (video conference) • Included RR, MEG Strategy Advice and Programs and CBH Resources • Date: 4 May 2023 • Rehabilitation Outcome feedback session • Future steps to determine agreed post-closure land-use for Broken Hill

5. Final Landform and Rehabilitation Plan

5.1 Final Landform and Rehabilitation Plan – Electronic Copy

Plan 1 presents the final landform features for the Mine Site and **Plan 2** presents the final landform contours for the Mine Site.

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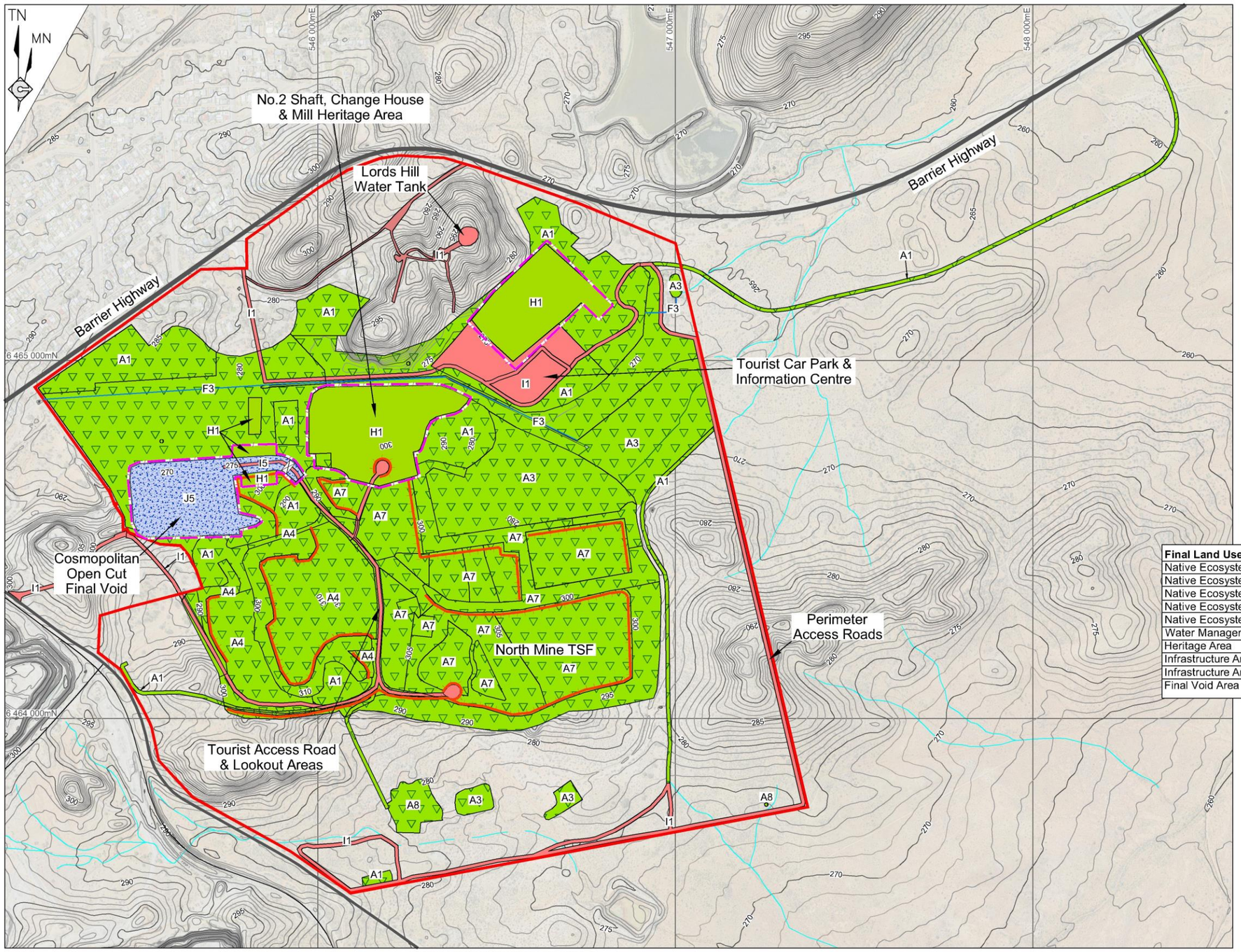

REFERENCE
- Project Approval Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Safety Bund
- Security Fence
- Water Diversion Drain

Final Land Use Domains
- A.Native Ecosystem Area
- F. Water Management Area
- H. Heritage Area
- I.Infrastructure Area
- J.Final Void Area

Mine Name	North Mine
Plan Name	Plan 1 - Final Landform Features
Anticipated Year of Relinquishment	2036
Submission ID Number	
Date Plan Created	31 July 2023

Final Land Use Domain	Mining Domain	Ref	Area (ha)
Native Ecosystem Area	Infrastructure Area	A1	62.8
Native Ecosystem Area	Water Management Area	A3	17.8
Native Ecosystem Area	Overburden Emplacement Area	A4	19.4
Native Ecosystem Area	Tailings Storage Facility	A7	45.5
Native Ecosystem Area	Other	A8	1.6
Water Management Area	Water Management Area	F3	0.2
Heritage Area	Infrastructure Area	H1	15.4
Infrastructure Area	Infrastructure Area	I1	13.8
Infrastructure Area	Active Mining Area (Open Cut Void)	I5	0.2
Final Void Area	Active Mining Area (Open Cut Void)	J5	6.8

Note: Coordinates are MGA Zone 54

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Source: Perilya - 25 November 2020

Plan 1
FINAL LANDFORM FEATURES

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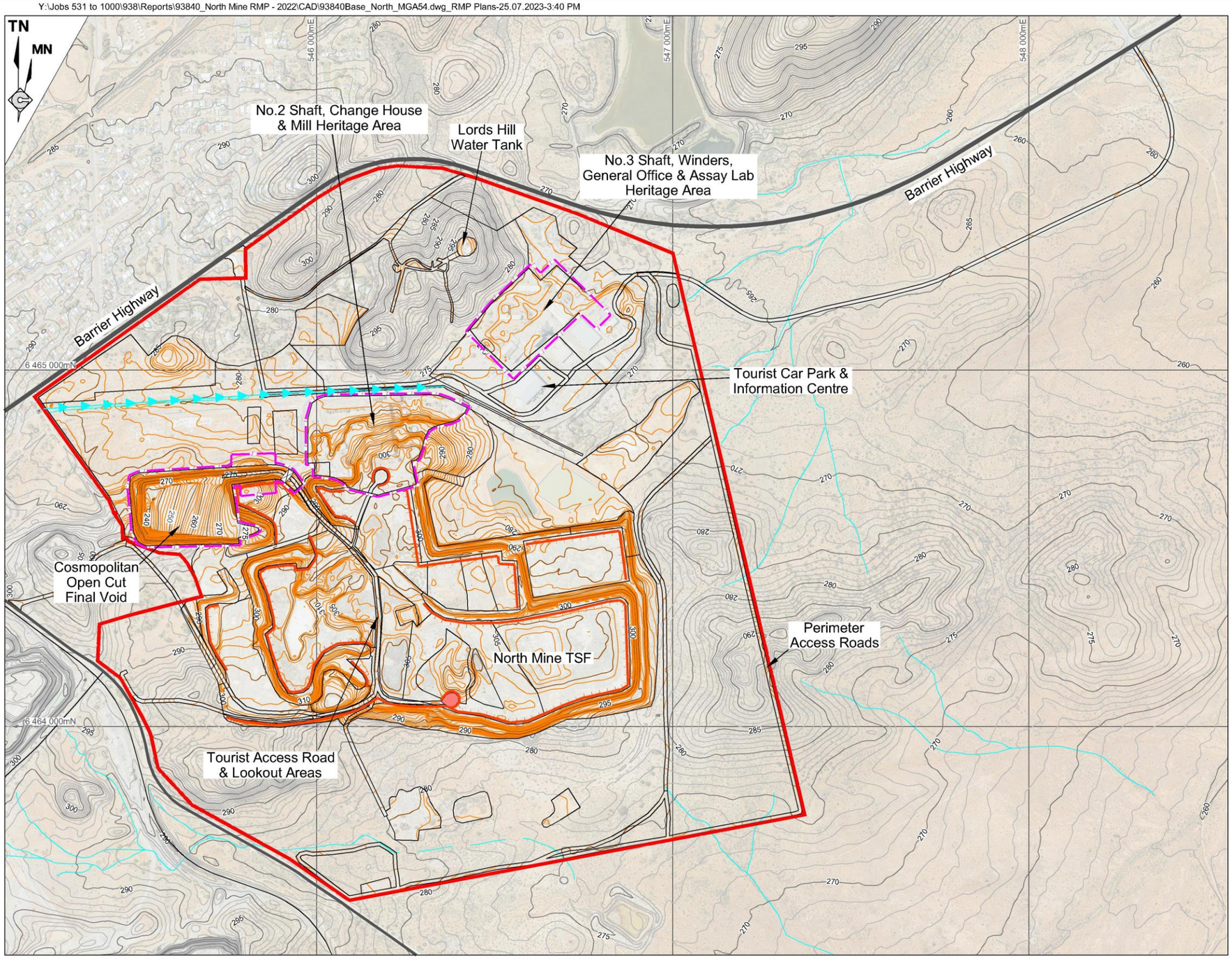

REFERENCE
- Project Approval Boundary
- Watercourse / Drainage Line
- Safety Bund
- Security Fence
- 200 Existing Contour (mAHD)(Interval = 1m)
- 200 Final Contour (mAHD)(Interval = 1m)

Mine Name	North Mine
Plan Name	Plan 2 - Final Landform Contours
Anticipated Year of Relinquishment	2036
Submission ID Number	
Date Plan Created	14 June 2023

Note: Coordinates are MGA Zone 54

SCALE 1:12 000 (A3)

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Source: Perilya - 25 November 2020

Plan 2
FINAL LANDFORM CONTOURS

6. Rehabilitation Implementation

6.1 Life Of Mine Rehabilitation Schedule

Based on current production rates and the extent of known mineralisation, it is anticipated that mining operations at the Mine will be completed by December 2030. However, the identification of further mineralisation or modifications to the current production schedule may result in the actual completion date being extended.

Prior to the cessation of mining operations, rehabilitation will only be undertaken in areas which are no longer required for operational purposes. **Figure 8** identifies the current mining domains at the Mine Site, effectively delineating the extent of areas required for ongoing mining operations and ancillary activities (e.g. waste rock and growth medium stockpiling). Additionally, specific management actions to be implemented for individual historic heritage items and their relative timing will be determined during preparation of the *Heritage Implementation Plan* (see Section 9.2.4).

Plans 3 to **5** present the indicative rehabilitation schedule for the Mine Site by depicting those areas which would be rehabilitated during each 5-yearly increment between the commencement of this plan and Mine closure. It is noted that this schedule is applicable only until the completion of the Ecosystem and Land Use Establishment phase of rehabilitation operations within all Mining Domains (see Section 6.2). Approximate timings for the Ecosystem and Land Use Development phase of rehabilitation have not yet been defined as this phase will principally involve the monitoring and maintenance of completed rehabilitation works until completion criteria identified in Section 4.1 have been achieved.

In summary, the rehabilitation schedule indicates that the following areas will be subject to the decommissioning, landform establishment, growth medium development and ecosystem and land use establishment rehabilitation phases prior to the cessation of mining operations.

- 2022 to 2026 (**Plan 3**):
  - Rehabilitation of areas of the Infrastructure domains, as illustrated in green on **Plan 3**.
- 2027 to 2031 (**Plan 4**):
  - Rehabilitation of areas of the Infrastructure domains, as illustrated in green on **Plan 4**.
  - Rehabilitation of an area of the Water Management Area (Bovril Dam).

Following the cessation of mining operations in 2030, all other Mining Domains would be subject to decommissioning, landform establishment, growth medium development and ecosystem and land use establishment rehabilitation phases (**Plan 5**). It is anticipated that the rehabilitation of all Mining Domains and the successful establishment of all Final Land Use Domains (up to the Ecosystem and Land Use Establishment phase, as a minimum) will be completed by 2035.

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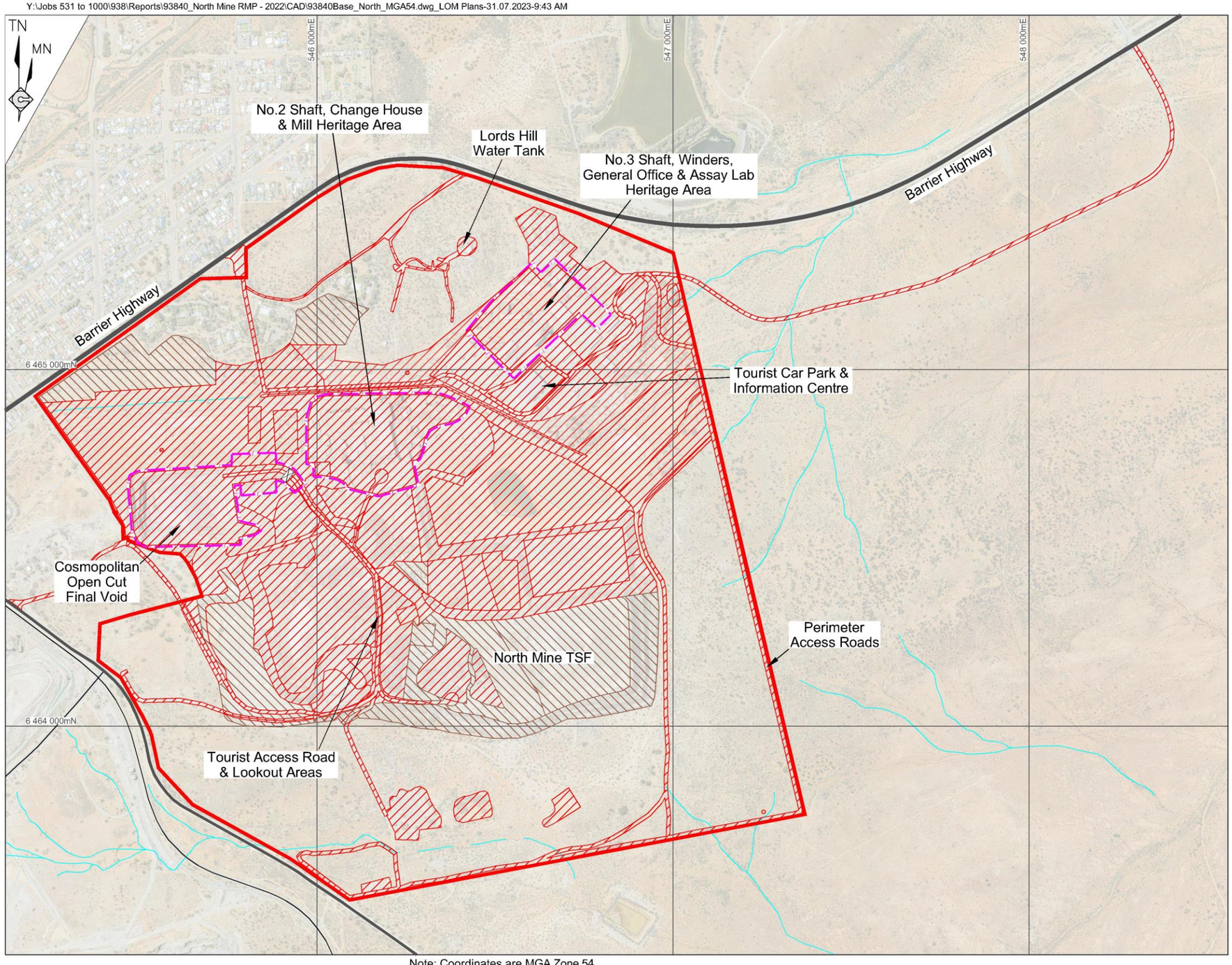

REFERENCE
Project Approval Boundary
200 Contour (mAHD)(Interval = 1m)
Watercourse / Drainage Line
Safety Bund
Security Fence
Rehabilitation Forecast
Forecast Disturbance
Forecast Land Prepared for Rehabilitation

Mine Name	North Mine
Plan Name	Plan 3 - Rehabilitation 2022 - 2026
Anticipated Year of Relinquishment	2036
Submission ID Number	
Date Plan Created	14 June 2023

Note: Coordinates are MGA Zone 54

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Source: Perilya - 25 November 2020

Plan 3
REHABILITATION 2022 - 2026

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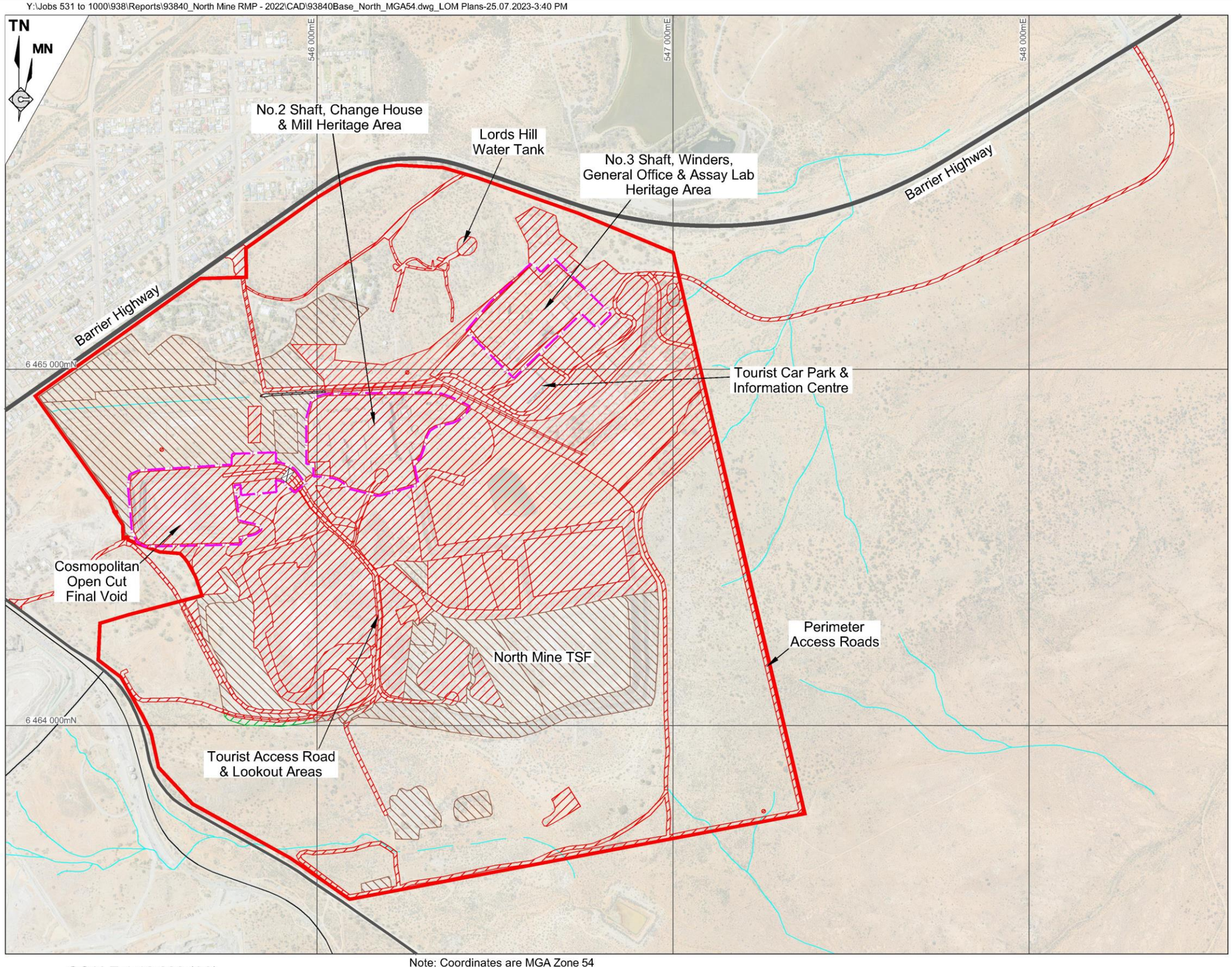

REFERENCE
- Project Approval Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Safety Bund
- Security Fence

Rehabilitation Forecast
- Forecast Disturbance
- Forecast Land Prepared for Rehabilitation

Mine Name	North Mine
Plan Name	Plan 4 - Rehabilitation 2027 - 2031
Anticipated Year of Relinquishment	2036
Submission ID Number	
Date Plan Created	14 June 2023

Note: Coordinates are MGA Zone 54

SCALE 1:12 000 (A3)

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Source: Perilya - 25 November 2020

Plan 4
REHABILITATION 2027 - 2031

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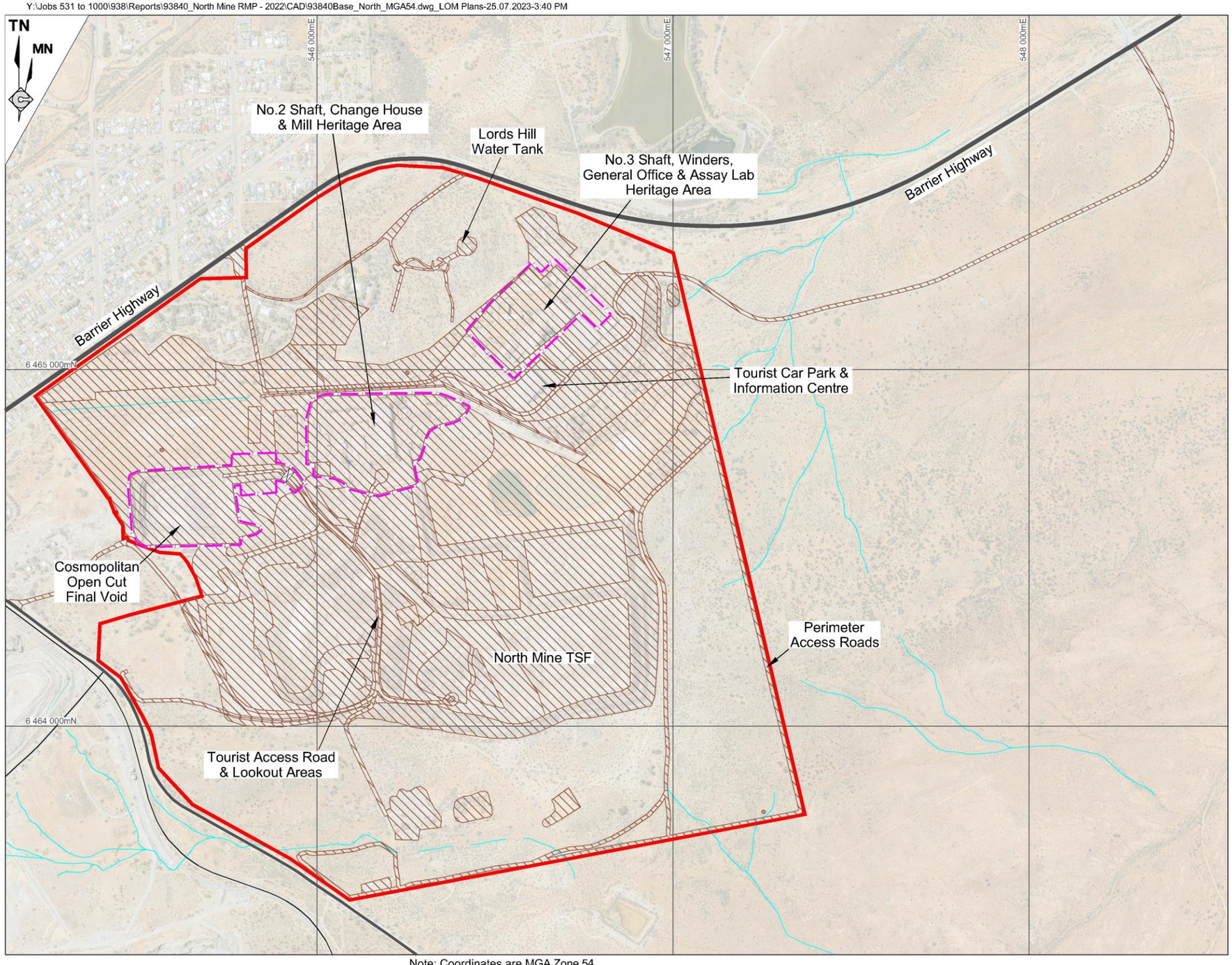

REFERENCE
- Project Approval Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Safety Bund
- Security Fence

Rehabilitation Forecast
- Forecast Disturbance
- Forecast Land Prepared for Rehabilitation

Mine Name	North Mine
Plan Name	Plan 5 - Rehabilitation 2032 - 2036
Anticipated Year of Relinquishment	2036
Submission ID Number	
Date Plan Created	14 June 2023

Note: Coordinates are MGA Zone 54

SCALE 1:12 000 (A3)

200 0 200 400 600 m

Source: Perilya - 25 November 2020

Plan 5
REHABILITATION 2032 - 2036

6.2 Phases of Rehabilitation and General Methodologies

6.2.1 Active Mining Phase

6.2.1.1 Topsoil Resource

Two soil types are present within the Mine Site as follows.

- Moderately deep to deep, red-brown clay loams found across the broad, lower-lying 'flats' between rises and bounding drainage lines and is associated with chenopod shrubland with sparse grassy understory; and
- Shallow to moderately shallow skeletal brown clay-loam lithosols on rocky rises and hills are covered by mulga open woodland with sparse forbs understory.

Detailed growth medium characterisation studies have not previously been undertaken at the Mine Site. However, RWC (2017) indicated that soils within the Mine Site could be classified based on land and soil capability assessment methodologies (OEH, 2012) as follows.

- Class VI:
  - Land generally only suitable for grazing with limitations.
  - Limitations include: steeply sloping lands (20-33%) that erode severely even without cultivation, shallow soils (<50cm deep), stoniness, rock outcrop (50-70% coverage), salt outbreaks, naturally acidic soils of low fertility, major flow lines with high flows and flooding, poorly drained areas, areas that are severely eroded (including scalds) and strong climatic limitations.
- Class VII:
  - Land with extremely severe limitations for most land uses unsuitable for any types of cropping or grazing.
  - Limitations include: steeply sloping land (33-50%), extreme soil erodibility, catchments where salinity and recharge are a serious problem, severely scalded areas where rock outcrop, stoniness and shallow soils are a severe problem, flooding, wind erosions and severe climatic limitations.

Soils within the Mine Site have been extensively disturbed by the historic mining operations over the past century. As a result, soils materials have not typically been preserved for rehabilitation purposes. **Figure 8** shows the locations of growth medium stockpiles located within the Mine Site which have been reclaimed from recent soil disturbing activities associated with the recommencement of mining at the Mine Site in 2018.

The Company commissioned SKR Consulting (Australasia) Pty Ltd (SKR) to prepare a *Waste Material and Soil Characterisation Assessment* (SKR, 2022) of soil areas (stockpiles, dams and contaminated contact zones) to evaluate the environmental risk posed by soils on the Mine Site to the final land use. SKR (2022) found that most soils had the following characteristics.

- Slightly acidic to moderately alkaline (pH 6 to 8.5).
- Non saline to slightly saline electrical conductivity (EC) up to 4 000µS/cm).

- Comprised low effective cation exchange capacity (eCEC).
- Gave rise to low electrostatic potential (ESP) values (less than 6% for 59 of 95 samples).
- A total nitrogen (TN) content of the soil samples ranging between 50mg/kg (very low) and 2 030mg/kg (medium) with an average of 328mg/kg (most TN was present as nitrate).
- Low total phosphorus (TP) concentrations of the soil samples, ranging between 90mg/kg and 2 050mg/kg with an average of 385mg/kg.
- Comprised a range of particle sizes, with the sand fraction most dominant, followed by the silt fraction.
- Classed as Emerson Class 3 – meaning they posed a risk of dispersion.
- Relatively evenly distributed between low erodibility (34 samples), moderate erodibility (28 samples) and high erodibility (33 samples).
- Lead exceeded guideline values for all land use classes – with concentrations in approximately 29% of samples exceeding the Commercial/Industrial Health-Based Investigation Levels (HIL).

In general, SKR (2022) found that the soil properties indicate that the soils are nutrient deficient and pose a risk of erosion and dispersion. Some soils exhibit contaminant concentrations that exceed HIL values for recreational use (arsenic, cadmium and lead) and Commercial/Industrial use (lead). Higher lead concentrations are associated with those collected from the North Mine and the Potosi Operations where average soil lead concentrations were 3,586mg/kg and 3,258mg/kg respectively. Other elements that may require further investigation are arsenic, cadmium, manganese, and zinc as these exceeded non-commercial land use HILs. Classification according to NSW contaminated site regulations may be required where contaminant concentrations cannot be mitigated.

The *Waste Material and Soil Characterisation Assessment* also included known areas of contamination that will require remediation activities to the existing surface to support the proposed final land use. An options analysis of remediation methodologies will determine if native ecosystems as the final land use is an achievable or preferred outcome for the areas identified.

Subject to investigations into available growth medium resources at the Mine Site, estimated growth medium resources available at the Mine Site for rehabilitation operations are likely to be inadequate. The quantity and quality of growth medium available for rehabilitation operations is therefore recognised as an issue representing a high risk to be managed prior to and during rehabilitation. However, it is noted that sustainable revegetation of disturbed North Mine demonstrate the resilience of native species to the saline, sodic, metalliferous soils identified in this assessment.

Risk Controls

The following risk controls have been identified and will be implemented in order to ensure that sufficient growth medium resources capable of supporting the final land use are available during rehabilitation operations.

The Company has conducted the following investigations into available growth medium resources at the Mine Site:

- Formal survey and development of growth medium stockpile register of volumes within the Mine Site.
- *Waste Material and Soil Characterisation Assessment* (SKR, 2022).

The Company will conduct the following investigations into available growth medium resources at the Mine Site.

- *Growth Medium Development Study* (see Section 9.2.1).
- *Remediation Options Assessment* (see Section 9.2.6)

The outcomes of the *Remediation Options Assessment* will be used to confirm areas of native ecosystems as the final land use and ensure that available growth medium resources, and any anticipated deficits, are considered during rehabilitation operations. If a deficit of growth medium resources is identified, an investigation into potential alternative sources of growth medium material will be initiated.

In addition to the above investigations, the following risk controls and management practices will be implemented at the Mine Site.

- Restrict vehicle access to growth medium stockpiles to prevent compaction, except during rehabilitation operations where necessary.
- Undertake extraction of growth medium materials from stockpiles only during favourable conditions (i.e. not during excessively windy or wet conditions).
- Lightly wet growth medium material prior to extraction from growth medium stockpiles, during growth medium placement and/or following growth medium spreading, as required, to prevent excessive dust generation and wind erosion.
- Construct any new growth medium stockpiles:
  - with topsoil and subsoil materials stockpiled separately;
  - by paddock dumping to avoid compaction by vehicles;
  - to a maximum height of 3m for topsoil or 4m for subsoil;
  - with a rough surface to promote water infiltration and airborne seed retention;
  - on flat surfaces away from overland flow paths; and
  - with signage labelling individual stockpiles, material types (e.g. topsoil or subsoil) and indicating the presence of growth medium materials.

6.2.1.2 Flora

Existing Biodiversity Assessments

The following flora assessments have been undertaken within or in the vicinity of the Mine Site.

- GCNRC (2000) – flora assessment undertaken by Geoff Cunningham Natural Resource Consultants to support the preparation of a Management Plan for Willyama Common.
- OzArk Environmental & Heritage Management Pty Ltd (OzArk) (2017) – ecological assessment prepared to support RWC (2017).
- Perilya Rehabilitated Areas LFA Assessments (GHD, 2020) – Ecosystem Function Analysis assessments including sites on the rehabilitated surface of Site D Cell 2.

Additionally, **Figure 5** displays Plant Community Types (PCTs) within the Mine Site and within the broader Broken Hill region based on State Vegetation Type mapping prepared by the Office of Environment and Heritage.

OzArk (2017a) identified that the Mine Site is located in an area originally mapped as *Acacia aneura – Acacia tetragonophylla tall shrubland*. This mapping unit represents open shrubland consisting of small acacias which includes extensive open areas containing dead shrubs. However, due to extensive clearing for mining operations, this vegetation type is no longer present within the Mine Site.

Vegetation within the Mine Site, represents a mixture of remnant of vegetation planted in the 1950s, vegetation planted during recent rehabilitation works or remnant vegetation in areas to the south and east of the TSF landform. Vegetation present within the Mine Site is generally not consistent with the definition of a specific PCT and is not classified as an Endangered Ecological Community.

OzArk (2017a) recorded a total of 15 flora species within the Mine Site, comprising 12 native species and 3 exotic species. No threatened flora species were recorded during field surveys. Green Cestrum (*Cestrum parqui*), a Regionally Controlled Weed, was the only noxious weed species identified at the Mine Site during field surveys (OzArk, 2017a).

In summary, as no Endangered Ecological Communities or threatened flora species have been identified within the Mine Site, no species-specific flora rehabilitation objectives have been established and no specific risk controls are required. Target vegetation communities and associated species, as well as methods for the introduction of flora to rehabilitated areas and the control of pests and weeds, are detailed in Section 6.2.5.

6.2.1.3 Fauna

Existing Biodiversity Assessments

The ecological assessment undertaken by OzArk (2017a) in support of RWC (2017) also included an assessment of fauna within the Mine Site.

Analyses of bat recordings conducted at the Mine Site identified three bat species:

- Gould's Wattled Bat (*Chalinolobus gouldi*).
- Inland Freetail Bat (*Mormopterus (Ozimops) planiceps*).
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).

The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) is listed as Vulnerable under the *Biodiversity Conservation Act 2016*. Additionally, OzArk (2017a) completed an assessment of likelihood of occurrence for listed fauna species, populations, communities and migratory species based on occurrence records in the vicinity of the Mine Site and the presence or absence of suitable habitat. This assessment indicated that the Little Pied Bat (*Chalinolobus picatus*), listed as Vulnerable under the *Biodiversity Conservation Act 2016*, is also likely to occur at the Mine Site. No additional fauna species were identified by OzArk (2017a) during field surveys or identified as likely to occur at the Mine Site.

OzArk (2017a) noted that, given the relatively low number of bat calls recorded and the environmental conditions observed during field surveys, the Cosmopolitan Portal mine shaft is unlikely to represent important breeding habitat for any of the identified bat species.

Consequently, no species-specific rehabilitation objectives have been established and no specific risk controls re required.

6.2.1.4 Waste Rock/Overburden Emplacement

Oxidised waste rock excavated during the development of the Cosmopolitan Open Cut was used to cap the demineralised tailings storage facilities (numbers 1 to 3) between 1991 and 1997.

Current waste rock management practices include a combination of the following.

- Waste rock is retained underground and used to backfill completed stopes and voids.
- Waste rock is transported to the surface and deposited in the Cosmopolitan Open Cut void, partially backfilling the void and facilitating the stabilisation of the open cut wall below the Portal.
- Waste rock is transported to the surface and stockpiled in preparation for the generation of road base material, stemming or subsequent stope/void backfilling.

Waste rock has previously been transported to the surface by haul truck and deposited in the vicinity of the Cosmopolitan Open Cut. This material has then been pushed into the Cosmopolitan Open Cut void, partially backfilling the void and facilitating stabilisation of the open cut wall below the portal.

Waste rock required for the construction of surface infrastructure to be retained as part of the final land use (e.g. safety bunds) will be subject to classification in accordance with the *Waste Material and Soil Characterisation Assessment* (SKR, 2022). Additional classification of uncertain waste rock material will include a program of kinetic column leach tests to provide a foundation for predictive modelling that are site-specific. The results of the kinetic tests may be used to assess oxygen consumption mechanisms and provide an understanding of mine waste

weathering processes. Furthermore, the results will form the foundation for predictive modelling of future mine-affected water quality and may be used to guide future mine waste management decisions.

In the event that excess waste rock material remains at the surface within temporary waste rock stockpiling areas and cannot be used for backfilling operations, excess waste rock will be used to undertake further backfilling of the Cosmopolitan Open Cut final void. The final surface of waste rock placed into the final void will achieve an east-facing slope with an average gradient of approximately 1:7 (V:H).

If additional suitable waste rock is required for the construction of surface infrastructure to achieve the final landform, the Company will explore options involving alternative waste rock sources such as transporting waste rock from the Company's other mine sites in Broken Hill. Approval for these activities will be sought where required.

6.2.1.5 Waste Management

Non-production Waste Management

Waste disposal and materials handling practices at the Mine aim to mitigate and manage any risks to the environment, including current and future land uses. The management of non-production waste generated at the Mine Site is described in **Table 8**.

Table 8
Non-Production Waste Management

Waste Type	Storage	Removal Method	Anticipated Volume and Destination
General Solid Waste (Putrescible and Non-putrescible)	Covered bins located within amenity buildings, offices and elsewhere, as required. Bins located in open areas are fitted with animal-proof lids.	Collected on a regular basis by a licensed waste contractor and transported to a licensed waste disposal facility.	Variable
General Recyclables	Covered bins located within amenity buildings, offices and elsewhere, as required. Bins located in the open are fitted with animal-proof lids.	Collected as required by a licensed recycling contractor and transported to an appropriate recycling facility.	One 6m^3 skip per fortnight
Waste Oils and Greases	Placed within a bunded area.	Collected on a regular basis by a licensed waste contractor and transported to an appropriately licensed facility.	200L to 600L per week
Batteries	Placed within a covered and marked battery storage area.	Collected on a regular basis by a licensed disposal contractor and recycled.	Variable
Tyres	Stored in bins adjacent to the workshop.	Collected by an EPA licenced waste recycling contractor.	Variable
Scrap Steel /Metal	Stored in bins adjacent to the workshop.	Sent to a scrap metal recycler on a regular basis.	Variable
Waste Water – Grey Water	Waste water from offices, workshops and ablutions facilities is pumped to the Water Storage Dam.	Water is evaporated from the Water Storage Dam.	Variable
Waste Water - Sewage	Sewage produced on the surface is stored in a 32 000L concrete tank. Sewage produced underground is stored in chemical toilet facilities.	Routinely pumped out or emptied by a licensed contractor and disposed of at approved facilities.	Variable
Source: Perilya Broken Hill Limited			

Management measures targeting the treatment and disposal of contaminated waste materials (e.g. contaminated growth medium) are detailed in Section 6.2.2.

6.2.1.6 Geology and Geochemistry

The Broken Hill Line of Lode is hosted by the upper Broken Hill Group of the Willyama Supergroup. The Line of Lode is an approximately 9.5km long, northeast – southwest striking, approximately boomerang-shaped orebody, with the "arms" plunging to depth. The Line of Lode consists of five major ore lenses (1, 2, 3, A and B Lenses) surrounded by a zone of disseminated mineralisation referred to as the C Lens. Typically, the upper lenses (2 and 3 Lenses) are lead rich, while the lower lenses (1, A and B Lenses) are zinc rich.

The geological setting of the North Mine is broadly similar to the rest of the Line of Lode, with each of the lenses occurring within the Lode. Mineralisation within the North Mine is typically associated with:

- Sphalerite (zinc sulphide);
- Galena (lead sulphide) with variable silver; and
- Tetrahedrite (copper antimony sulfosalt) with silver.

Typical combined grades of lead and zinc range from 5% to 40% within the high-grade zones, with silver grades between 50g/t and 400g/t in the galena rich lenses.

In November 2021, SKR undertook further mineralogical assessment of soils and materials at the Mine Site. SKR (2022) identified sulphur bearing minerals comprising the following.

- Sulfides – sphalerite and galena;
- Sulfates – anglesite, gypsum and Szomolonkite/gunningite; and
- Hydroxysulfates – jarosite, beaverite and beaudanite.

Table 9 provides the latest waste rock characterisation data for samples collected at the Mine Site. **Tables 10** and **11** provide the latest tailings material characterisation data for samples collected at the Mine Site.

Table 9
North Mine Waste Rock Characterisation

Page 1 of 3

Date: 19 October 2020		Sample					
Parameter	**LOR**	**NOR_TSF_02**	**NOR_TSF_04**	**NOR_WR_02**	**NOR_WR_03**	**NOR_WR_04**	**NOR_WR_05**
pH 1:5 (Soils)							
pH (pH)	0.1	8.1	6.1	6.0	6.6	6.2	6.7
Net Acid Production Potential							
Net Acid Production Potential (kg H2SO4/t)	0.5	-16	-9.7	-23	-5.6	-10.8	-16.8

Table 9 (Cont'd)
North Mine Waste Rock Characterisation

Date: 19 October 2020		**Sample**					
Parameter	**LOR**	**NOR_TSF_02**	**NOR_TSF_04**	**NOR_WR_02**	**NOR_WR_03**	**NOR_WR_04**	**NOR_WR_05**
Conductivity(1:5)							
Electrical Conductivity @ 25°C (µS/cm)	1	140	81	657	54	925	170
Net Acid Generation							
pH (OX) (pH)	0.1	7.4	6.3	9.0	4.0	5.2	7.7
NAG (pH 4.5) (kg H2SO4/t)	0.1	**<0.1**	**<0.1**	**<0.1**	**1.3**	**<0.1**	**<0.1**
NAG (pH 7.0) (kg H2SO4/t)	0.1	**<0.1**	1.0	**<0.1**	4.6	1.4	**<0.1**
Acid Neutralising Capacity							
ANC as H2SO4 (kg H2SO4 equiv./t)	0.5	18.5	12.5	24.2	12.6	18.8	17.4
ANC as CaCO3 (% CaCO3)	0.1	1.9	1.3	2.5	1.3	1.9	1.8
Fizz Rating (Fizz Unit)	0	1	1	1	1	1	1
Total Sulphur by LECO							
Sulphur – Total as S (LECO) (%)	0.01	0.08	0.09	0.04	0.23	0.26	0.02
Total Major Cations							
Calcium (mg/kg)	50	3340	750	10700	600	3110	1840
Magnesium (mg/kg)	50	2820	1110	2970	3830	2510	3100
Sodium (mg/kg)	50	100	**<50**	290	220	300	180
Potassium (mg/kg)	50	2560	1440	3640	4130	2870	2390
Total Metals by ICP-AES							
Aluminium (mg/kg)	50	7970	3260	16600	9160	7630	7180
Iron (mg/kg)	50	19400	6110	25700	15100	13300	14900
Total Metals by ICP-MS							
Arsenic (mg/kg)	0.1	34	34.3	91.6	0.6	21.1	9.9
Selenium (mg/kg)	1	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**
Barium (mg/kg)	0.1	72.1	31.8	150	30.7	26.3	**16.9**
Thallium (mg/kg)	0.1	0.4	0.2	0.5	0.4	0.5	0.4
Beryllium (mg/kg)	0.1	0.4	0.34	0.6	2.3	0.9	0.5

Table 9 (Cont'd)
North Mine Waste Rock Characterisation

Date: 19 October 2020		**Sample**					
Parameter	**LOR**	**NOR_TSF_02**	**NOR_TSF_04**	**NOR_WR_02**	**NOR_WR_03**	**NOR_WR_04**	**NOR_WR_05**
Total Metals by ICP-MS (Cont'd)							
Cadmium (mg/kg)	0.1	10.8	2.5	35.2	0.8	7.2	3.0
Bismuth (mg/kg)	0.1	1.0	0.6	2.8	0.1	0.5	0.1
Cobalt (mg/kg)	0.1	11.4	5.0	17.9	5.2	9.3	6.3
Chromium (mg/kg)	0.1	10.4	5.7	24.9	11.2	10.8	19.6
Gallium (mg/kg)	0.1	4.1	1.4	5.1	2.7	2.6	2.5
Manganese (mg/kg)	0.1	1310	475	5860	62.0	677	89.7
Strontium (mg/kg)	0.1	13.5	5.2	29.8	7.4	12.5	2.5
Molybdenum (mg/kg)	0.1	0.5	0.2	0.9	**<0.1**	0.3	0.2
Nickel (mg/kg)	0.1	14.0	6.5	21.8	10.0	17.4	13.6
Lead (mg/kg)	0.1	3260	2350	9070	58.2	2460	60.7
Antimony (mg/kg)	0.1	5.2	1.4	0.4	0.2	1.3	0.1
Uranium (mg/kg)	0.1	2.1	1.0	5.7	0.2	1.3	0.8
Zinc (mg/kg)	0.5	3400	1070	7910	176	2560	245
Vanadium (mg/kg)	1	14	9	31	16	14	19
Tin (mg/kg)	0.1	1	0.5	18.2	0.3	0.6	0.2
Titanium (mg/kg)	1	274	227	406	588	454	669
Total Recoverable Mercury by FIMS							
Mercury (mg/kg)	0.1	0.4	**<0.1**	2.0	**<0.1**	0.2	**<0.1**
Total Phosphorus as P by Discrete Analyser							
Total Phosphorous as P (mg/kg)	2	450	276	2040	111	130	216

Note: Bold text indicates values below LOR value.

Source: ALS Environmental Certificate of Analysis: ES2037666

Table 10
North Mine TSF Tailings Analysis – Leachable Metals

Date: 19 October 2020		**Sample**		
Parameter (unit)	**LOR**	**NOR_TSF_01**	**NOR_TSF_03**	**NOR_REVEG_01**
Leachable Metals by ICPAES				
Aluminium (mg/L)	0.1	3.7	2.3	1.5
Arsenic (mg/L)	0.1	**<0.01**	**<0.01**	**<0.01**
Cadmium (mg/L)	0.05	0.38	0.07	0.88
Chromium (mg/L)	0.1	**<0.01**	**<0.01**	**<0.01**
Cobalt (mg/L)	0.1	**<0.01**	**<0.01**	**<0.01**
Copper (mg/L)	0.1	0.7	0.2	0.9
Lead (mg/L)	0.1	54.6	39.3	30.9
Manganese (mg/L)	0.1	5.2	6.2	7.5
Nickel (mg/L)	0.1	**<0.01**	**<0.01**	0.1
Silver (mg/L)	0.1	**<0.01**	**<0.01**	**<0.01**
Zinc (mg/L)	0.1	99.1	23.6	130
Leachable Mercury by FIMS				
Mercury (mg/L)	0.0010	**<0.0010**	**<0.0010**	**<0.0100**
Water Leachable Metals by ICP-MS				
Aluminium (mg/L)	0.01	0.87	0.79	0.47
Arsenic (mg/L)	0.001	0.004	0.012	0.003
Cadmium (mg/L)	0.0001	0.0888	0.0268	0.0905
Chromium (mg/L)	0.001	**<0.001**	**<0.001**	0.01
Cobalt (mg/L)	0.001	0.005	0.009	0.011
Copper (mg/L)	0.001	0.018	0.019	0.061
Lead (mg/L)	0.001	0.659	2.68	1.12
Manganese (mg/L)	0.001	1.08	1.44	1.63
Nickel (mg/L)	0.001	0.004	0.005	0.008
Silver (mg/L)	0.001	**<0.001**	**<0.001**	**<0.001**
Zinc (mg/L)	0.005	4.09	4.79	11.9
Water Leachable Mercury by FIMS				
Mercury (mg/L)	**0.0001**	**<0.0001**	**<0.0001**	**<0.0001**
ASLP Leaching Procedure – Inorganics/Non-Volatile Organics (Glass Vessel)				
Extraction Fluid pH (pH)	0.1	4.9	4.9	4.9
Final pH (pH)	0.1	4.39	4.8	4.4
Bottle Leaching Procedure – Inorganics/Non-Volatile Organics (Glass Vessel)				
Final pH (pH)	0.1	6.2	5.8	5.8
Note: Bold text indicates value below LOR.				
Source: ALS Environmental Certificate of Analyses: ES2037670 and ES2037672				

Table 11
North Mine TSF Tailings Analysis

Date: 19 October 2020		**Sample**		
Parameter (unit)	**LOR**	**NOR_TSF_01**	**NOR_TSF_03**	**NOR_REVEG_01**
pH 1:5 (Soils)				
pH Value (pH)	0.1	6.7	6.4	6.4
Net Acid Production Potential				
Net Acid Production Potential (kg H2SO4/t)	0.5	-10.7	75.1	-15.8
Conductivity(1:5)				
Electrical Conductivity @ 25°C (µS/cm)	1	993	220	668
Net Acid Generation				
pH (OX) (pH)	0.1	7.2	6.4	6.9
NAG (pH 4.5) (kg H2SO4/t)	0.1	**<0.1**	**<0.1**	**<0.1**
NAG (pH 7.0) (kg H2SO4/t)	0.1	**<0.1**	1.2	0.3
Acid Neutralising Capacity				
ANC as H2SO4 (kg H2SO4 equiv./t)	0.5	17.4	15.5	23.4
ANC as CaCO3 (% CaCO3)	0.1	1.8	1.6	2.4
Fizz Rating (Fizz Unit)	0	1	1	1
Actual Acidity				
pH KCl (23A) (pH)	0.1	8	7.1	6.3
Titratable Actual Acidity (23F) (mole H+ / t)	2	**<2**	**<2**	3
sulfidic - Titratable Actual Acidity (s-23F) (% pyrite S)	0.02	**<0.02**	**<0.02**	**<0.02**
Potential Acidity				
Chromium Reducible Sulfur (22B) (% S)	0.005	0.135	0.129	0.085
acidity - Chromium Reducible Sulfur (a-22B) (mole H+ / t)	10	84	81	53
Acid Neutralising Capacity				
Acid Neutralising Capacity (19A2) (% CaCO3)	0.01	1.95	0.95	----
acidity - Acid Neutralising Capacity (a-19A2) (mole H+ / t)	10	389	190	----
sulfidic - Acid Neutralising Capacity (s-19A2) (% pyrite S)	0.01	0.62	0.3	----
Acid Base Accounting				
ANC Fineness Factor (-)	0.5	1.5	1.5	1.5
Net Acidity (sulfur units) (% S)	0.02	**<0.02**	**<0.02**	0.09
Net Acidity (acidity units) (mole H+ / t)	10	**<10**	**<10**	56
Liming Rate (Kg CACO3/t)	1	**<1**	**<1**	4
Net Acidity excluding ANC (sulfur units) (% S)	0.02	0.14	0.13	0.09
Net Acidity excluding ANC (acidity units) (mole H+ / t)	10	84	81	56
Liming Rate excluding ANC (Kg CACO3/t)	1	6	6	4
Moisture Content (Dried @ 105-110°C)				
Moisture Content (%)	0.1	0.8	0.5	5
Total Sulfate by ICPAES				
Sulfate as SO4 2- (mg/kg)	100	5310	4380	5310
ED042T: Total Sulfur by LECO				
Sulfur - Total as S (LECO) (%)	0.01	0.22	2.96	0.25

Table 11 (Cont'd)
North Mine TSF Tailings Analysis

Date: 19 October 2020		Sample		
Parameter (unit)	**LOR**	**NOR_TSF_01**	**NOR_TSF_03**	**NOR_REVEG_01**
Total Recoverable Mercury by FIMS				
Mercury (mg/kg)	0.1	0.2	0.3	1.4
Sulfide as S2-				
Sulfide as S (%)	0.01	0.04	2.81	0.07
Total Organic Carbon (TOC) in Soil				
Total Organic Carbon (%)	0.02	0.13	0.09	1.74
Total Carbon (TC) in Soil				
Total Carbon (%)	0.02	0.16	0.13	2.07
Total inorganic Carbon (TIC) in Soil				
Total Inorganic Carbon (%)	0.02	0.03	0.04	0.33
Note: **Bold text** indicates value below LOR.				
Source: ALS Environmental Certificate of Analysis: ES2037673				

Risk controls

Prior to use for the construction of surface infrastructure (e.g. safety bunds), waste rock will be subject to kinetic column leach tests in accordance with the *Waste Material and Soil Characterisation Assessment*. Additional classification of uncertain waste rock material will include a *Program of Kinetic Column Leach Tests* (see Section 9.2.3) to provide a foundation for predictive modelling that are site-specific.

6.2.1.7 Material Prone to Spontaneous Combustion

As no material within the Mine Site is prone to spontaneous combustion, no specific risks to rehabilitation associated with spontaneous combustion have been considered.

6.2.1.8 Material Prone to Generating Acid Mine Drainage

The host rock and halo material is silica-rich metasediments and metavolcanics. These rocks are typically non-reactive due to high percentages of contained quartz, feldspar, garnet and micaceous minerals. The mineralisation typically has low concentrations of acid generating minerals such as pyrite, chalcopyrite and pyrrhotite. Typical analysis for these minerals is <0.2% in waste rock. Higher concentrations of 0.5% to 5% are rare and, when they do occur, are invariably within the ore zones rather than waste rock or halo material. In addition, the host rock includes acid-neutralising minerals, including carbonates in varying forms.

Table 12 and **Figure 9** present the results of waste rock characterisation analyses conducted for waste rock samples (samples collected did not represent final land use and included waste rock not exposed to surface conditions) at the Mine Site in 2021. In summary, the Net Acid Production Potential (NAPP) results for waste rock range between 18.1kgH_2SO_4/t and 30.5kgH_2SO_4/t and the Net Acid Generation (NAG) results for waste rock range between 5.2 pH and 6.1 pH. As such, all waste rock samples are classified as uncertain.

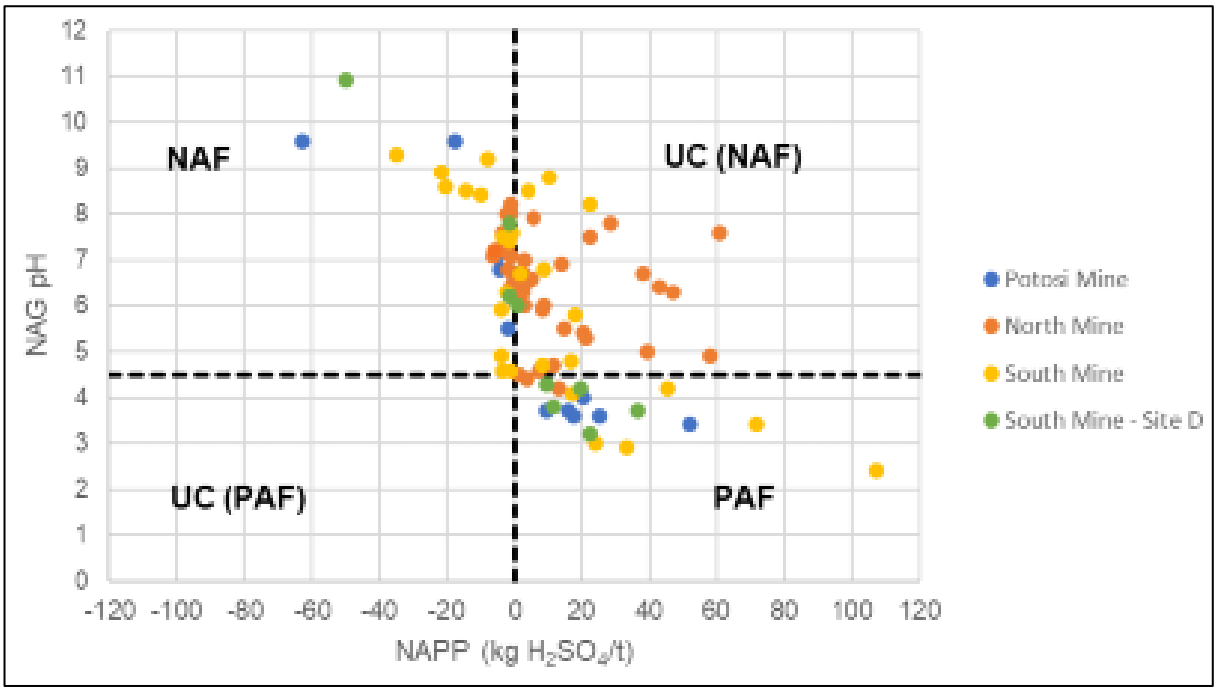

Figure 9
Waste Rock Geochemical Classification

The results of the study found that 38 samples were classified as NAF and 19 were classed as PAF (**Table 12**). Most of the PAF classes samples had a low capacity to generate acidity (i.e. less than 5kg H_2SO_4/t). An additional 34 samples were of uncertain acid forming potential - this classification is conservative since the samples contain a large proportion of sulfate and non-acid generating sulfides which are influencing the NAPP calculation. The results of the test work indicates that there is potential for acid generation waste rock at the locations below:

- Potosi Operation – Waste rock associated with historical exploration diggings and waste rock enclosed with Waste Rock Emplacement WRE.
- North Mine- Waste rock tailings capping below surface level
- South Mine-rock armour to TSF A/B and the mullock pile adjacent to Southern Cross Shaft Site D-rock fragments placed around the TSF (e.g. at top of access ramp and top of Cell 2 berm).

A number of elements were found to be enriched - Pb was enriched in the highest number of samples, followed by Cd, Zn, Ag and As.

Consequently, additional classification of uncertain waste rock material will include a *Program of Kinetic Column Leach Tests* (see Section 9.2.2) to provide a foundation for predictive modelling that are site-specific.

Table 12
Summary of ABA and NAG – Waste Rock

Location	Sample Count	Statistic	Paste pH	Paste EC	Total S	ANC	NAG pH	NAG to pH 4.5	NAG to pH 7	MPA	NAPP	AMIRA Classification			
			pH units	µs/cm	%	kgH2SO4/t	pH units	kgH2SO4/t				NAF	UC (NAF)	PAF-LC	PAF
Potosi	11	Min	3.5	407	0.04	<0.5	3.4	<0.1	<0.1	1.2	-18.0	5	0	6	0
		Average	5.7	1915	0.5	6.4	5.2	1.0	5.2	17	10				
		Max	8.5	6040	1.7	18.9	9.6	4	11.8	53	52				
North Mine	43	Min	4.0	50	<0.01	<0.5	4.2	<0.1	<0.1	0.3	-6.4	16	25	2	0
		Average	6.3	1600	0.5	5.4	6.5	<0.1	2	16	11				
		Max	10.7	5690	3.1	35	8.2	0.4	13.3	96	61				
South Mine	28	Min	3.2	78	<0.01	<0.5	2.4	<0.1	<0.1	0.3	-22.0	14	8	2	4
		Average	7.1	2152	0.8	14.7	6.2	1.9	7.0	25	11				
		Max	8.8	6590	3.5	59.1	9.2	27.8	56.3	108	108				
Site D	9	Min	6.1	142	0.02	2.3	3.2	<0.1	<0.1	0.6	-50	3	1	4	1
		Average	7.2	1881	0.6	12.2	5.6	1.1	6.2	17	5.3				
		Max	9.0	3070	1.6	50.8	10.9	5.4	16.3	47	37				
All Samples	91	Min	3.2	50	<0.01	<0.5	2.4	<0.1	<0.1	0.3	-50	38	34	14	5
		Average	6.5	1838	0.6	9.1	6.2	0.9	4.4	19	10				
		Max	10.7	6590	3.5	59.1	10.9	27.8	56.3	108	108				

Notes: EC – Electrical Conductivity, S – Sulfur, ANC – Acid Neutralising capacity, NAG – Net Acid Generation, MPA - Maximum Potential Acidity, NAPP – Net Acid Producing Potential, NAF – Non-Acid Forming, UC – Uncertain, PAF – Potentially Acid Forming, LC – Low Capacity

Source: SKR (2022) – after Table 3-2.

6.2.1.9 Ore Beneficiation Waste Management (Reject and Tailings Disposal)

Tailings Geochemical and Geophysical Characteristics

Geochemical characterisation of tailings material at the Mine Site was undertaken in September 2020 for samples collected from Site AB, Site C and Site D (Cells 1, 2 and 3) and is presented in **Tables 13** and **14** and **Figure 10**.

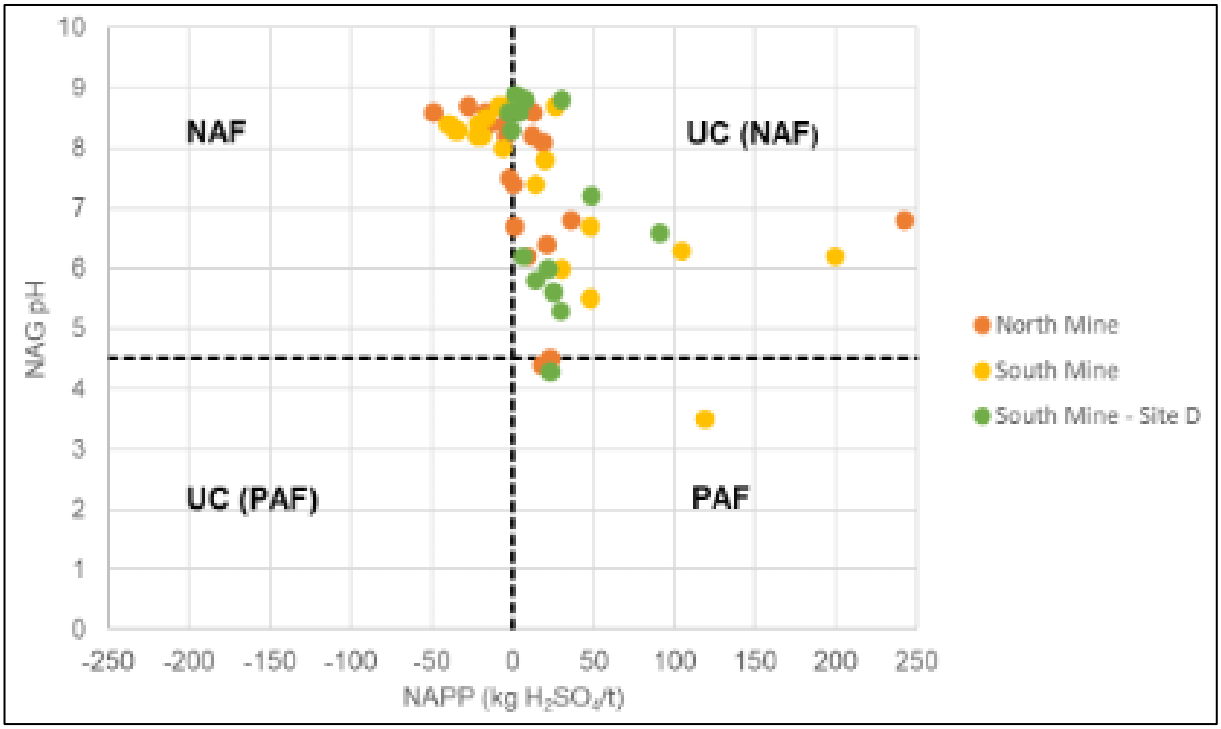

Figure 10
Tailings Geochemical Classification Plot

Of the 53 samples tested, 30 were of uncertain acid forming potential, 20 were classed as NAF, and 3 were classed as PAF (two with low capacity to generate acidity). Similar to the waste rock samples, the presence of a large proportion of sulfate and non-acid generating sulfides is influencing the NAPP calculation for the tailings samples.

Average total sulfur values were similar for the different locations, ranging between 1.33% (Site D) and 2.05% (South Mine). Several elements were found to be enriched - with Ag, As, Cd, Pb, Sb and Zn enriched in all samples, followed by S (52 samples), W (50 samples). Mn (48 samples) and Bi (39 samples).

Leachate pH was mildly acidic (pH 5.25) to neutral (pH 7.28). EC values ranged between 2 320 and 14 400 S/cm, with solutions typically dominated by Ca and SO High concentrations of trace elements including Cd, Pb, Mn and Zn in the leachate suggests that there is the potential for neutral drainage to contain significant solute load (i.e. NMD).

Table 13
Results of Tailings Mineralogical Assessment

Mineral Group	Mineral	NMOMGS	NMTP10-4	NMTP19-3	NMTP19-4	SMTP05-1	SMTP06-4	SMTP07-4	SMGSTAB
Sulfide[1]	Sphalerite	5.6	2	0.4	4.9		4.8	0.5	22
	Galena	0.2	0.3	0.2	2.4		1.5	0.5	0.2
Sulfate	Anglesite	2.4	1.2	0.2	0.1	0.6	1.6	0.6	
	Gypsum	15.7	1.7	4.9					0.4
	Anhydrite				0.1				
	Bassanite	8.7	0.8	2.8	3.9	1.5	1.6	2.5	2.4
	Szomolnokite							1.3	
	Szomolnokite/gunningite		2						3.1
Hydroxysulfate	Alunite	0.8							
Carbonate	Calcite		1.3	9.1	8.9	6.7	1.9	4.6	8.9
	Calcite (Mg)			4.2	5.3	5.7		5.4	4.5
	Cerussite		0.8	0.5	0.7				
	Rhodochrosite/siderite	3.3		3.3	1.3				
Silicate and alumino silicate	Quartz	23	34.5	24.6	29	36	38.2	35.2	38.7
	Chlorite		3.9	3.9	4	3.6	4.5	1.2	1.9
	Cordierite					4	3.3	4	
	Grossular				0.1	1.2	0.3	1.2	1.9
	Hedenbergite								4.6
	Illite/mica	9.6	29	16.7	13.6	10.2	15.4	11.9	11.7
	Kaolinite	1.6	3.2	0.7	1.8		2.2	1	
	K-Feldspar	4.4	10.8	10.5	8.4	9.7	7.2	6.5	10.7
	Plagioclase		1.9			5.6	2.7	3.3	
	Pyralspite garnet	4.5	5.2	6.9	2.9	8.8	11	14.9	4.6
	Sillimanite					2.9			
Oxide	Gahnite						0.5		
Halide	Fluorite	2.1	0.2	2	2.1	1.7	0.9	1.5	2.6
Amorphous[2]		18.2	1.4	9.2	10.5	1.8	2.4	4	1.6

Note 1: Typical limits of detection for sulfide minerals such as sphalerite, galena, pyrite, pyrrhotite, and arsenopyrite are around 0.2%
Note 2: Found by difference (i.e. 100% - sum of absolute estimates)

Source: SKR (2022) – modified after Table 3-8

Table 14
Summary of ABA and NAG – Tailings

Location	Sample Count	Statistic	Paste pH	Paste EC	Total S	ANC	NAG pH	NAG to pH 4.5	NAG to pH 7	MPA	NAPP	AMIRA Classification			
			pH units	µs/cm	%	kgH2SO4/t	pH units	kgH2SO4/t				NAF	UC (NAF)	PAF-LC	PAF
North Mine	18	Min	5.3	1,670	0.29	3.2	4.4	<0.1	<0.1	8.9	-49	7	10	1	0
		Average	6.9	2,749	1.56	33	7.4	0.11	1.6	48	15				
		Max	7.8	7,030	8.93	99	8.7	0.30	11	273	242				
South Mine	20	Min	5.6	1,390	0.84	<0.5	3.5	<0.1	<0.1	26	-41	11	8	0	1
		Average	7.1	3,768	2.05	45	7.5	0.45	4.5	63	18				
		Max	7.8	14,400	6.52	82	8.7	7.1	49	200	199				
Site D	15	Min	4.6	1,060	0.56	1.8	4.3	<0.1	<0.1	17	-3	2	12	1	0
		Average	6.8	2,947	1.33	21	7.2	0.11	1.9	41	20				
		Max	7.7	4,910	3.39	48	8.9	0.3	7.5	104	90				
All Samples	53	Min	4.6	1,060	0.29	<0. 5	3.5	<0. 1	<0.1	8.9	-49	20	30	2	1
		Average	7	3,190	1.68	34	7.4	0.24	2.8	51	18				
		Max	7.8	14400	8.93	99	8.9	7.1	49	273	242				

Note: EC – Electrical Conductivity, S – Sulfur, ANC – Acid Neutralising capacity, NAG – Net Acid Generation, MPA - Maximum Potential Acidity, NAPP – Net Acid Producing Potential, NAF – Non-Acid Forming, UC – Uncertain, PAF – Potentially Acid Forming, LC – Low Capacity.

Source: SKR (2022) – modified after Table 3-9.

The classification of the samples is summarised in **Table 14** and illustrated graphically in the geochemical classification plot in **Figure 10**. In summary:

- 20 samples were classified as NAF
- 3 samples were classed as PAF, however, the acidity generated was small - less than 5 kgH.SO. for 2 samples which were classified as PAF-LC
- 30 samples were classified as UC(NAF) - this classification is conservative since the samples contain a large proportion of sulfate and non-acid generating sulfides. Depending on the sulfur content these samples are likely to be sources of NMD considering the presence of sphalerite and other sulfides.

The PAF classified samples were collected from each of the three operational areas.

- NMTP10-3 - brown tailings collected from a trial pit excavated near the evaporation ponds (where tailings from the DeBavay process were deposited)
- SMTP06-4 - grey tailings from TSF C
- SDTP01-2-yellow tailings collected from Cell 1 at Site D.

6.2.1.10 Erosion and Sediment Control

A summary of meteorological conditions in Broken Hill is provided in Section 6.2.5.

Undisturbed sections of the Mine Site and rehabilitated areas with low slopes, including the top surface of the capped TSF landform, are largely stable and not prone to erosion and sedimentation. However, areas with steep slopes and areas which convey concentrated water flow during intense, infrequent rainfall events are vulnerable to erosion and loss of growth medium material. Additionally, exposed areas on elevated landform surfaces are vulnerable to wind erosion.

To encourage short-term stabilisation of areas exposed to wind and water erosion, earthworks and revegetation (e.g. hydromulch or other seed application methods) will be applied to stabilise exposed areas. The establishment of vegetation is also key to minimising the generation of particulate matter and achieving long-term stabilisation of rehabilitated areas. Where unfavourable climatic conditions prevent the commencement of growth medium spreading and revegetation activities in exposed areas, polymer- or lignosulfonate-based dust suppressants may be applied as a short-term measure prior to the establishment of sustainable vegetation communities to minimise the generation of particulate matter.

The TSF landform was profiled and stabilised through the application of oxidised waste rock by the previous Mine Operator. Due to the steep and highly exposed nature of these surfaces and their vulnerability to erosion by both wind and water, additional growth medium will not be applied to the TSF batter surfaces. Direct seeding trials are currently planned to determine whether the establishment of vegetation on the TSF landform batters can be achieved to enhance their stability and soften their appearance.

The water erosion risk should be considered in conjunction with rainfall erosivity, slope length and degree, surface cover and land management practice and therefore the erosion risks of soils to be using in the rehabilitation of landforms (such as WRD) should be considered in the context of the landform setting and closure design. Final landform design should also consider the possible risks erodible/dispersive soils may pose to the stability of final slopes.

Based on the Emerson Class results, soil texture results, and ESP, the soils are relatively evenly distributed between low erodibility (34 samples), moderate erodibility (28 samples) and high erodibility (33 samples) (**Tables 15** and **16**). While most locations showed a relatively even distribution across water erodibility classes, Site D had a tendency towards high erodibility. This is reflective of the tendency towards finer grained soils observed at the Site.

From those samples taken at the surface, 13 were correlated to low erodibility, 8 moderate erodibility and 20 high erodibility. Inversely, the subsurface samples were found to be classified more commonly as moderate erodibility (20 samples), with 11 samples classified as low and 13 as high.

Erosion and sediment control is a matter requiring ongoing consideration during rehabilitation operations and represents a moderate risk to rehabilitation. Final landforms with slopes will included waste rock armour for erosion management given the soil limitations (highly dispersive) of the Broken Hill region.

Risk Controls

The following measures will continue to be implemented at the Mine Site and/or will be implemented during rehabilitation operations to manage risks associated with erosion and sedimentation.

- Progressive rehabilitation of exposed areas, including the establishment of vegetation as soon as practicable.
- Profiling of landforms (e.g. the TSF top surface) to create undulating surfaces which maximise water retention and minimise flow concentration and velocity.
- Rock armouring of TSF landform batter surfaces to prevent erosion.
- Maintaining roads and upgrading unsealed roads to be retained as part of the final land use through the installation of surface water controls.
- Revegetation of rehabilitated surfaces to support the development of groundcover and therefore protect exposed surfaces.
- Construction of hard geo-engineering structures (e.g. drainage channels, bunding) where required to address identified erosion issues.

6.2.1.11 Ongoing Management of Biological Resources for Use in Rehabilitation

Biological resources including growth medium and habitat features were not salvaged and stockpiled during the early development of the Mine Site in the late 19th and early 20th centuries. As such, existing stockpiles of biological resources at the Mine Site are severely limited. Topsoil and subsoil stockpiles are confined to domain 8a (see **Figure 8**), with woody debris from recent clearing activities incorporated into topsoil stockpiles.

Table 15
Summary of Soil Characteristics by Site

Location	Average Acidity	Average Salinity	Average CEC	Sodicity	Nutrient Status		Metals Content	Dispersion Risk	Erosion Hazard for Wind	Erosion Hazard for Water
					TN	TP				
Potosi	Moderate	Non-saline	Low	Non-sodic	Low	Low	Cd, Pb, Zn	Moderate	Low-moderate	Moderate
North Mine	Moderate	Slightly saline	Moderate	Marginally sodic	Low	Adequate	As, Cd, Pb, Mn, Zn	Moderate	Low-moderate	Low-moderate
South Mine	Moderate	Non-saline	Moderate	Non-sodic	Low	Low	As, Cd, Pb, Mn, Zn	Moderate	Moderate	Moderate
Site D	Moderate	Non-saline	Low	Marginally sodic	Low	Low	As, Pb	Moderate	Moderate	High
Source: SKR (2022) –after Table 4-10										

Table 16
Summary of Water Erodibility

	Low	Medium	High
All Soils	34	28	33
Potosi	11	11	10
North Mine	16	13	8
South Mine	5	5	4
Site D	2	1	11
Source: SKR (2022) –after Table 4-9			

Growth medium stockpiles have demonstrated significant vegetation regrowth from the entrained seed bank and will increase the seed bank and soil biota prior to Mine closure. Furthermore, revegetation trials have demonstrated that a sustainable vegetation community can be established through direct seeding methods on either dried tailings material or the oxidised waste rock which as previously been used to cap decommissioned TSF landforms (see Section 9.1.2).

Approved vegetation clearing authorised by the current development approval is largely limited to the footprint of a third evaporation pond. As such, opportunities to salvage additional woody debris and habitat features will be minimal.

Risk Controls

Management measures targeting the maintenance of seedbank and soil biota viability are included in the growth medium stockpile establishment principles outlined for any new growth medium stockpiles in Section 6.2.1.1.

Growth medium application depths on rehabilitated surfaces will vary between 150mm and over >1,000mm depending on the type of growth medium used. The suitability of this growth medium application depth for the germination, establishment and long-term survival of target vegetation communities will be investigated through analysis of rehabilitation trial results prior to Mine closure (see Section 9.1.1).

6.2.1.12 Mine Subsidence

The following factors support the conclusion that underground mining operations at the Mine Site represent a low risk of mine subsidence.

- Broken Hill is a hard rock region and the Mine Site is a hard rock mining operation.
- The use of modern mining methods, engineering practices and geotechnical methods significantly reduce the risk of void collapse and subsequent subsidence.
- Geotechnical controls are utilised to support mine shafts and open cut voids.
- Mining operations incorporate an active program of void backfilling using waste rock material.
- No previous occurrences of subsidence have occurred that have resulted in impacts to natural features that required rehabilitation.

As a result, risks to rehabilitation associated with mine subsidence are considered to be low and no specific risk controls have been identified.

6.2.1.13 Management of potential cultural and heritage issues

Aboriginal Heritage

An inspection of the Mine Site was undertaken by OzArk (2017b) on 15 and 16 June 2016 as part of a *Historic and Aboriginal Heritage Assessment and Statement of Heritage Impact* prepared in support of RWC (2017). The site inspection confirmed that the Mine Site, including revegetated areas, has experienced high levels of ground disturbance. No previously recorded Aboriginal sites were identified within the Mine Site and no Aboriginal sites or objects were recorded during the site inspection (OzArk, 2017b).

Historic Heritage

The Mine is located within the curtilage of the national heritage listing for the City of Broken Hill (item ID 105861) on the National Heritage List. The following aspects relevant to the Mine are noted for the City of Broken Hill listing.

- Outstanding significance to the nation for its role in creating enormous wealth.
- Its long enduring and continuing mining operations.
- The physical reminders of its mining origins such as the Line of Lode, the barren mullock heaps, tailings, skimps and slagheap escarpment and relict structures.
- The adoption of vanguard industrial relations and management policies, together with its role as a pioneer in setting occupational health and safety standards.
- It has significance as a place where outstanding technical achievement has occurred in refining ore for its minerals and it is also important as a place of research potential to reveal further information on mineral deposits with its range of complex minerals.
- The Broken Hill zinc-lead-silver ore deposit is one of the world's largest orebodies and contains an extraordinary array of minerals. It is geologically complex and has national scientific significance.
- It is associated with persons of great importance to Australia's history.

No items within the Mine Site are listed on the NSW State Heritage Register.

A total of 32 items of local heritage significance listed under the *Broken Hill Local Environmental Plan 2013* (Broken Hill LEP) are located within the Mine Site (**Figure 11**). **Table 17** provides a description of these items as outlined in OzArk (2021).

Table 17
Items of Local Heritage Significance

Page 1 of 2

Item	ID[1]	Constructed	Description
No. 1 Mill Foundations	319	1906-1910	Concrete and brick foundations of the No. 1 Mill.
No. 1 Mill Tunnel	320	Early 1900s	Reinforced concrete tunnel.
Ambulance Station	311	1940	Steel framed, corrugated galvanised iron clad Ambulance Station.
No. 2 Shaft Headframe and Crushers	327	1928-1932	Steel headframe structure connected to corrugated galvanised iron-clad crushing station building. Some remaining machinery.
No. 2 Shaft Winderhouse	328	1928-1932	Tall steel framed building on large concrete foundation footprint. Still contains some original winding machinery.
No. 2 Shaft Changehouse	321	1934	Steel framed, corrugated galvanised iron-clad building.
No. 2 Mill	324	1937-1938	Large structure consisting of five connected steel frame buildings that cascade down several levels. Contains significant proportion of original machinery.
No. 2 Residue Pumphouse, No. 12 Conveyor and Hopper	326	1939	Series of connected steel frame structures: a large pumphouse with some remaining pumps and vats; hopper connected to long, elevated conveyer tunnel.

Table 17 (Cont'd)
Items of Local Heritage Significance

Item	ID[1]	Constructed	Description
No. 2 Reagent Shed	325	1937	Timber framed and steel reinforced shed with five operational roller doors for access.
No. 2 Thickener Vats	329	1937	Four remaining circular vats from an original number of 12 Agitators and similar features are intact. Item includes vacuum pumphouse to the north.
No. 2 Lead Bin	323	1937	Large, solid rectangular bin constructed from reinforced concrete with rail lines underneath opening.
No. 2 Filterhouse and Loading Station	322	1938	Tall rectangular building adjacent to thickening vats with some remaining machinery.
No. 3 Vent Fan	318	1967	Very large tubular venting duct above the capped vent shaft.
Weighbridge Station	341	1952	Small rectangular building made of concrete.
Water Tank (Lords Hill)	340	c. 1956	500 000-gallon concrete tank supplying No. 2 Mill.
Archaeological Potential – Amalgamated Zinc	312	1905-1924	Area containing two shed structures and the remains of some demolished structures associated with the previous Amalgamated Zinc mining operation.
Loading Station	N/A	1963	Elevated loading conveyer structure that was not included in the LEP heritage listings.
No. 3 Crusher House	330	1953	Very large square building made of concrete and corrugated iron. Contains all original machinery.
No. 3 Shaft Headframe	317	1948-53	Large headframe structure with automated controls for lift and cage.
No. 3 Winderhouse	332	1950-55	Concrete panelled rectangular building containing a large amount of intact winding machinery.
No. 3 Changehouse and Subsurface Platform	316	1952-4	Multi-level changehouse building constructed of similar material and design to the winderhouse and crusher house. Features full length windows.
North Mine General Offices	335	1965	Three-winged, two-storey office brick building.
North Mine Assay Office	334	1969	Smaller rectangular building constructed in a similar style to the North Mine General Offices.
No. 3 Tanks and Shed	339	1956	Small green shed clad in corrugated galvanised iron. Two large concrete tanks are nearby.
No. 3 Transformers and Cooling Tower	331	1954	Transformers surrounded by wire fencing connected to a low rectangular cooling structure.
No. 3 Shed (former sawmill)	337	1956	Timber framed corrugated galvanised iron shed.
Houses 17, 18, 19, 19B and 20	315	Early 1900s	Five larger houses likely used by upper management during the early years of the mine. Brick and timber construction.
North Mine Residences	336	Pre-1968	Brick houses constructed at various periods of the mine's development.
North Broken Hill Entrance Gates	333	1950s	Brick structure with corrugated galvanised iron eaves and steel gate.
Drainage Channel I314	314	c. 1948	Stone channel 4 metres wide and 2 metres deep.
Railway Gauge and Siding	338	1970	Railway tracks serving the no. 3 mine.
Compressed Air and Power Line	313	c. 1956	Six powerlines and one galvanised steel compressed air pipeline built on steel supports.
Note 1: Schedule 5 of the Broken Hill Local Environmental Plan 2013.			
Source: OzArk (2021) – After Sections 3.3.1 to 3.3.4.			

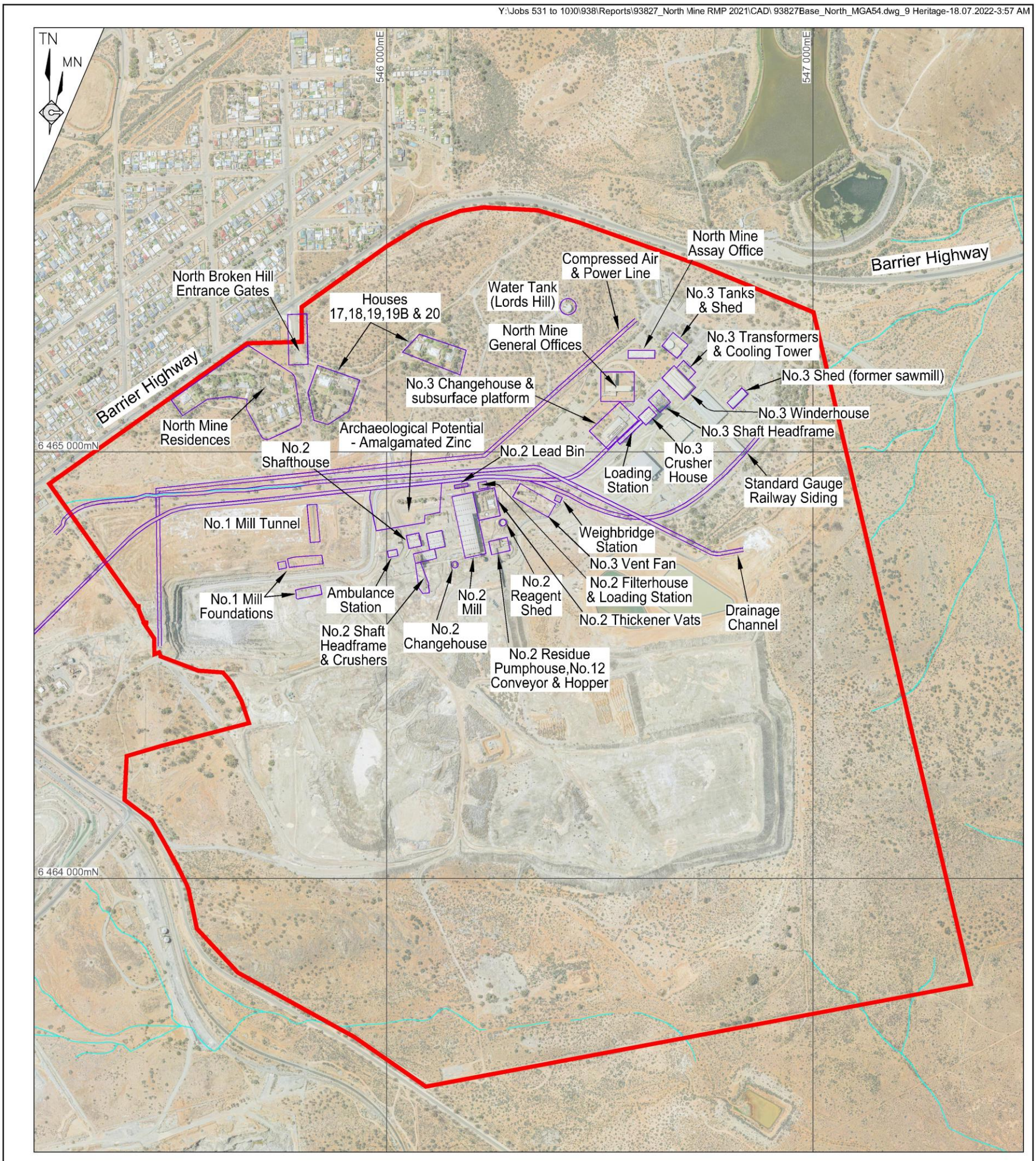

Figure 11
HISTORIC HERITAGE SITES

Securing identified heritage areas and mining areas of interest whilst retaining their heritage significance and potential future educational and tourism values will require consideration during rehabilitation operations. As a result, management of historic heritage during rehabilitation will be an environmental issue to be managed during rehabilitation.

Risk Controls

A draft Strategic Historic Heritage Management Plan (SHHMP) (version 3.9) was prepared for the Mine by OzArk (2021). Following review of the plan by Broken Hill City Council, the draft SHHMP was provided to the Department of Planning, Industry and Environment, Department of Primary Industries and the Heritage Council of NSW for consultation on 21 April 2021. Approval of the SHHMP is awaited.

Historic heritage items within the Mine Site will be assessed in accordance with the *Strategic Historic Heritage Management Plan*, which outlines a decision-making matrix for determining appropriate management actions for individual heritage items. Additionally, a *Heritage Implementation Plan* and a *Heritage Interpretation Plan* will be developed and implemented to guide management actions for individual historic heritage sites and future tourism and educational opportunities within the Mines Site respectively (see Sections 9.2.5 and 9.2.6).

Where required and as indicated on **Figure 7**, historic heritage items within the Mine Site will be retained following the cessation of mining operations, with security fencing installed to ensure public safety and control access as required.

6.2.1.14 Exploration Activities

A targeted program of exploration aimed at identifying new resources in the area will continue to be undertaken within CML4 and CML5 (**Appendix 1**). A variety of exploration techniques will be employed including early stage, generative activities as well as drill testing of defined target areas. Given the amount of historic work in the area, exploration will primarily target deeper portions of stratigraphy, generally greater than 200m below the surface and below the level of past exploration programs. Target generation activities may include:

- mapping and rock chip sampling;
- handheld pXRF soil surveying; and
- surface geophysical surveying, including (but not limited to) electromagnetic, magnetometric resistivity, induced polarisation, magnetotelluric, and seismic techniques.

Prospective targets identified will be tested by drilling. Given the targeted depths, which could extend to upwards of 2km below surface, diamond drilling will be the primary method of drilling. However, reverse circulation drilling could be employed on shallower targets (<500m depth). Downhole geophysical surveying may be completed on both new and historic drill holes in order to detect potential nearby mineralization.

Whilst the majority of exploration targets will likely require drill testing from underground platforms, several targets may be tested by surface drilling. Surface drilling currently contemplated by the Company in the vicinity of the Mine includes the Junction North, Zinc Lodes, Tin Street and Fitzpatrick/2k areas (see **Appendix 1**).

Risk controls

Rehabilitation of historic and new exploration drill sites, both within the Mine Site and outside on the greater area of CML4 and CML5, has been and will continue to be undertaken as soon as reasonably practical after completion of drilling activities. The rehabilitation of areas subject to exploration-related disturbance will potentially include capping and burial of casings, with site contouring and light raking to promote revegetation completed as required. Monitoring of exploration-related rehabilitation will be undertaken in accordance with the Company's established monitoring program (see Section 8.2).

6.2.2 Decommissioning

6.2.2.1 Site Security

Existing site security measures will be maintained during decommissioning and active rehabilitation operations at the Mine unless they are required to be modified for rehabilitation purposes. No public access to the Mine Site is currently permitted, with the main site entry points secured by locked gates during and outside of operating hours. Exclusion of the public from the Mine Site is currently provided via a combination of perimeter security fencing and stock-proof fencing. Temporary security fencing is also currently in place around non-operational areas of the Mine Site containing historic heritage items which pose a potential safety risk due to their dilapidated condition or the potential presence of hazardous materials.

Existing security fencing that is to be retained will be structurally assessed and repaired or replaced where necessary. Prior to permitting public access to the Mine Site, permanent security fencing will be constructed around the perimeter of the Cosmopolitan Open Cut final void and key heritage precincts which contain potentially unsafe historic infrastructure to prevent unauthorised access (**Figure 7**). Signage warning of the presence of open voids and potentially unstable structures will be installed every 50m on security fencing.

Permanent safety bunds will be constructed around the top edge of batter walls and around tourist lookout areas to prevent inadvertent access to steep batter slopes and rehabilitated areas. Where safety bunds are already in place, these will be assessed and repaired as required or removed and replaced with waste rock safety bunds where existing safety bunds contain growth medium material required for rehabilitation.

The fencing of historic heritage items and construction of safety bunds around tourism infrastructure will be completed in accordance with the *Heritage Implementation Plan* and *Heritage Interpretation Plan* (see Sections 9.2.5 and 9.2.6).

6.2.2.2 Infrastructure to be Removed or Demolished

Table 18 presents a list of the site features to be decommissioned to achieve the final land use. No specific formal requirements exist for the decommissioning of built infrastructure at the Mine Site. Notwithstanding, any infrastructure not required for the final land use will be subject to engineering assessments to identify potential risks associated with closure and decommissioning activities, where required.

Table 18
Assets in Mine Site Domain to be Removed or Decommissioned

Domain	Assets	Decommissioning and Demolition Requirements
1 – Infrastructure Areas	Roads: includes internal unsealed haul roads and access roads.	Selected mine access roads, internal roads and perimeter access tracks will be retained for future site management and tourism access purposes. All remaining roads and access tracks will be decommissioned and rehabilitated.
	Buildings: includes operational buildings (e.g. administration buildings, amenities buildings, workshops, storage sheds) and operational areas (e.g. ROM Pad, parking areas, storage and hardstand areas ROM Pad).	Subject to the identification of an alternative final use (e.g. historic item storage or tourist amenities) during development of the *Historic Heritage Interpretation Plan*, all buildings which are not identified as historic heritage items or structures to be retained as part of the final land use will be demolished/removed following the disconnection of services, with any rubble removed from the Mine Site. Concrete footings would be removed and ether used to further backfill the Cosmopolitan Open Cut final void or crushed and used to construct safety bunds. Hardstand areas within final land use domain A3 (see **Figure 7**) and heritage areas will be retained and modified to provide for tourist parking and information areas. All other hardstand areas will be ripped and revegetated.
	Miscellaneous Infrastructure: includes water pipelines, water storage tanks, power lines, substations, and a ventilation shaft.	The No. 3 Ventilation Shaft will be capped and sealed. Following the disconnection of services, all other miscellaneous infrastructure would be removed from the Mine Site unless required for the final land use.
	Heritage Infrastructure: includes non-operational, historic heritage items.	Subject to approval, all historic heritage items will be retained and managed in accordance with the *Historic Heritage Implementation Plan*.
	Growth medium stockpiles	Growth medium stockpiles will be progressively removed and utilised as growth medium is applied during rehabilitation operations. Following removal, growth medium stockpile footprints will be profiled and revegetated.
	Mine Waste Facility	The Mine Waste Facility will be used to dispose of suitable waste generated during rehabilitation operations and will be capped and revegetated prior to relinquishment.
	Other Ancillary Disturbance	All other infrastructure areas (e.g. McCulloch's Flat, historic disturbance areas) will be reprofiled and revegetated.
	Includes items identified as having historic heritage value.	Historic heritage items will be retained and managed in accordance with the *Heritage Implementation Plan*.
3 – Water Management Areas	Water Diversion Drains	Water Diversion Drains divert dirty water from the Mine Site into water storage dams to ensure that contaminated water does not leave the site.
	Water Storage Dams and Evaporation Ponds	The McCulloch Stormwater Drain and associated clean water diversion drain will be retained to permit the conveyance of stormwater from residential areas within Broken Hill through the Mine Site. The portion of the toe drain along the eastern boundary of the TSF landform which slopes north will be reshaped and stabilised to convey water collected between the TSF landform and adjacent hill landform. All other water diversion drains and toe drains, and all water storage dams and evaporation ponds, will be decommissioned and rehabilitated.
5 – Active Mining Area	Includes the Cosmopolitan Open Cut and Portal and other active shafts.	Final voids will be made safe, with perimeter safety bunds and security fencing constructed or retained to restrict human and fauna access. Portals and shafts will be backfilled with waste rock material and plugged to prevent access.

Table 18 (Cont'd)
Assets in Mine Site Domain to be Removed or Decommissioned

Domain	Assets	Decommissioning and Demolition Requirements
7 – Tailings Storage Area	Includes the top surface and batters of the TSF landform.	The top surface and batters of the TSF landform will be progressively rehabilitated as areas are no longer required for operational purposes. Safety bunds will be constructed around the top edge of batters and tourist lookout areas will be constructed in accordance with the *Heritage Implementation Plan*.
Note 1: Domains as shown on **Figure 8**		

All demolition procedures and subsequent waste removal undertaken during the decommissioning phase of rehabilitation operations will comply with Section 6.2 (Lead Contamination) of Broken Hill City Council's *Broken Hill Development Control Plan 2016* (Broken Hill DCP) or other requirements as identified through consultation with Broken Hill City Council. As a minimum, the following controls will be implemented during demolition works at the Mine Site.

- Sites will be continually damped down with water to suppress dust during demolition, with potentially contaminated water captured as appropriate.
- Works will be undertaken so as to minimise the generation of particulate matter.
- Works will not be undertaken during periods of high wind.
- Upon completion, and unless ruins or footprints are to be retained for heritage purposes, work sites will be capped with a minimum 50mm layer of clean material.
- Loads of waste material removed from demolition sites will be covered prior to transportation.

All material and waste products generated from any demolition, decommissioning and/or removal operations will be collected and either disposed of within the Mien Site where appropriate, removed immediately from the Mine Site or stored in appropriate (i.e. disturbed) areas for removal by a licensed waste contractor as soon as practicable.

6.2.2.3 Buildings, Structures, and Fixed Plant to be Retained

Figure 7 shows key infrastructure and heritage precincts to be retained as part of the final land use. Existing infrastructure to be retained includes:

- access roads off Phillips Street and Menindee Road;
- internal access roads for tourist access and site maintenance;
- perimeter access tracks for site maintenance;
- the McCulloch Stormwater Drain and associated clean water diversion drain;
- the north-sloping portion of the toe drain (to be converted into a clean water diversion drain) immediately east of the TSF landform;
- hardstand areas within final land use domain A3 (see **Figure 7**);

- all historic heritage items identified in **Table 17** (to be managed in accordance with the *Heritage Implementation Plan*); and
- existing safety bunds and security fencing around open voids, batters and potentially unsafe heritage items/precincts.

In addition to the above, tourist lookout areas will be constructed to facilitate tourism and educational final land uses at the Mine Site. Whilst **Figure 7** provides an indicative location for two lookout areas, it is noted that the final form and locations of any tourist infrastructure to be constructed at the Mine Site will be subject to consultation with relevant stakeholders during preparation of the *Heritage Interpretation Plan* (see Section 9.2.5). Furthermore, additional structures (e.g. office and store, storage sheds) may be retained where alternative uses consistent with the final land use (e.g. historic item storage, tourist amenities) are identified. The retention of any additional structures would also be subject to consultation with relevant stakeholders during preparation of the *Heritage Interpretation Plan*.

Short-term risks associated with the retention of nominated infrastructure and structures are relatively low as these features have primarily been retained for safety purposes (e.g. safety bunds, security fences), to facilitate access to areas of the Mine Site or for heritage conservation purposes.

Long-term risks to public safety and the environment associated with retained infrastructure and structures would only occur in the absence of appropriate maintenance. Roads will need to be inspected following high intensity rainfall events (i.e. ≥25mm within 24 hours) to ensure that conditions remain suitable for safe access to publicly accessible areas. Failure of roads would potentially contribute to the generation of sediment laden water which may impact water quality within local watercourses. Security fencing and safety bunds will also need to be inspected regularly to ensure that entry to historic sites and final void areas by humans, fauna and vehicles remains effectively restricted. Failure of security fences and safety bunds would present a significant risk to public safety.

Prior to and during the decommissioning and landform establishment phases of rehabilitation operations, structural and engineering assessments will be carried out as required prior to the relinquishment of retained and newly constructed infrastructure. Any necessary repair, replacement or re-design works recommended as part of these assessments will be carried out and assessed by a suitably qualified engineer before public access is permitted to the Mine Site.

Historic heritage items will be retained and managed in accordance with the *Heritage Implementation Plan* (see Section 9.2.4).

6.2.2.4 Management of Carbonaceous/Contaminated Material

A *Closure Management Plan* will be developed and implemented in order to guide the assessment, remediation and monitoring of potentially contaminated areas within the Mine Site (see Section 9.2.3).

A *Waste Material and Soil Characterisation Assessment* was undertaken in April 2022 to characterise available growth medium resources and determine their suitability for use as part of the final land use. The Company will undertake a *Remediation Options Assessment* to assess the need for any growth medium amelioration and provide recommendations for viable amelioration measures to be implementation at the Mine Site.

Non-polluting contaminated material (i.e. metalliferous rock material) will be used to backfill underground workings or disposed of within the Cosmopolitan Open Cut final void and capped with suitable waste rock material. Where organic contaminants are identified and on-site remediation is practicable, remediation would be undertaken on site. Where it is not feasible to undertake remediation of contaminated materials at the Mine Site, contaminated materials will be transported to an appropriately licenced facility and remediated prior to being returned to site. Following verification of contaminated material remediation in accordance with the *Closure Management Plan* , returned material will be used during rehabilitation operations or disposed of at the Mine Site.

In the event that contaminated materials are identified and it is not possible or practicable to remediate these materials either on or off site, contaminated materials will either be removed from the Mine Site and disposed of at an appropriately licenced waste facility or disposed of at the Mine Site, where appropriate.

In the event that significant volumes of contaminated material are identified at the Mine Site through the implementation of the *Closure Management Plan*, contaminated material remediation and/or disposal activities may result in significant delays to planned rehabilitation operations. Additionally, the identification of unacceptable contamination levels within stockpiled rehabilitation resources (e.g. growth medium and waste rock) would likely increase anticipated rehabilitation resource deficits. In order to account for and mitigate these risks, investigations into alternative growth medium and waste rock sources would commence was soon as practicable following the identification of any resource deficits.

6.2.2.5 Hazardous Materials Management

A *Closure Management Plan* will be developed by a suitably qualified expert in order to identify procedures for the identification, removal and appropriate disposal of hazardous materials (see Section 9.2.3). It is anticipated that this procedure would address hazardous materials including asbestos, hydrocarbons, explosives, highly contaminated materials and any other hazardous materials considered likely to occur at the Mine Site.

No hazardous materials are proposed to be retained following the cessation of mining and rehabilitation operations. A hazardous materials audit of the Mine Site will be conducted by a suitably qualified expert in accordance with the *Closure Management Plan* prior to the commencement of decommissioning activities to identify all potentially hazardous materials (e.g. asbestos) and any associated risks.

Explosives will be retained and stored in the magazine for any final shaping of void walls, if required, and will be removed from site by appropriately licensed persons once final void landforms have been achieved. Once removed, the magazine will be decommissioned and demolished.

On-site hydrocarbons and storage will also be retained for use during rehabilitation operations before being removed. All remaining fuel and oil will be removed from site before storage and filling infrastructure is decommissioned and removed. Any soils or material that is identified as being contaminated by hydrocarbons will be removed and treated as outlined in Section 6.2.2.4.

All other hazardous materials identified at the Mine Site will either be retained in situ, disposed of at the Mine Site or removed and disposed of at an appropriately licences facility in accordance with the *Closure Management Plan* . Hazardous material types, volumes, removal methods, dates of associated removal works and contractors who completed those works, disposal methods (including the details of any off-site disposal facility) and any waste transportation records and receipts will be recorded in the *Rehabilitation Quality Assurance Register*.

6.2.2.6 Underground Infrastructure

All underground infrastructure, equipment and materials will be removed or salvaged from underground operations where practical.

The Cosmopolitan Open Cut portal will be backfilled with waste rock and sealed to prevent access. Existing security fencing will be retained during and after sealing and decommissioning to prevent unauthorised access to underground workings and to the final Cosmopolitan Open Cut final void. Services and infrastructure associated with all other underground access points (e.g. No. 3 Ventilation Shaft, service declines and emergency access shafts) will be disconnected and removed prior to the sealing of access points, with temporary security fencing established during sealing works to prevent unauthorised access.

Groundwater from underground workings is currently dewatered to the Evaporation Ponds. Dewatering operations would cease and all associated infrastructure would be removed where possible. Groundwater levels within the underground workings would be left to return to natural levels. No discharges of groundwater are proposed to occur, and no specific measures to manage groundwater accumulation in underground workings are expected to be required. Quarterly groundwater quality sampling will continue to be undertaken for a minimum of two years following cessation of mining operations until relevant completion criteria are achieved.

6.2.3 Landform Establishment

6.2.3.1 Water Management Infrastructure

The McCulloch Stormwater Drain is composed an approximately 590m section of underground pipe which travels from west to east under McCulloch's Flat as well as an open stone-lined channel which continues west and west-southwest for approximately 925m. The drain diverts stormwater runoff from residential areas in Broken Hill through the Mine Site and discharges into an unlined clean water diversion drain in the vicinity of Dam 57 and Dam 57A (**Figure 2**).

The McCulloch Stormwater Drain and the unlined clean water diversion drain would be retained following Mine closure to permit the continued diversion of stormwater around the Mine Site. A clean water diversion occupying a gully between the eastern side of the TSF landform and hills to the east would also be retained to prevent water pooling in this area.

The stone-lined portion of the McCulloch Stormwater Drain is approximately 4m wide and 2m deep and is listed as a historic heritage item (ID: I314) under the Broken Hill LEP. This heritage portion of the McCulloch Stormwater Drain will be managed in accordance with the *Heritage Implementation Plan*.

All other water management structures, including storage dams, evaporation ponds, water diversion drains, toe drains and associated infrastructure (e.g. water tanks, pipelines and pumps) will be removed and disturbed areas rehabilitated following the cessation of mining operations.

Water storage dams including the Common Dam, Dam 57, Dam 57A, Small Dam, Bovril Dam and the Wilcannia Road Dam are unlined and consist of depressions bunded by walls of growth medium material. Due to the Broken Hill climate and based on previous observations which indicate that the dams are typically empty except during periods following significant rainfall, it is not anticipated that these dams will require draining prior to decommissioning.

The Evaporation Ponds (only Cells B and C constructed to date) are HDPE lined water storage cells used to contain water generated through the dewatering of the underground workings. Following the cessation of dewatering operations, water within the Evaporation Ponds would be allowed to evaporate naturally.

Sediment material on the floor of all dams and water storage structures will be tested for contamination in accordance with the *Closure Management Plan* and any contaminated material will be remediated and disposed of in accordance with procedures outlined in Section 6.2.2.4. Following the removal of any contaminated material, any liners would be removed and disposed of and the growth medium bunds which form the dam walls will either be harvested for use elsewhere within the Mine Site or pushed and spread during profiling of the dam footprints. Dam floor surfaces will be profiled to be consistent with the surrounding landscape and either allowed to revegetate naturally through the seedbank contained within spread growth medium, colonisation via airborne seed, or revegetated using direct seeding methods.

Jack's Hollow is a depression on the top surface of the TSF landform which is used to store excess water generated through dewatering of underground workings. Following the cessation of dewatering operations, the hollow would be allowed to dry out prior to the application of growth medium material and profiling to achieve an undulating surface. Revegetation of this area would be achieved through broadcast seeding or hydromulch application consistent with adjacent areas of the TSF landform top surface.

6.2.3.2 Final Landform Construction: general requirements

As shown on **Figure 7**, the majority of the Mine Site will be progressively rehabilitated to achieve the appearance of vegetated natural landforms in the surrounding area. Areas which will remain unvegetated, including the Cosmopolitan Open Cut, heritage areas and tourism infrastructure areas, will be consistent with the final land uses for the Mine Site as well as the national heritage listing status of the Mine Site within the context of Broken Hill more broadly.

Disturbed areas within the Mine Site which do not form part of identified heritage areas, infrastructure areas, the Cosmopolitan Open Cut final void or the TSF landform will be rehabilitated to achieve a final land use of native ecosystem areas (**Figure 7**). These areas are generally relatively flat and do not contain Mine-related infrastructure of historic heritage value. Following revegetation with species based on analogue sites established in the vicinity of the Mine Site and Broken Hill (see Section 8.1), these areas will enhance habitat connectivity and ecosystem values within adjacent areas of remnant vegetation and the Willyama Common.

Following the completion of rehabilitation operations, it is not expected that these areas will present any specific geotechnical or geochemical risks. Additionally, with the exception of the McCulloch Stormwater Drain and two clean water diversions to be retained (see Section 6.2.3.1) to manage rainfall runoff, it is not expected that these areas will require specific erosion and sediment control measures following the establishment of vegetation.

Details of infrastructure to be constructed or retained to support future tourism land uses will be the subject of consultation with relevant stakeholders during the preparation of the *Heritage Interpretation Plan*.

6.2.3.3 Final Landform Construction: Reject Emplacement Areas and Tailings Dams

The existing TSF landform is now a capped and decommissioned tailings storage facility which received tailings material between 1956 and 1990. The facility was stabilised and partially rehabilitated (including the commencement of growth medium trials) by the previous Mine operator, with batters stabilised through the application of waste rock armouring and the top surface covered with a layer of coarse oxidised waste rock material to prevent the generation of wind-blown dust and provide a growth medium for revegetation purposes. No additional TSF areas will be constructed during the remaining life of the Mine.

The Company will continue to harvest waste rock located within the Waste Rock Harvesting Area (**Figure 2**) southeast of the Cosmopolitan Open Cut. Waste rock extracted from unconsolidated or uncompacted waste rock stockpiles in this area (limited to areas above 300m AHD) will continue to be used to backfill underground voids and/or the Cosmopolitan Open Cut void. Additionally, the Company will commence the harvesting of tailings located within the Tailings Harvesting Area (**Figure 2**) to generate paste fill at the Paste Fill Plant Area required to fill underground voids. Exposed tailings material in this area would be regularly watered to limit dust generation, with suitable polymer-based dust suppressants used in low traffic areas to minimise watering requirements.

Following the cessation of mining operations, a suitably qualified engineer will be engaged to undertake a geotechnical assessment of the TSF landform and verify the effectiveness of the capping system. Any works required to address issues identified as a result of this inspection and to ensure the long-term geotechnical and geochemical stability of the TSF landform will be undertaken during the landform establishment phase of rehabilitation operations. It is anticipated that these works would likely be limited to minor batter reprofiling and rock armouring works similar to those currently undertaken where instances of gullying erosion or slumping are identified during regular inspections of the Mine Site.

As the top surface of the TSF landform has already been capped, landform construction activities during rehabilitation operations would largely be limited to profiling works undertaken during the application and spreading of growth medium material. Profiling of the TSF top surface will be undertaken to achieve an undulating surface designed to retain incident rainfall. The undulating surface will affect the development of a store and release cover system, with runoff captured and stored on the surface rather than being diverted to drainage structures and directed down the batter slopes. Growth medium varying in depth from between 150mm and >1000mm will be revegetated through natural recolonisation, broadcast seeding, hydromulching or a combination of these methods.

It is expected that rehabilitation of the TSF landform top surface and batters will reach the ecosystem and land use development phase of rehabilitation operations by 2035 following the anticipated cessation of mining operations in 2030.

6.2.3.4 Final Landform Construction: final voids, highwalls and low walls

The Cosmopolitan Open Cut would be retained following Mine closure and secured using a combination of perimeter safety bunds and security fencing. The portal entrance would be backfilled with waste rock and sealed to prevent access to underground workings. The access road into the Cosmopolitan Open Cut would be retained for maintenance purposes, with the existing lockable gate also retained to prevent unauthorised access.

Waste rock material generated by ongoing mining operations and waste rock harvesting operations will be used to partially backfill the Cosmopolitan Open Cut void during the remaining Mine life. Based on anticipated waste rock production and harvesting volumes at the Mine, it is expected that the in-pit waste rock emplacement would backfill the existing void to below the level of the portal (i.e. approximately 240mAHD). The final surface of the in-pit waste rock emplacement would form an east-facing slope with an average gradient of approximately 1:7 (V:H), with elevations ranging from approximately 240m AHD to approximately 275m AHD. It is noted that whilst the final level of the in-pit waste rock emplacement may vary significantly depending on the amount of waste rock actually generated at the Mine, the final level of the waste rock emplacement would remain below the level of the crest of the Cosmopolitan Open Cut.

The final heights and slopes of the Cosmopolitan Open Cut void walls will remain as they are in their current state, subject to a geotechnical investigation that will be conducted during the decommissioning phase of rehabilitation operations. In the event that potential geotechnical issues are identified, the recommendations of that report will be implemented in order to ensure that the final void landform is safe and stable.

Groundwater

The groundwater aquifer in the vicinity of the Mine Site has been subject to mineralisation from the Line of Lode ore body and episodic dewatering since the commencement of mining operations in 1883. The natural groundwater level in the vicinity of the Mine Site in the absence of mining-related dewatering is not well understood. **Table 19** presents water level records for the period between February 1998 and August 2018 when water levels rose in response to the cessation of dewatering operations. In summary, water levels rose approximately 1 135m at an average rate of approximately 16cm per day over the 19-year period between 1998 and 2017 when no dewatering was undertaken.

The Company will engage a suitably qualified expert to undertake groundwater modelling for the Mine Site in order to determine the likely natural water level in the vicinity of the Mine Site and therefore the potential final water level within the Cosmopolitan Open Cut and underground workings. As any final water level will depend upon the final level of the in-pit waste rock emplacement, groundwater modelling will be completed following the cessation of mining activities. The results of groundwater modelling will be used to identify any likely groundwater inflows into the Cosmopolitan Open Cut final void and therefore inform any future water licencing requirements.

Table 19
Standing Water Levels – 1998 to 2018

Date	Standing Water Level (m BGL)	Volume Dewatered (ML)
10 August 2018	584.5	144.7
2 March 2018	544.0	Nil
6 January 2017	579.2	Nil
10 October 2016	585.8	Nil
15 January 2016	610.0	Nil
20 July 2014	638.4	Nil
August 2011	724.0	Nil
February 1998	1 714.0	Nil
mBGL = metres below ground level		

C.M. Jewell & Associates Pty Ltd (Jewell, 2011) were engaged to prepare an assessment of groundwater quality within the No. 3 Shaft. The resulting report is presented as Appendix 6 of RWC (2017). **Table 20** presents the results of groundwater quality analysis completed as part of that assessment. In summary, groundwater within the No. 3 Shaft, and by extension, within the remainder of the North Mine workings, has a near neutral pH with elevated concentrations of dissolved solids and some metals, including arsenic, cadmium, copper, iron, lead, manganese and zinc (Jewell, 2011). The water does not meet the criteria for discharge to natural drainage, irrigation, stock use or human potability.

Table 20
No. 3 Shaft Groundwater Quality Analysis Results

Page 1 of 2

Analyte	Units	Limit of Reporting	Adopted Criteria[1]	Analytical Results		
				780m bgl	970m bgl	1160m bgl
Physio-chemical Parameters						
pH	pH units	0.01	6.5 – 7.5	6.91	6.68	6.63
Electrical conductivity	µS/cm	0.1	-	≈ 12 972	≈ 12 833	≈ 12 698
TDS and TSS						
Total Dissolved Solids	mg/L	5	500	**6 470**	**8 200**	**8 610**
Total Suspended Solids	mg/L	5	-	98	32	33
Major Anions and Cations						
Bicarbonate Alkalinity as $CaCO_3$	mg/L	1	-	76	67	67
Carbonate Alkalinity as CaCO3	mg/L	1	-	<1	<1	<1
Hydroxide Alkalinity as $CaCO_3$	mg/L	1	-	<1	<1	<1
Total Alkalinity as $CaCO_3$	mg/L	1	-	76	67	67
Sulfate as SO_4	mg/L	1	500	**2140**	**2620**	**2560**
Chloride	mg/L	1	250	**1660**	**2220**	**2780**
Calcium	mg/L	1	-	518	682	728
Magnesium	mg/L	1	-	168	214	238
Potassium	mg/	1	-	48	62	67
Sodium	mg/L	1	180	**1390**	**1690**	**1870**

Table 20 (Cont'd)
No. 3 Shaft Groundwater Quality Analysis Results

Page 2 of 2

Analyte	Units	Limit of Reporting	Adopted Criteria[1]	Analytical Results		
				780m bgl	970m bgl	1160m bgl
Heavy Metals						
Arsenic	mg/L	0.001	0.007	**0.073**	**0.099**	**0.098**
Cadmium	mg/L	0.0001	0.0002	**0.0101**	**0.0092**	**0.0101**
Chromium	mg/L	0.001	0.1	<0.001	<0.001	<0.001
Copper	mg/L	0.001	0.0014	**0.005**	**0.006**	**0.006**
Iron	mg/L	0.05	0.3	**23.8**	**29.7**	**29**
Lead	mg/L	0.001	0.0034	**0.082**	**0.167**	**0.198**
Manganese	mg/L	0.001	0.5	**107**	**112**	**112**
Nickel	mg/L	0.001	0.011	**0.151**	**0.171**	**0.171**
Silver	mg/L	0.001	0.00005	<0.001	<0.001	<0.001
Zinc	mg/L	0.005	0.008	**35.7**	**38.8**	**39**
Mercury	mg/L	0.0001	0.0006	<0.0001	<0.0001	<0.0001
Trivalent Chromium	mg/L	0.01	-	<0.01	<0.01	<0.01
Hexavalent Chromium	mg/L	0.01	0.001	<0.010	<0.010	<0.010
Sulfide						
Sulfide as S2	mg/L	0.1	-	<0.1	<0.1	<0.1
Ionic Balance						
Total Anions	meq/L[2]	0.01	-	92.9	118	133
Total Cations	meq/L[2]	0.01	-	101	127	13
Ionic Balance	%	0.01	-	4.36	3.36	2.17
Oil and Grease						
Oil and Grease	mg/L	5	-	<5	<5	<5

Note 1: Adopted Criteria based on a combination of the Australian Drinking Water Guidelines (aesthetic and health criteria) and ANZECC (2000) (Trigger Values for the Protection of 95% of species in Freshwater and agricultural irrigation

Note 2: meq/L = milliequivalents per litre

Note 3: Figures in Bold exceed the adopted criterion

Source: Jewell (2011) – Table 5

6.2.3.5 Construction of Creek/River Diversion Works

No creek or river diversion works will be required during the rehabilitation of the Mine Site. Details of works required to rehabilitate retained clean water diversions as part of the final land use are provided in Section 6.2.3.1.

6.2.4 Growth Medium Development

As outlined in Section 6.2.1.1, stockpiled growth medium within the Mine Site are subject to the following.

- Formal survey and development of growth medium stockpile register of volumes within the Mine Site.
- *Waste Material and Soil Characterisation Assessment* (SKR, 2022).

The Company will conduct the following investigations into growth medium resources.

- *Remediation Options Assessment* (see Section 9.2.6).
- *Growth Medium Development Study* (see Section 9.2.1).

The results of the formal stockpile survey and *Waste Material and Soil Characterisation Assessment* will be used to develop a register of available growth medium resources for rehabilitation operations. The results of the *Growth Medium Development Study* will inform the need for any growth medium amelioration trials, with the results of these trials and any effective and feasible amelioration methods to be detailed in this Plan.

Where growth medium has previously been cleared from disturbed areas within the Mine Site, growth medium will be applied to a depth of between 150mm and >1000mm in order to support the establishment and survival of vegetation. In areas which are not located on the TSF landform, growth medium will be spread and profiled to achieve slopes consistent with the surrounding landscape. Former road and hardstand surfaces at the Mine Site will be deep ripped prior to the application of growth medium material to address compaction and allow growth medium to be keyed into underlying material.

Water carts will be employed to lightly wet growth medium material prior to spreading in order to minimise dust generation. In areas where there is an elevated risk of erosion, earthworks and revegetation via direct seeding or hydromulch will be applied to facilitate stabilisation and vegetation establishment. In areas which are vulnerable to wind erosion where revegetation cannot be achieved in the near term (e.g. due to climate constraints), polymer- or lignosulfonate-based dust suppressants will be applied to minimise the generation of particulate matter. Areas which are not considered vulnerable to erosion will either be hydromulched, sown using broadcast seeding methods or allowed to revegetate naturally from the stored seedbank and airborne seed. Growth medium spreading will not be undertaken during excessively wet or windy conditions.

No specific habitat augmentation activities are required to be undertaken at the Mine Site. Woody debris salvaged during recent vegetation clearing and topsoil stripping activities is currently stockpiled together with topsoil resources at the Mine. As such, the application of topsoil material and salvaged woody debris within prepared areas will be undertaken simultaneously during rehabilitation operations. Where available, these resources will be applied to areas on the top surface of the TSF landform or to areas where additional topsoil and/or woody debris material is required to achieve ecosystem characteristics comparable to those identified at analogue sites (see Section 8.1).

Seasonal and local meteorological conditions will be monitored to identify conditions which may result in delaying vegetation establishment (e.g. extended drought conditions). Land preparation and growth medium spreading activities will only be undertaken where conditions are predicted to be favourable (i.e. average or above average annual rainfall) to the establishment of vegetation.

6.2.5 Ecosystem and Land Use Establishment

The semi-arid to arid climate of the Broken Hill region represents a key consideration which must be accounted for during the establishment of vegetation at the Mine Site. **Table 21** provides a summary of relevant meteorological data recorded at the Bureau of Meteorology-operated

Broken Hill Airport Automatic Weather Station (Station No. 047048). In summary, mean maximum temperatures exceed 30°C during summer and mean minimum temperatures fall below 6°C during winter each year. Mean rainfall in the Broken Hill region is equivalent to 246.4mm (i.e. below the 250mm threshold which defines arid areas), with rainfall exceeding 1mm occurring on fewer than 28 days per year on average.

Table 21
Broken Hill - Meteorological Data Summary

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Maximum Temperature (°C)	33.7	32.4	29.0	24.4	19.2	15.9	15.7	17.8	21.8	25.6	28.9	31.6	24.7
Mean Minimum Temperature (°C)	19.4	18.6	15.4	11.5	7.9	5.5	4.8	5.6	8.5	11.7	14.9	17.4	11.8
Mean Rainfall (mm)	27.6	18.3	20.1	20.1	19.7	14.8	17.0	18.3	21.3	24.3	20.7	21.3	246.4
Mean Number of Rain Days ≥1mm	2.3	1.7	1.8	1.7	2.5	2.3	2.8	2.8	2.5	2.7	2.6	2.1	27.8
Source: Bureau of Meteorology - Broken Hill Airport AWS (Station No. 047048) – data between 1957 and 2021.													

Vegetation establishment activities at the Mine, including the application of hydromulch and broadcast seeding, will occur only where favourable climatic conditions are expected to occur. Consequently, prolonged drought periods may result in extended delays to rehabilitation activities including growth medium spreading and seeding.

Seeding of available areas will be completed using a combination of direct seeding, broadcast seeding and hydromulch application methods. As outlined in Section 6.2.4, the application of individual methods will depend partially upon the vulnerability of individual areas to erosion by wind and water. Due to the limited availability of fresh water at the Mine Site, cover crops will not be sown, and no watering of seeded areas will be undertaken.

Given suitable climatic conditions, rehabilitation earthworks will comprise the first stage of the process. The aim of these earthworks will be to control surface water runoff and also provide micro-scale niche environments where nutrients, water and seed can collect and increase the likelihood of germination and survival of emergent seedling. Contour ripping on flat and sloped ground (slopes up to approximately 20˚) will be preferentially employed to achieve these aims. A hydromulching trial is being evaluated to determine the efficacy of this method on areas where steeper slopes are present (see Section 9.2.1).

Revegetation will be undertaken following any earthworks and surface preparation works. Areas located adjacent to sustainable vegetation which are generating seed on a routine basis (e.g. former unsealed road areas) may not require the application of supplemental seed during rehabilitation operations. Larger disturbed areas will require direct seeding of local species following the completion of earthworks, with methods including hydromulching and other direct seeding methods (mechanical, manual or pneumatic) to be employed as appropriate throughout the Mine Site.

Seed material will be sourced where possible from local suppliers, nurseries and/or propagation specialists. Seed will also be sourced from commercial suppliers where the required volume of seed material or specific species are not available locally for rehabilitation works.

Table 22 presents an indicative (but not exhaustive) list of species that will be used during revegetation of the Mine Site for each target vegetation community type and **Figure 12** shows the anticipated extent of target vegetation community types within the Mine Site. The species listed in **Table 22** represent those which have been identified within analogue sites representative of the target vegetation community types (i.e. Southern Flat, Rocky Ridge and Creek Line – see Section 8.1).

6.2.6 Ecosystem and Land Use Development

6.2.6.1 Weed and Pest Management and Monitoring

Several parameters associated with the presence of weeds and grazer impacts will be recorded during EFA assessments as part of rehabilitation monitoring activities. The results of EFA assessments will be detailed in an Annual Rehabilitation Report. The Annual Rehabilitation Report will also include the following.

- An overview of any weed and pest management measures implemented at the Mine Site during the reporting period.
- A list of weed species identified during rehabilitation monitoring and any other inspections completed at the Mine Site to delineate the distribution of weeds within CML 5 and CML 6.
- Details of any pests or evidence of grazer damage to revegetated areas identified during inspections, including a plan showing distribution within the Mine Site, where appropriate.
- Recommendations for specific weed and pest management measures to be implemented during the subsequent 12-month period.

6.2.6.2 Environmental Management and Monitoring Program

Surface Water

Visual inspections of erosion and drainage control structures, in addition to inspections of the TSF landform batters for signs of erosion, will be undertaken following significant rainfall events (i.e. ≥25mm within 24 hours).

Where safe to do so, surface water samples will be collected following significant rainfall events (i.e. ≥25mm within 24 hours) which generate flow in natural watercourses and stormwater drains at the Mine Site. Monitoring of surface water quality during flow conditions will be undertaken at the following locations (see **Figure 2**), consistent with those identified in the Water Management Plan.

- NMSW3 – located at the Mine Site boundary where stormwater from residential areas of Broken Hill enters the underground portion of the McCulloch Stormwater Drain.
- NMSW4 – located at the Mine Site boundary where water discharged from the McCulloch Stormwater drain and clean water diversion enters natural drainage.

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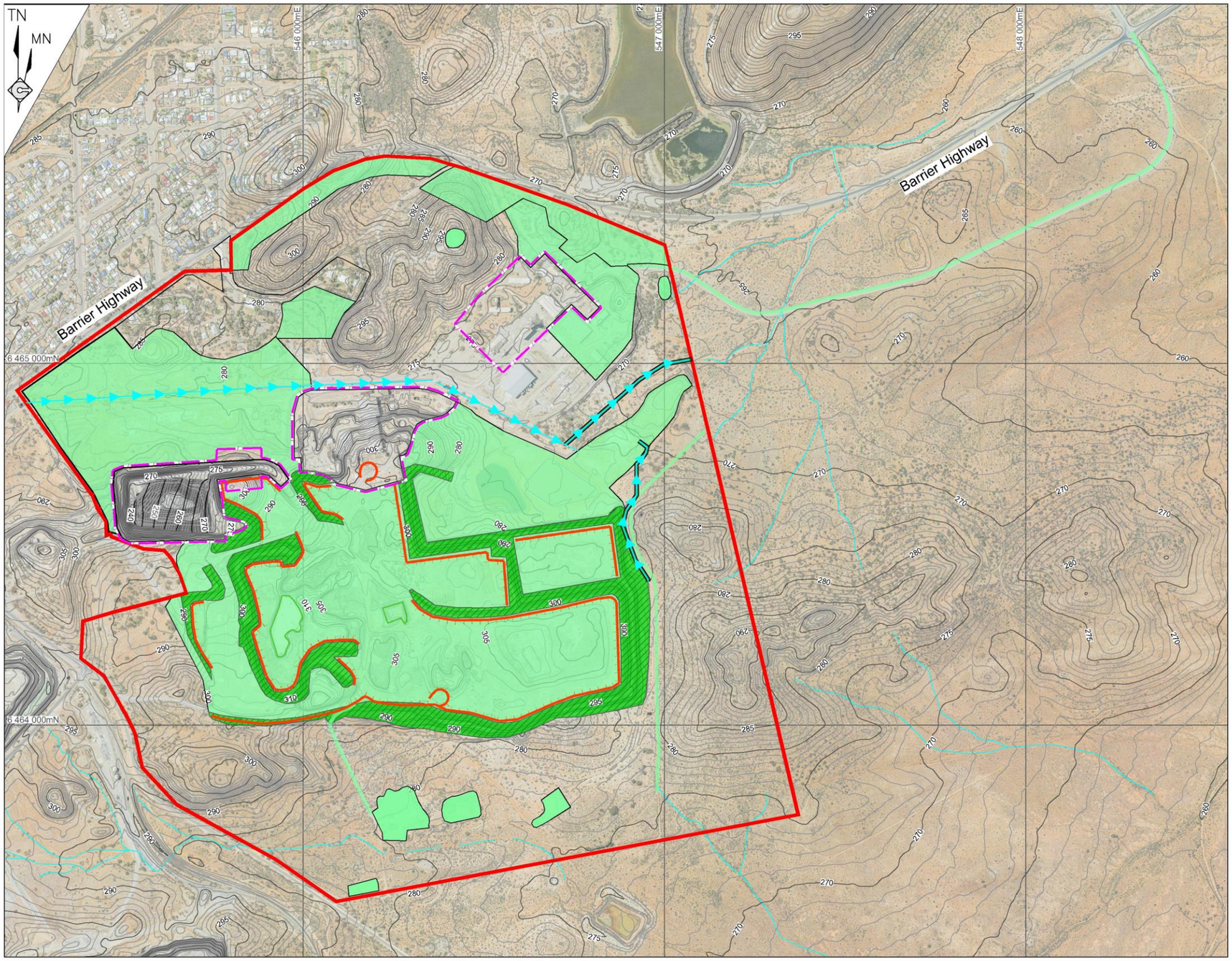


REFERENCE
- Mine Site Boundary
- 200 Contour (mAHD)(Interval = 1m)
- Watercourse / Drainage Line
- Water Diversion Drain
- Batters
- Safety Bund
- Security Fence

Vegetation Community Type
- Southern Flat
- Rocky Ridge
- Creek Line

Note: Coordinates are MGA Zone 54

SCALE 1:12 000 (A3)

200 0 200 400 600 m

Source: Perilya - 25 November 2020

Figure 12
TARGET VEGETATION COMMUNITY TYPES

Table 22
Target Vegetation Species for Revegetation

Species	Common Name	Vegetation Community Type		
		Rocky Ridge	Southern Flat	Creek Line
Canopy and Midstory (>1m)				
Acacia aneura	Mulga Wattle	■		
Acacia sp.		■		
Acacia victoriae	Gundabluie, Bardi Bush		■	■
Santalum sp.			■	
Senna artemisioides s.l.	Wormwood Senna		■	
Shrubs (<1m)				
Atriplex limbata	Spreading Saltbush			■
Atriplex lindleyi s.l.	Lindley's Saltbush			■
Atriplex stipitata	Mallee Saltbush			■
Dissocarpus paradoxus	Cannonball Burr, Curious Saltbush		■	■
Euphorbia drummondii	Caustic Weed		■	
Maireana brevifolia	Cotton Bush, Small-leaf Bluebush		■	
Maireana eriantha			■	■
Maireana sp.			■	■
Maireana turbinata			■	
Menkea australis	Fairy Spectacles		■	
Nitraria billardierei	Nitre Bush, Dillon Bush			■
Ptilotus obovatus	Silvertails	■		
Rhagodia spinescens	Prickly Saltbush, Spiney Saltbush, Creeping Saltbush		■	■
Salsola australis	Prickly Saltwort, Tumbleweed		■	■
Sclerochlamys brachyptera	Short-winged Copperburr		■	
Sclerochlamys ericantha	Tall Bindi		■	
Sclerolaena lanicuspis	Wollen Copperburr, Spinach Burr		■	
Sclerolaena limbata	Wollen Copperburr, Spinach Burr		■	
Sclerolaena sp.	Copperburrs		■	
Sclerolaena tricuspis	Giant Redburr		■	■
Solanum sp.		■		
Groundcovers				
Asteraceae sp.	Daisies		■	
Aristida sp.		■		
Austrostipa scabra subsp. falcata	Rough Speargrass	■	■	■
Brachyscome ciliaris	Variable Daisy		■	
Enneapogon avenaceus	Common Bottle-washers	■	■	
Lepidium phlebopetalum	Veined Peppercress			■
Lotus cruentus	Redflower Lotus, Red Birds-foot			■
Podolepis capillaris	Wiry Podolepis, Invisible Plant		■	
Rhodanthe stuartiana			■	
Roepera apiculata	Common Twinleaf		■	■
Roepera crenata	Notched Twinleaf		■	
Roepera eremaea	Climbing Twinleaf	■		■
Sclerolaena diacantha	Grey Copperburr		■	■
Sclerolaena obliquicuspis			■	■
Sida corrugata	Corrugated Sida		■	■
Vittadinia eremaea			■	■

Note: Green shaded cells indicate that a species has been identified as occurring within analogue sites associated with the vegetation community type

Source: GHD (2020) – after Table 5

Monitoring at the upstream and downstream locations during flow events will allow comparison of water quality before and following the input of runoff from the Mine Site. Surface water monitoring will target parameters including pH, electrical conductivity, total suspended solids, major ions and dissolved metals and metalloids (e.g. lead, zinc, arsenic). Monitoring will be undertaken to confirm the success of final rehabilitation, represented by water quality parameter measurements for the downstream location which are within 10% (or better) of the upstream location on three consecutive occasions.

Groundwater

Continuous monitoring of groundwater levels at the No. 3 Shaft will continue throughout rehabilitation operations and would cease either following the stabilisation of standing groundwater levels at the Mine or as recommended following the completion of groundwater modelling committed to in Section 6.2.3.4.

No monitoring of groundwater quality is currently undertaken or required at the Mine. In the event that standing groundwater is present within the Cosmopolitan Open Cut final void, monitoring of groundwater quality within the void would be undertaken quarterly for a minimum period of two years following the cessation of mining operations, until the final relinquishment of the Mine Site. Parameters including metal concentrations, salinity and pH would be recorded and compared against previous groundwater quality monitoring results (see Section 6.2.3.4) to identify any significant changes in groundwater quality.

6.2.6.3 Revegetation

Vegetation establishment activities at the Mine, including growth medium spreading and seeding operations, will occur only where favourable climatic conditions are expected to occur. Consequently, prolonged drought periods may result in extended delays to these rehabilitation conditions. In the event that extended drought periods occur at the Mine Site, rehabilitation schedules will be updated to prioritise other rehabilitation activities and opportunities to prepare additional areas for revegetation once favourable conditions return will be investigated.

The following management measures will be implemented to monitor revegetation operations during the ecosystem development phase of rehabilitation.

- Undertake Ecosystem Function Analysis (EFA) assessments within the first three years following initial vegetation establishment activities, subject to confirmation of favourable rainfall conditions[1].
- Undertake EFA assessments every three years following the initial assessment until target values are achieved.

Results from EFA assessments will be used to assess the progress of revegetated areas towards target values based on analogue sites for each of the established vegetation community types (see Section 8.1). The general methodology to be employed during EFA assessments is outlined in

[1] Favourable rainfall conditions are defined as confirmation of two consecutive years of rainfall equal to or exceeding the annual average for Broken Hill, as recorded by the Broken Hill Airport Automatic Weather Station (Station No. 047048).

GHD (2020). However, it is noted that this methodology is preliminary only and will be adapted to accommodate the specific measurements required to assess rehabilitation performance at the Mine Site.

The results of EFA monitoring will also be compared against the triggers outlined in Section 10 and additional management actions implemented as required. These additional management actions may include, but would not be limited to:

- growth medium amelioration (e.g. fertiliser or organic matter application);
- reseeding of areas with seed of target species where species assemblages are not consistent with those of analogue sites; and
- engaging a suitably qualified expert to provide recommendations to improve rehabilitation outcomes.

6.2.6.4 Land Management and Infrastructure Maintenance

Site infrastructure including roads, security and stock-proof fencing, safety bunds and signage will be inspected on an annual basis. Additionally, infrastructure vulnerable to erosion (e.g. unsealed roads, safety bunds, clean water diversions) will be inspected following significant rainfall events (i.e. ≥25mm within 24 hours).

The results of infrastructure inspections as well as records of annual infrastructure maintenance activities and costs will be included as part of an Annual Rehabilitation Report, including comparison against costs for similar maintenance works within Broken Hill, until relinquishment.

6.3 Rehabilitation of Areas Affected by Subsidence

No incidences of mine subsidence have been identified as occurring within the Mine Site or as a result of mining operations associated with the Mine. As outlined in Section 6.2.1.12, subsidence represents a low risk to rehabilitation at the Mine Site. As such, no specific subsidence-related management and maintenance programs are required at the Mine.

7. Rehabilitation Quality Assurance Process

The following section details the rehabilitation quality assurance process for the Mine in accordance with *Guideline 3: Rehabilitation Controls (July 2021)*. The rehabilitation quality assurance checklist included in this section is intended to be used as an indicative guide for rehabilitation operation managers and practitioners responsible for the rehabilitation of the Mine Site.

As the Mine is currently operational, many of the pre-disturbance risk controls outlined in *Guideline 3* (e.g. baseline assessments and monitoring) have either been completed or form part of ongoing investigations to be undertaken during rehabilitation planning. As such, a condensed risk control checklist containing items applicable to the remaining active mining and planned rehabilitation phases of the Mine Site has been prepared.

It is anticipated that rehabilitation operations within the Mine Site will occur on a progressive basis as areas are no longer require for operational purposes. Consequently, it is noted that rehabilitation progress through the planned rehabilitation phases will not occur concurrently across all mining domains identified in **Figure 8**.

As part of the rehabilitation quality assurance process, relevant records and documentation will be recorded in a Rehabilitation Quality Assurance Register and reported as part of the Annual Rehabilitation Report. The Rehabilitation Quality Assurance Register will, as a minimum, include a copy of the risk control checklists as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. The Rehabilitation Quality Assurance Register will be maintained, reviewed and refined by the Environment Superintendent to ensure that it is reflective of current rehabilitation progress, risk controls implemented at the Mine Site and the outcomes of any updated rehabilitation risk assessments.

Table 23 outlines key responsibilities for the Company and Mine personnel with regards to rehabilitation operations.

Table 23
Key Roles and Responsibilities

Page 1 of 2

Role	Responsibility
Mine Operator	• Comply with applicable laws, regulations, licences and approvals. • Ensure all contractors, sub-contractors and service personnel are appropriately qualified and/or licenced to undertake the required work. • Ensure that appropriate resources are available to site management and personnel to enable the implementation of this Plan.
Environmental Superintendent / Site Supervisor	• Ensure that the Rehabilitation Quality Assurance register is maintained and up to date based on site activities. • Ensure that the workforce is aware of relevant development and rehabilitation risks and management and mitigation measures, including any additional corrective and/or preventative measures. • Ensure that the rehabilitation quality assurance process outlined in Section 7 is implemented as required.

Table 23 (Cont'd)
Key Roles and Responsibilities

Role	Responsibility
Environmental Superintendent / Site Supervisor (Cont'd)	• Ensure that the documentation and recording of rehabilitation risk controls occurs within a suitable timeframe • Ensure that specialist contractors adhere to the guidelines and methodologies outlined in this RMP where required, or that the guidelines and methodologies in this Plan are updated to reflect those employed at the Mine Site.
All Mine Personnel	• Follow direction provided by the Environmental Superintendent / Site Supervisor. • Notify the Quarry Manager / Site Supervisor in the event that uncontrolled rehabilitation risks are identified at the Quarry.

8. Rehabilitation Monitoring Program

8.1 Analogue Site Baseline Monitoring

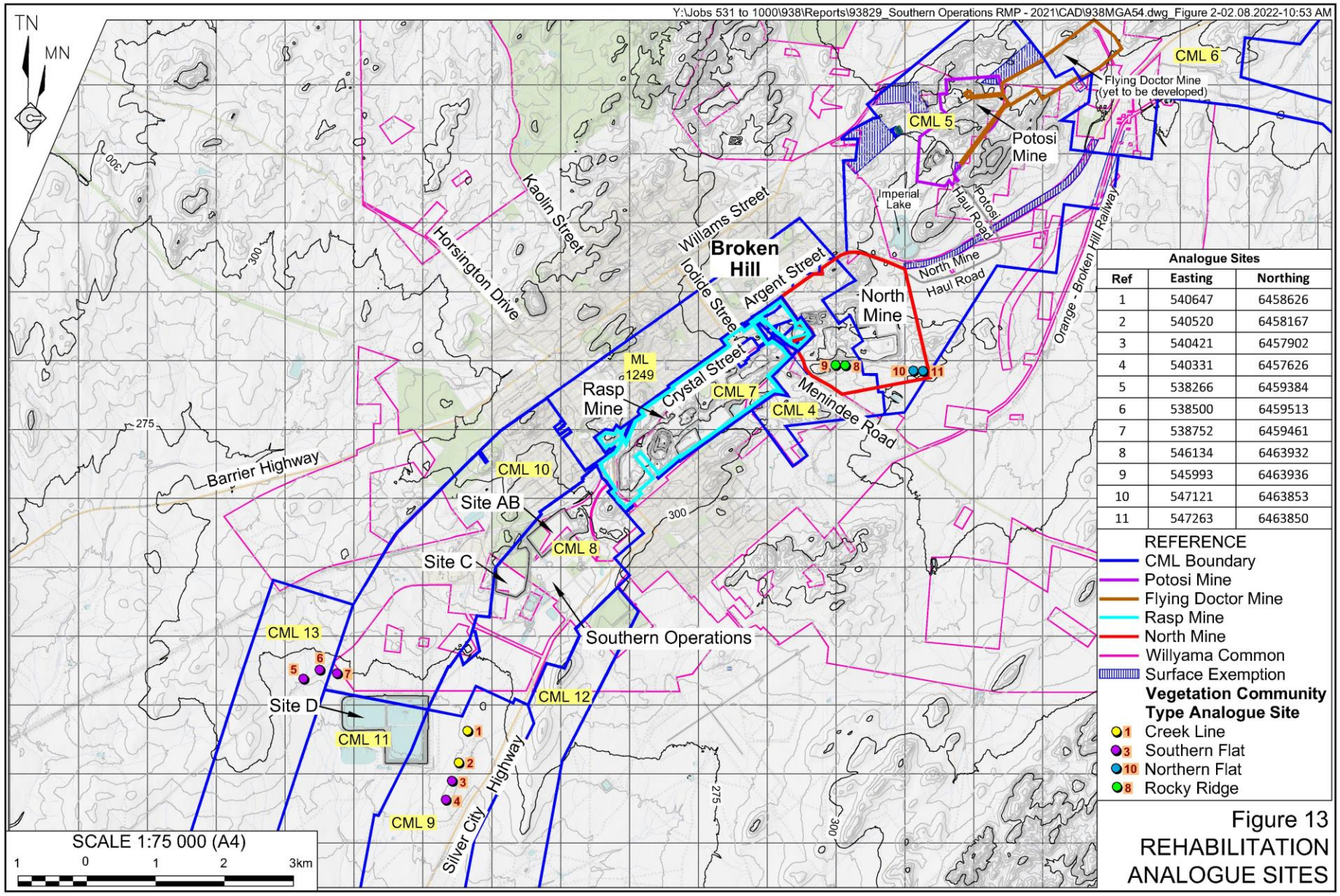
A program of monitoring has been established at the Mine Site in order to inform rehabilitation objectives and establish robust rehabilitation completion criteria based on the identification of appropriate analogue sites.

The Ecosystem Function Analysis (EFA) methodology, representing a combination of the Landscape Function Assessment methodology developed by Tongway and Hindley (2004) and the biometric method developed by Gibbons *et al.* (2008), has been adopted for both the assessment of analogue sites and the monitoring or rehabilitated areas within the Mine Site. A preliminary round of EFA assessments was undertaken in December 2020 by GHD Pty Ltd (GHD) in the vicinity of the Mine and the Company's Southern Operations mine site in Broken Hill. The initial round of EFA assessments included the establishment of 11 analogue sites in undisturbed areas and a further 10 rehabilitation monitoring sites on the rehabilitated surfaces of TSF structures. The resulting report is hereafter referred to as GHD (2020).

A detailed description of the EFA methodology employed during the initial round of assessments is provided in section 3 of GHD (2020). In summary, each EFA site (analogue and rehabilitation monitoring sites) consists of a parallel pair of 50m by 20m transects located approximately 100m apart. Each transect location is permanently marked using stainless steel markers at each end of the centreline of the transect to enable the identification and reassessment of sites as required. A range of parameters including flora species richness, vegetation cover, habitat features, soil surface condition and landscape function indices were recorded for each site. It is intended that the range of parameters will be adjusted for future assessment rounds in order to ensure that all key characteristics as well as relevant indicators of ecosystem condition (e.g. grazer impacts) are assessed for each vegetation community type.

Analogue sites were selected by the Company to include areas of minimal historical disturbance which are representative of key vegetation community types present in the Broken Hill region. **Figure 13** shows the locations of the 11 analogue sites established during the initial round of EFA assessments and **Table 24** provides an overview of the vegetation community types which are intended to be established in areas where native ecosystems will form the final land use (see **Figure 11**). In summary, the vegetation community types and therefore analogue site types relevant to the Mine Site will include the Southern Flat, Rocky Ridge and Creek Line communities. Species associated with each target vegetation community type are listed in **Table 22**.

Additional EFA assessment rounds, including the establishment of additional analogue sites in close proximity to the Mine Site, will be undertaken to inform the development of robust rehabilitation completion criteria. Re-assessment of analogue ecosystem characteristics and function may occur every three to five years or as required to account for anticipated changes as a result of natural events (e.g. prolonged drought conditions).



Analogue Sites		
Ref	Easting	Northing
1	540647	6458626
2	540520	6458167
3	540421	6457902
4	540331	6457626
5	538266	6459384
6	538500	6459513
7	538752	6459461
8	546134	6463932
9	545993	6463936
10	547121	6463853
11	547263	6463850

REFERENCE
CML Boundary
Potosi Mine
Flying Doctor Mine
Rasp Mine
North Mine
Willyama Common
Surface Exemption
Vegetation Community Type Analogue Site
1 Creek Line
3 Southern Flat
10 Northern Flat
8 Rocky Ridge

Figure 13
REHABILITATION ANALOGUE SITES

Table 24
Target Vegetation Community Types

Vegetation Community Type	No. Analogue Sites	Comments[1]
Southern Flat	5	• Representative of remnant vegetation present in flat and gently undulating areas to the South of Broken Hill. • Generally consistent with: – PCT 139 Prickly Wattle tall open shrubland of dunes and sandplains of semi-arid and arid regions; and – PCT 155 Bluebush shrubland on stony rises in the arid and semi-arid zones.
Rocky Ridge	2	• Representative of remnant vegetation present on steep, rocky ridge lines with minimal growth medium availability in the Broken Hill region. • Generally consistent with PCT 123 Mulga – Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill complex Bioregion. – Due to engineering constraints, only small shrub and groundcover species associated with PCT 123 will occur on final waste rock emplacement and TSF batter landforms.
Creek Line	2	• Representative of remnant vegetation within ephemeral watercourses in the Broken Hill region. • Generally consistent with PCT 136 Prickly Wattle open shrubland of drainage lines on stony rises and plains of the aid climate zones.
Note 1: See PCT distribution within the Broken Hill region shown on **Figure 5**.		

8.2 Rehabilitation Establishment Monitoring

Rehabilitation trials completed at the Company's mine sites in Broken Hill to date have indicated that the rate of vegetation establishment following the completion of growth medium spreading activities is highly dependent upon local climatic conditions (see Section 1.1.5). As such, it is more likely that vegetation establishment will occur in response to infrequent rainfall events which trigger seed germination rather than within a specific period following growth medium spreading and seed application. Rehabilitation establishment monitoring will therefore largely be confined to opportunistic monitoring following rainfall events and the identification of any triggers which indicate the need for mitigation measures to address emerging issues (see Section 10).

EFA assessments will form the primary monitoring method used to assess the progress of rehabilitation towards rehabilitation completion criteria based on target vegetation community characteristics (see Section 8.3). It is expected that the first EFA assessment for each area will occur within three years following the completion of growth medium spreading and seeding activities, subject to confirmation of suitable rainfall condition (i.e. average or above average annual rainfall during at least two consecutive years).

In addition to those rehabilitation establishment monitoring strategies, monitoring of exploration drill hole rehabilitation within CML 4 and CML 5 will continue to be undertaken in accordance with practices implemented across the Company's Broken Hill operations. These monitoring practices include:

- the use of a rehabilitation checklist at the completion of drilling programs to ensure that rehabilitation has been completed in line with nominated objectives;
- maintenance of a rehabilitation diary, including documenting the rehabilitation methods used and any outstanding rehabilitation to be completed at each location;
- maintenance of a photographic record, including photos taken prior to, during and following rehabilitation works;
- photo monitoring of drilling locations at 6 months and 12 months following the completion of rehabilitation works in order to record progress; and
- the recording of any follow up actions required after the 12 month period following the completion of rehabilitation works (e.g. ongoing monitoring at six monthly intervals), including a follow up date for review and close out, where rehabilitation is identified as having failed to achieve nominated criteria.

In the event that established exploration drill hole methods fail to achieve successful rehabilitation within three years following the completion of initial rehabilitation works and favourable rainfall conditions, a suitably qualified expert would be engaged to assess rehabilitation performance and provide recommendations for alternative rehabilitation methods. These recommendations would be implemented as soon as reasonably practicable and the above steps would be repeated until the nominated rehabilitation criteria have been achieved.

8.3 Measuring Performance against Rehabilitation Objectives and Rehabilitation Completion Criteria

Details of validation methods and indicators to be employed during monitoring in order to assess performance against the rehabilitation completion criteria for the Mine Site are provided in Section 4.1.

EFA assessments (or their equivalent) will form the foundation of long-term rehabilitation monitoring at the Mine Site. As outlined in Section 8.2, initial EFA assessments for rehabilitated areas will be undertaken within three years following the completion of growth medium spreading and seed application activities, subject to confirmation of suitable rainfall conditions (i.e. average or above average rainfall during two consecutive years). Subsequent EFA assessments will be undertaken every three years until target rehabilitation completion criteria values are achieved. EFA monitoring will ideally be undertaken in early spring following rainfall as the results of EFA assessments can be significantly impacted by rainfall events (GHD, 2020).

As detailed in Section 8.1, the establishment of analogue sites to inform rehabilitation completion criteria has commenced and will be expanded to include additional sites for Creek Line and Rocky Ridge vegetation community types. Once monitoring has established suitable analogue sites and associated target values for key ecosystem characteristics within the identified vegetation community types, the target values will be recorded in this Plan.

The results of rehabilitation monitoring will be graphed and compared against target values in order to determine:

- the relative performance of rehabilitated areas compared to other sites within the Mine Site;
- the rate of development towards target values, including a timeline for the achievement of target values and/or rehabilitation completion criteria; and
- whether additional controls, management measures or specialist assessments to identify issues and provide recommendations are required based on trigger values (see Section 10).

The Rehabilitation Quality Assurance Register will be used to record details of any additional management measures or risk controls implemented during the ecosystem development phase in response to the analysis of rehabilitation monitoring results.

An Annual Rehabilitation Report and Forward Program will be prepared for the Mine as required under the new standard mining lease conditions for rehabilitation, to be implemented through amendments to the Mining Regulation 2016. Once required, the Company proposes to submit an Annual Rehabilitation Report and Forward Program for the Mine by 31 March Each Year to cover the previous 12-month calendar year period. It is also proposed that the Annual Review for the Mine, required under Condition 5 of Schedule 4 of SSD 7538, will be submitted by 31 March each year and will cover the previous 12-month calendar year period. As part of the Annual Rehabilitation Report and Forward Program, the Company will validate and certify that the security deposit covers the estimated cost of rehabilitation liabilities each year.

9. Rehabilitation Research and Trials

This section details current and future rehabilitation trials and research programs across the Company's three operational mines in Broken Hill (i.e. the Potosi Mine, North Mine and Southern Operations). It is considered that the results of rehabilitation trials and research undertaken at any one of these mines will generally be applicable to rehabilitation operations at the Mine Site as:

- the relative proximity of the three mine sites means that they are exposed to similar environmental conditions;
- the proposed final land uses, and therefore rehabilitation objectives and rehabilitation completion criteria, are similar across all three sites;
- the target vegetation community types are similar across all three sites and are based on analogue sites in the vicinity of Broken Hill;
- all three sites likely contain similar contaminating and hazardous material types which will need to be addressed;
- the same rehabilitation methodologies will be applied across all three sites, where practicable; and
- heritage values, including associated management actions and tourism infrastructure requirements, will be considered within the broader Broken Hill context rather than within individual mine sites.

9.1 Current Rehabilitation Research and Trials

9.1.1 Southern Operation Site D Long-term Growth Medium Trials

The Company established a long-term growth medium suitability trial in 2011 on the top surface of Cell 1 of the Site D TSF at the Southern Operations mine site. The objectives of this trial are to:

- assess the suitability of different growth medium treatments for the establishment of sustainable vegetation communities on rehabilitated TSF landforms; and
- assess the long-term performance of a range of growth medium types in situ.

One trial site consisting of four distinct contiguous 20m x 20m plots was established on the top surface of Cell 1 of Sited D. Each plot received one of the following treatments (**Plates 6** to **9**).

- Treatment 1 – Control plot contain TSF clay capping material only.
- Treatment 2 – Plot containing a mixture of fine-grade waste rock and topsoil material (50:50 ratio).

Photo dated: 24 February 2021

Plate 6 Control plot containing capping material only and no growth medium application

Photo dated: 24 February 2021

Plate 7 Plot containing fine grade waste rock mixed with topsoil material (50:50 ratio)

Photo dated: 24 February 2021

Plate 8 Plot containing coarse grade waste rock mixed with topsoil material (50:50 ratio)

Photo dated: 24 February 2021

Plate 9 Plot containing growth topsoil material only

- Treatment 3 – Plot containing a mixture of coarse-grade waste rock and topsoil material (50:50 ratio).
- Treatment 4 – Plot containing topsoil material only.

With the exception of the control plot, the remaining treatments were subject to soil ripping post application of growth medium to incorporate the applied substrate into the existing surface where possible. Topsoil material used in this trial was salvaged from the footprint of the Site D TSF and vegetation was allowed to germinate from the topsoil seedbank. No additional seeding, watering or maintenance of the trial plots was undertaken between 2011 and 2021.

Opportunistic visual monitoring of the trial plots completed over the past ten years indicates the following.

- Vegetation did not naturally colonise the control plot where no topsoil growth medium was present.
- Seed banks present in salvaged topsoil material supported the establishment of groundcover vegetation when applied to rehabilitated areas.
- Vegetation cover supported by combined topsoil and waste rock material on the tailings material was marginally denser than that supported by topsoil material alone.

- Vegetation supported by a combination of coarse waste rock and topsoil material was marginally denser than that supported by a combination of fine waste rock and topsoil material.

Whilst no formal monitoring of this rehabilitation trial was completed, it is possible that the incorporation of waste rock into topsoil material assisted the development of vegetation through:

- minimising the loss of topsoil material by reducing exposure to wind erosion;
- contributing to increased overall depth of growth medium material and thereby enhancing water retention and temperature regulation; and
- assisting in the development of microclimates at the surface (e.g. sheltered positions, micro-scale 'run on' and 'run off' zones') which support seed germination and establishment.

9.1.2 North Mine Direct Seeding Trials – Waste Rock and Tailings Media

The previous mine operator established localised direct seeding trails at the Mine Site using native plant seed on the rehabilitated TSF landform. The objectives of this trial are to:

- assess the suitability of different growth medium treatments for the establishment of sustainable vegetation communities on decommissioned tailings storage facilities; and
- assess the long-term performance of a range of growth medium types in situ.

One trial site consists of an area approximately 0.7ha in size where native chenopod seeds were directly applied to the dried tailings. To date, this trial site has demonstrated that:

- a chenopod plant community can be established directly on North Mine tailings material; and
- this rehabilitation method is sustainable, having resulted in the development of a persistent vegetation community which has survived at least two registered drought periods since establishment.

The second trial site consists of an area approximately 0.5ha in size where native chenopod seeds were directly applied to the waste rock capping of the dried tailings. To date, this trial site has demonstrated that:

- a diverse community of native tree, shrub and annual species can be established by direct seeding of the waste rock capping; and
- this rehabilitation method is sustainable, having resulted in the development of a persistent vegetation community which has survived at least two registered drought periods since establishment.

9.1.3 Hydromulch Trials

Hydromulching trials will seek to confirm the efficacy of hydromulching as a method for the application of seed onto areas within the Mine Site. Hydroseeding trials will be undertaken within the areas identified as RII and RIII on **Figure 8**, representing a total area of approximately 1.3ha. The seed mix applied to these areas will be generally consistent with those species identified as occurring within the Southern Flat vegetation community type (see Section 6.2.5), however, additional species may also be included to investigate their suitability for revegetation of the batter surfaces. As the surfaces of the RII and RIII areas will consist of an integrated mixture of growth medium and waste rock, species present in the Southern Flat analogue sites which display similar growth medium depth are considered most likely to be sustainable in these areas.

Monitoring of the hydromulching trial areas will be undertaken in accordance with the rehabilitation establishment monitoring methods outlined in Section 8.2. It is expected that the results of the hydromulching trial will be valuable in determining:

- the efficacy of hydromulching as a method for the establishment of vegetation on rehabilitated surfaces;
- approximate timings for vegetation establishment following the application of hydromulch to rehabilitated areas;
- the ability of the integrated waste rock and growth medium material to support vegetation establishment and growth; and
- long-term vegetation survival rates following hydromulching.

Hydromulching trials will commence in Spring 2022.

9.2 Future Rehabilitation Research and Trials

9.2.1 Growth Medium Development Study

A *Growth Medium Development Study* will be undertaken across the Company's three mine sites in Broken Hill with the aim of assessing amelioration options, existing growth medium resource stockpiles and comparing key characteristics against those of growth medium present within analogue sites. The study will also seek to assess alternative growth medium options, including amelioration requirements to support the development of target vegetation community types. The resulting report will be utilised in combination with the results of a formal growth medium resource survey and the *Waste Material and Soil Characterisation Assessment* in order to determine the volume of suitable growth medium resources available for rehabilitation operations at the Mine Site.

The objectives of the *Growth Medium Development Study* will be to:

- assess the suitability of stockpiled growth medium for revegetation by comparing key characteristics with those of growth medium at analogue sites; and
- assess the suitability of alternative growth medium options; and
- determine the need for any growth medium amelioration to support revegetation.

Preparation of the *Growth Medium Development Study* will commence in 2022 or 2023.

9.2.2 Southern Operations Program of Kinetic Column Leach Tests

Kinetic leach tests will seek to provide an understanding of solute release from the samples and can also be used to calculate the sulfide oxidation rate based on sulfate release rates from the column. Kinetic column leach testing is designed to yield data on solute release under optimal conditions for sulfide oxidation The test work program could be modified to include tests under optimal conditions as well as those that are more site-specific

Measurement of the oxygen consumption rate will provide an indication of the oxygen consumed due to sulfide oxidation. The results of the test work may be used to assess oxygen consumption mechanisms and provide an understanding of mine waste weathering processes. Furthermore, the results form the foundation for predictive modelling of future mine-affected water quality and may be used to guide mine waste management decisions.

Preparation of the *Program of Kinetic Column Leach Tests* will commence in 2023.

9.2.3 Closure Management Plan

A *Closure Management Plan* will be developed across the Company's three mine sites in Broken Hill with the aim of defining action plans for key closure assessments. The following subtitles summarise the key assessments that will be undertaken as part of the *Closure Management Plan*.

Engineer Assessment of Structures

The engineer assessment of structures will aim to:

- establish engineer assessment requirements of structures to remain in final land use;
- establish stability assessment criteria for historic tailing storage facilities; and
- establish a procedure for the isolation of hazardous electrical and mechanical infrastructure to remain for which can be applied consistent across the Company's three mine sites in Broken Hill.

Stability assessments of historic tailing storage facilities will be undertaken progressively prior to decommissioning phase of active tailing storage facilities.

Contaminated Site Assessment

The contaminated site assessment will aim to:

- establish a procedure for the sampling and testing of contaminated materials and areas which can be applied consistent across the Company's three mine sites in Broken Hill; and
- establish target contamination levels which are appropriate for individual final land use types.

Contamination testing will be undertaken progressively prior to and during the decommissioning phase of rehabilitation operations. Contaminated areas and the relative concentration of key contaminants will be mapped, and results of testing will be recorded in the Rehabilitation Quality Assurance Register.

Post-Closure Surface and Groundwater Assessment

The post-closure surface and groundwater assessment will aim to:

- establish target water quality parameters which are appropriate for individual final land use types; and
- undertake modelling groundwater following closure.

Hazardous Materials Assessment Procedure

The hazardous materials assessment will aim to:

- outline procedures for the identification and investigation of key hazardous materials;
- identify any specific management measures to be implemented during the removal or retention of hazardous materials; and
- identify any specific waste disposal methods and locations for individual hazardous material types.

Preparation of the *Closure Management Plan* will commence in 2024. The development of the various components (Contaminated Site Assessment) of the plan will commence in 2022 or 2023.

9.2.4 Heritage Implementation Plan

A *Heritage Implementation Plan* will be developed by a suitably qualified expert and applied across the Company's mine sites in Broken Hill. The *Heritage Implementation Plan* will include a framework for the assessment of individual historic heritage items based on the decision matrix provided in the Strategic Historic Heritage Management Plan (SHHMP). Individual heritage items will be assigned management measures to be implemented during rehabilitation operations based on one of the following four management outcomes.

- Archival recorded, demolition to foundations and inclusion in the interpretive plan.
- Retain in landscape as a managed ruin with safety maintenance and implement measures to ensure the structure is not a risk to Mine personnel or visitors.
- Conserve in the landscape with cyclical maintenance and implement measures to maintain the structural integrity of the structure.
- Continued use and undertake maintenance to ensure continued use is possible.

The objectives of the *Heritage Implementation Plan* will be to:

- identify appropriate management actions and outcomes for individual historic heritage items by applying the decision matrix provided in the SHHMP;
- provide a schedule for the management and prioritisation of individual heritage items across the Company's three mine sites in Broken Hill; and
- identify any legislative requirements for development consent, licences and/or permits prior to the demolition or alteration of individual heritage items, as required.

Preparation of the *Heritage Implementation Plan* will commence in 2023, subject to approval of the Strategic Historic Heritage Management Plan.

9.2.5 Heritage Interpretation Plan

A *Heritage Interpretation Plan* will be developed by a suitably qualified expert and applied across the Company's mine sites in Broken Hill. The plan will record/present the heritage values of individual historic heritage items within the Mine. Additionally, the plan will guide future tourism land uses within the Mine Site through consideration of how heritage items, including moveable heritage items, will be displayed, heritage information presented and publicly accessible areas constructed to enhance tourism and educational land uses.

The objectives of the *Heritage Interpretation Plan* will be to:

- identify opportunities for tourism and educational experiences associated with historic heritage items and the Company's three mine sites in Broken Hill more broadly;
- identify any additional structures and/or infrastructure which need to be retained to support final tourism land uses (e.g. amenities buildings, storage, services); and
- determine the types of structures and/or infrastructure which need to be constructed to support final tourism land uses (e.g. access roads, lookout areas, signage) and the best locations for these.

Preparation of the *Heritage Implementation Plan* will commence in 2023, subject to approval of the Strategic Historic Heritage Management Plan.

9.2.6 Remediation Options Assessment

The *Remediation Options Assessment* will provide a risk based approach on best option analyses for remediating a contaminated area. It will include a risk analysis of options with consideration of potential health and environmental impacts. The assessment will concentrate on contaminated areas, including the following.

- McCulloch's Flat at North Mine.
- Historic tailings adjacent to Site AB at Southern Operations.

The focus of the assessment will be on treatment options including extraction and capping of contaminated material.

Preparation of the *Remediation Options Assessment* will commence in 2023.

10. Intervention and Adaptive Management

Table 25 presents the Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in the rehabilitation risk assessment (refer Section 3) as having a risk rating of moderate or above.

The results of rehabilitation trials, including the development of procedures to be implemented during rehabilitation operations as outlined in Section 9, will be continually reviewed and reported in the Annual Rehabilitation Report for the Mine. Where rehabilitation trial outcomes suggest that rehabilitation methods outlined in this Plan may not support the realisation of rehabilitation completion criteria, this Plan will be updated to detail additional or alternative rehabilitation methods as required. Additionally, where the development of procedures or plans described in Section 9 is completed, this Plan will be updated to reflect specific management implications for individual areas of the Mine Site and/or target values associated with rehabilitation completion criteria.

Table 25
Trigger Action Response Plan

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Rehabilitant Risk	Potential Adverse Outcome	Trigger	Action/Response
Active Mining Phase of Rehabilitation			
Limited pre-existing and stockpiled biological resources for use (e.g. topsoil, woody debris).	Insufficient resources available for rehabilitation limiting suitability of final land use.	Rehabilitation resource estimates indicate that sufficient soil and other biological resources are not available within the Mine Site	Suitable alternative source of additional soil material/ growth medium to be identified.
			Investigation into measures that may be implemented to ameliorate other materials to make them suitable for use as a growth medium.
Ineffective impoundment of geochemical and geotechnically unsuitable tailings and reject materials.	Final landform geotechnically unstable	Monitoring or final closure geotechnical and/or environmental assessment identifies instability / unacceptable movement (actual or potential) in final landform.	Suitably qualified geotechnical engineer engaged to assess the instability and provide a range of recommendations to remediate the instability.
	Final landform is a source of pollution.	Surface water monitoring or visual inspection indicates that final landform is eroding or is a source of unacceptable levels of pollution.	Remediate eroding area through additional earthworks, soil works, revegetation or other stabilisation works. If the above is unsuccessful, engage a suitably qualified professional in sediment and erosion control to prepare an assessment report and recommendations.
Adverse geochemical/chemical composition of materials such as overburden, interburden, processing wastes, subsoils and topsoils and imported cover materials.	Final landform unsuitable for biological development.	Substrate and material characterisation testing identifies geochemical/chemical composition of materials outside of target values.	Suitably qualified soils or rehabilitation specialist engaged to investigate options of material amelioration and/or alternative suitable source of materials.
	Final landform is a source of pollution.		

Table 25 (Cont'd)
Trigger Action Response Plan

Rehabilitant Risk	Potential Adverse Outcome	Trigger	Action/Response
Active Mining Phase of Rehabilitation (Cont'd)			
Adverse surface and groundwater quality and quantity (underground and surface operations).	Final landform unsuitable for final land use.	Surface and groundwater quality monitoring indicate unsatisfactory levels of water contamination resulting from Mine-related operations.	Review and inspect existing water management infrastructure to identify potential sources of contamination and investigate potential control operations, including removal and/or treatment of contaminated material.
Decommissioning Phase of Rehabilitation			
Hazards associated with retained infrastructure.	Final landform features present risk to public safety.	Visual inspection or engineering assessment identifies potential or actual failure of retained infrastructure.	Review the requirement to retain any infrastructure outlined to be retained, and consider suitable and or practicable repair or decommissioning.
Generation of material and waste products from the demolition process.	Landform unsuitable for intended land use. Landform is a source of pollution.	*Closure Management Plan* identifies potentially hazardous or contaminated waste.	Removal and disposal in accordance with the *Closure Management Plan*.
Exposure or access to underground workings.	Public access to Void and Portal poses unacceptable risk to public safety.	Rehabilitation monitoring identifies potential for public access to Void and portal or access by unauthorised persons is identified.	If necessary, additional security measures to be installed including fencing, suitable signage, additional bunding, etc.
Landform Establishment Phase of Rehabilitation			
Erosion and mass movement issues associated with landform construction.	Landform unsuitable for intended land use.	Monitoring identifies instability / unacceptable movement (actual or potential) in final landform.	Suitably qualified geotechnical engineer engaged to assess the instability and provide a range of recommendations to remediate the instability.
	Final landform is a source of pollution.	Surface water monitoring or visual inspection indicates that final landform is eroding or is a source of unacceptable levels of pollution.	Remediate eroding area through additional earthworks, soil works, revegetation or other stabilisation works.
Ineffective impoundment of geochemical and geotechnically unsuitable tailings and reject materials.	Final landform geotechnically unstable	Monitoring or final closure geotechnical and/or environmental assessment identifies instability / unacceptable movement (actual or potential) in final landform.	Suitably qualified geotechnical engineer engaged to assess the instability and provide a range of recommendations to remediate the instability.
	Final landform is a source of pollution.	Surface water monitoring or visual inspection indicates that final landform is eroding or is a source of unacceptable levels of pollution.	Remediate eroding area through additional earthworks, soil works, revegetation or other stabilisation works. If the above is unsuccessful, engage a suitably qualified professional in sediment and erosion control to prepare an assessment report and recommendations.

Table 25 (Cont'd)
Trigger Action Response Plan

Rehabilitant Risk	Potential Adverse Outcome	Trigger	Action/Response
Landform Establishment Phase of Rehabilitation (Cont'd)			
Lack of availability of suitable materials for encapsulation or capping of adverse materials.	Final landform presents risk to public safety. Inability to construct final landform capable of sustaining the final land use.	*Growth Medium Development Study* or *Waste Material and Soil Characterisation Assessment* identify rehabilitation material deficits.	Identify an alternative source of additional suitable material, including the potential for amelioration of available unsuitable resources.
Final landform unsuitable for final land use (e.g. large rocks present affecting cultivation, settlement and surface subsidence leading to extended ponding).	Final landform prevents sustainable future land use.	Landform assessment and/or visual inspection identifies areas or features that may prevent effective final land use.	Remediate areas or features through additional earthworks and land-shaping until final land use domains meet design specifications. If above is unsuccessful, engage a suitable qualified professional in landscape and landform design to identify required remediation or redesign.
Lack of availability of suitable materials for construction of final landform features (e.g. safety exclusion bunds).	Final landform presents risk to public safety Inability to construct final landform capable of sustaining final land use.	Inspections during and/or after construction of landform features identifies lack of available suitable materials.	Suitable source of additional suitable material to be identified, including potential for amelioration of available resources.
Growth Medium Development Phase of Rehabilitation			
Inappropriate physical and structural properties of substrate.	Soil not capable of sustaining vegetation community.	Soil parameters not consistent with baseline studies.	Prepare a report incorporating soil analysis results and identifying a range of recommendations to be implemented to ensure that the soil is suitable for sustaining the vegetation community.
Subsoil and topsoil deficit for rehabilitation activities.	Insufficient soil available for construction of sustainable final landform and land use.	Sufficient soil resources are not available within a reasonable distance of the Mine Site.	Suitable source of additional soil material / growth medium to be identified. Commence investigation into measures that may be implemented to ameliorate other materials to make them suitable for use as a growth medium.
Substrate inadequate to support revegetation or agricultural land capability (e.g. lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).	Inadequate soil thickness applied to final landform.	Test pitting following placement of soil material identifies placed soil thickness not consistent with final approved soil thickness.	Additional soil material spread on the final landform.
	Soil not capable of sustaining vegetation community.	Soil parameters not consistent with baseline studies.	Prepare a report incorporating soil analysis results and identifying a range of recommendations to be implemented to ensure that the soil is suitable for sustaining the vegetation community.

Table 25 (Cont'd)
Trigger Action Response Plan

Rehabilitant Risk	Potential Adverse Outcome	Trigger	Action/Response
Ecosystem and Land Use Establishment Phase of Rehabilitation			
Adopting inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Vegetation does not become established on final landform.	Rehabilitation monitoring identifies failure or partial failure of vegetation establishment on final landform.	Suitably qualified ecologist or revegetation expert engaged to assess reasons for failure of revegetation and recommend actions to ensure that the final vegetation community corresponds as closely as possible to analogue sites.
	Rehabilitation operations result in a greater disturbance footprint from rehabilitation activities.	Identification of significant areas of disturbance outside and/or within rehabilitation areas.	Suitably qualified ecologist or revegetation expert engaged to assess reasons for additional disturbance and recommend actions to align techniques and management practices to industry best practice.
Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Delay to or failure of vegetation establishment.	Visual monitoring during and/or after adverse weather/climatic events identifies limited opportunities for progressive rehabilitation or negative effects on vegetation establishment	Review of rehabilitation schedule and update to forward schedule.
			Rehabilitation areas are assessed for damage and necessary repairs and/or revegetation efforts are employed as required.
Unavailability of areas for revegetation in optimal seasonal conditions.	Delay to or failure of vegetation establishment.	Rehabilitation operations are unable to be completed during optimal operational timeframes in accordance with forward schedule.	Review of rehabilitation progress, resource and priorities and revision of rehabilitation operations as required.
Lack of habitat structures for colonisation or use.	Reduced suitability of final landform for native flora and fauna.	Ecosystem Function Analysis identifies that relevant indices are not consistent with analogue sites.	Investigate availability of additional and/or supplementary structural habitat resources and apply as required.
Lack of infrastructure to support intended final land use (e.g. bunding, fences, access).	Final landform unsuitable for final land use.	Visual inspections identify lack of necessary infrastructure	Undertake additional assessments to identify remaining required infrastructure including options for sourcing of materials where necessary.
Ecosystem and Land use Development Phase of Rehabilitation			
Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Vegetation does not become established on final landform.	Rehabilitation monitoring identifies failure or partial failure of vegetation establishment on final landform.	Suitably qualified ecologist or revegetation expert engaged to assess reasons for failure of revegetation and recommend actions to ensure that the final vegetation community corresponds as closely as possible to baseline studies.
Post-closure water quality and quantity issues (e.g. acid-drainage, high salinity).	Final landform unsuitable for final land use.	Surface and groundwater monitoring indicate unsatisfactory levels of water contamination resulting from Mine-related operations.	Review and inspect existing water management infrastructure to identify potential sources of contamination and investigate potential control operations, including removal and/or treatment of contaminated material.
	Final landform a source of pollution.		

Table 25 (Cont'd)
Trigger Action Response Plan

Rehabilitant Risk	Potential Adverse Outcome	Trigger	Action/Response
Ecosystem and Land use Development Phase of Rehabilitation (Cont'd)			
Damage to rehabilitation (e.g. fauna, domestic stock, vandalism, vehicular interactions, bushfire, insects and plant disease).	Vegetation does not become established on final landform.	Rehabilitation monitoring identifies higher grazing pressure within rehabilitation areas compared to analogue sites.	Review existing pest exclusion and management processes for potential modes of failure (e.g., damage to fences) and revise type, intensity and frequency of pest controls until assessments indicate a return to background grazing levels.
		Rehabilitation monitoring identifies damage to rehabilitation areas from public access.	Review existing safety and exclusion infrastructure to identify potential modes of failure and/or strengths and weaknesses in infrastructure design, and implement any necessary repairs/improvements where practicable.
	Final landform requires significantly more management than analogue sites.	Visual assessment of groundcover, biomass or Landscape Function Analysis identify that relevant indices are not trending towards the baseline sites.	Suitably qualified ecologist or revegetation expert engaged to assess reasons for additional management requirements and recommend actions to align management required with that of the analogue sites.
	Bushfire impacts are more severe compared to analogue sites.	Rehabilitation monitoring identifies bushfire impacts which are more severe compared to analogue sites.	Review bushfire management and mitigation measures and revise as required.
Insufficient establishment of target species and limited species diversity.	Species assemblage on final landform does not conform to target species assemblages based on analogue site.	Rehabilitation monitoring identifies floristic assemblages inconsistent with analogue sites.	Undertake additional revegetation works to develop species assemblage comparable to analogue sites.
Erosion and failure of landform, drainage and water management/storage structures.	Final landform is a source of sedimentation that negatively impacts rehabilitation or contributes to pollution in surrounding areas.	Surface water monitoring or visual inspection indicates that final landform is eroding or is a source of unacceptable levels of sedimentation.	Remediate eroding area through additional earthworks, soil works, revegetation or other stabilisation works.
Lack of resources for rehabilitation maintenance.	Vegetation does not become established on final landform.	Rehabilitation monitoring identifies failure or partial failure of vegetation establishment on final landform.	Suitably qualified ecologist or revegetation expert engaged to assess reasons for failure of revegetation and recommend actions to ensure that the final vegetation community corresponds as closely as possible to baseline studies.
	Weeds and pests become established and require significant resources to manage.	Rehabilitation monitoring identifies higher weed or pest occurrence or more significant impacts within rehabilitated areas compared to analogue sites.	Review weed and pest control programs and revise intensity and frequency of control efforts as required. If the above is unsuccessful, engage a suitably qualified professional to provide recommendations to control pests or protect rehabilitation areas.

11. Review And Implementation

Table 26 presents the triggers for reviewing this Plan. Following each review, this Plan will be revised if significant structural amendments are necessary and provided to the Resources Regulator. Additionally, further consultation with relevant stakeholders will be undertaken where revisions to this Plan result in significant changes to proposed final land uses final landforms, rehabilitation objectives, rehabilitation completion criteria and/or the rehabilitation schedule. Milestones as documented in this Plan will be updated in the Annual Rehabilitation Report and will trigger an update to this Plan in the event that a significant change in rehabilitation risks and/or proposed rehabilitation methodologies is identified.

Table 26
Rehabilitation Management Plan Review Triggers

Trigger	Review
Amendment (required under Clause 11 of Schedule 8A of the *Mining Regulation 2016*)	
Approval of the proposed rehabilitation outcome document by the Secretary.	Within 30 days
Amendment to the rehabilitation outcome document under Clause 14 of Schedule 8A of the Mining Regulation 2016.	Within 30 days
Changes to risk control measures in the Rehabilitation Risk Assessment.	As soon as practicable
Written request from the Secretary.	As required by any notice
Review	
Commencement of the Operational Rehabilitation Reform transition period.	Within 12 months
Finalisation of any of the following. • Growth Medium Development Study • Closure Management Plan • Heritage Implementation Plan • Heritage Interpretation Plan • Remediation Options Assessment • Kinetic Column Leach Testing	Within 12 months
Modification of an existing development consent.	Within 3 months
Modification of CML 4 and/or CML 5.	Within 3 months
Submission of each Annual Rehabilitation Report and Forward Program.	Within 1 month
Completion of a rehabilitation trial.	Within 1 month
Receipt of a specialist consultant report prepared in response to a trigger outlined in Section 10.	Within 3 months
Consultation with relevant stakeholders with significant implications for the final land use and/or final landform.	Within 3 months
Consultation with relevant stakeholders with significant implications for rehabilitation objectives and/or rehabilitation completion criteria.	Within 3 months

In addition to reviews of this Plan as outlined in **Table 26**, a Rehabilitation Quality Assurance Register will be developed and regularly maintained to ensure that mining and rehabilitation activities at the Mine Site are being conducted in accordance with this Plan. The Rehabilitation Quality Assurance Register will include a risk control checklist as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. Additionally, the Rehabilitation Quality Assurance Register will include:

- records of any contaminated water or hazardous materials collected at the Mine Site and disposed of off site;
- the latest map of weed distribution at the Mine Site;
- the latest map of contamination at the Mine Site; and
- details of any additional rehabilitation measures and/or risk controls implemented within individual domains during rehabilitation operations.

12. References

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Theoharidis, P., (2007) – *Site Rehabilitation Review 2006*, internal report for Perilya Broken Hill Pty Limited.

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Appendix 1

Figure A – Exploration Target Areas

(Total No. of pages including blank pages = 2)

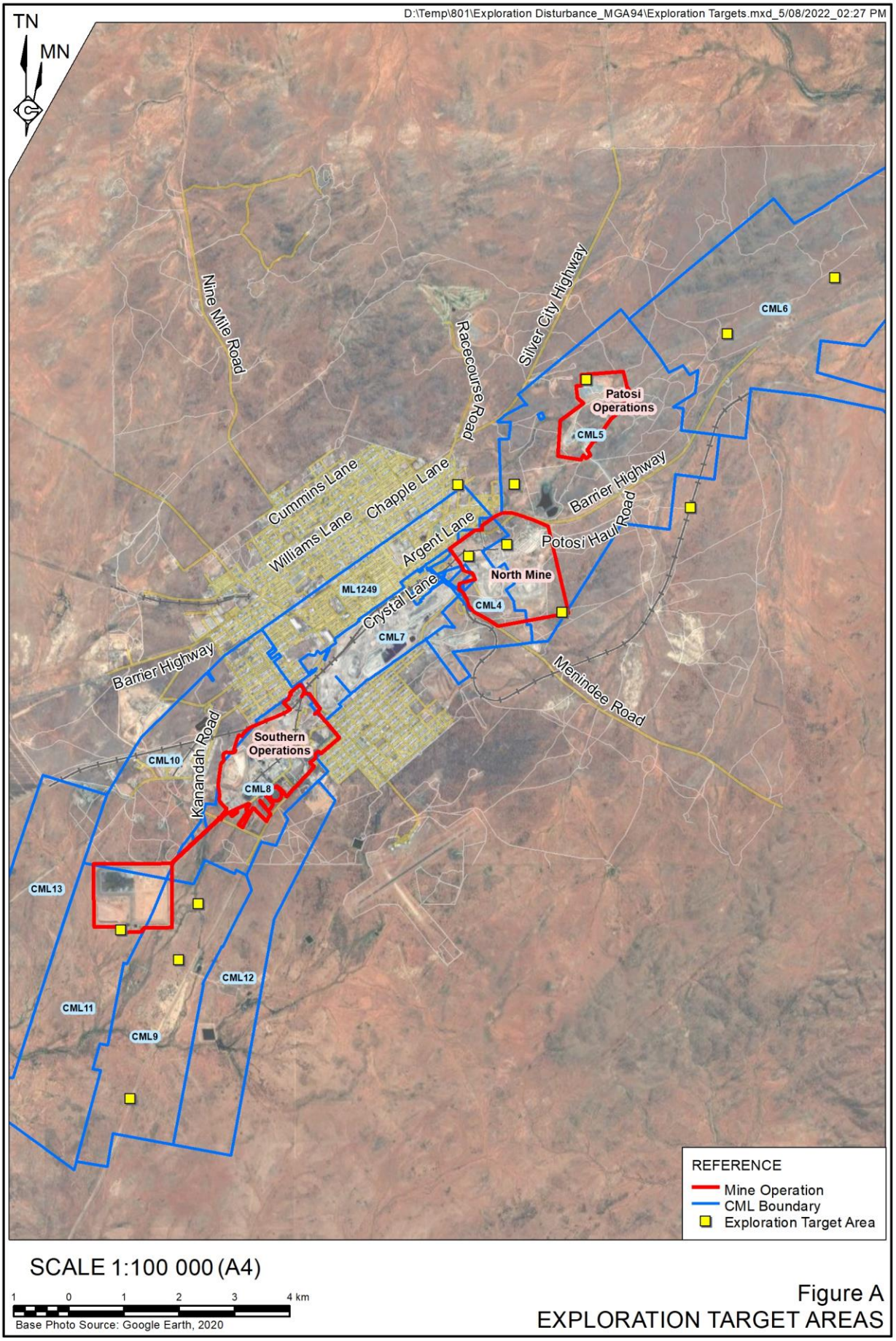

Figure A
EXPLORATION TARGET AREAS