Gumigil Chrysoprase Mine's Progressive Rehabilitation and Closure Plan

Marlborough Museum - Inside of Front Door

Version 02

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Tenure 5769, 5770, 5781, 5782, 5791, 5792, 5795, 5802, 7197 and 7198

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Contents

Figures

Tables

1. Introduction

This report documents the rehabilitation planning and background information for the Gumigil Chrysoprase Mine.

The content of this report aims to meet the relevant guidance notes published by the Qld Progressive Rehabilitation and Closure Plans (PRC plans)" ESR/2019/4964 V3.01, "Common Issues with Progressive Rehabilitation and Closure Plan Applications (PRCP applications)" ESR/2021/5775 • Version 1.01 and "Submission of a progressive rehabilitation and closure plan" ESR/2019/4957 V3.01.

The PRCP follows the order listed in Appendix 1 of the application.

- Project Planning –
    - Baseline Information
    - Site Locations
    - Project Description
        - Tenure
        - Primary Mine Features
        - Type of Mining Operation
    - Rehabilitation Planning
- Community Consultation
- Post-Mining Land Use
- Non-Use Management Areas
- Rehabilitation Management Methodology –
    - Hydrogeology
    - Flooding
    - Soil and capping material assessment
    - Waste Characterisation
    - Landform Design
    - Cover Design
    - Water Management
    - Revegetation
    - TSF
    - Voids
    - Underground Mining
    - Built Infrastructure
- Risk Assessment –
- Monitoring and Maintenance
- Large Tables
- Large Figures
- Appendix A – Photographs of Rehabilitation
- Appendix B – Marlborough Creek Cross Sections

2. Baseline Information

2.1. Marlborough Serpentinite Landscape

Section Reference:

Marlborough serpentine landscape management and conservation. A workshop presented by Central Queensland University 20-21 February 2002

The largest area of Serpentinite in Queensland occurs in a discontinuous belt from Marlborough to Rockhampton. Specifically, the Marlborough hills are the largest block of serpentinite in eastern Australia and are valued for:

- nickel, chrysoprase, magnesite, cobalt and chromium mineralisation;
- unique ecosystems including many endemic plant species, flora and fauna of conservation significance, and unusual aquatic ecosystems, all because of the topography, associated hydrology, highly leached soils and mineralisation.

The landscape (see Figure 33 and Figure 34) within which the mine is located consists of high, steep ridges. Marlborough Creek east of mine is at ~RL 40m with South Slopeaway mountain peaking at RL 360m at the Industrial Area immediately to the north of the Eastern Cut. Upper slopes on which the mining occurs are very steep and precipitous in places. Long, moderately steep colluvial slopes descend to the valley floor to gentler colluvial aprons.

2.2. Climate

The Marlborough region experience wet summers with mild dry winters. Bureau of Meteorology Weather Stations are located at St Lawrence BOM 033065 (75km) and the Marlborough Helipad BOM 033111 (16km). St Lawrence is 75km from the site but has rainfall records dating back to 1872. The Marlborough Helipad BOM 33111 is 16km from site with incomplete records dating back to 2001.

Table 1 displays the mean Maximum and Minimum Temperatures for each month of the year and Table 2 lists rainfall statistics for St Lawrence. Table 3 lists the Rainfall Statistics for the Marlborough Helipad.

St Lawrence has recorded a daily rainfall over 100mm for every month in the 151 years of records. The helipad has recorded 9 incidents of daily rainfall exceeding 100mm in the last 12 years (see Table 4). The Queensland government maintains the Marlborough Creek Monitoring Station (130009A) at Slopeaway. This station includes a rainfall gauge. Records date from 10/10/2013 to date. The station recorded the following events:

- 169mm on 31/3/2025 to midnight;
- 143mm on 9/11/2021;
- 97m on 29/03/2017 with 66mm the following day total of 241mm in 4 days; and
- 213mm in 4 days in 2016.

Records of hourly rainfall are not available at the Marlborough Creek monitoring station.

Table 5 lists the mean monthly daily solar radiation and evaporation by month. Wind speed is relatively constant throughout the year ranging from 13.4 km/hr to 19 km/hr. The regions climate can be summarised as coastal.

Table 1: Mean Maximum and Minimum Temperatures St Lawrence PO

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Max T°C	31.7	31.4	30.9	29.3	26.7	24.3	23.8	25	27	28.9	30.4	31.5
Mean No days >= 35°C	1.3	1	0.5	0	0	0	0	0	0	0.3	0.7	1
Mean Min T°C	22.5	22.5	21.1	18.4	15.1	12.2	10.9	11.8	14.4	17.7	20.2	21.7

Table 2: Rainfall Statistics St Lawrence PO

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean rainfall (mm)	204.7	197.3	133.4	59.6	48.4	48.1	32.2	23.5	26.2	44.9	71.3	124.7	1018.8
Highest rainfall (mm)	1255.8	823.5	513	461.3	299	282.5	289.1	218.6	209.8	224.6	428.2	613.2	1976.1
Lowest rainfall (mm)	0.2	3.8	0	0	0	0	0	0	0	0	0	0	197.7
Highest daily rainfall (mm)	381	406	230.4	182.6	129.2	188.5	115.6	128	122.2	130.6	170	231.9	406
Mean No rain days	10.9	11	9.3	6.3	5.8	5.1	4	3.3	3.4	4.5	6.5	8.3	78.4

Table 3: Rainfall Statistics Marlborough Helipad

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	97.3	117.5	73.0	40.6	28.4	24.5	29.2	17.8	15.8	42.9	54.1	98.2
Median	80.9	102.1	45.2	32.3	14.4	15.8	11.2	6.6	7.2	27.0	41.2	72.0
Highest Daily	*91.2*	*166.2*	*121.8*	*178.3*	*78.8*	*51.4*	*111.8*	*65.8*	*23.4*	*80.6*	*102.8*	*121.6*

Table 4: Helipad Rainfall Events > 100mm

Month	Year	Daily rainfall (mm)
April	2002	102
February	2003	166
February	2009	103
March	2010	121
December	2010	212
February	2016	101
July	2016	112
March	2017	116
November	2021	103
December	2010	121

Table 5: Radiation and Evaporation St Lawrence PO (BOM Station 033065)

Mean daily solar exp (MJ/(m*m))	23.8	22.1	20.6	18	15.6	14.1	15.4	18.4	21.8	24.3	25.5	25.2
Mean daily evap (mm)	5.7	5.1	4.9	4.3	3.4	2.9	3.1	3.7	4.6	5.4	6	5.9

No rainfall records are available from the mine site.

2.3. Climate Change

Section Reference

https://www.qld.gov.au/__data/assets/pdf_file/0020/68141/central-qld-climate-change-impact-summary.pdf
https://www.longpaddock.qld.gov.au/qld-future-climate/

Future climate change is expected to bring:

1. Higher temperatures (the region is already about 1.5°C above 1986-2005 average), expected to reach up to 3.9°C by 2070;

2. More frequent periods of extreme weather with increased intensity and duration;
3. More frequent and extended periods of fire weather; and
4. Less frequent rainfall events, but at greater intensity.

2.4. Geology

Section Reference:

J. Digby Matheson (1967) Notes on the formation and geological setting of Chrysoprase in the Marlborough Deposits Queensland Government Mining Journal, November 1967, pages 495 to 496.

The general geology (Figure 35) of the area is shown on the 1:250,000 geological series sheet SF.55-12, St Lawrence, published by the Bureau of Mineral Resource, Geology and Geophysics, Canberra ACT 1963. The ultrabasic complex of the Marlborough Area, referred to as “mainly serpentinite” is part of the Central Qld Serpentinite Belt. In the area of Gumigil’s mining leases (MLs), the direction of Marlborough Creek is determined by the main North South striking fault. According to the map, there is a widespread cover of laterite over the ridges and hills of serpentinite to the west of Marlborough Creek, but none on the hills to the east.

Some details of the geological environment are given by J.H. Brooks paper entitled “Marlborough Creek Chrysoprase Deposits” in the Queensland Government Mining Journal, March 1964. The main serpentinite mass has been intruded by granite as well as gabbro and doleritic dykes. The serpentinite is said to consist of massive and schistose types which are layered and tend to be interbedded in the form of sills. The serpentinite is overlain by Permian Lower Bowen volcanics and is probably Carboniferous in Age. Brooks also explained the process of serpentinization of ultrabasic rocks but does not say out of which original ultrabasic rock the serpentinite developed.

The Chrysoprase formed in the lateritic weathering profile over ultrabasic rocks which contain about 0.2% Nickel, and which have undergone a strong silification as a result of the serpentinization process. Work done by Dr E. G. Haldemann in March 1965 and later by field geologists with the Broken Hill Proprietary Company Limited revealed that the primary nickel is present in the magnesium silicate forsterite, a mineral of the olivine group which is a constituent of certain ultrabasic rocks such as dunite, peridotite, harzburgite and saxonite. Haldemann states that ultrabasic rocks such as pyroxenite and hornblendite may not contain any olivine at all, and on analysis, shows only traces of nickel. Nickeliferous laterites and Chrysoprase, the nickel-stained chalcedony cannot, therefore, develop on the rocks. Thus, the fact that, in places, little or no Chrysoprase is present among the veins of chalcedony or other forms of silica in the laterite may indicate that it is underlain by non-nickeliferous bedrock, although no absolute correlation between bedrock and nickel values has been established.

The best Chrysoprase has been formed as residual veins in the laterite profile of remnants of a plateau standing at 400 to 450 m above sea level that is about 360m above Marlborough Creek. Concordant levels of ridges, which remained of this former plateau, are present on either side of Marlborough Creek and in more distant places, but the laterite profile on the ridges to the east of the Creek has largely been removed by erosion. Some Chrysoprase has been found in fractured and veined, weathered serpentinite on the flanks of the hills, where only the base of the laterite profile remains, or where topographic and erosional conditions did not lead to development of a thick laterite profile. This is clearly evidence on ML417 being worked by Kays and Party on the northern slope of South Slopeaway where stripping has been possible to a maximum 1 to 1.2m before hard unweathered rock is encountered. In this locality there is very little, if any, good grade Chrysoprase, the veins being mostly white quartz and chalcedony or rusty brown Jasper.

Thus, the remnants of the laterite profiles of the highest plateau in the area are the zones of occurrence of good grade Chrysoprase.

Nickel goes into solution only under a very limited range of pH values. Under certain environmental conditions, free silica is precipitated beneath a laterite deposit; under other conditions, garnierite (nickeliferous hydro-silicates of magnesium) is formed. Haldemann's opinion is that the Chrysoprase formed only in a zone close to the surface where, in plateau remnants, there are seasonal variations of the groundwater table. Here under the influence of the atmospheric conditions, cyclic changes of pH values in the groundwater result. In this zone, which extends along the steep south facing slopes about 45m below the capping on South Slopeaway, garnierite has been leached of its nickel content, some of which reprecipitated with silica produced the Chrysoprase. Perhaps the Chrysoprase may simply represent silicified garnierite.

That the very special environmental conditions applied only to a restricted zone of the laterite profile which was close to the surface and below the edge of the plateau is not yet conclusive, following investigations of drill cutting from Coorumburra some 4.8km to the south. Deep weathered serpentinite zones below the capping give rise to the possibility of Chrysoprase extending more deeply into the laterite profile. However, the presence of such minerals as tremolite and actinolite in the cuttings of such areas could represent deep weathering in the shear zone.

On the main Western Cut on ML 385 and 383[1] (Capricorn Mineral Development Company Pty Ltd) the vertical extent of the Chrysoprase occurrence has been proved over mine bench levels having a depth of 55m. Lateral distance measured from original surface of slope is over 21.3m with no indications of the lateritic soil disappearing. It is possible that the laterite profile is developed in a draped form as in Figure 1, and that the Chrysoprase occurring in such a great vertical depth as at South Slopeaway is developed within the profile of a steep scarf.

[1] Currently ML 5791

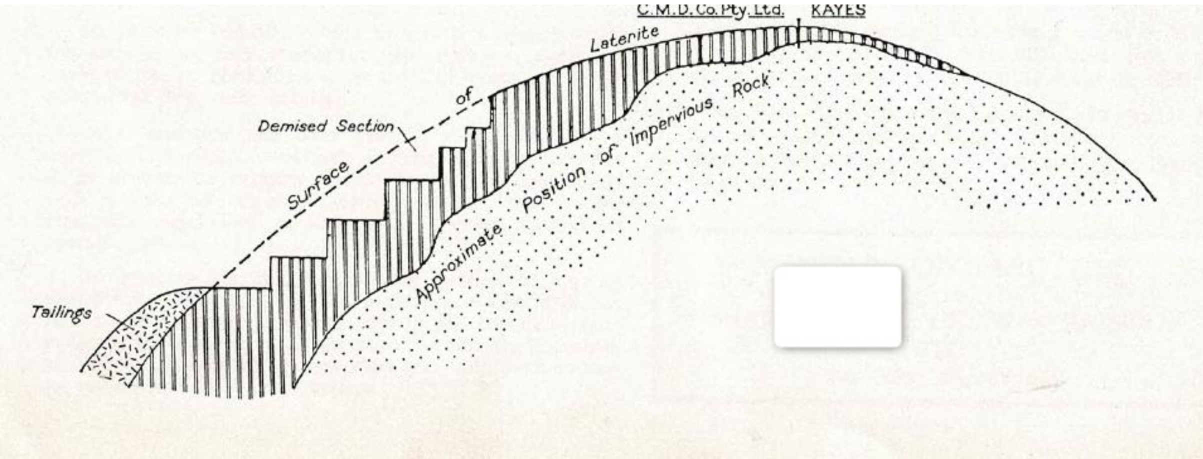

Figure 1: Geology

The best quality Chrysoprase in Eastern Cut occurs in three main cones, regularly spaced across the face of the Cut, which is 85m wide. See Figure 2. These cones, which are broadest at the base, pinch to an apex at 36.5m to 42m and are readily recognised by their green-grey colour. The largest, the most westerly, is 20m at the base and has yielded to date the largest quantity of good quality Chrysoprase.

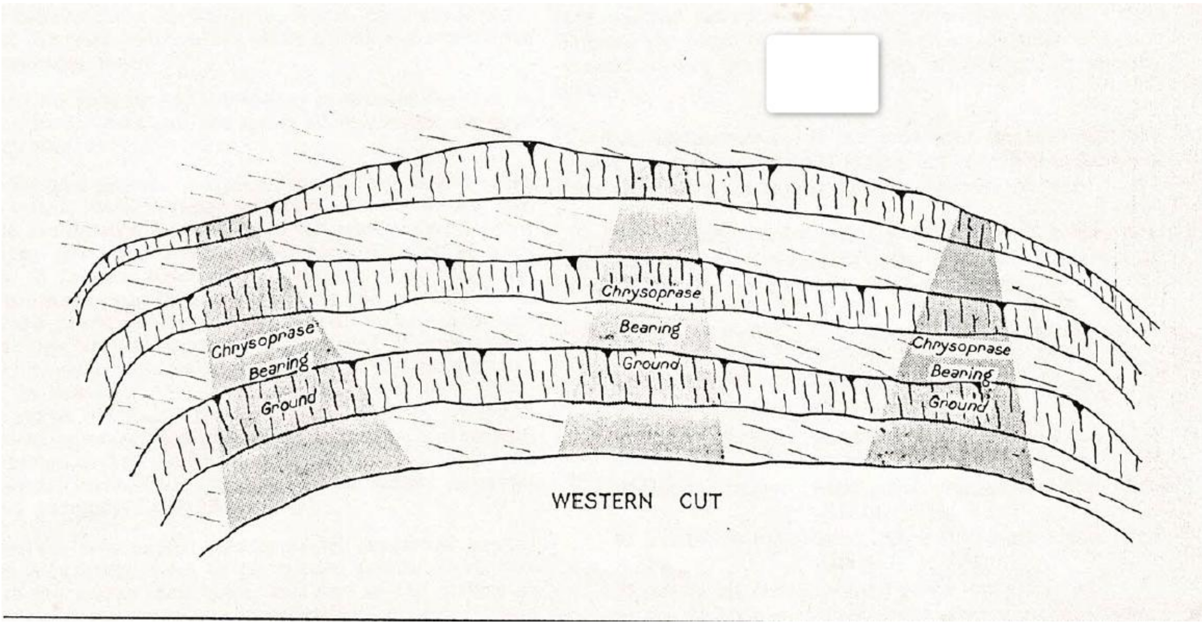

Figure 2: Western Cut Cones

Two similar cones to the east have not been fully exposed to allow for full scale mining, but there are indications that these areas are similar to the main western cone.

Drill cuttings from a hole (No 415) drilled to 72m approximately 40m north from the main Western Cut showed the following results from the surface:-

- 0 to 20 m - Boxwork laterites, Brown silica nodules.
- 20m to 21m – Poor grade Chrysoprase.
- 21m to 23m - Silica nodules in soil.
- 23m to 24.5m - Good colour Chrysoprase and silica nodules.
- 24.5m to 26m - Good colour Chrysoprase and silica nodules

- 26m to 27.5m - Good colour Chrysoprase and silica nodules.
- 27.5m to 44m - Lateritic rocks and soil.
- 44m to 46m - Chrysoprase and brown silica nodules in soil.
- 46m to 52m - Lateritic rock and soils
- 52m to 72m - White calcedony, magnesite on Serpentinite.
- 73m - Hole bottomed on Serpentinite.

A further Hole (No. 410) drilled some 1.2km east of hole Number 415 intersected Chrysoprase at 27m from the surface to 87m. This zone, where it bottomed on magnesite at 64m, is approximately 60m below the level of the Chrysoprase zone in the Western Cut.

Disseminated manganese occurring on the periphery of the Chrysoprase cones has a marked effect on quality control of the Chrysoprase lying adjacent to it. The normal pale green garnierite “skin” surrounding each nodule of stone shows a distinct transformation to purplish black in the manganiferous soil. The gemstone is more translucent and displays less depth of colour, being sometimes a watery green.

The most recent drilling results obtained show sufficient evidence that a much deeper weathering profile exists than was thought previously and that conditions exist on South Slopeaway for continued production for many years to come.

Footnote:

Because of its relationship with nickel the formation of Chrysoprase has come in for some study in recent years. Quoting from one report on a sample forwarded for examination:

” The evidence in this sample and in other samples with garnierite and silica occur together, suggests that Chrysoprase is formed by the replacement of garnierite by silica followed by recrystallization and introduction of silica and reduction of inclusion size. The resultant Chrysoprase would be evenly pigmented by sub microscopic inclusions of garnierite”.

2.5. Soils

Section Reference:

Forster BA and Baker DE (2002) Soils of the Marlborough Serpentinite Landscape of Central Queensland (Marlborough Serpentine Landscape Management and Conservation Workshop

The soils on South Slopeaway Mountain are red clay loams on saprolite from strongly weathered Serpentinite on the mountain top with stoney red and brown clay loams on moderately weathered Serpentinite on the gravelly colluvial and alluvial slopes at the toe of the mountains.

The highly leached soils are very permeable with high infiltration rates. The high infiltration rates reduce surface run-off. Surface run-off trapped in depressions in the Tops infiltrates within days if not hours. Runoff trapped in the lower sediment basins infiltrates or evaporates within weeks. The lack of surface water storage in the mining area is a negative for the mining operation.

In the nutrient poor Serpentinite ultramafic soils, the uptake of phosphate and ammonium ions, together with nickel, in the transpiration stream affects the initial survival of seedlings of eucalypts and their subsequent growth; and the nature of the understory. In the gradient from skeletal soils to deep lateritic earths, the density and the height of eucalypts in the overstory increases; the understory grades from *Macrozamia – Xanthorhoea spp* mid-height shrubs to sclerophyllous (healthy) shrubs to a savannah dominated by *Themeda spp*. Most of the understory species (with lower evapotranspiration rates) appear to exclude nickel ions at the root-soil interface. A few, however, accumulate the nickel ions into foliage growth apices where small genetic modifications have resulted in distinct taxa.

The soils of ML 5791 have low availability of essential nutrients due to the pH being slightly acidic, magnesium as the dominant cation and low in organic carbon. Table 6 is a summary of analysis conducted in 1999, 2002 and 2024 of topsoil, subsoil and the growth media of rehabilitation. As no topsoil has been used on the rehabilitated areas, the similarity of levels between the subsoil and the soils sampled from the rehabilitated areas is expected. These inhospitable soil properties and low moisture holding capacity of the natural soil and the overburden support the unique flora and fauna of the Serpentinite ecosystems.

Table 6: Nutrient Levels

Sampling conducted 1999, 2002 and 2024

	Unit	Topsoil	Subsoil	Growth Media	Comment
pH (1:5 Water)		6.2-7.1	6.1-6.9	6.7-7.1	Okay
EC (1:5 Water)	µS/cm	50 -800	50-200	50-400	Good
CEC		7.44	2.3	4.9-7.42	
Organic Carbon	%	1.92	0.62	0.19-1.05	Low
Nitrate Nitrogen	mg/kg	<0.65-7	<0.65-2.7	8.4	Low
Phosphorus (BSES)	mg/kg	13-38	9-11	7.5	Low
Calcium % of cations	%	64	32	9-24	Variable
Magnesium % of cations	%	32	61	69-83	High
Calcium/Magnesium Ratio		2.0	0.52	0.35-0.1	Poor
Sulphur (mcp)	mg/kg	3.4-22	38-53	1.6-3	Low
Zinc	mg/kg	0.41-5.1	0.83-2.2	1.7	Low

2.6. Land Stability

The largest area of Serpentinite in Qld occurs in a discontinuous belt from Marlborough to Rockhampton. The Serpentinite belt is characterised by endemic vegetation communities and distinctive soil topo-sequences.

The landscape within which the mine is located consists of high (up to 360m), steep ridges (see Figure 3). Upper slopes on which the mining occurs are very steep and precipitous in places with slopes ranging from 40 to 80%. Long, moderately steep colluvial slopes descend to the valley floor to gentler colluvial aprons grading to coarse and then relatively fine alluvia on the valley floor. The natural landscape is stable. The mined landform aligns with its surrounds except for the Tops; the flattened areas where mining has occurred. Monitoring of the disturbed footprint with areas of natural revegetation approaching 60 years of age is demonstrating that this footprint will achieve stability.

This landscape is not favourable for grazing which preserves the ground cover.

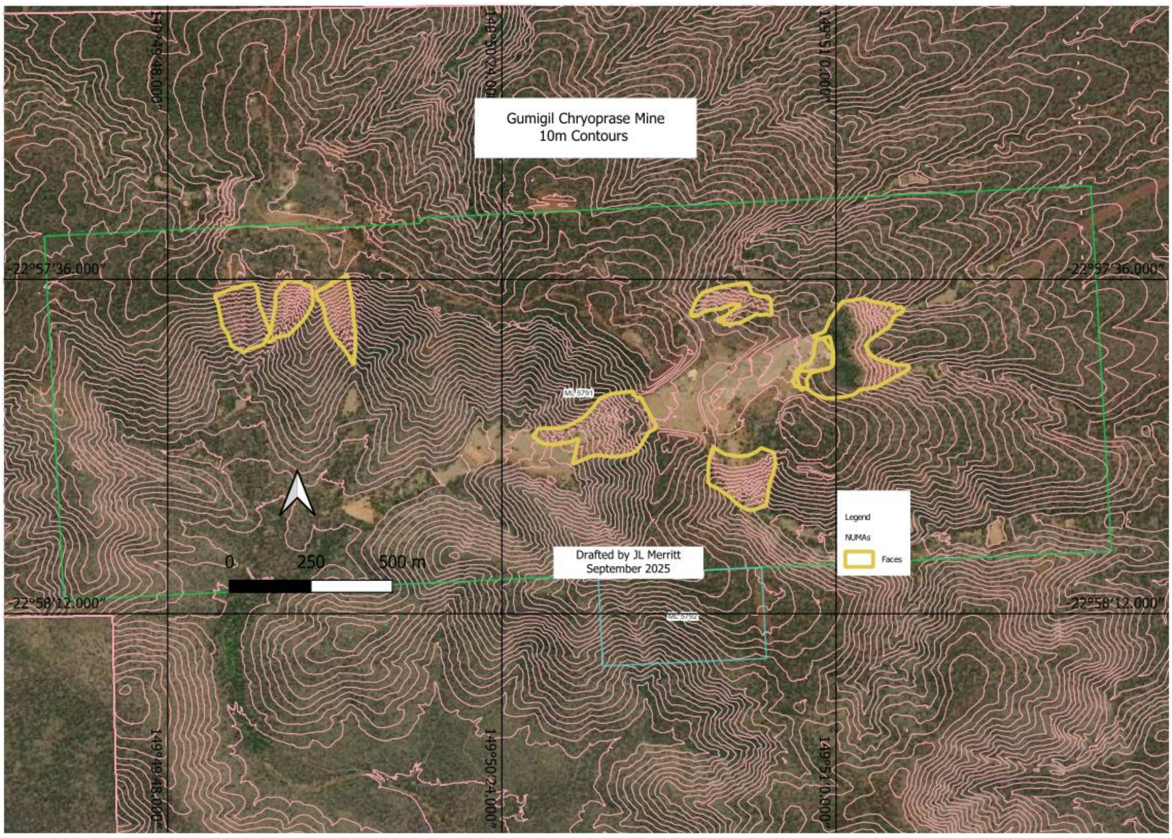

Figure 3: Contours

2.7. Vegetation Communities

Gumigil holds 10 leases over part of four lots on two properties in the Marlborough Hills (see sections 4.1 and 4.2 for details and Figure 4, Figure 5 and Figure 6. Although there has not been any detailed vegetation mapping of the leases, they are covered by Queensland's state-wide regional ecosystem mapping (https://www.qld.gov.au/environment/plants-animals/plants/ecosystems). All leases are mapped as supporting remnant vegetation, commonly ecosystems of conservation significance.

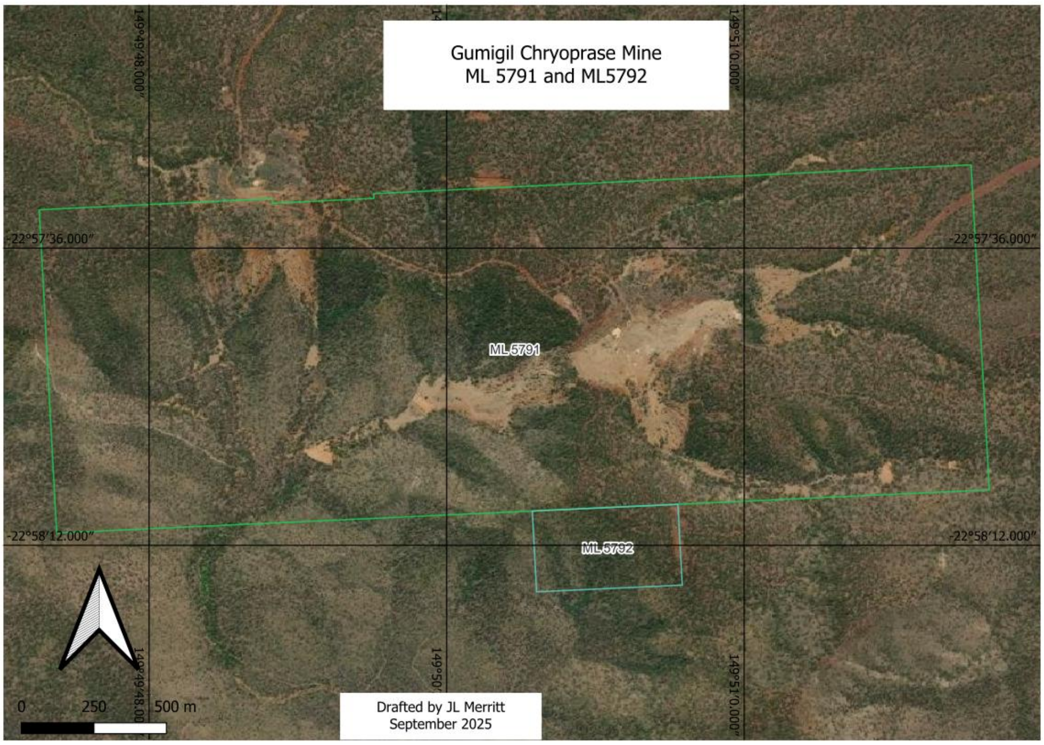

Figure 4: MLs 5791 and 5792

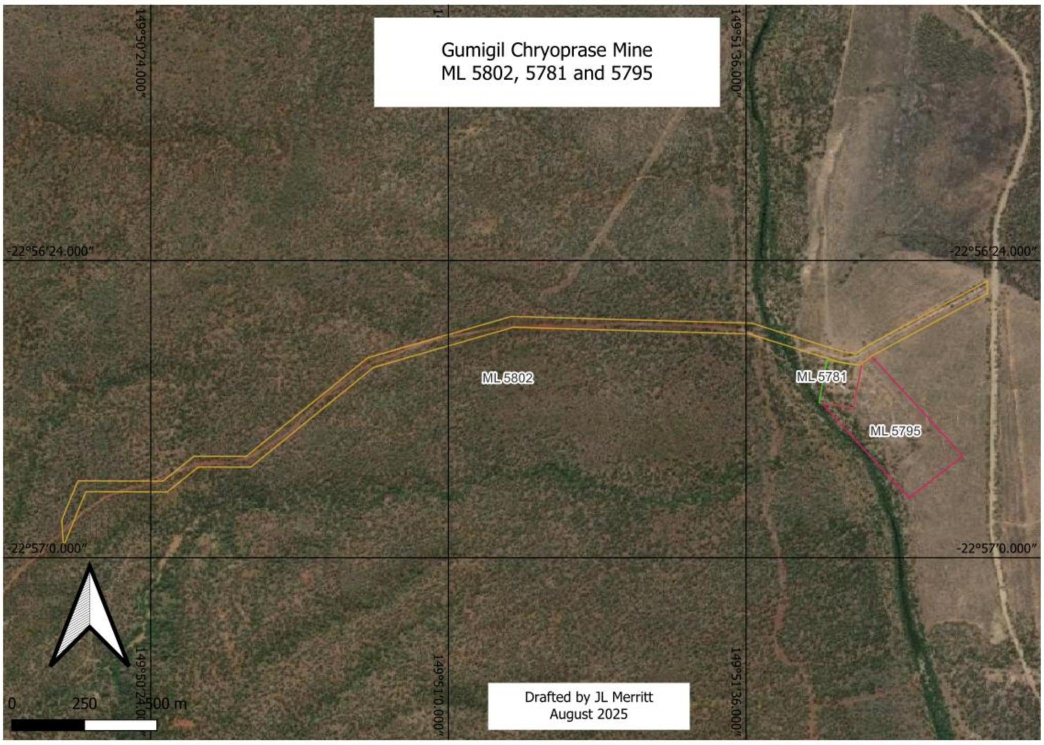

Figure 5: MLs 5802, 5781 and 5795

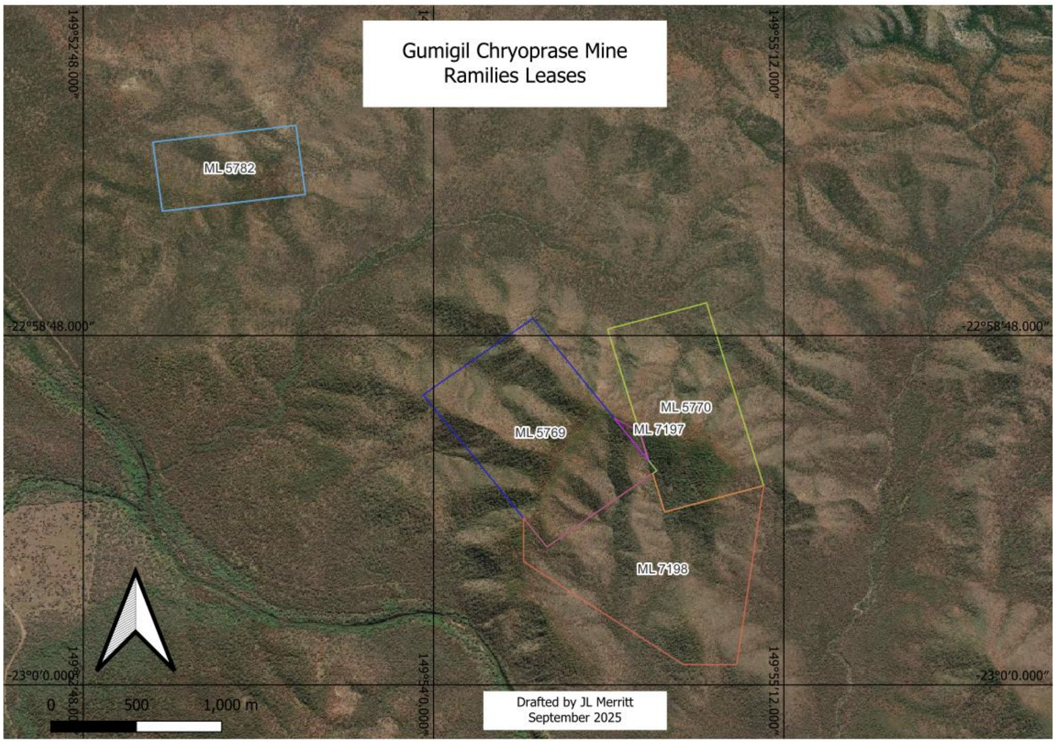

Figure 6: MLs 5769, 5770, 5782, 7197 and 7198

2.7.1. Vegetation

MLs 5792, 5782, 5769, 5770, 7177 and 7198 have not been subject to any major mine-related disturbance. These six MLs support remnant vegetation. The four MLs where mining related activity has occurred (MLs 5791, 5802, 5781 and 5795) have been subject to varying degrees of disturbance and clearing. This is most extensive in ML5791 which has been the focus of contemporary mining. This lease contains a mosaic of remnant and non-remnant lands. The remnant vegetation is predominantly RE11.11.7 with elements of RE11.11.21 (see Figure 7 and Table 7). The non-remnant lands are either cleared land or support regenerating shrublands, woodlands or open forest (depending on the type of disturbance and the time since last disturbance) composed primarily of local native species. ML 5802 encompasses the primary access road for the contemporary mining. This lease cuts across remnant RE 11.11.7x11.11.21 on the hills and ranges, RE 11.5.9c and RE 11.11.1 on the valley floor and RE 11.3.25c fringing Marlborough Creek. It also crosses non-remnant grassy shrubland formed by the clearing of Lot 2 LI334 by Marlborough Station. Both ML 5781 and ML 5795 encompass areas of this non-remnant pastoral land as well as small portions of RE 11.3.25c (see Figure 8).

MLs 5782, 5769, 5770, 7177 and 7198 (Figure 9) wholly encompass remnant vegetation. The RE's on ML 5792 are RE 11.11.7 (dominant) with a component of RE 11.11.21. ML 5782 is mapped as supporting a complex of REs 11.11.7, 11.3.25c and 11.11.21. However, its position in the landscape indicates that the RE within the lease is wholly 11.11.7. MLs 5769, 5770 and 7198 are mapped as encompassing RE 11.11.7/11.3.25c/11.11.21 and the upper reaches of 11.3.38/11.11.7a/11/3/25c. However, the position of these leases in the serpentine hills suggests that RE11.3.38 is unlikely to be present even though some headwater drainage systems fall within the leases. ML 7197 lies wholly within a complex of REs 11.11.7, 11.3.25c and 11.11.21.

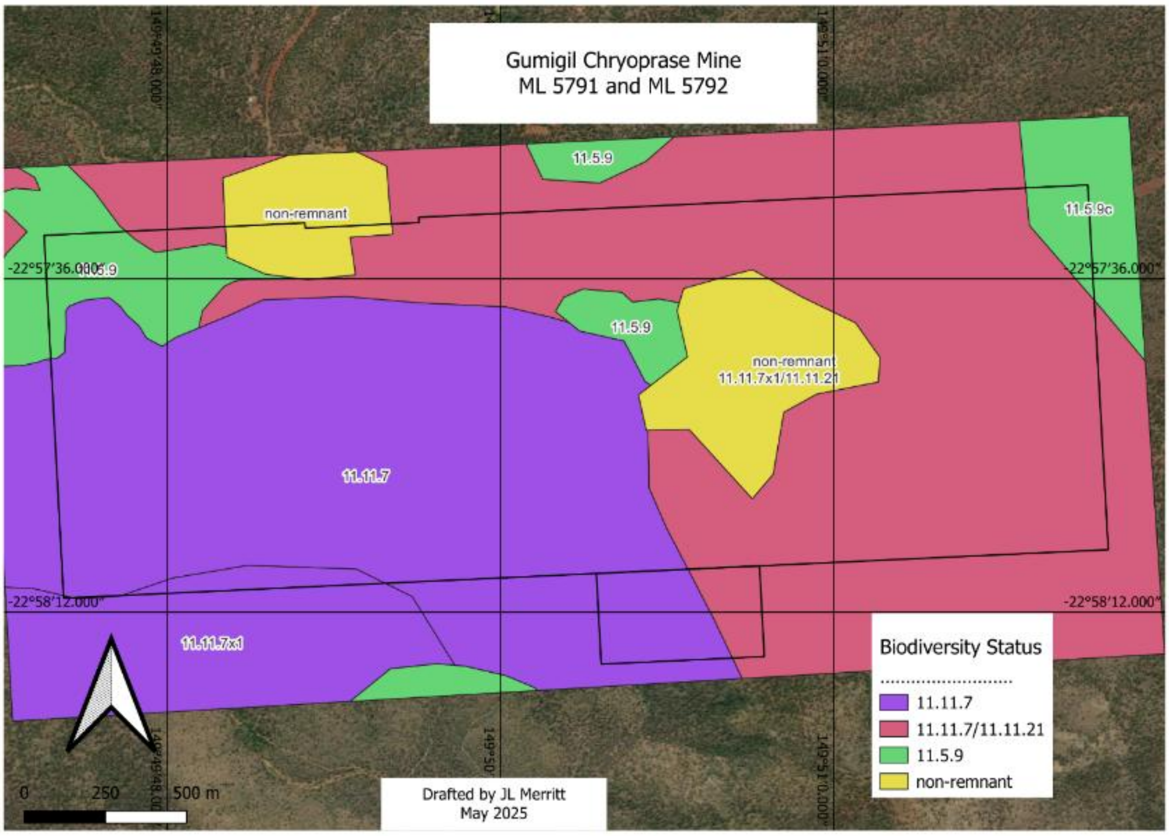

Figure 7: REs on ML5791 and ML 5792

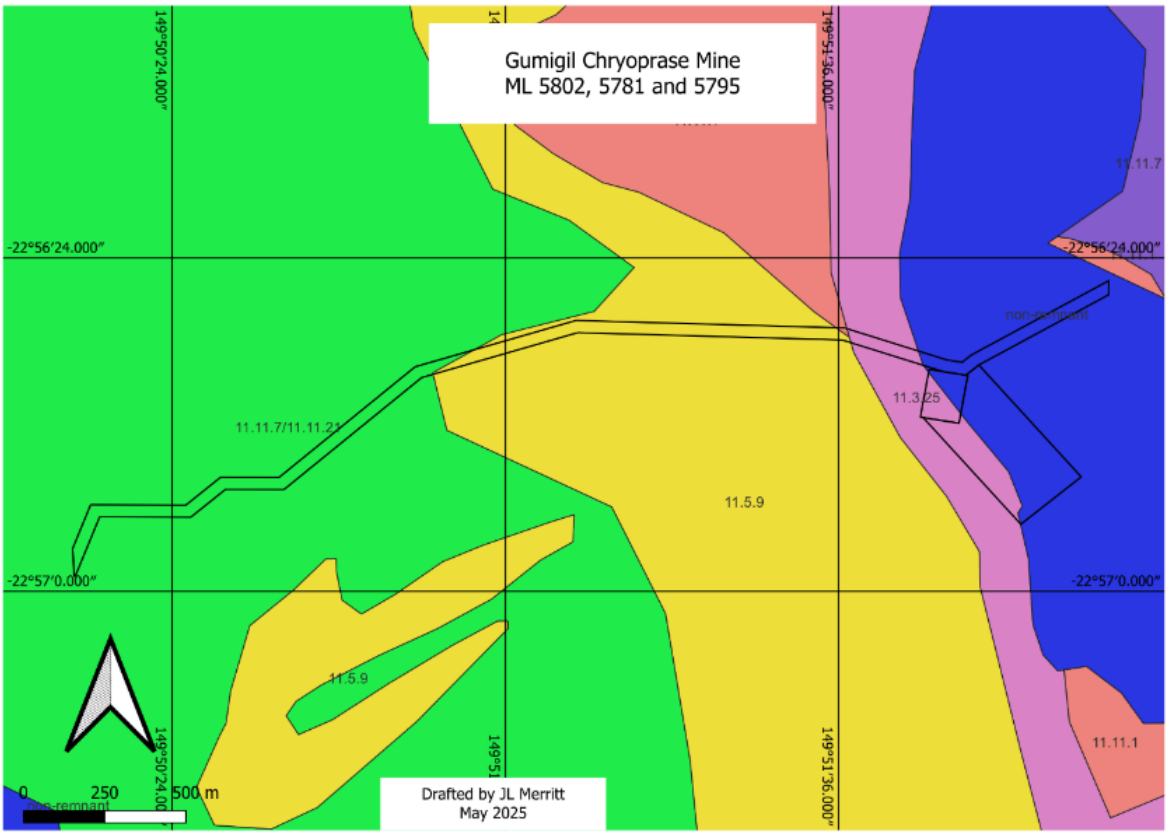

Figure 8: REs on Infrastructure Leases

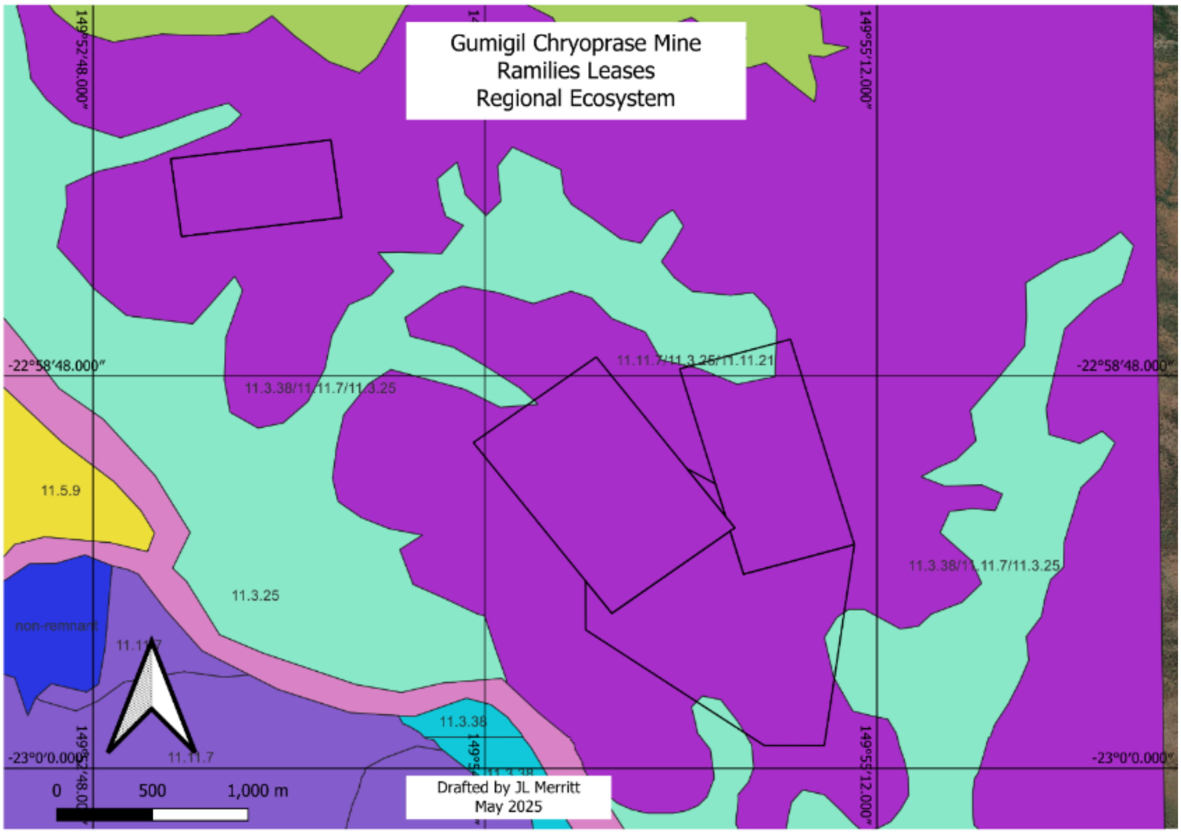

Figure 9: REs on Ramilies MLs

The RE descriptions are described below, with a summary in Table 7:

- **11.3.25c**: *Eucalyptus camaldulensis or E. tereticornis* open forest to woodland. Occurs fringing drainage lines derived from Serpentinite.
- **11.3.38**: *Eucalyptus tereticornis*, *Corymbia tessellaris*, *C. dallachiana* +/- *E. fibrosa* subsp. fibrosa, +/- Melaleuca spp. woodland to open forest. Includes areas dominated by *Melaleuca bracteata l*ow woodland. The grassy ground layer includes *Arundinella nepalensis* and *Themeda triandra*. Occurs on alluvial plains and broad drainage lines overlying magnetite deposits derived from serpentinite.
- **11.5.9c**: *Eucalyptus crebra* +/- *Corymbia intermedia* +/- E. *moluccana* +/- C. *dallachiana* woodland on Cainozoic sand plains and/or remnant surfaces.
- 11.11.1: Eucalyptus crebra +/- Corymbia citriodora, E. melanophloia, C. erythrophloia, C. clarksoniana, E. fibrosa and E. moluccana. Cycas ophiolitica may be present.
- **11.11.7**: Complex of vegetation on serpentinite hills and adjacent undulating colluvial aprons dominated by *Eucalyptus fibrosa* subsp. fibrosa +/- *Corymbia xanthope* +/- *Corymbia spp*. A variable shrub layer includes *Acacia leptostachya*, *Hakea trineura*, *Xanthorrhoea spp*. and Macrozamia serpentina. Occurs on steep mountains, undulating low hills and rises and colluvial aprons formed from Permian ultramafic rocks (serpentinite) including remnant lateritised surfaces in more elevated areas. Associated soils are shallow to moderately deep dark stony clays to clay loams.
- **11.11.7x1**: Eucalyptus fibrosa subsp. fibrosa +/- *Corymbia spp*. tall woodland with rainforest elements in the understorey.
- **11.11.7a**: Eucalyptus fibrosa subsp. fibrosa +/- Corymbia spp. +/- Eucalyptus spp. woodland with a diverse shrub layer including several endemic species. Occurring on undulating low hills and colluvial aprons.
- **11.11.21**: Semi-evergreen vine thicket on serpentinite. Species include Brachychiton rupestris, Gossia bidwillii, Notelaea longifolia, Cupaniopsis wadsworthii, Diospyros spp., Croton insularis, Alyxia ruscifolia, Turraea pubescens, Samadera bidwillii and includes the endemic Neoroepera buxifolia. Occurs on narrow hillcrests, upper slopes, gullies, footslopes and lateritised hills with shallow to moderately deep stony red to brown clay loams and clays formed from moderately weathered or lateritised serpentinite hills and mountains.

Table 7: RE's, their associated vegetation and conservation significance

RE	Short Description	Status	Potential species of significance
11.3.25c	*Eucalyptus camaldulensis* or *E. tereticornis* open forest to woodland. Occurs fringing drainage lines derived from Serpentinite.	Of concern	*Petauroides volans* *Phascolarctus cinereus* *Rheodytes leukops* *Elseya albagula*
11.3.38	*Eucalyptus tereticornis*, *Melaleuca viridiflora*, *Corymbia tessellaris* and *Eucalyptus fibrosa* subsp. *fibrosa* woodland with a grassy ground layer on alluvial plains and broad drainage lines derived from serpentinite	Endangered	*Bursaria reevesii* *Capparis thozetiana* *Hakea trineura* *Stackhousia tryonii* *Pimelia leptospermoides* *Samadera bidwillii*
11.5.9c	*Eucalyptus crebra* +/- *Corymbia intermedia* +/- *E. moluccana* +/- *C. dallachiana* woodland on Cainozoic sand plains and/or remnant surfaces.	Not of concern	*Cycas ophiolitica*
11.11.1	*Eucalyptus crebra* woodland on old sedimentary rocks with varying degrees of metamorphism and folding.	Not of concern	*Cycas ophiolitica*
11.11.7	*Eucalyptus fibrosa* subsp. *fibrosa*, *Corymbia xanthope* woodland on serpentinite	Of concern	*Bursaia reeevesii* *Capparis humistrata* *Capparis thozetiana* *Corymbia xanthope* *Cycas ophiolitica* *Hakea trineura* *Leichhardtia brevifolia* *Lissanthe brevistyla* *Macrozamia serpentina* *Neoroepera buxifolia* *Olearia orientalis* *Pimelia leptospermoides* *Putenaea setulose* *Stackhousia tryonii*
11.11.7x1	11.11.7x1: *Eucalyptus fibrosa* subsp. *fibrosa* +/- *Corymbia* spp. tall woodland with rainforest elements in the understorey.	Of concern	As for 11.11.7
11.11.7a	*Eucalyptus fibrosa* subsp. *fibrosa* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland with a diverse shrub layer including several endemic species. Occurring on undulating low hills and colluvial aprons.	Of concern	As for 11.11.7
11.11.21	Semi-evergreen vine thicket on serpentinite	Endangered	*Neoroepera buxifolia*

When the relationship between each lease and the landform elements over which it lies is considered, the RE attribution and associated vegetation description is more tightly defined. This is summarised in Table 8.

Table 8: Vegetation, landform and conservation significance by ML

(CE, CR critically endangered, E endangered, V vulnerable, OC of concern, NT near threatened, LE local endemic RE regional endemic, SE serpentine endemic, QE Queensland endemic, LDD limited disjunct distribution) * only if water holes are present.

ML No	Landform	Vegetation	RE	Potential significant species
5769	Steep serpentinite mountains, low hills and rises and associated colluvial aprons	*Eucalyptus fibrosa* subsp. *fibrosa/Corymbia* spp shrubby woodland forming open forest in places. Rainforest elements may occur in the midstorey, forming semi-evergreen vine thicket in places.	11.11.7/11.11.7x1/11.11.21 OC/OC/E	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
5770	Steep serpentinite mountains, low hills and rises and associated colluvial aprons	*Eucalyptus fibrosa* subsp. *fibrosa/Corymbia* spp shrubby woodland/open forest. Rainforest elements may occur in the midstorey, forming semi-evergreen vine thicket in places.	11.11.7/11.11.7x1/11.11.21 OC/OC/E	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
5781	Stream fringing Quarternary alluvium	*Eucalyptus tereticornis/Casuarina cunninghamiana* open forest and grassy shrubland.	11.3.25c OC	*Petauroides volans* E *Phascolarctus cinereus* E **Rheodytes leukops* V RE *Elseya alabagula* CE CR
	Low hills or undulating metasediments	*E. crebra* woodland	11.11.1 NoC	*Cycas ophiolitica*
5782	Steep serpentinite mountains, low hills	*Eucalyptus fibrosa* subsp. *fibrosa/Corymbia* spp shrubby woodland forming open forest in places.	11.11.7 OC non-remnant	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
5791	Steep serpentinite mountains, low hills and rises and associated colluvial aprons	*Eucalyptus fibrosa* subsp. *fibrosa/Corymbia* spp shrubby open forest/woodland with rainforest elements in the midstorey forming semi-evergreen vine thicket in places. Also, non-remnant shrublands/woodlands/open forest with *Acacia leptostachya*, *Eucalyptus fibrosa* subsp. *fibrosa* and Corymbia species common.	11.11.7/11.11.7x1/11.11.21 OC/OC/E Non-remnant	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V*

				Macrozamia serpentina E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
5792	Steep serpentinite mountains	*Eucalyptus fibrosa* subsp. *fibrosa*/*Corymbia* spp shrubby open forest with rainforest elements in the midstorey.	11.11.7x1 OC	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
5795	Stream fringing Quarternary alluvium	*Eucalyptus tereticornis*/*Casuarina cunninghamiana* open forest and grassy shrubland.	11.3.25c OC non-remnant	*Petauroides volans* E *Phascolarctus cinereus* E *Rheodytes leukops* V RE *Elseya alabagula* CE CR
5802	Low hills or undulating metasediments	grassy shrubland	non-remnant	
	Low hills or undulating metasediments	*E. crebra* woodland	11.11.1 NoC	*Cycas ophiolitica*
	Stream fringing Quarternary alluvium	*Eucalyptus tereticornis*/*Casuarina cunninghamiana* open forest	11.3.25c OC	*Petauroides volans* E *Phascolarctus cinereus* E *Rheodytes leukops* V RE *Elseya alabagula* CE CR
	Gently inclined lower slope/flat with red earths	*Eucalyptus crebra* shrubby open forest	11.5.9c NC	*Cycas ophiolitica* E RE
	Steep serpentinite mountains, low hills and rises and associated colluvial aprons	*Eucalyptus fibrosa* subsp. *fibrosa*/*Corymbia* spp shrubby open forest	11.11.7 OC	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
7197	Steep serpentinite mountains	*Eucalyptus fibrosa* subsp. *fibrosa*/*Corymbia* spp shrubby open forest with midstorey rainforest elements in places.	11.11.7x1 OC	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE

				Leichhardtia brevifolia QE LDD *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE
7198	Steep serpentinite mountains, low hills and rises and associated colluvial aprons	*Eucalyptus fibrosa* subsp. *fibrosa*/*Corymbia* spp shrubby woodland forming open forest in places. Rainforest elements may occur in the midstorey, forming semi-evergreen vine thicket in places.	11.11.7x1/11.11.21 OC/E	*Bursaia reeevesii* V SE *Capparis humistrata* E RE *Capparis thozetiana* V SE *Corymbia xanthope* V SE *Cycas ophiolitica* E RE *Hakea trineura* V SE *Leichhardtia brevifolia QE LDD* *Lissianthe brevistyla V* *Macrozamia serpentina* E SE *Neoroepera buxifolia* V LE Olearia orientalis E *Pimelia leptospermoides* NT/V SE *Pultenaea setulose* V SE Samadera bidwillii V *Stackhousia tryonii* NT SE

2.7.2. Conservation significance

All the leases contain regional ecosystems of conservation significance as well as the potential for species of conservation (endangered, vulnerable or near threatened) and scientific significance (serpentine, local, regional, or state endemicity). These values are summarised in Table 8. There is a good understanding of the occurrence of plant species of significance in ML's 5791 and 5792, but further work would be required to understand the detailed distribution of such species across these and the other leases. Similarly, there is good knowledge of the significant fauna associated with streams in ML's 5802, 5781 and 5795. Additional surveys would be required to confirm the presence and distribution of important species in the other leases.

2.7.3. Land Zones

Three land zones are represented on the project area. These are land zone 3 (recent Quaternary alluvial systems, land zone 5 (Tertiary-early Quaternary loamy and sandy plains) and land zone 11 (metamorphic rocks).

2.8. Terrestrial Fauna

Section Reference

Augusteyn J, Melzer A. Porter G, Houston W and Clarke J (2002) Terrestrial Vertebrate Fauna of the Serpentinite Communities near Marlborough. Marlborough Serpentine Landscape Management and Conservation Workshop CQU's Centre for Environmental Management.

180 terrestrial vertebrate species were recorded in two 10-day fauna surveys in spring 1997. This included two bird species significance being the squatter pigeon and the cotton pygmy goose. The survey also observed a probable new species (at that time) of gecko, brigalow scaly-foot, the common rock-rat and the spotted quail-thrush.

2.9. Site Hydrology and Fluvial Networks

Section References:

Cox Andrews Engineers (2024) Gumigil Mine Sediment Basins Catchment Rainfall Runoff Modelling. Desktop Assessment ungauged Catchments.

Centre for Land and Water Resource Management "Impact Assessment of the proposed Lagoon Hill Nickel Project on the aquatic environment of Marlborough Creek, Central Qld" EIS 1998

Duivenvoorden LJ, Roberts D and Tucker G (2002) Water Quality and Sediments of the Marlborough Creek System. Marlborough Serpentine Landscape Management and Conservation Workshop CQU's Centre for Environmental Management

Duivenvoorden LJ, Price M, Attard T, Rogers V, Roberts D and Tucker G (2002) Aquatic Flora and Fauna of the Marlborough Creek System. Marlborough Serpentine Landscape Management and Conservation Workshop CQU's Centre for Environmental Management.

Quartz Water Australia Pty Ltd "Surface Water/Groundwater within the Marlborough Nickel Project." Marlborough Nickel Project – Lagoon Hill Nickel NL EIS May 1998

Water Monitoring Information Portal Stream Flow Data – 130009A Marlborough Ck at Slopeaway https://water-monitoring.information.qld.gov.au/

Marlborough Creek (Figure 36) originates in hills north of Marlborough and flows south to join the Fitzroy River, approximately 30 kilometres upstream of Eden Ban. The creek's major tributaries include Spring Creek, Devlin Creek, and Mountain Hut Creek. The tributaries of Marlborough Creek, except for Spring Creek, usually stop running during the dry season. Marlborough Creek is a perennial stream topped up with base flow from the regional groundwater table. Catchment is 67,600ha.

The MLs lie on either side of Marlborough Creek with ML 5791 to the west. Gullies 1, 2,3 and 4 drain to the east into Marlborough Creek whilst Gullies 5, 6 and 7 drain into Devlin Creek, a tributary of Marlborough Creek. Gully 4 (Poacher's Gully) flows into Marlborough Creek 13 kms upstream from the confluence with the Fitzroy River. The Marlborough Creek Gauging Station is located at Coorumburra Road crossing. Gully 4 runs into Marlborough Creek at this location.

The Creek is a reasonably large stream. The width of its bed ranging between 40 to 50 m in the reach through the mining leases, though it widens considerably towards its mouth at the Fitzroy River. It consists mainly of a series of extended pools, some 500 m long, joined by riffle sections, usually not longer than about 20 to 30 m. Generally, the pool sections of the creek exceed 4 m in depth in some reaches and generally 20 to 30 m wide. Riparian vegetation at every site studied was well developed, with *Casuarina* and stream-fringing trees generally about 15 to 25 m high.

Cox Andrew Engineers modelled the 5 catchments (see Figure 37) draining the disturbed area namely gullies 1 and 2 (113ha catchment), gully 3 (29ha), gully 4 (95ha) and gullies 5, 6 and 7 (189ha). No gauging data exists for these streams and data from nearly stations are not relevant. These catchments are small. The model demonstrated that the catchments have infrequent flows and supports onsite experience of shallow and infrequent flows.

Model output is summarised in Figure 38 and Figure 39. There is a 50% chance that runoff will exceed 0.8mm/day and there will be 9 events/annum.

Marlborough Creek Water Quality

Duivenvoorden LJ, Roberts D and Tucker G (2002) stated that the water itself was well oxygenated and had a relatively high conductivity and pH. Chemical analysis of water samples shows that Marlborough Creek in 1998 at the time of the survey was high in conductivity (1,146 to 2,200 µS/cm), pH (8.3 to 9.1) and oxygen, the last indicating a generally healthy condition. The dominant ions were Cl, Mg, Na and Ca. Nutrient concentrations were mostly low. Al, Co, Cu, Mn, Ni and Zn in the steam were naturally high in concentration reflecting the soils of the Serpentinite geology. Metal levels at some sites exceeding ANZECC and ARMCANZ (2000) trigger values for the protection of aquatic systems.

Selected water quality data from the Slopeaway Gauging Station is shown in Table 9.

Table 9: Gauging Station Data

Parameter	Min	Medium	90 Percentile
Conductivity(µS/cm)	230	1,390	1,508
Turbidity (NTU)	0.8	3.0	45.8
pH	6.7	8.4	8.6
TDS (mg/L)	130	753	876
Mg (mg/L)	10	140	174
Al soluble (mg/L)		.0388	
Fe soluble (mg/L)	.01	.01	.64
Nickel	.0061		.015
Zn soluble (mg/L)		.06	

Gumigil sampled Marlborough Creek at the road crossing to the mine on ML (Sample 1) and at the Coorumburra Road crossing (Sample 2) on December 4, 2023. Spring Creek flows into Marlborough Creek between the two sample points. Results are displayed in Table 23 and Table 24 in Section 13. There were no large discrepancies between the water quality at both points. Conductivity was low at 520µS/cm. Aluminium, total Manganese, total and filtered Nickel were the metal well above the LOR. Magnesium dominated the Alkali metals. Water is suitable for livestock drinking water.

Further water sampling is planned for Marlborough Creek to build a better understanding of the Creek water quality especially when base flow dominates the creek's flow. Future sampling will include Spring Creek whose confluence with Marlborough Creek is between the two sampling points. The gauging station records a medium TDS of 753mg/L much higher that the recent sampling conducted by Gumigil.

Water quality of the region is strongly influenced by the high metal concentration of the geology. Water quality does not align with the remainder of the Fitzroy basin.

Aquatic Vegetation

The aquatic vegetation of Marlborough Creek typically consists of a community with relatively few species for an area of permanent water. Many sites in Central Qld with permanent water had over 15 different species, yet sites on Marlborough Creek had only between two to six species. The macroinvertebrate fauna of the Marlborough Creek system was moderately diverse, consisting of between 9 and 40 taxa per site. This is typical of other sites in Central Qld, although comparisons are limited because most of the other sites studied have not included riffle sections. The aquatic flora and fauna of Marlborough Creek, like the terrestrial plants that have adapted to Serpentinite geology, are somewhat tolerant of the high levels of ions and metals, and low nutrients reported for the Marlborough Creek.

2.10. Flooding

The response of Marlborough Creek and sub catchments like Devlin Creek is known to be very fast with rapid rises in water levels and flows, and similarly rapid declines. Typical floods in Marlborough Creek last in the order of days, as distinct from weeks in the Fitzroy River. Anecdotal evidence suggests that Devlin Creek flat has not flooded this century (Marlborough Nickel EIS 1998). The flood line for the 1971 flood in the Fitzroy River is shown in Figure 40.

The Marlborough Creek Monitoring Station adjacent to the Coorumburra Road crossing downstream from the confluence of Gully 4 (-22°58'04.5 149°52'09.5) has recorded 3 significant rainfall events since 2013. Maximum height recorded was 9.854m or RL 50m on 30/03/2017.

The toe of sediment basins on Gully 1, 2 3, and 4 Faces draining the eastern face lie at approximately 200m RL with Marlborough Creek 1 kilometre to the east (see Figure 41). No flooding is likely at RL 150m above a rapidly flowing creek such as Marlborough Creek. Gully 4 sediment basin 4 lies at RL 80m 30m above the highest recorded level in Marlborough Creek. Flooding of the toe of any face is unrealistic and does not require modelling to support this hypothesis.

3. Site Location

The Gumigil Chrysoprase Mine is located 17km south of Marlborough along the Coorumburra Road (see Figure 42). The Mine is 80km northwest of Rockhampton. The area has a rich mining history with the Magnesite Mines to the east with the Chrysoprase Mine surrounded by Nickel Leases.

4. Project Description

4.1. Mining Tenements

Gumigil Chrysoprase mine comprises 10 MLs (Table 10 and Figure 43) in the steep lateritic ridges of the Slopeaway range within the Marlborough Hills and two leases on the flats adjacent to Marlborough Creek.

The MLs lie within and adjacent to other mining tenements predominantly associated with nickel or Chrysoprase resources (see Figure 44). Current mining occurs on ML 5791 with associated roads and infrastructure on ML’s 5795 and 5802. Future mineral resources are held within ML’s 5769, 5770, 5782, 5792, 7197 and 7198. ML 5781 contains infrastructure.

Table 10: Lease Details

Mining Leases	Name	Granted	Area (ha)	Purpose
5769	Currawong 3	1974	97.12	Mining
5770	Currawong 4	1984	72.75	Mining
5781	-	1974		Living Quarters
5782	Mountain Magpie	1974	37.39	Mining
5791	-	1974	389.21	Mining
5792	-	1987	15.18	Mining
5795	-	1974	10.72	Transport
5802	-	1974	14.60	Transport
7197	Currawong 2	1992	1.16	Mining
7198	Currawong 1	1992	101.30	Mining

4.2. Underlying landholders

Table 11, Figure 45 and Figure 46 lists the Lot/Plan, Tenure, Property Name, and landholder for the 2 underlying properties and landholder. Gumigil has compensation agreements with the background landholder meaning that the land will be returned to the ownership of the landholder at lease relinquishment. *Marlborough Station* owner is independent of Gumigil. *Ramillies* is owned by a party connected with the ownership of Gumigil Pty Ltd. No mining is planned soon of the Currawong Leases.

Table 11: Underlying Landholders

ML	Lot Plan	Tenure	Property Name	Landholder
5769	Lot 3 USL42122	Term Lease	*Ramillies*	Chak Sun Cheung
5770	Lot 4 USL42122	Pastoral Holding	*Marlborough Stn*	Max Baldwin
5781	Lot 2 LI334	Pastoral Holding	*Marlborough Stn*	Max Baldwin
5782	Lot 2 LI334	Pastoral Holding	*Marlborough Stn*	Max Baldwin
5791	Lot 2 LI334	Pastoral Holding	*Marlborough Stn*	Max Baldwin
5792	Lot 2 LI334	Pastoral Holding	*Marlborough Stn*	Max Baldwin
5795	Lot 2 LI334	Pastoral Holding	Marlborough Stn	Max Baldwin
5802	Lot 2 LI334	Pastoral Holding	*Marlborough Stn*	Max Baldwin
7197	Lot 1 LI318	Term Lease	*Ramillies*	Chak Sun Cheung
7198	Lot 1 LI318	Term Lease	*Ramillies*	Chak Sun Cheung

4.3. Pre-mining land use

Marlborough Station and *Ramillies* are grazing properties running breeders on the creek flats and selling progeny as weaners or removing the weaners from the property to grow out on properties elsewhere. The leases are held on mountainous areas of the property which would be rarely grazed due to the low-quality pasture, steep terrain and presence of poisonous plants. The exclusion of the MLs from the two properties does not change the carrying capacity of the property as the cattle graze the creek flats.

4.4. Activities on the EA

The mine is currently under care and maintenance. Grading equipment remains on site. The site retains a manager and a part time operator. The manager and the operator conduct routine monitoring on site. Contractors are engaged to maintain access to the mine and to the gullies for monitoring and maintenance of the sediment structures.

The Environmental Authority (EA) endorses the Environmentally Relevant Activity Schedule 3 20(a): Clay pit mining, dimension stone or mining gemstones of 5,000t to 100,000t in a year.

4.5. Primary Mine Features and Infrastructure

Infrastructure on ML 5781 and ML 5795 are the core sheds and care-taker's cottage. The access to the mining area is covered by ML 5802 up to the northern end of Qld Nickel's ML 5780. Access through the Qld Nickel lease is by mutual agreement. Mining has only occurred on ML 5791. The two main mining areas are the Eastern Cut and the Western Cut plus other minor disturbed areas. There are two areas of infrastructure on ML5791 being sheds used for equipment maintenance and storage of equipment. Disturbed areas of the Eastern Cut and Western Cut are classified as Tops, Pit Walls, Faces and Sediment/sediment basin walls on the gullies downstream of the mined area.

4.6. Type of Mining Operation

The mine is an open cut mine.

4.7. History of Mining

Capricorn Mineral Development Company mined the Western Cut and conducted exploration on the Eastern Cut from 1950 to the middle of the 1960s. Mining started at the top of the mountain with the waste dozed off the target area over the edge of the slope. The waste flowed down the ~ 33% hill slopes. The Tops were essentially flat. Sediment eroded from the exposed angle of repose slopes and mined Tops into the streams below. No rehabilitation was undertaken.

VAM Ltd operated the mine on the Eastern Cut from the middle of the 1960s to 1976 when the company went bankrupt. The mining method remained unchanged, and sediment continued to flow into the streams below. No rehabilitation was undertaken by VAM.

The current owners, Gumigil Pty Ltd acquired the MLs in 1977. Mining commenced in the Eastern Cut in 1982. Further extensions were created to the existing pit from the previous operations. Waste was pushed onto the Faces in gullies 1, 3 and 4. As mining reduced the bench height from RL 370 metres down to RL 290 metres too much prospective land was being sterilised by the waste. To properly utilise the resource, a larger cut was developed, commencing in 1988 at RL375 and with waste pushed into Gully 5 and Gully 2.

Figure 47 shows the location of the three benches in the Eastern Cut. Work progressed on bench number 1 with RL320 level being reached in 1994 when a rock bar at RL 250, which had retained a large portion of the waste in the Gully 5 angle of repose dump, shifted and allowed bulk movement of the stacked waste downstream into gully 5. Due to safety concerns, this dump had to be abandoned until the waste had restabilised.

Last mining was conducted in 2005.

Mining Method 1991 - 2005

A spotter visually detects the Chrysoprase as the waste is ripped and dozed aside in 200-mm passes. The waste is dozed off the bench onto the angle of repose slope. A marker bucket containing a sample of the gemstone is left and the stripping operation moves to another area. The area immediately around the marker bucket is excavated by a backhoe into a tipping truck and transported to the ROM. The material is fed over 150 mm grizzly into a hopper for screening out material over 11 millimetres and then hand sorted.

The oversize and less than 11 mm reject are stockpiled on bench No 1 for further sorting later. This stockpile remains with sorting planned as the first step when mining recommences.

Sediment Controls

In 1987, Gumigil trailed various options for removing sediment from the drainage lines leaving the lease areas affected by mine disturbance. Sediment fences proved ineffective and costly to maintain. Initially sediment fences were installed which were progressively raised when the lower fence was filled. A sediment basin was built in Gully 5 in 1988 to retain sediment as this gully was intended to be the primary dump area at the time.

In 1997 single sediment basins were installed in Gullies 2, 3 and 4. These sediment basins along with Gully 5 managed the runoff from the Eastern Cut mining area.

Extract from Incident Report

On the 18th of February 1999, isolated storms were active in the vicinity of the Eastern Cut. Three bulldozers were pushing overburden on Bench 3 into gullies 2 and 3. Bench 2 had a small bund wall on its crest and the shape of bench 3 was level with only loose material forming a bund along the crest of Slopes 2 and 3.

At approximately 1300hrs, a localised storm formed over the Eastern Cut. The rain was described as torrential. Work ceased and the Operators moved machinery to a place of safety and moved to the light vehicles on Bench 1. Water was seen to be entering Bench 1 from the access road and overtopping the bund along the crest of Bench 1 and then entering Bench 2. The workforce drove to the workshop area with rain continuing to fall heavily for around one hour with an excess of 130mm measured in this time. The workers left the site and drove out of the storm in a short distance (under 1km). There were no further storms in the area. Marlborough Creek was at a low flow state.

When the workforce returned to the site the next day, they observed that the bunds on Bench 1, 2 and on the crest of Slope 3 had been breached and a considerable quantity of sediment had been mobilised. At this time Gully 3 had one sediment basin. The initial rush of the mudslide had blocked the by-wash and the flow off the mountain breached the wall allowing fine (<5mm) sediment to continue to flow down Gully 3 into Gully 4 then flow into the waterhole in Marlborough Creek directly above Coorumburra Road crossing.

Work began immediately on repairing the breach in the sediment trap in Gully 3, repositioning the by-wash and preparing to construct further sediment basins. On the 23rd of February three officers from the Rockhampton EPA visited the site to inspect the site and discuss actions to be taken to remediate the site. It was estimated that the waterhole in Marlborough Creek contained 70BCM of sediment. Further silt was along the side of the creek. Management and EPA agreed on a plan to pump the sediment out to a ring tank constructed 100m off the creek. Silt was scooped up and returned to the mine whilst mobile sediment was pumped to the ring tank. The operation was completed in three days. The sediment drained freely through the floor of the ring tank. On compaction, the sediment was capped with topsoil and seeded. Bunds on the 3 benches were upgraded with earthworks *where practical to divert flow off the Tops over natural ground as opposed running down the angle of repose Faces.*

Further sediment basins were built on gully 1, gully 2, gully 3 and gully 4 commencing 1999 to 2002 with further basins constructed at the toe of the slopes in gullies 5,6 and 7 in 2003. Basins were constructed with downstream walls at 4:1 (Figure 10) and upstream walls at 3:1 with a 5m wide berm on top out of the local material. Basins were constructed with a small dozer with the by-wash constructed in natural material on one side of the wall (see Figure 11). No further incidents of large quantities of sediment being captured in sediment basins have been recorded since 1999 or failure of the drainage system on either Western Tops or Eastern Tops have been reported. It is likely that the site may have received isolated falls >100mm/day since 1999 as Marlborough Helipad regularly receive daily falls exceeding 100mm/day (see Table 4). The nearby Marlborough Creek monitoring station recorded 169mm on 31/3/2025. This is the first recorded time sediment basin 4 on gully 4 has by-washed since construction in 1999. Inspections after the event have not identified any observable erosion with all sediment basins functioning as planned. Minor maintenance will be required on sediment basin 3 and 4 on gully 4.

Figure 10: Downstream Wall Dam 2 – November 2022

Figure 11: Bywash Dam 3 – November 2022

4.8. Current Status of Mine

The mine was placed on care and maintenance in 2006. The mine continues in care and maintenance to this day as the stockpile of Chrysoprase remains sufficient to supply the market for the foreseeable future.

Mining ceased in the Eastern Cut in 2005 and in the Western Cut in 1991. Natural regeneration of the Eastern Cut is at least 17 years old with areas of regeneration in the Western Cut now exceeding 50-year-old.

ML 5791 is the only lease where mining has been undertaken by the current lease holder. There are areas of disturbance due to exploration and the need for access outside the delineated area of Western and Eastern Cut. This disturbance has been left to naturally regenerate for at least the last 20 years. Mining and exploration occurred in the area prior to the grant of the current mining leases.

4.9. Current Landform

The landform of the Western Cut and the Eastern Cut is the profile left from the mining of Chrysoprase from 1950 to 1991 (Western Cut) and Eastern Cut (mid 1960s to 2005).

Figure 12 is a schematic cross section of the mined mountain showing domains or disturbance types.

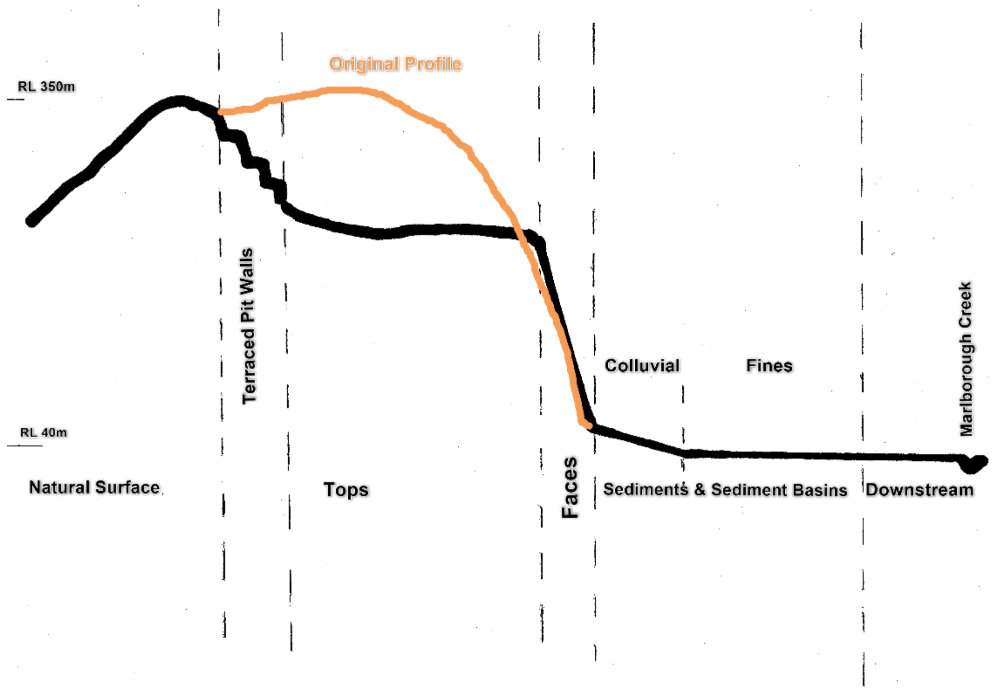

Figure 12: Typical Cross Section of Landform

The mined landform contours are consistent with the surrounding natural landscape (see Figure 3). The landscape within which the mine is located consists of high, steep ridges. Upper slopes on which the mining occurs are very steep and precipitous in places. Long, moderately steep colluvial slopes descend to the valley floor to gentler aprons of finer sediment grading to coarse and then relatively fine alluvia on the valley floor. Monitoring to date demonstrates that the mined landform has stabilised and blends in with the surrounding landscape.

The low vegetation cover of the Eastern Cut on the upper slopes exposes the soil making the mine visible in the local area (~50km). Local graziers utilise the mine visibility to orientate themselves when "off the beaten track" on their properties. The mine visibility in the local district has not been raised negatively during community consultation.

4.10. Domains

The disturbance domains of the mining area are:

- Tops with slopes less than 25%;
- Pit Walls;
- Faces with slopes greater than 25%; and
- Sediment/sediment basin walls in gullies draining the mining area.

Exploration pits, Industrial areas and access tracks are a separate domain.

4.10.1. Tops

Tops are the base of mining on the tops of the mountains. The Western Cut Tops have revegetated and are not listed in the EA. Tops in the Eastern Cut are reserved for mining.

Reserves remain in areas in the Tops in the Eastern Cut where the base of the laterite has not been reached e.g. bench 1. Tops could be left as benches at different RLs. Benches have slopes less than 25%. In the Eastern Cut, there are three benches (see Figure 47).

After mining and reshaping, the topography of Tops is undulating with low rises, depressions principally for the management of runoff, and flat or gently sloping benches. Due to the low slope angles, the Tops have naturally regenerated rapidly. As the Tops are accessible, selected areas having been rehabilitated, planted with tube stock or over sown with seed from listed and serpentine endemic species collected on the lease area.

4.10.2. Pit Walls

Terraced Pit Walls in the Eastern Cut mined landform are on the hillside edge of the area selected for mining and between bench 1 and 2. The walls have 6 metres benches and batters 10m deep with a slope of 1v:2.8H. The pit wall is left on the edge of a mining block as the pit progressively deepens. Some benches have been sheeted with loose overburden when accessible from the mining face e.g. upper benches on pit wall above bench 1. Terraced pit walls were left in the late 1970s above bench 2 in the Eastern Cut. Certain areas of Pit Walls are within the footprint of the future mining area and will be mined through to access the reserves to the north. The edge of the future mining area will be terraced and left as Pit Walls.

4.10.3. Faces

Mine waste was pushed over the side of the mountain to expose the Chrysoprase in the Tops. This waste draped over the steep side of the mountain is the Face domain. The mountain side above each gully was most accessible slope over which to push the overburden. Hence the Faces are named after the downstream gully e.g. gully 1 Face. Faces are inaccessible for man or machine preventing any manual rehabilitation or on-ground monitoring. Faces rely solely on natural regeneration. Gully 7a and 7b Face have regenerated to a stage where there is limited visibility of the overburden. The Faces support scattered native trees, shrubs and herbaceous tussocks. On the oldest face this natural revegetation has evolved to form shrubby very open woodlands (Gully 6) to shrubby open forest (Gully 7a).

The Faces are no steeper than the surrounding stable natural slopes. This is demonstrated in Figure 3.

The Eastern Cut bench 1 has the upper section of the waste dump on gully 1 reshaped to 25-33% (see Figure 48). This area is included in this domain.

4.10.4. Sediment/Sediment Basin Walls

Deposition of sediment at the toe of the Faces is a natural process mimicking the toe of surrounding slopes with a steeper colluvial slope (see Figure 13) initially in the gully followed by finer sediment on the lower slopes. All 7 gullies have sediment basins downstream of the Face. Where stable sediment layers are established, free from intermittent, short duration flows, natural regeneration of native trees and shrubs occurs rapidly (see Figure 13).

The incident in 1999 deposited silt along the entire length of Gully 3 and Gully 4. Silt deposits have revegetated blending into the surrounding vegetation. The natural regeneration of the sediment on the Western Cut has been assisted in limited areas with the planting of tube stock and introduction of seed of listed and serpentine endemic vegetation species when the opportunity arises.

Figure 13: Active Colluvial Apron – November 2022

Figure 14: Revegetated Colluvial Apron - Western Cut – November 2022

4.10.5. Exploration Pits, Maintenance & Infrastructure Areas, Tracks

The disturbance domain outside of the mining area consists of the following disturbance:

- Infrastructure - This area includes 2 maintenance areas including sheds located near the Eastern Cut and a storage shed and care takers quarters located on the entrance road; and
- Roads/Tracks accessing the mining areas.

No exploration pits are listed. The limited exploration drilling was conducted by the Mines Department. Gumigil is planning to return tracks to the background landholder. As this point in time, no agreements with the landholder are in place.

4.11. Final Landform

To demonstrate compliance with PRCP guidelines, the disturbance is divided into four Rehabilitation Areas (RAs) and two Non-Use Management Areas (IAs).

1. RA1 covers the Western Cut Tops and Sediment/sediment basin walls;
2. RA2 covers the Tops in the future mining area in the Eastern Cut;
3. RA3 is the non-mining disturbance footprint on the MLs. The non mining footprint is the industrial areas, roads and tracks and the accommodation and storage facilities on ML 5781, 5795 and 5802;
4. RA4 covers the Eastern Cut downstream Sediment/sediment basin walls;
5. IA1 covers the Western Cut and Eastern Cut Faces; and
6. IA2 covers the Eastern Cut Pit Walls.

Rehabilitation Area 1 (Figure 15)

RA1 is stable with the disturbance naturally revegetated as mining ceased in 1991. In select areas of sediment, the natural revegetation has been facilitated by the distribution of seed or fruiting propagules of listed and serpentine endemic species.

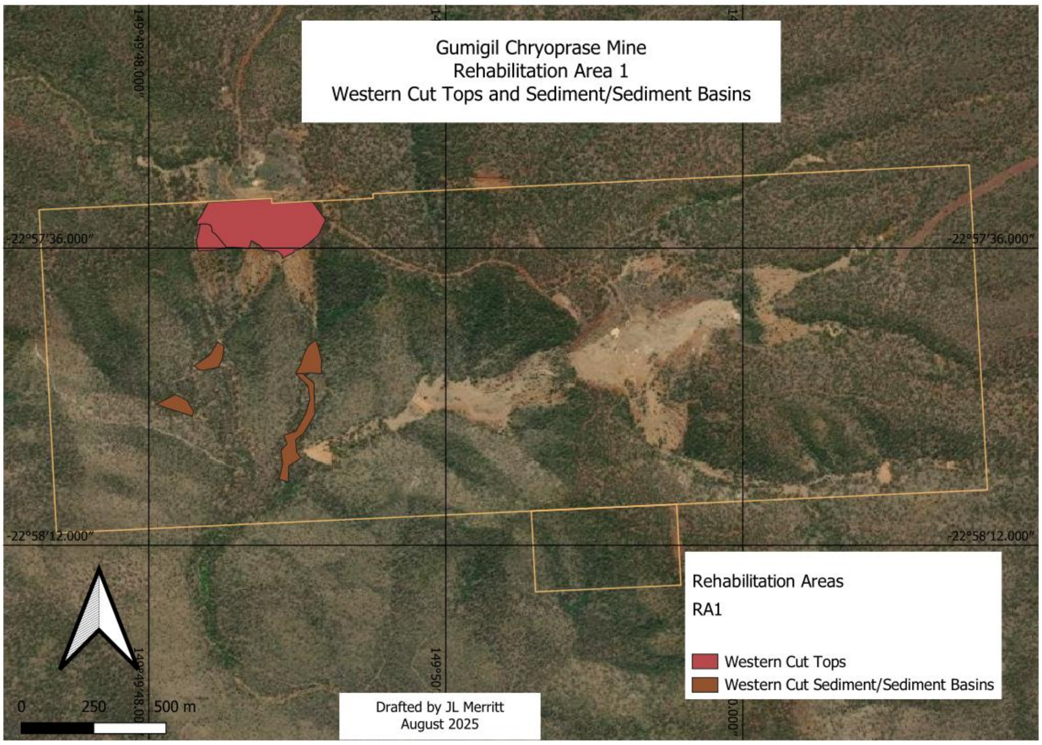

Figure 15: RA1

Rehabilitation Area 2 (Figure 16)

RA 2 covers the Tops within the future mining. This area includes the current area of Eastern Cut Tops and the planned area of mining to the north. Mining may commence in 2033 and continue in campaigns for 100 years. Tops and Terraced Pit Walls will be rehabilitated in two tranches. Benches 2 and 3 will be backfilled in the initial stages of future mining. The backfilled benches will be the initial area of rehabilitation. Mining of the remainder of the area plans to deposit spoil within the footprint.

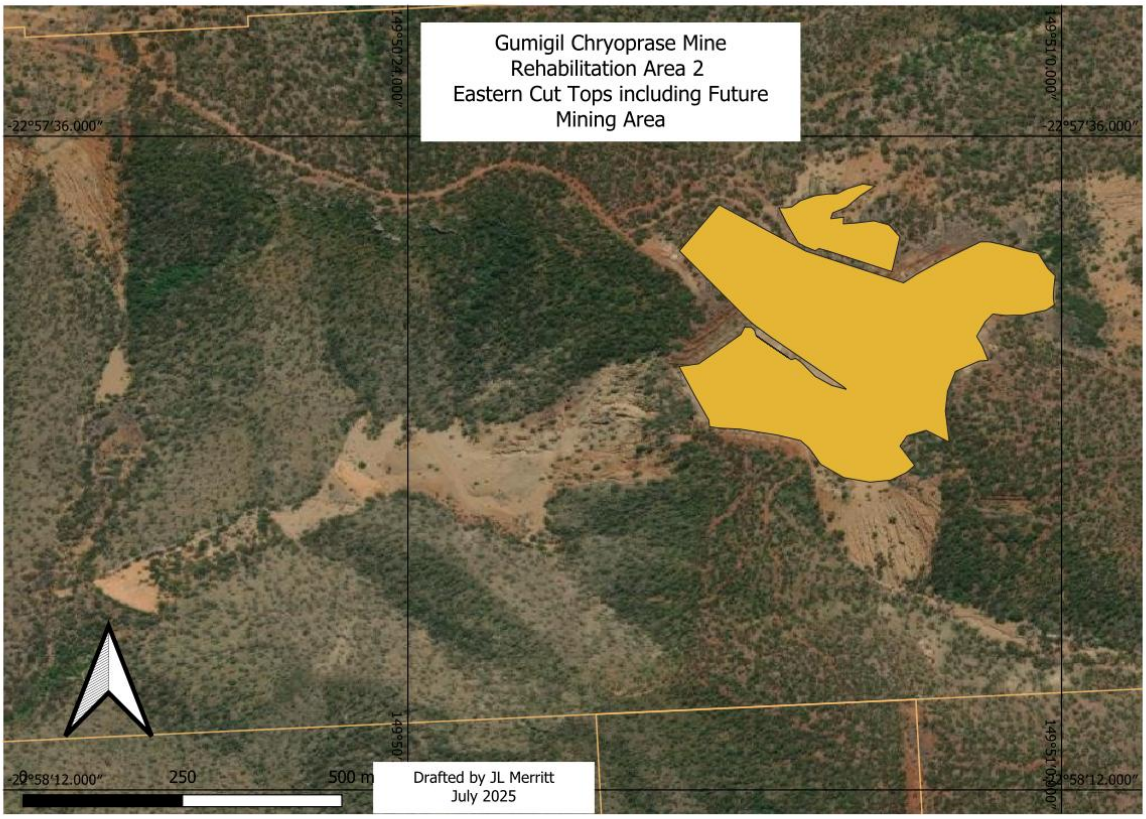

Figure 16: RA 2

Rehabilitation Area 3 (Figure 17)

Infrastructure on leases 5781 and 5795 are being progressively decommissioned and the area rehabilitated. Rehabilitation of the remainder of ancillary structures and tracks will commence at the cessation of mining.

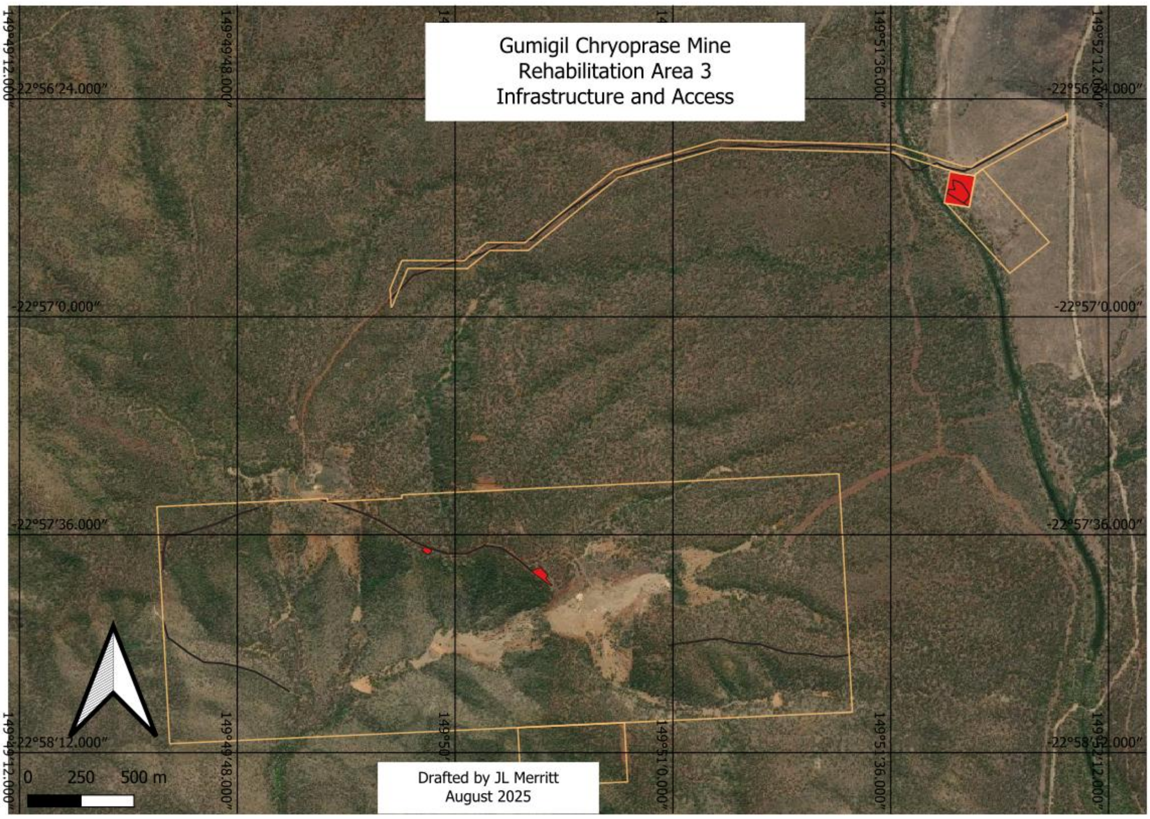

Figure 17: RA3

Rehabilitation Area 4 (Figure 18)

Mining ceased in the Eastern Cut in 2005. The sediment above sediment basin 1 in gully 5 is targeted for further seeding. Stem counts in plots on this bare area were conducted in April 2024. Poaceae stems counts average 2.4 stems/m^2 with the presence of Casuarina, Acacia, Hardenbergia and Eucalypts/ Corymbia species. All sediment basins will be required to be decommissioned and the disturbance rehabilitated. The immediate priority will be to decommission sediment basin 1 and 2 in gully 4 as these basins are full of sediment with head cuts through the wall and sediment.

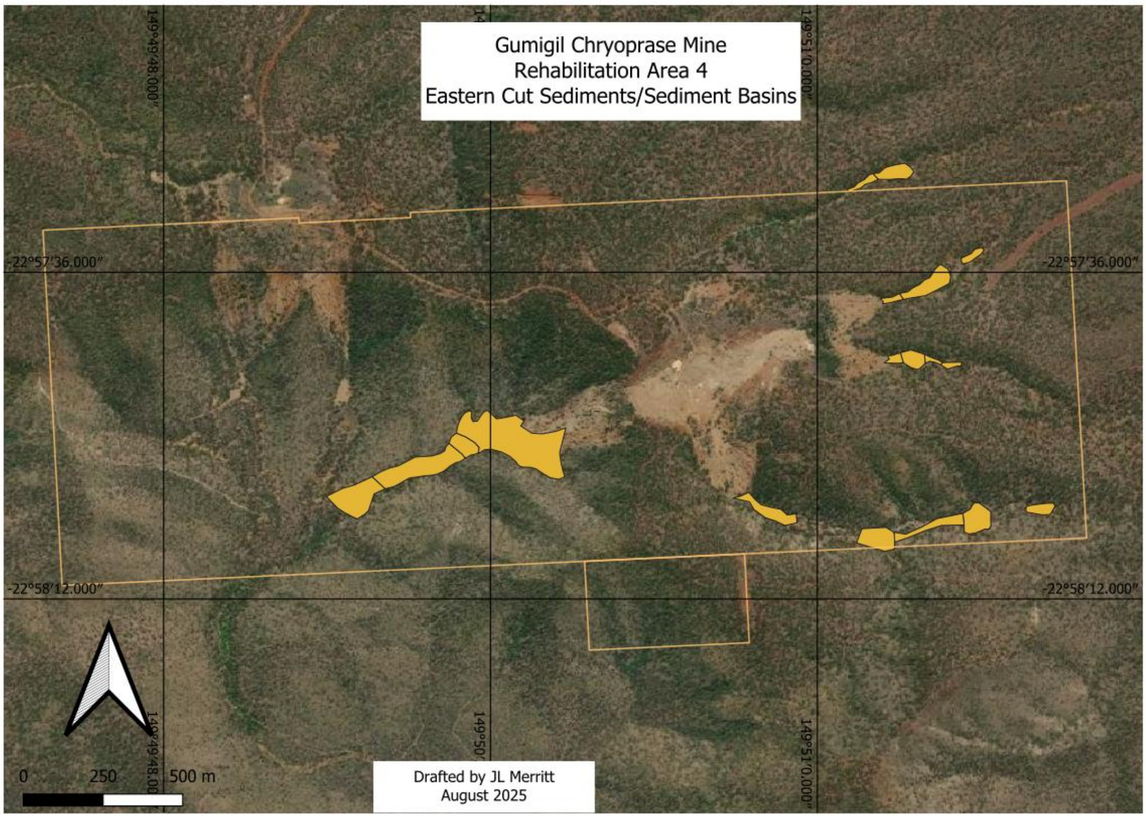

Figure 18: RA4

Improvement Area 1 (Figure 19)

Western Cut Faces are gully 6 and gully 7 whilst the Eastern Cut Faces are gully 1, gully 2, gully 3 and gully 4 Face on the east and gully 5 to the west. The Western Cut Faces have progressively revegetated with time. As the Faces are inaccessible to man, the area will be monitored remotely.

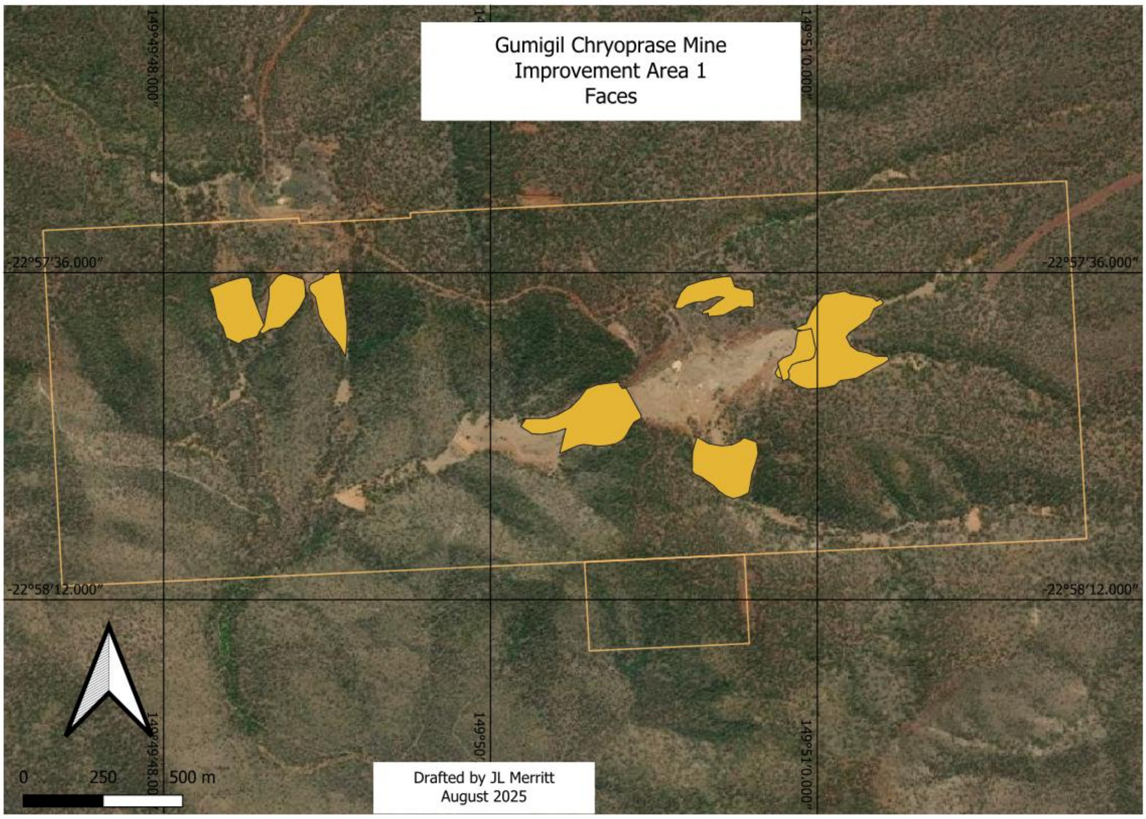

Figure 19: IA1

Improvement Area 2 (Figure 20)

IA2 comprises the existing pit walls that are not in the future mining footprint and the pit wall surrounding the future mining area. Benches on the current pit walls have revegetated with the presence of listed species of conservation significance. The sheer rock batters remain bare of vegetation.

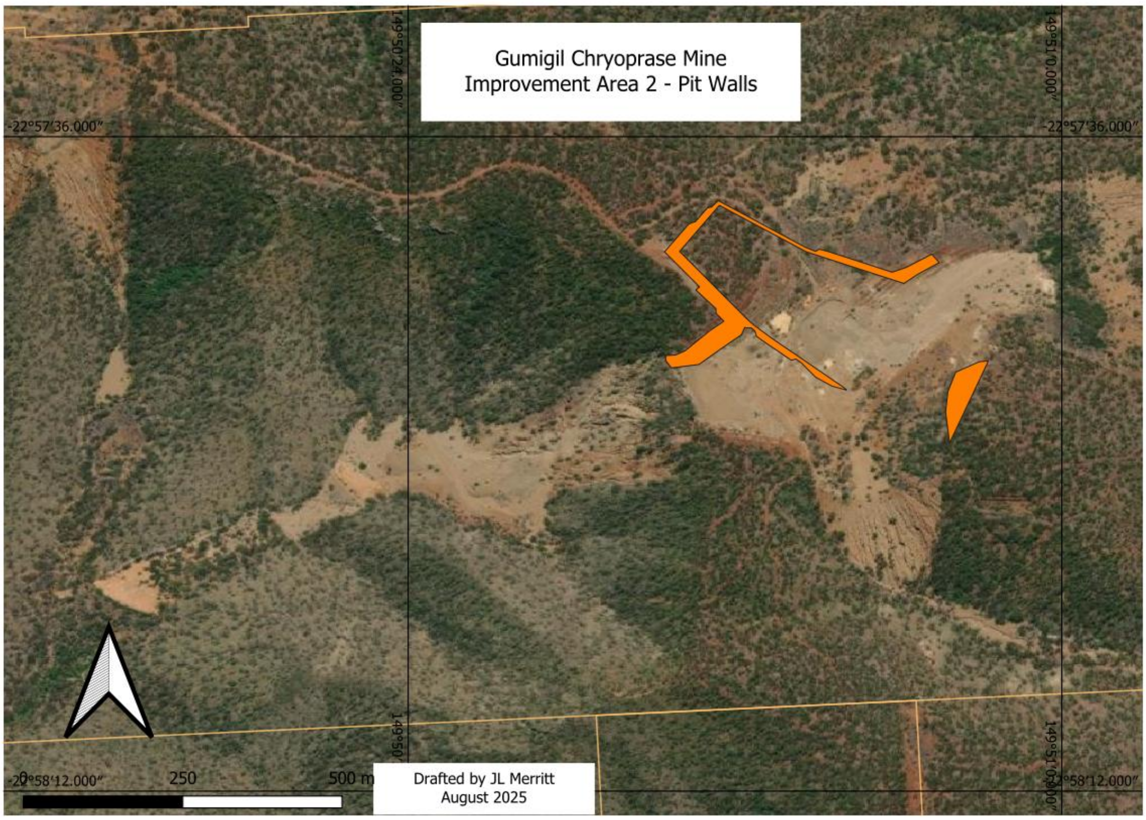

Figure 20: IA2

4.12. Revegetation Success

Revegetation of the Western Cut since the mid-1960s and the Eastern Cut since 2005 has been a combination of natural revegetation and man's intervention in this natural process. Appendix A contains examples of this revegetation success across all domains.

The intervention has ranged from the introduction of fruiting bodies of listed and serpentine endemic species through to full rehabilitation trials. Trails on selected areas of Tops have seen the implementation of a methodology from the establishment of a landform, amelioration and seeding. This methodology is adopted in the rehabilitation milestones.

4.12.1. Trials

In 1987, Gumigil commenced rehabilitation trials on selected areas of the domains of Tops and Sediment/Sediment Basins (Gullies 6 and 7) in the Western Cut mainly restricted to reshaping some lower slopes and ripping and seeding benches where access was possible. Tube stock was also planted. When the opportunity arose for collection of seed of the local listed and serpentine endemic species, this seed was distributed on both domains. This work continued into the mid-1990s.

The natural revegetation on the Western Cut has had two bushfire events in 2003 and 2016 since the mid-1990s demonstrating resilience akin to the surrounding natural vegetation. The resultant landform has endemics volunteering in the rehabilitated area. No reshaping or rehabilitation was conducted on gully 6 or gully 7 Face. Following the construction of the sediment basins on gullies 1 to 4 in 1999 to 2002, select walls of the sediment basins were planted with tube stock grown onsite from locally collected seed (see Figure 10).

In 2002 and 2003 Gumigil in co-operation with the Qld Herbarium (George Batinoff principally) experimented with the establishment of listed and serpentine endemic species in the rehabilitation and to determine fertiliser rates. Gullies 6 and 7 sediment basin walls were planted initially with all ongoing revegetation using the techniques developed at this time.

In 2002, bench 1 on the eastern side of the Eastern Cut (Figure 21) was pushed until the upper reshaped slope achieved a slope of 33 %. The toe of the slope remains at angle of repose. A cross section of the area demonstrates that impact of continuing the 33% slope to the toe (see Figure 48). The 33% slope would extend further down the colluvial slopes at the toe of the existing slope covering an area of natural vegetation. The 33% face would not be consistent with the surrounding natural vegetation. The increased length of slope would increase the runoff and risk of sheet and gully erosion. The reshaped slope was contour ripped, seeded and hay mulched. Hay mulch was crimped into the slope using the dozer tracks. Tube stock was grown from local seed sources and propagated by Gumigil. The area has high density tree cover and endemic grasses, and understory are volunteering the same as the Western Cut. These trials were inspected in the monitoring program in 2023/2024.

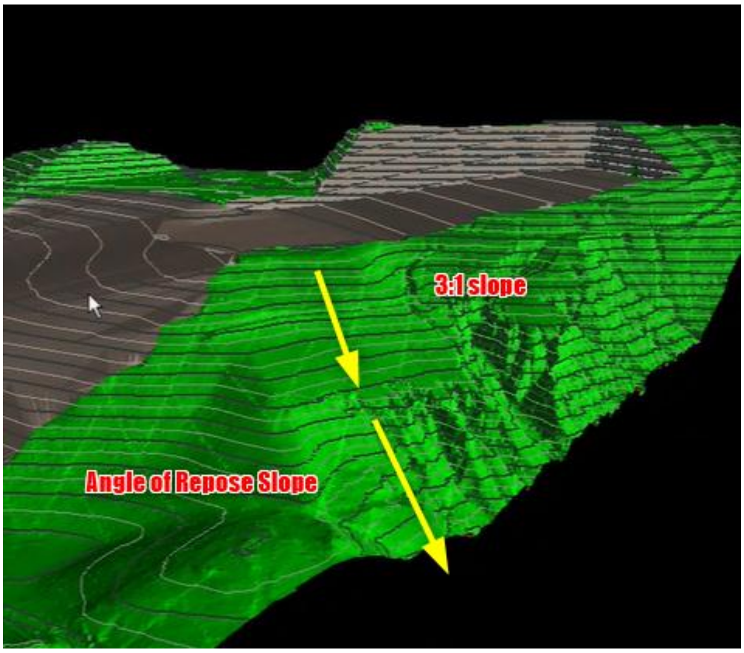

Figure 21: Reshaped Upper Slope

In 2003, a fertilizer trial applied lime and a balanced NPK fertilizer. The aim of this trial was to ensure availability of these nutrients, which are generally locked up by the magnesium rich ultra mafics host rock and not available for plant growth. This trail was done in conjunction with the Queensland Herbarium. Graphic presentation of results is shown in Figure 22. Given the significant improvement in initial dry matter, application of lime at

500kg/ ha and a general NPK fertilizer at 350kg ha has been included in the rehabilitation technique for any future rehabilitation. The benefit of the lime application is to add Calcium to the profile, not to change the pH of the soil. Trials have demonstrated that only one application of lime and fertiliser is required for establishment of vegetation. Inspection of these trials was included in the monitoring program in 2023/24.

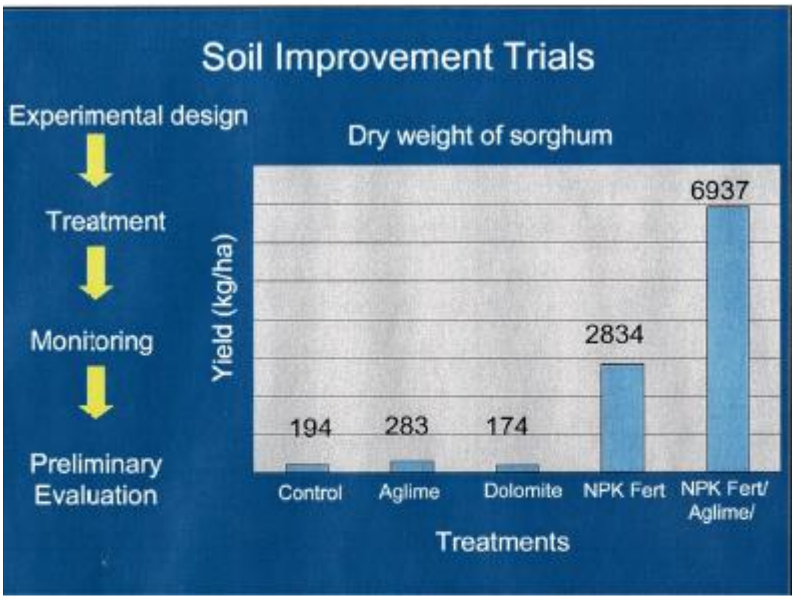

Figure 22: Results Fertilizer and Lime Trails

4.12.2. Tops

Tops have regenerated rapidly being the first domain to show satisfactory cover levels. Figure 23 taken in the Western Cut Tops is typical of the successful natural regeneration of the domain.

Figure 23: Revegetation of Western Cut Tops – November 2022

The rehabilitation methodology for Tops for the period 2000-2005 involved the following steps:

- Construct desired landform;
- Lime @ 500kg/ha and a general NPK fertilizer @ 350kg/ha applied;
- Area hay mulched with pasture round bales from the local area (5-10mm depth);
- Endemic tree and shrub seed mainly Acacia species from the local area spread at a rate of 2 kg/ha; and
- The area track rolled with a dozer.

4.12.3. Terraced Pit Walls

Terraced Pit Walls have maintained geotechnical stability over time. The upper terraces on the pit wall on bench 1 (Figure 24) were covered with a layer of overburden to promote vegetation growth. This action occurred in the early 1990's when the terraces were accessible from the mining face. Isolated native tussocks can be observed on the vertical batters and low open woodlands growing on the terraces.

Figure 24:Terraced Pit Wall on bench 1 – July 2022

4.12.4. Faces

Revegetation of the inaccessible Faces is making slower progress than other domains. On these angle-of-repose slopes, the development of a final vegetation cover is dependent on the formation of stable landforms. This has largely been completed in Gully 7a where rates of erosion appear minimal and vegetation cover has taken the form of shrubby open woodland/forest dominated by *Eucalyptus fibrosa* and *Corymbia xanthope*. This assemblage includes species of significance including *C. xanthope* (vulnerable, serpentine endemic), *Olaeria orientalis* (endangered, serpentine endemic), and *Pimelia leptospermoises* (serpentine endemic). There is no evidence of significant sediment transport from Gully 7a. Revegetation in Gully 7a and Gully 6 is advanced with cover forming shrubby very open woodlands and open woodlands dominated by *E. fibrosa* and *C. xanthope*. Downstream transport of materials is minimal, and the underlying parent material is exposed in many places indicating that the reserves of fines for downstream transport has been largely exhausted. Site inspection following the April 2025 rain event has revealed no significant erosion on the Faces nor deposition of erosion in the sediment basin.

4.12.5. Sediment and Sediment Basin Walls

Sediment deposited prior to the establishment of the sediment basins in the 1990s has revegetated in all gullies. The colluvial flans in gully 6 and 7 (Western Cut) have revegetated with these areas containing plants of conservation significance (see Figure 14). Deposited sediment that is not annually inundated has been colonised by natural regeneration.

4.12.6. Exploration Pits, Maintenance & Infrastructure Areas, Tracks

Figure 25 shows the decommissioned fuel storage area and is an example of an industrial area that has naturally revegetated.

Figure 25: Fuel Storage Area – April 2023

4.12.7. Plants of Conservation Significance

Monitoring has identified significant elements of the pre-mining conservation values. Of the sites monitored as of September 2023, four of the five studied had achieved a composition and structure analogous to the *of concern* RE11.11.7 and supported at least two plant species of conservation significance i.e. listed and endemic serpentine species.

Ten species of conservation significance have been identified within the analogue sites and the rehabilitation sites as of September 2023. Between three to seven listed and endemic serpentine species were identified among the analogue sites and nought to four among the rehabilitation sites. Exotic species richness among the studied rehabilitation sites is generally low (0-14%) and only slightly higher than in the analogue sites (0-6%).

4.13. Proposed Duration of Operation

Mining is planned at the Eastern Cut in the next 100 years. All production MLs have resources of Chrysoprase. The current disturbance and planned mining at the Eastern Cut will remain under the maximum disturbance authorised by the EA.

4.14. Future Mining operation

The future mining operation is focused on the current Eastern Cut Tops and Pit Walls mining to the north through the Pit Wall into the remnant vegetation to the north. Whilst bench 3 is at the base of mining, benches 1 and 2 contain reserves of Chrysoprase. Spoil from bench 1 and 2 will be dumped on bench 3 until the design level is achieved. The dump will then extend to the north as per the mine design and plan. A plan view of the existing landform prior to mining is shown in Figure 49. Final landform is shown in Figure 50. The proposed mining and dump area is 18.2ha. Figure 51 displays a long section through the centre of future mining area showing the pit floor in red, the final landform as a yellow line with the pre-mining landform as the green line. 3D models of the final landform are shown in Figure 52 south looking north and Figure 53 east looking west. All figures show contours at 2.5m spacing. Surface water flows off the final landform are shown in Figure 54.

1.9ha of vegetation will be impacted (see Figure 55).

4.15. Screening Plant

The ROM will be initially located to the west of the mining block on bench 1 in the current disturbed footprint. There remains ROM material left as the cessation of mining in 2005. The screening plant and water supply will be in the same area. Reject from the screen i.e. waste will be placed in the existing void.

4.16. Mining Sequence

Mining will occur in campaigns mining approximately 60,000 m^3 from south to north. Mining may not occur every year. Mining will be conducted with an excavator and trucks. The identified mining area varies from 0m to 40m in depth. The mining face will be benched to suit the equipment. The mining crew will be able to visually identify the faults containing the Chrysoprase and selectively mine these faults and cart the material to the ROM. The waste will be carted to the dump face. Waste will be initially placed in the void to the south for the initial 11 mining campaigns creating the desired final landform. This area will then be progressively rehabilitated. For the remaining 9 campaigns the waste will be dumped in pit.

4.17. Area available for Mining

An early exploration campaign indicates that MLs 5791, 5792, 5782, 5769, 5770 and 7197 contain Chrysoprase resources. Gumigil plans to conduct further exploration to identify the next reserve that will be mined once the outlined mining area is exhausted. Next area of mining will be the area around the proposed future mining area. The planned mining will provide a lead as to which areas of prospectivity surrounding the to be mined area.

4.18. Future RE Disturbance

The planned mining area is 18.2ha with 1.9ha of 11.11.7 *Eucalyptus fibrosa subsp. fibrosa / Corymbia spp*. remnant shrubby open forest impacted. This area has been disturbed by costains and access roads. A survey of the area reveals numerous disturbed sites with well-established revegetation.

4.19. Proposed Duration of Operation

20 campaigns will mine the identified mining area. The duration between campaigns could be anywhere between 2 to 10 years. Expectation is that the identified block should be mined in 100 years once mining recommences. As it may be 10 years before mining starts, the mining of the identified block may be completed by 2136 with a scheduled time of 10 years for the rehabilitation on this area to reach certifiable rehabilitation.

5. Rehabilitation Planning

The targeted mine reserves and the dump space for waste will be confined to the footprint of the domain Eastern Cut Tops. This area is currently listed as Tops and Pit Walls where mining has occurred previously and an area of vegetation to the north. The waste will be dumped in the existing void and in-pit within the planned mining area. No waste will be pushed onto the angle of repose waste dumps. Rehabilitation will occur in two phases. The current void area will be backfilled up to the adjacent landform after 11 mining campaigns. The void area will then be progressively rehabilitated. The remainder of the mining area will achieve the final landform within 1 year of the cessation of mining as stockpiled waste will have to rehandled to create a free draining landform with no void. The pit walls will be terraced with 6m benches, batters of 1V:3.8H with a rise of 10m. The remainder will be rehabilitated after the final landform is created following the completion of mining. Stockpiled waste will be placed in the void to meet final landform criteria.

5.1. Climate Change Adaption

There will be the potential for climate change impacts on (a) worker health, (b) hydrological patterns, and (c) ecosystem processes, including plant community growth rates, structure, and composition. These potential impacts have implications for the pattern of mine operation, post-mining landform design and expectations on rehabilitation performance.

Gumigil management understands that the climate may change over time. The company will use an adaptive management approach responding to feedback from the vegetation and other monitoring.

The surrounding vegetation and the rehabilitation will evolve with any change in the climate. Vegetation related milestone criteria e.g. RM7.6 correlate the rehabilitation areas with an array of analogue sites. The evolution of the local ecosystems and rehabilitation areas should not impact this relationship.

5.2. Closure Vision

The closure vision for the project area is to demonstrate that the current landform is safe with limited conservation values. It is critical that the background landholder endorses the closure vision as the lease area will revert to their ownership on lease relinquishment.

6. Community Consultation

6.1. Consultation undertaken in developing the PRCP

Gumigil including management has been part of the Marlborough community since 1977 with its donations of monies and time to the community. It has a bursary for academic achievement at the local primary school since 1978. The present Manager Bill Stacey has lived in Marlborough since 1991 and is fully approachable by anyone in the area regarding information on the Mine and its activities. Bill grew up in Marlborough after the family moved there in 1964 and worked away from 1980 to 1991 when he returned to manage the mine.

Many of the citizens of Marlborough have either worked at or one of their family members have been associated with the mine during its operation.

The Local Museum is proud of its association with the Mine. The museum has a display of the mine (Figure 26) and of Chrysoprase (Figure 27).

Figure 26: Mine Display

Figure 27: The Gem

Documented meetings commenced 09/06/2022.

1. Landholder 1 – Max Baldwin Marlborough Station. Underlying landholder of the ML's
2. Landholder 2 – Manager David Howard Coorumburra Station (CRE). To the south and west of ML5791
3. Landholder 3 – Kenny Develin Station. To the west of ML5791
4. Landholder 4- Warren Rea Woodstock Station. To the north of ML5791
5. Landholder 5 – Steven Beak Develin Creek station. To the west of ML5791
6. Landholder 6 – Lee Collins Wandilla Station. Marlborough community member
7. Landholder 7 – Ross Olive Clifton Station. To the west of ML5791
8. Interested Person – Billy Mann Darumbal Elder.

A summary of this consultation is documented in Table 25.

6.2. Consultation on future rehabilitation

Planned community consultation is listed in Table 12.

Table 12: Community Consultation Plan

Objective	Engagement Type	Proposed Consultation frequency	Released Information	How feedback/comments are considered
Update community and Marlborough Station owner of PRCP and schedule on approval	Manager to meet with individual community members and landholder	Once off within 4 months of approval	Agreed rehabilitation objectives and schedule	Comments documented.
Re-commencement of mining	Manager to meet with individual community members and landholder	Prior to commencement of mining	Mining plan and schedule	Feedback reviewed and Plan revised in response to comments
Keep community informed of rehabilitation progress and sediment basin management	Manager to meet with individual community members and landholder and extend personal invitation	Yearly	Nil	Date and time of tour will be confirmed at consultation or subsequently.
Include rehabilitation information into local Chrysoprase Display	Manager to meet with organisers to discuss	Once off within 4 months of approval	Rehabilitation Posters on display	Posters format agreed with organisers

7. Post-mining Land Use

The Post Mining Land Use (PMLU) for the project area has been nominated in the original EA issued in 2005. The PMLU is a novel native ecosystem dominated by locally occurring plants. Pre-mining the project area was part of 2 grazing operations (see Section 4.2). On lease surrender, the land will be returned to the background landowner who operates the property as a grazing enterprise.

The vegetation communities for the project area are described in Section 2.7.

The proponent has not reached agreement with the background landholder on the retention of any roads or infrastructure on lease surrender. An agreement with the landholder may be reached prior to lease surrender. Existing tracks will assist the grazier with access to the area for fire management essential to maintain the health of the local ecosystems.

Compensation Agreements with Background Landholders

Gumigil has compensation agreements with the background landholder for the term of the lease with land on lease relinquishment returning to the background title and landholder. It is the desire of both the tenement holder and the background landholders that this land be relinquished free of any covenants. Infrastructure required by the owner of Marlborough Station will be left in the condition agreed under any written agreement between Gumigil and the owner of Marlborough Station.

The PMLU is consistent with how the land was used prior to the grant of the mining leases and State and Commonwealth planning instruments.

State and Council Planning Regulations

The PMLU is consistent with the Rural Zone Code under the Livingstone Planning Scheme V3 page P6-82. Marlborough Creek is listed on page P3-5 as a water that comprises important wetlands and features that may have areas of National, State or local environmental significance. Gumigil has taken steps since 1987 to protect this waterway.

Development Approval

There are no developmental approvals over land underlying the MLs.

Parks and Reserves

Gumigil Chryoprase Mine is surrounded by Parks and Reserves (see Figure 56). The number of parks and reserves is indicative of the community's interest in the unique vegetation of the Princhester Serpentine region.

Previous/Current Land Use

The land under the MLs prior to the grant of the leases were part of the properties Marlborough Station and Ramillies. Grant of the MLs was subject to the signing of compensation agreements with the background landholders. On lease relinquishment, the land will be returned to the background landholders. Due to the terrain of the mine disturbance (Land Zone 11), the lack of palatable grass species and the presence of plants toxic to cattle means that the land is infrequently grazed. On return to the landholders, the land will remain fenced off to cattle and managed with strategic burning so that the area does not impact on the management of the remainder of the grazing property. The mined area will remain a novel ecosystem of mostly endemic vegetation. Other land within the mining leases may be grazed.

8. Non-Use Management Areas

Two domains, Faces and Pit Walls are Non-Use Management Areas (NUMAs) as the PMLU cannot be achieved for these areas in the time permitted under the current PRCP guidelines.

Faces remain at a slope of "angle of repose" and are too steep to safely rehabilitate. The operator cannot safely access angle of repose slopes to undertake rehabilitation activities. The PRCP guidelines require rehabilitation or active intervention to ensure domains meet completion criteria in the desired timeframe. Mining ceased above gully 7 Face in the mid-1980s allowing the face to regenerate for 50 years. Observations of the gully 7 Face from the toe of the slope lead to the conclusion that Gumigil's Faces can achieve the Post Mining Land Use of a Novel Native Ecosystem with conservation values in time. However, the timeframe of 50 years for the natural regeneration of Faces falls outside the timeframes in the PRCP guidelines to achieve the stated rehabilitation objectives. The Faces need to achieve a land suitability (conservation) of 4 for successful closure.

Pit Walls have 6 metres wide flat benches and batters 10m deep with a slope of 1v:2.8H. While the benches with time have revegetated, the batters are too steep and competent to host any vegetation. The pit walls will not achieve the PMLU in the timeframes in the PRCP guidelines to achieve the stated rehabilitation objectives. The commitment is to achieve a land suitability (conservation) of 3 for the benches and 4 for the batters.

Community Consultation

The community accepts the Faces as part of the mined landform being visible from the surrounding properties and the Coorumburra Road to the east. Pit Walls are only visible from within the mined footprint. The Marlborough Station landholder nor other community members have not raised any concerns that the NUMAs on the lease will impact downstream ecosystems or Marlborough or Devlin Creek and accept that the Faces will eventually revegetate. The fact has been acknowledged in a roundabout way by property owners to the west who have stated to Gumigil's Manager that the visibility of the unvegetated mine is reducing with time limiting the opportunity for use of the mine as a landmark for orientation when "off the beaten track" on their property.

The owner of Marlborough Station understands that the Faces and Pit Walls will take time to revegetate and is willing to accept the current landform on lease relinquishment.

Compensation Agreements with Background Landholders

Gumigil has compensation agreements with the background landholder for the term of the lease with land on lease relinquishment returning to the background title and landholder.

It is the desire of both the tenement holder and the background landholders that this land be relinquished free of any covenants. Infrastructure required by the owner of Marlborough Station will be left in the condition agreed under the written agreement between Gumigil and the owner of Marlborough Station.

The long term rehabilitation objective for the Non-Use Management Areas is consistent with how the land was used prior to the grant of the mining leases and State and Commonwealth planning instruments.

State and Council Planning Regulations

The NUMA is consistent with the Rural Zone Code under the Livingstone Planning Scheme V3 page P6-82. Marlborough Creek is listed on page P3-5 as a water that comprises important wetlands and features that may have areas of National, State or local environmental significance. Gumigil has taken steps since 1987 to protect this waterway.

Development Approval

There are no developmental approvals over land underlying the MLs.

Parks and Reserves

Gumigil Chryoprase Mine is surrounded by Parks and Reserves (see Figure 56). The number of parks and reserves is indicative of the community's interest in the unique vegetation of the Princhester Serpentine region.

Previous/Current Land Use

The land under the MLs prior to the grant of the leases were part of the properties Marlborough Station and Ramillies. Grant of the MLs was subject to the signing of compensation agreements with the background landholders. On lease relinquishment, the land will be returned to the background landholders. Due to the terrain of the mine disturbance (Land Zone 11), the lack of palatable grass species and the presence of plants toxic to cattle means that the land is infrequently grazed. On return to the landholders, the land will remain fenced off to cattle and managed with strategic burning so that the area does not impact on the management of the remainder of the grazing property. The mined area will remain a novel ecosystem of mostly endemic vegetation. Other land within the mining leases may be grazed.

9. Land Suitability (Conservation Purposes)

Class definitions for land use suitability for conservation uses are a five-rank system. An abbreviated summary of these classes as they apply to mining lease areas is as follows:

Class 1
Areas well suited for conservation uses must possess significant conservation benefits in the pre-mining environment and be capable of being returned to that use post mining.

Class 2
These areas are suited to conservation use in that a significant component of the pre-mining conservation values can be restored post mining. There will however be some loss in conservation values where soil terrain or hydrological post-mining conditions may inhibit the full replication of the pre-mining values.

Class 3
These lands contain significant conservation values pre mining, however, restoration of all of these values may not be feasible. These areas could however, be restored to a form of conservation use which provides alternative conservation benefits.

Class 4
These lands contain limited conservation values pre-mining and/or are incapable of being effectively restored post mining to any alternative conservation use which provides similar benefits. The area could however be restored to provide a stable form of use which does not impact on surrounding conservation values.

Class 5
These lands will have no conservation values.

Section 4.12.7 discusses the presence and frequency of listed and endemic species observed on the rehabilitation and nearby REs. Gumigil is committed to returning different domains to specific land suitability classes (Conservation) (see Table 13). The completion criteria for achieving the target land suitability conservation) goals are stated in Table 14. The likelihood that these can be achieved is supported by the monitoring of analogue and rehabilitation sites in 2023 and 2024.

Table 13: Land Suitability (Conservation) Goals

Disturbance Type	Land Suitability (Conservation)	
	Pre-mining	Post-Mining
Face - at angle of repose	1	4
Tops- <25%	1	2
Terraced Pit Walls - Benches - Batters	1	 3 4
Sediments - <17%	1	2
Dam Sediments & Walls 17 – 33%	1	2
Exploration Pits	1	2
Maintenance & Infrastructure	1	2
Roads	1	2

Table 14: Completion criteria - Land Suitability (Conservation) classes

Target Land Suitability Class	Completion Criteria
2	E. fibrosa and C. xanthope dominates including two or more listed species or serpentine endemics.
3	E. fibrosa or C. xanthope dominates including one or more listed species or serpentine endemics.
4	E. fibrosa and/or C. xanthope dominates

10. Rehabilitation and Management Strategy

10.1. Hydrogeology

Groundwater

Section Reference

URS 2007 Updated Groundwater Investigation Section K Supplement to EIS Gladstone Pacific Nickel RSF and Plant Sites

Section 2.4 of the EIS describes the weathered zone i.e. the serpentine layers as highly leached layers as this process lays down the nickel deposits surrounding the veins of Chrysoprase. The base of mining lies within the weathered layers with the groundwater table below this level. Figure 28 is a conceptual model of the general groundwater levels on ML 5791. Marlborough Creek to the east is feed by groundwater. The Serpentine layers allow high rates of infiltration making the mountain ranges recharge zones. Given the highly mineralised nature of the Serpentine layers, the groundwater is highly mineralised with high levels of Nickel and other metals.

No shallow (<100 metres) aquafers have been identified in the region. General groundwater levels will follow the topography with groundwater contributing to the base flow in Marlborough Creek. Gumigil does not monitor the local ground water and no groundwater has ever been intersected with the mining on the top of the mountain.

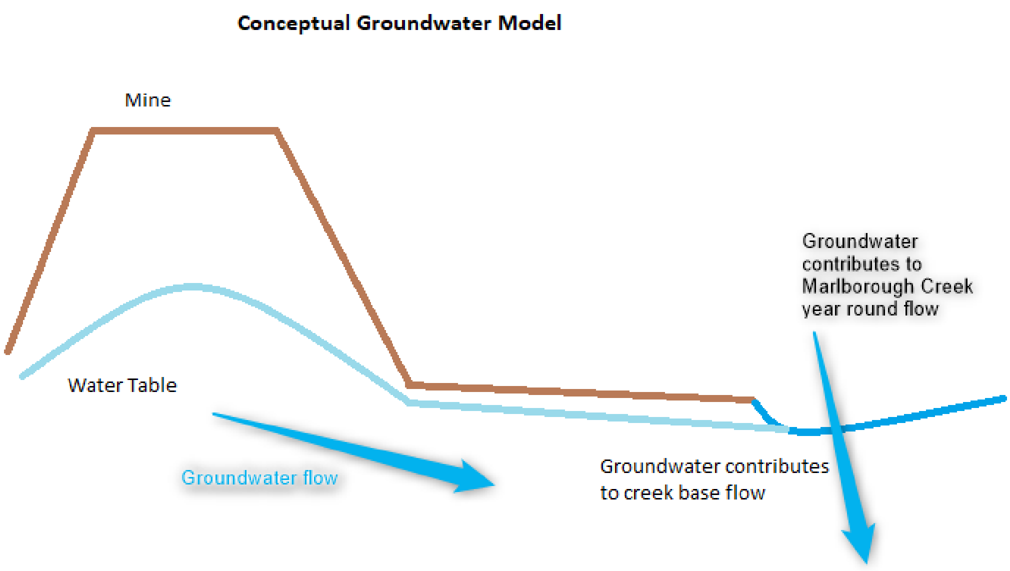

Figure 28: Conceptual Groundwater Model

Groundwater Water Quality

Reference:

McNeil, V.H., Thames, D., Vaca, F., Bennett, L. & McGregor, G.B. 2018. Regional groundwater chemistry zones: Fitzroy-Capricorn-Curtis Coast and Burdekin-Haughton-Don regions: Summary and results. Draft for consultation. Water Planning Ecology: Department of Environment and Science, Queensland Government

Quartz Water Australia Pty Ltd 1998 "Surface Water/Groundwater within the Marlborough Nickel Project." Marlborough Nickel Project – Lagoon Hill Nickel NL EIS May 1998

McNeil, V.H., Thames, D., Vaca, F., Bennett, L. & McGregor, G.B. 2018. Regional groundwater chemistry zones: Fitzroy-Capricorn-Curtis Coast and Burdekin-Haughton-Don regions: Summary and results. Draft for consultation. Water Planning Ecology: Department of Environment and Science, Queensland Government

McNeil et al (2018) describes both the Serpentinite alluvium (Zone 25) and the fractured rock groundwater (Zone 9) from the existing NRM database. Marlborough Creek Electrical Conductivity (EC) equates to the 50th percentile recorded in the groundwater EC in the alluvium zone and the fractured rock.

Alluvium Zone 25

Serpentinite can confer distinctive water quality characteristics on the groundwater in the alluvium. The Fitzroy Serpentinite Belt covers the area around the Fitzroy River between Marlborough and Alligator Creeks, where extensive outcrops of serpentinite occur. It comprises an area of 1849km^2, being one of the smaller zones, and represents a minor proportion of the regional data. The serpentinite forms dissected hills, except where it is overlain by Tertiary sediments. These Tertiary deposits are, as are the outcrops of Precambrian to Palaeozoic trap rocks and granites. There are 255km^2 of floodplains around

Marlborough Creek, parts of the Alligator Creek, and the Lower Fitzroy River. The alluvial system extends from moderate depths to below 100m, but most bores are within the moderate to deep range of 16m to 38m. Irrigated cropping is carried out around Eden Bann Weir, and there is some mining activity, particularly for chromite and the gem chrysoprase. The remaining land use is grazing on native vegetation, with Marlborough and Yaamba being the major towns in the zone. The data record is considered historical only, and relatively sparse. The recorded salinity ranges is usually moderate, ranging up to 2,456µS/cm. Chemistry is $MgHCO^3$, which is compatible with serpentinite and basaltic terrains. Salinity may sometimes affect taste, and the water may not be ideal for other general purposes because of high EC and hardness. Precipitates are likely to be deposited over time, with some scaling. The water quality appears to be moderate for irrigation, except for sensitive crops because of elevated salinity. It is suitable for stock. The surface water usually resembles the groundwater but is occasionally Na dominated. However, groundwater EC exceeds QWQG aquatic ecosystem surface water quality guidelines, and Total Nitrogen and pH (upper range values) may do also. Groundwater in the alluvium is quoted from 62 samples ranging from 356 µS/cm (10th percentile) to 2,465 µS/cm (90th percentile).

Fractured Rock Zone 9

A small, fractured rock zone, with an area of 2,586km^2, lies on the northern edge of the Lower Fitzroy Catchment, between Marlborough and Alligator Creek where bands of serpentinite have intruded through Precambrian deposits and have subsequently been intruded by granites and partially overlain by trap rocks, alluvium, and remnants of Mesozoic basalt. The groundwater system is very varied, but includes Trap rocks such as the Berserkers, Mesozoic basalts including the Alton Downs Formation, as well as occasional serpentinite and granite. Depths are mostly moderate to deep, extending from 13m to 42m. The data record is average but old. The salinity ranges from moderate to high, being between 893µS/cm and 7,273 µS/cm. Salinity affects taste, and the water may not be ideal for other general purposes because of high EC and hardness. Precipitates are likely to be deposited over time with some scaling. The salinity may be excessive for sensitive crops, but it is suitable for stock. Groundwater EC exceeds QWQG aquatic ecosystem surface water quality guidelines, and Total Nitrogen and pH (upper range values) may do also. Groundwater in the fractured rock zone is quoted from 543 samples ranging from 543 µS/cm (10th percentile) to 6,608 µS/cm (90th percentile).

No ground water monitoring occurs in association with the Gumigil leases. Base flow water quality in Marlborough Creek is influenced by the ground water quality in the locality. Base flow into Marlborough Creek ensures that this stream is perennial.

10.2. Soil and Capping Assessment

10.2.1. Topsoil

No topsoil was stripped during the mining phase from 1950 to 2005 from the very steep and sometimes precipitous terrain. Vegetation has successfully colonised the disturbed terrain without topsoil.

The topsoil over the undisturbed area planned to be mined was surveyed in January 2023. Topsoil depth averages 300mm in depth. Figure 29 has 300mm of topsoil over rocky subsoil. Figure 30 has 200mm of topsoil depth. Table 22 lists the nutrient levels of topsoil and subsoil in the future mining area and a soil sample from a rehabilitated site.

The challenge with topsoil stripping in the steep terrain is accessibility with machinery to strip and stockpile the medium. Topsoil that can be safely stripped with the mining equipment will be stockpiled on bench 1.

The site does not have a topsoil inventory.

1.9ha will be disturbed for the future mining area in RA2. This will yield 4,000m^3 of topsoil. The total area of Tops in RA2 to be revegetated is 16.6ha including 6.2ha final landform in the north which is sloped. To maximise the effectiveness of the limited topsoil reserves, 50% of this area will be topsoiled in strips at 125mm in depth. Terraced Pit Walls will receive no topsoil.

Future disturbance in RA1 or RA4 will not be topsoiled nor will any area to be rehabilitated in RA3.

Figure 29: Topsoil depth 752303E 7444852N GDA 94

Figure 30: Topsoil depth 791579E 7457924N GDA 94

10.2.2. Waste Characterisation (Hostile Spoil)

The baseline information presented in Section 2.4 Geology, Section 2.5 Soil and Section 2.7 Vegetation Communities demonstrate the unique characters of this Serpentinite landscape. Local ecosystems have evolved and adapted to the soils of low fertility, high levels of metals and low water holding capacity. The native flora continues to successfully colonise the disturbed areas. The proponent is committed to returning the mined landform to a novel native ecosystem adapted to these soils. Short-term soil modification will involve one application of lime @ 500kg/ha and a general fertilizer @ 350kg/ha to facilitate the establishment of locally adapted vegetation in the rehabilitation phase. Attempts at long-term amelioration of growing conditions are not considered feasible and would likely result in the short to medium term invasion of undesirable exotic species, as well as the eventual collapse of the revegetated plant community without the repeated, ongoing input of resources.

As the mining is conducted in a highly leached weathered zone, there is no AMD in the profile. The high metal composition of the soils and leachate generate saline drainage just like the surrounding natural environment see Section 2.9 Site Hydrology.

10.2.3. Capping Assessment

Capping has not used in the rehabilitation to date or proposed to be used as all strata mined are capable of sustaining vegetation. The strata's high infiltration rate and consequent low runoff rates are a critical dynamic in the landform's stability. As stated in Section 4.12, regeneration of a novel ecosystem is occurring including listed and serpentine endemic species.

10.3. Landform Design

Gumigil's Chrysoprase Mine landform has evolved with the mining conducted between 1950 and 2005 in the Western and Eastern Cut. Future mining will extend the current mine footprint in the Eastern Cut to the north. Earlier mining practice resulted in mine waste being pushed off the Tops onto the upper slopes of natural gullies. Later remediation intercepted fine and coarse sediment transport downstream, but a legacy of angle-of-repose spoil Faces remain. In future mining, no waste will be pushed onto the Faces with all waste dumped on the Tops. The landform design will raise the height of gully 4 and gully 5 Faces to direct runoff from the Tops away from gully 4 Face draining down the adjacent natural slopes.

The mining process shaved up to 70m off the top of mountain at the Eastern Cut reducing the slope length of Eastern Cut Faces. As stated in Section 2.4 Geology, the mined profile is highly weathered and is highly mineralised. The local ecosystems and streams have evolved in this mineralised environment. The mined landform does not differ from this natural landform having high rates of infiltration and thus reduced runoff. Due to no change in the mineralogy or structure of the waste, there is no need to create erosion control structures on the mined landform to reduce rainfall runoff to achieve stability.

The mine installed sediment basins in all gullies in the period from 1999 to 2002. These basins have been monitored annually. Past practice has been to construct new sediment basins downstream when the basins upstream filled with sediment. All downstream sediment basins have capacity and the upstream sediment stable. Since the high rainfall event recorded in February 1999 which dumped sediment in downstream gullies and the installation of the network of sediment basins, the nearest rainfall station at the Marlborough Helipad has recorded 9 daily rainfall totals exceeding 100mm (see Table 4). The local gauge at the Marlborough Creek Monitoring Station at Slopeaway has recorded 169mm on 31/3/2025 to midnight; 241mm in 4 days in November 2017 and 213mm in 4 days in 2016. No water was recorded in sediment basin 3 and 4 in gully 4 from construction to the April 2025 rain event.

A risk with the stability of the landform is that head cuts (see Figure 31) migrating upstream through the accumulated sediment in sediment basins that are failing may result in the release of basin sediments over time at levels more than the downstream gully can assimilate. As observed in Figure 31, the sediment's structure limits remobilisation with manageable impact downstream.

When the Eastern Cut and the Western Cut rehabilitation areas obtain the milestone of certifiable rehabilitation, sediment transport will be reduced to background levels in these gullies and maintenance of the sediment basins will not be required with the stream geomorphology re-establishing the pre-mining stream grade. Monitoring of the gullies and sediment basins is aimed to demonstrate the stability of this.

Basin 1 and basin 2 on Gully 4 (Poacher's Gully) have over-topped with a head cut working its way upstream through the basin wall and deposited sediment (see Figure 31). Sediment basins 3 and 4 have been constructed below basins 1 and 2. 3 and 4 continue to function and remain at >90% of the original capacity. Basin 4 first overflowed in April 2025.

The sediment basin on gully 7a filled with sediment in 2015. A bund was constructed in the same year to divert flows into the adjacent gully 7b above the sediment basin. This diversion continues to be effective.

Figure 31: Head cut on Basin 1 Gully 4 – April 2023

The angle of repose Faces are consistent with the surround terrain (Figure 3). As mining of the Western Cut ceased in mid 1960s and in the Eastern Cut in 2005, the angle of repose slopes range in age from 58 years to 18 years. A trail period of this magnitude gives a better understanding of the stability of these slopes than any erosion modelling in a locality where no analysis of soil parameters has been collected or verified in trials.

Future Mining Landform

Figure 50 shows the proposed landform for the future mining area. The proposed landform will backfill the current mining void which daylights out on the southwestern end up to the levels of the bench to the south and west of the void. Water will be directed off the mined landform to the south onto natural ground flowing in Gully 4 (Poachers Gully). The excavated pit will be partially backfilled. Pit walls to the west, north and east will be terraced to the design of the terrace above bench 1.

10.4. Cover Design

As covered in Section 10.2.2, Gumigil has not identified a risk of hostile spoil. The mined landform has successfully regenerated with no treatment of the overburden. No capping is proposed to rehabilitate any future disturbance.

10.5. Water Management

Section 2 describes the uniqueness of the area with the evolution of the geology over time oxidising and leaching to create a landform high in Nickel, Cobalt and Chromium. The vegetation of the area has adapted to this environment. This process is ongoing in the local environment including the mine disturbance.

Runoff and infiltration of rainfall into the groundwater from the mined area continues to occur. Exposure to the waste profile will “contaminate” both water streams. The ongoing infiltration of rainfall and seepage into the groundwater from the mining area is consistent with the surrounding landform and with no identified impact on the local environmental values. No evidence of changes to the local vegetation has been observed since mining commenced in the mid-1960s. The final landform will replicate the local landscape with similar rates of infiltration and runoff. The comparatively high infiltration of the local and mined landform reduces runoff from the steep landscape minimising the erosion potential. With no voids and no change to seepage water quality, no ongoing water management at mine closure will be required or has been required since the mining ceased in 2005 in the Eastern Cut.

10.6. Revegetation

10.6.1. Revegetation Objectives

The closure vision for the mine is to achieve a safe and stable landform revegetated with a novel ecosystem similar to the surrounding regional ecosystems. The ecosystem will support elements of the pre-mining conservation values. The EA does require the recovery of specified land suitability classes.

The conservation values of the ecosystems of the serpentine Marlborough Hills and associated waterways are well known. These are listed for each of the Gumigils ML’s (see Table 7). For Gumigil, rehabilitation encompasses:

- Revegetation through the establishment of a self-sustaining assemblage of locally occurring native plants; and
- The achievement of agreed land suitability classes that include the recovery of elements of the pre-existing conservation values.

10.6.2. Key Flora Species

The pre-mining conservation values in ML5791 include the *Of Concern* RE 11.11.7 and up to 15 plants of significance (conservation listed and/or serpentine endemics) (see Table 15). To achieve the target of recovering elements of these pre-existing conservation values, the revegetated lands would support a plant assemblage that is analogous in structure and composition to RE11.11.7 or supports at least one of the significant plant species. Monitoring of the revegetated final landform demonstrate that:

- An assemblage analogous to RE11.11.7 is achievable; and
- Establishing at least one listed species within the revegetation assemblage is achievable on all domains.

Table 15: Listed and serpentine endemics observed

Species in analogue and sites (as of February 2024)

(**NT=near threatened, V=vulnerable, E=endangered, SE=serpentine endemic, NE=north Qld endemic. NCA=Qld Nature Conservation Act 1992, EPBC=Commonwealth Environmental Protections and Biodiversity Act 1999**).

Species	Conservation classification
Bursaria reevesii	V NCA, SE
Corymbia xanthope	V NCA, V EPBC, SE
Hakea trineura	V NCA, V EPBC, SE
Leucopogon cuspidatus	V EPBC, NE
Leichhardtia brevifolia	V EPBC
Lissanthe brevistyla	V NCA, SE
Macrozamia serpentina	E NCA, SE
Olearia orientalis	E NCA, SE
Pimelia leptospermoides	NT NCA, V EPBC
Samandera bidwillii	V NCA, V EPBC

10.6.3. Fauna Habitat

No specific fauna habitats are proposed.

10.6.4. Analogue Sites

Revegetation success is, in part, assessed by benchmarking against an analogous condition. Revegetation on the mine will be assessed against the related analogous benchmarks with RE 11.11.7 - *Eucalyptus fibrosa* woodland, RE 11.11.1 - *Eucalyptus fibrosa* and *E. crebra* open forests or RE 11.3.25 -*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines. These RE's encompass a variety of related plant floristics and structures. It is not intended that, and it is not feasible that, any one rehabilitation area will be identical to any one analogue site. Rather it is intended that a successfully rehabilitated site will support dominant vegetation with a structure and composition that falls within the variety occurring within the remnant vegetation. As a consequence, a range of analogous sites Table 16) have been selected to capture some of the variety within the remnant state of the surrounding REs. Figure 57 sets out the location of these sites.

Table 16: Analogue Site Location

Site Name	Latitude (GDA2020)	Longitude (GDA2020)	Regional Ecosystem
GA1	-22.960403	149.843252	RE 11.11.7
GA2	-22.962991	149.826532	RE 11.11.7
GA3	-22.955992	149.832566	RE 11.11.7
GA4	-22.965094	149.829672	RE 11.11.7
GA5	-22.985056	149.851371	RE 11.11.7
GA6	-22.951514	149.860654	RE 11.11.7
GA7	-22.960733	149.832400	RE 11.11.7
GA8	-22.942233	149.858267	RE 11.11.1
GA9			RE 11.11.1
GA10			RE 11.11.1
GA11			RE 11.3.25
GA12			RE 11.3.25
GA13			RE 11.3.25

Sites GA9 to GA13 yet to be nominated.

Tops

The post-mining landforms on the Tops are broadly undulating and at a similar elevation to adjacent remanent vegetation (RE 11.11.7) on upper slopes and mountain crests. Three analogous sites have been established in these elevated landforms. The Tops revegetation and these three analogous sites will be monitored together. It is expected that the rehabilitation sites will exhibit characteristics that falls within the range occurring among the analogue sites.

Pit Walls

Sufficient examples of Pit Walls (including steep rocky batters and narrow benches or terraces) can be accessed directly to assess progress towards rehabilitation goals. The vegetation assemblage on the benches forms low woodlands dominated by species present in the analogue sites. Structurally, the revegetation is consistent with part of the structural range within the Tops analogue sites i.e. RE 11.11.7. These sites will be monitored in the same manner as the Tops and Sediment and Sediment Basins.

Sediment and Sediment Basins

This domain occurs on the lowest slopes of the ranges and includes minor colluvial deposits associated with gullies draining the Faces. Remnant vegetation associated with this domain is also RE 11.11.7. Revegetation of this domain is to be benchmarked against remnant vegetation as it occurs on these lower landforms and a further three analogue sites have been established in the remnant vegetation associated with these landforms. These sites will be monitored in the same manner as for the Tops and Terraced Pit Walls.

Exploration Pits, Maintenance & Infrastructure Areas, Tracks

This domain includes a suite of small disturbance areas as well as the linear footprint of access tracks. For the most part, these occur in the same landforms as the Tops, Pit Walls and the Sediment and Sediment Basins. These areas will be assessed against the 11.11.7 analogue sites i.e. GA1 to GA7. Rehabilitation on ML 5802, 5781 and 5795 will be assessed against the nominated analogue sites representing the pre-clearing RE either 11.11.1 or 11.3.25.

10.6.5. Site Rehabilitation

The area to be rehabilitated is divided into 4 discrete RAs. These areas are listed in Section 4.11.

Site rehabilitation must meet the Schedule's criteria to demonstrate that the rehabilitated areas are safe and capable to achieving the designated PMLU. Rehabilitation milestones with criteria are listed in Table 26 and in the PRCP schedule PRCP_EPML00421413_V1.

The agreed timeframes for achieving the rehabilitation milestones for each RA are listed in the PRCP schedule PRCP_EPML00421413_V1 and in Tables in Section 14 of the PRCP. Table 27 lists the scheduled timing for completing the rehabilitation milestones for RA 1. Table 28 lists the scheduled timing for completing the rehabilitation milestones for RA 2. Table 29 lists the scheduled timing for completing the rehabilitation milestones for RA 3. Table 30 lists the scheduled timing for completing the rehabilitation milestones for RA 4.

This section describes the rehabilitation process proposed for the rehabilitation of any planned disturbance after 2025. Mine disturbance currently revegetated through natural revegetation or facilitated natural revegetation will not be assessed against rehabilitation milestones 3, 4 or 5.

The methodology has evolved from the trials and outcomes from the rehabilitation carried out on the existing western and eastern cuts. The trials and revegetation have been monitored to provide quantitative data on the revegetation providing confidence of likelihood of success in future rehabilitation.

Revegetation can be achieved by natural rehabilitation through recolonisation with native species via windborne seed from adjacent remnant vegetation. The potential for this approach to succeed was provided by (a) the benign nature of the post-mining land surface and associated spoil, and (b) the immediate proximity of sources of native seed in adjacent relic and remnant vegetation. In practice, the mine has utilised natural revegetation (vegetation establishment on untreated post-mining surfaces), facilitated natural revegetation (vegetation establishment on post-mining land surfaces after one or more of either reformation, spoil deposition, mulching and/or short-term surface amelioration with lime and general NPK fertiliser) and traditional revegetation (seed or tube stock planting and chemically ameliorated soils). Monitoring to date demonstrate that self-sustaining plant assemblages based on local native species is achievable on all domains. The selected seed mix will be based on the pre-clearing RE of the area.

Tops

The Tops encompasses reformed mining lands including low hills, and depressions as well as undulating, gently sloping or flat lands. Tops on the Western Cut where mining ceased in the mid-1960s have naturally revegetated. Tops in the Eastern Cut will be rehabilitated by with the following steps:

- Achieving the proposed final landform;
- Spreading the available topsoil in strips on final landform;
- A once off application of Lime @ 500kg/ha and a general NPK fertilizer @ 350kg/ha applied to the surface;
- Area hay mulched with pasture round bales from the local area (5-10mm depth);
- Endemic tree and shrub seed mainly Acacia species spread at a rate of 2 kg/ha if seed can be purchased supplemented by seed collected on the MLs; and
- The area track rolled with a dozer.

Some smaller areas will remain as unmodified post-mining rock or rubble surfaces. These will be rehabilitated through natural regeneration. Other small areas may be spread with spoil, but not planted or seeded, facilitating natural regeneration.

Key species of the background RE 11.11.7 to be included in the seed mix if seed is available are listed in Table 17.

Table 17: Seed Mix RE 11.11.7

Scientific name	Common name
Analogue RE 11.11.7	
Acacia disparima	Southern salwood
Acacia fimbriata	Fringed wattle
Acacia julifera	n/a
Acacia leptostachya	Slender wattle
Alphitonia excelsa	Soap bush; red ash
Bursaria reevesii	Reeves' blackthorn
Casuarina cunninghamiana	River she-oak
Corymbia xanthope	Glen Geddes bloodwood; yellow bloodwood
Eucalyptus fibrosa subsp *fibrosa*	Red ironbark; broad leafed ironbark
Eucalyptus portuensis	White mahogany
Gahnia aspera	Rough saw-sedge
Grewia latifolia	Dysentery plant; dog's balls
Hakea trineura	Three-veined hakea
Hybiscus divaricatu	Native hybiscus
Leichhardtia brevifolia	Shrubby bush pear
Leucopogon cuspidatus	Cuspida beard-heath
Lomandra longifolia	Mat-rush
Macrozamia serpentina	burrawang
Melaleuca hemistricta	Mt Wheeler bottlebrush
Oleria orientalis	Twiggy daisy-bush
Pimelia leptospermoides	Serpentine rice flower
Psychotria daphnoides var. *angustifolia*	Smooth psychotria
Xanthorhea latifolia	Coastal grass-tree

Stockpiled topsoil will be reserved for the future mining area. This will yield 4,000m^3 of topsoil. The total area of Tops to be revegetated is 16.6ha including 6.2ha final landform which is sloped. To maximise the effectiveness of the limited topsoil reserves, 50% of this area will be topsoiled in strips at 125mm in depth.

Sediment/Sediment Basin Walls

The domain of Sediment/sediment basin walls includes the sediment deposited in the gullies 3 and 4 following the February 1999 incident, sediment deposited in sediment basins and the constructed sediment basin wall. Sediment basin sediment and walls will be excavated to re-establish the natural stream grade with extracted material deposited on either side of the gully with angle of repose side slopes as occurs in the natural gullies on the mine lease with the crest blended into the surround slopes and revegetated spreading endemic tree and shrub seed mainly Acacia species (Table 17) spread at a rate of 2 kg/ha if seed can be purchased supplemented by seed collected on the MLs.

RA 4 Disturbance

RA4 covers the exploration pits, infrastructure areas and tracks that will not be required by the background landholder. Rehabilitation steps are:

- Site decommissioning of all infrastructure;
- Achieving the proposed final landform;
- No topsoil is available;
- Area ripped with a dozer;
- A once off application of Lime @ 500kg/ha and a general NPK fertilizer @ 350kg/ha applied to the surface; and
- Endemic tree and shrub seed mainly Acacia species spread at a rate of 2 kg/ha if seed can be purchased supplemented by seed collected on the MLs. Seed would be selected from Table 17, Table 18 or Table 19 depending on the pre-clearing listed RE.

Most of the infrastructure and tracks are located on pre-mine landscape so little effort will be required to integrate the disturbance back into the landscape with no interference to the overland flow except for woo-boys on tracks on steep grades.

Table 18: Seed Mix RE11.11.1

Analogue RE 11.11.1	
Acacia disparima	Southern salwood
Corymbia clarksoniana	Clarkson's bloodwood
Corymbia erythrophloia	Variable barked bloodwood
Cycas ophiolitica	Marlborough blue cycad
Eucalyptus crebra	Narrow leaf ironbark
Gahnia aspera	Rough saw-sedge
Grewia latifolia	Dysentery plant; dog's balls

Table 19: Seed Mix RE 11.3.25

Analogue RE 11.3.25	
Casuarina cunninghamiana	River she-oak
Eucalyptus tereticornis	Qld blue gum; forest red gum
Ficus opposita	Sandpaper fig
Gahnia aspera	Rough saw-sedge
Grewia latifolia	Dysentery plant; dog's balls
Livistona decora	Cabbage palm
Lomandra longifolia	Mat-rush
Melaleuca viminalis	Weeping bottlebrush
Melaleuca fluviatilis	Weeping paperbark
Neoroepera buxifolia	

10.6.6. Non-Use Management Areas

The disturbed area nominated as NUMAs is to 2 discrete areas being Faces and Pit Walls. These areas are described in Section 4.11. Gumigil recognises its responsibility to rehabilitate the land identified within the NUMA to the greatest extent possible using best practice environmental management for the area to minimise risks to the environment. Pit wall benches will be rehabilitated whilst no rehabilitation activities are practical on Faces or Pit Wall Terraces.

The NUMAs must show significant improvement of the land by meeting the management milestones listed in Table 31 and in the PRCP schedule *PRCP_EPML00421413_V1*. Table 32 lists the timeframe in which IA1 will achieve the listed milestones whilst Table 33 lists the timeframe for IA2.

Pit Walls

Pit Walls comprise of benches in between near vertical batters. The benches will be revegetated with the following steps:

- Achieving the proposed final landform;
- Spreading a layer of overburden; and
- Endemic tree and shrub seed mainly Acacia species spread at a rate of 2 kg/ha if seed can be purchased supplemented by seed collected on the MLs.

A layer of overburden will be placed on each bench while the bench is accessible during the mining process. Endemic tree and shrub seed from Table 17 will be spread at a rate of 2 kg/ha if seed can be purchased.

Some smaller areas will remain as unmodified post-mining rock or rubble surfaces. These will be rehabilitated through natural regeneration. Other small areas may be spread with spoil, but not planted or seeded, facilitating natural regeneration.

10.7. Tailings Storage Facilities

Mining of Chrysoprase does not require a wash plant to separate the semiprecious stones from the Run of Mine (ROM). The Chrysoprase is hand picked off a conveyor following screening of the material from the ROM. The waste is transported to the waste dumps.

10.8. Voids

No voids will form part of the final landform. All disturbed domains will drain externally.

10.9. Underground mining

Gumigil has not conducted underground mining on the leases. No future underground mining is planned.

10.10. Built Infrastructure

Infrastructure on ML 5791 consists of sediment basins and two sheds used for the maintenance and storage of equipment during the mining phase up to 2005. It is planned to decommission all infrastructure and rehabilitate the footprint prior to closure. The exception to this will be tracks or sheds which will be transferred to the background landholder under a written agreement.

All sediment basins will be decommissioned by excavating a channel through the sediment and basin wall back to the natural grade of the stream. Excavated material will be placed adjacent to the channel creating a 3:1 stream bank. These banks will be seeded as per the rehabilitation milestones listed in the schedule. An excavator will be used to decommissioning the basins.

Infrastructure on this lease is the old Blacksmiths Shop and a larger shed used for storage and maintenance. Both sheds will be manually pulled down and removed from site except for concrete which will be placed in the spoil. Waste will be deposited at the Marlborough Waste Station. The main shed will be within the footprint of the area planned to be mined and will be decommissioned prior to mining taking place. Mining ceased in 2006 and there is today no visible evidence of oil spills. Consumables used on site during the mining was limited to fuel, lubricants and explosives

Infrastructure on ML 5795 and ML 5781 includes a caretaker's cottage and sheds. The caretaker's cottage is currently being removed from site. Waste will be removed from site. Worker accommodation used in the mining phase up to 2006 has been decommissioned.

The access track on ML 5802 and 5791 is used jointly by Gumigil, the owner of adjacent nickel lease and the landholder for access. Initial talks with the landholder have indicated that he wishes to retain all access post mining for the management of the property e.g. fire management. Otherwise, the roads and tracks will be rehabilitated according to the rehabilitation milestones listed in the schedule.

11. Risk Assessment

The risk assessment is in two parts. Firstly, the table lists the risks that may prevent any of the 4 RAs from achieving a safe and stable condition. Secondly, the table lists the risks that may prevent either of the IAs from achieving the management milestones listed in the Schedule.

Mining ceased in the Western Cut in the mid-1970s with the last mining in the Eastern Cut conducted in 2005. The disturbed mine landform has been naturally revegetating since mining ceased i.e. for 18 to 48 years. The proponent has listed the response from application of the rehabilitation methodology and the outcome from natural events e.g. fire in the Table column "Overview of Current Controls, Measures & Actions In Place. Closure of the mine is planned for 2146. There are many examples of revegetated disturbance (Figure 14 and Appendix A) that reflect the identified disturbance domains that have been assessed giving the proponent confidence that rehabilitation outcomes will be achieved.

Sediment basins were installed on all gullies from 1999 to 2002. There has been no visible erosion of the Faces or deposition in the gullies or sediment basins downstream in the last 10 years as natural regeneration stabilises the mined landform. This demonstrates the overall stability of the rehabilitation areas. Stability will continue to improve.

Section 12.1 outlines Gumigil's monitoring program and the requirement to raise with management any issues potentially inhibiting the natural progression on site to the rehabilitation achieving a safe and stable condition. Management will review these findings and implement any recommendations coming from the review. This agreed action will be monitored to understand if the action has mitigated the identified risk to successful completion of completion criteria. If necessary, the rehabilitation methodology or site practices will be revised to incorporate the findings of the review.

The above factors given the proponent confidence that the rehabilitated landform will achieve rehabilitation milestones in the timeframes nominated in the Schedule and the NUMAs will achieve the Schedule's Improvement Milestones. The risk matrix for the assessment is shown in Table 34. The risk register is shown in Table 35.

12. Monitoring and Maintenance

12.1. Monitoring

Routine inspections of the mine site have been conducted since 2005 including:

- Inspection of all sediment basins quarterly;
- Monthly inspections of the tracks;
- Visual inspection annually of all rehabilitation areas; and
- Stream monitoring

Planned Monitoring Program

The Mine Manger is responsible for all site monitoring and maintenance of records. The manager is assisted by the part time operator. Table 20 list the monitoring program for Gumigil.

Table 20: Monitoring Program

Aspect	Timing	Record
Surface Preparation	At completion	Photographs and written record
Revegetation	At completion	Photographs and written record
Achievement of Surface Conditions	As per Schedule	SQEP report
Monitoring of streams, sediment basins and revegetation areas	Trigger is daily rainfall > 50mm recorded at Gauging Station	Date and unexpected impacts and required maintenance
Monitoring of rehabilitation following RM4	Yearly for 5 years	Date and unexpected impacts and required maintenance
Streams and Sediment Basins	Yearly monitoring of transects	Photograph with photo pole at fixed point
Water Quality in Runoff	RSS checked if runoff from site has been observed or daily rainfall > 50mm	Sample collected and sent to Lab
Water Quality - Marlborough Creek	Yearly	Results filed
Marlborough Creek Cross Sections (see Appendix B)	Every 10 years	Results filed
Analogue and Rehab Sites	Every 10 years	Detailed report including maintenance recommendations.
Geotechnical Stability	Once off for all domains	SQEP Report

Runoff Water Quality Monitoring

Rising Stage Samplers (RSS) have been installed on Gullies 1,3, 4 and the Devlin Creek catchment at suitable locations downstream of the lease boundary as required by Condition WA3 of the EA (see Figure 32). Samplers have only 1 bottle that will collect flows greater than 200mm. Monitoring of Gully 2 was abandoned as gully 2 flows into Gully 1 upstream of the Gully 1 monitoring point. No samples have been collected since monitoring commenced in 2014.

Figure 32: Gully 4 Rising Stage Sampler – November 2022

Gully Monitoring:

- Sediment basins and selected locations in the gullies draining the mine disturbance will be photo-monitored annually using a standard graduated photo pole. Monitoring sites are listed in Table 21. Monitoring sites at gully1,2 and gully 5,6&7 are shown in Figure 58 and Figure 59.
- Sediment basins and gullies will be monitored if the daily rainfall is > 50mm within two weeks of the event; and
- Nominated cross sections of Marlborough Creek will be recorded every 10 years.

Table 21: Gully Monitoring

	Latitude	Longitude
Gully 1 and 2	-22.954231	149.862129
Gully 3	-22.964966	149.861212
Gully 4		
Headcut	-22.967008	149.855968
Basin 3 bywash	-22.967560	149.857825
Basin 4 bywash	-22.966869	149.858807
Gully 5,6,7	-22.970226	149.832067

Rehabilitation Monitoring

Selection and monitoring of suitable analogue sites and rehabilitation sites in Tops and Terraced Pit Walls commenced in 2022. Monitoring will be extended to Sediment/sediment basin walls in 2026. Rehabilitation sites will be monitored at least three times including the initial round to establish criteria until milestone RM6 is reached. Analogue sites will be monitored in conjunction with the rehabilitation sites. Where a progression towards the goals is not evident management will be reviewed and intervention considered.

Rehabilitation goals are:

- Revegetation through the establishment of a self-sustaining assemblage of locally occurring native plants; and
- The achievement of agreed land suitability classes that include the recovery of elements of the pre-existing conservation values.

Performance against these goals in all Domains will be assessed by monitoring plant community structure (height, overstorey and understorey cover, basal area) and composition (total species richness, exotic species richness, richness of conservation listed species), as well as reproduction (presence of flowering or fruiting) and recruitment (presence of seedlings, saplings or suckers) at monitoring sites against the condition amongst relevant analogous sites in comparable landform elements.

Post Closure Monitoring

No post closure monitoring is proposed as the PRCP schedules forecast mine closure in 2169 after demonstrating that all Rehabilitation Areas has achieved Rehabilitation Milestone 6. At closure, mining would have operated from the mid-1960s totally 204 years.

12.2. Maintenance

Gumigil has a crew of a part time Manager and a part time operator whose task has been since 2005 to maintain the operating lease to a standard whilst the mine is on care and maintenance. A local bulldozer contractor is engaged to maintain tracks. The RSS will be inspected at least quarterly.

Mine Manager would be responsible to implement any agreed maintenance programs arising from the routine monitoring.

13. Tables

Table 22: Soil Analysis

Nutrient Advantage®

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SUMMARY REPORT

John Merritt	
Biloela	
QLD 4715	

Service Provider:	AGnVet Rural - Moura
Advisor/Contact:	Christopher Dawson
Phone:	0429 204 500
Purchase Order:	0584

Sample No		021765620	021765619	021765621
Paddock Name		FMA Subsoil	W/C Rehab	FMA Top Soil
Sample Name				
Sample Depth (cm)		45 - 80	0 - 20	0 - 20
Sampling Date		20/02/2024	20/02/2024	20/02/2024
Test Code		E33	E33	E33
Sample Type		Soil	Soil	Soil
Analyte	**Unit**	**Result**	**Result**	**Result**
Soil Colour		Red	Orange/Yellow	Red
Soil Texture		Clay	Sandy Loam	Clay Loam
pH (1:5 Water)		6.1	6.7	6.9
pH (1:5 CaCl2)		5.3	5.6	5.8
Electrical Conductivity (1:5 water)	dS/m	0.05	0.05	0.05
Electrical Conductivity (Sat. Ext.)	dS/m	0.3	0.5	0.4
Chloride	mg/kg	14	<10	<10
Organic Carbon (W&B)	%	0.62	1.05	1.92
Organic Matter (W&B * 1.72)	%	1.1	1.8	3.3
Nitrate Nitrogen	mg/kg	2.7	8.4	4.5
Ammonium Nitrogen	mg/kg	1.4	5.6	19
Phosphorus (Colwell)	mg/kg	<5.0	5.0	8.3
Phosphorus (BSES)	mg/kg	9.0	7.5	38
Phosphorus Buffer Index		180	29	130
Sulphur (MCP)	mg/kg	53	1.6	6.9
Cation Exch. Cap. (CEC)	cmol(+)/kg	2.30	4.90	7.44
Calcium (Amm-acet.)	cmol(+)/kg	0.73	1.2	4.7
Magnesium (Amm-acet.)	cmol(+)/kg	1.4	3.4	2.4
Sodium (Amm-acet.)	cmol(+)/kg	0.098	0.19	0.089
Potassium (Amm-acet.)	cmol(+)/kg	0.073	0.12	0.21
Available Potassium	mg/kg	29	46	80

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SUMMARY REPORT

John Merritt		Service Provider:	AGnVet Rural - Moura
		Advisor/Contact:	Christopher Dawson
Biloela		Phone:	0429 204 500
QLD 4715		Purchase Order:	0584

Analyte	Unit	Result	Result	Result
Aluminium (KCl)	cmol(+)/kg	<0.10	<0.10	<0.10
Aluminium % of Cations	%	<1	<1	<1
Calcium % of Cations	%	32	24	64
Magnesium % of Cations	%	61	69	32
Sodium % of Cations (ESP)	%	4.3	3.8	1.2
Potassium % of Cations	%	3.2	2.4	2.8
Calcium/Magnesium Ratio		0.52	0.35	2.0
Zinc (DTPA)	mg/kg	0.11	2.0	0.38
Copper (DTPA)	mg/kg	1.1	0.36	1.2
Iron (DTPA)	mg/kg	12	20	27
Manganese (DTPA)	mg/kg	20	12	39
Boron (Hot CaCl2)	mg/kg	0.37	0.21	0.55
Silicon (BSES)	mg/kg	290	190	490

The results in this report pertain only to the sample submitted. Analyses performed on soil dried at 40°C and ground to 2mm or less, excluding moisture tests, or as otherwise indicated. Analyses performed on plant dried at 70°C and ground to 1mm or less, excluding moisture tests, or as otherwise indicated. Water analyses performed on an 'as received' basis. Analytical results reported by the laboratory as 'less than' the level of reporting, will be deemed by NA Pro as being equivalent to the level of reporting for both calculation and interpretive purposes. This document shall not be reproduced except in full.

Disclaimer: Laboratory analyses and fertiliser recommendations are made in good faith, based on the best technical information available as at the date of this report. Incitec Pivot Limited, its officers, employees, consultants, Agents and Dealers do not accept any liability whatsoever arising from or in connection with the analytical results, interpretations and recommendations provided, and the client takes the analytical results, interpretations and recommendations on these terms. In respect of liability which cannot be excluded by law, Incitec Pivot's liability is restricted to the re-supply of the laboratory analysis or the cost of having the analysis re-supplied.

Table 23: Laboratory Results - page 1

eurofins | Environment Testing

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Ecoscope Environmental P/L
PO Box 3338
Rockhampton
QLD 4701

Attention: **Ecoscope Laboratory**

Report **1050675-W**
Project name GUMIGIL041223
Received Date Dec 05, 2023

Client Sample ID			G01 MARLBOROUGH CREEK 1	G01 MARLBOROUGH CREEK 2
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**B23-De0008778**	**B23-De0008779**
Date Sampled			**Dec 04, 2023**	**Dec 04, 2023**
Test/Reference	LOR	Unit		
Acidity (as CaCO3)	10	mg/L	< 10	< 10
Ammonia (as N)	0.01	mg/L	0.14	0.20
Chloride	1	mg/L	68	64
Conductivity (at 25 °C)	10	uS/cm	530	510
Fluoride	0.5	mg/L	< 0.5	< 0.5
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.06
Nitrate (as N)	0.02	mg/L	0.05	0.06
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02
Organic Nitrogen (as N)*	0.2	mg/L	0.86	0.5
pH (at 25 °C)	0.1	pH Units	7.9	8.1
Phosphate total (as P)	0.01	mg/L	< 0.01	0.04
Phosphorus reactive (as P)	0.01	mg/L	0.03	< 0.01
Reactive Silica (as SiO2)	2	mg/L	20	18
Sulphate (as S)	5	mg/L	< 5	< 5
Sulphate (as SO4)	5	mg/L	5.8	< 5
Sulphide (as S)	0.1	mg/L	< 0.1	< 0.1
Sulphite (as S)	0.5	mg/L	< 2.5	< 2.5
Thiosulphate (as S)	1	mg/L	< 5	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	430	360
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.0	0.7
Total Nitrogen (as N)*	0.2	mg/L	1.0	0.8
Total Sulphur (as S)	5	mg/L	< 5	< 5
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	17	40
Turbidity	1	NTU	4.0	10
Hardness mg equivalent CaCO3/L	5	mg/L	220	190
Alkalinity (speciated)				
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	180	170
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20
Total Alkalinity (as CaCO3)	20	mg/L	180	170
Heavy Metals				
Aluminium	0.05	mg/L	0.36	0.09
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05
Antimony	0.005	mg/L	< 0.005	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005	< 0.005

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ABN : 50 005 085 521 Telephone: +61 3 8564 5000
Date Reported: Dec 19, 2023
Page 1 of 13
Report Number: 1050675-W

Table 24: Laboratory Results - page 2

eurofins | Environment Testing

Client Sample ID			G01 MARLBOROUGH CREEK 1	G01 MARLBOROUGH CREEK 2
Sample Matrix			Water	Water
Eurofins Sample No.			B23-De0008778	B23-De0008779
Date Sampled			Dec 04, 2023	Dec 04, 2023
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.001	0.001
Arsenic (filtered)	0.001	mg/L	0.001	0.001
Barium	0.02	mg/L	0.04	0.04
Barium (filtered)	0.02	mg/L	0.04	0.03
Beryllium	0.001	mg/L	< 0.001	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001	< 0.001
Boron	0.05	mg/L	< 0.5	< 0.5
Boron (filtered)	0.05	mg/L	< 0.5	< 0.5
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.004	0.002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001	< 0.001
Copper	0.001	mg/L	0.002	0.002
Copper (filtered)	0.001	mg/L	0.002	0.002
Iron	0.05	mg/L	0.57	0.21
Iron (filtered)	0.05	mg/L	0.07	0.07
Lead	0.001	mg/L	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001
Manganese	0.005	mg/L	0.17	0.023
Manganese (filtered)	0.005	mg/L	< 0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005
Nickel	0.001	mg/L	0.017	0.013
Nickel (filtered)	0.001	mg/L	0.012	0.012
Selenium	0.001	mg/L	< 0.001	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001	< 0.001
Silver	0.005	mg/L	< 0.005	< 0.005
Silver (filtered)	0.005	mg/L	< 0.005	< 0.005
Tin	0.005	mg/L	< 0.005	< 0.005
Tin (filtered)	0.005	mg/L	< 0.005	< 0.005
Uranium	0.005	mg/L	< 0.005	< 0.005
Uranium (filtered)	0.005	mg/L	< 0.005	< 0.005
Vanadium	0.005	mg/L	0.010	0.009
Vanadium (filtered)	0.005	mg/L	0.006	0.007
Zinc	0.005	mg/L	< 0.005	< 0.005
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005
Alkali Metals				
Calcium	0.5	mg/L	5.8	5.4
Magnesium	0.5	mg/L	49	42
Potassium	0.5	mg/L	3.7	3.4
Sodium	0.5	mg/L	31	30

Date Reported: Dec 19, 2023 | Eurofins Environment Testing 6 Monterey Road, Dandenong South, Victoria, Australia 3175 ABN : 50 005 085 521 Telephone: +61 3 8564 5000 | Page 2 of 13 Report Number: 1060676-W

Table 25: Community Consultation

Date	Community Member	Contact Method	Information Provided	Summary of Discussion/issues	How issues were considered	Decisions Outcomes	Commitments
09/06/22	Landholder 1	Face to Face	Discussions of the plans and proposed rehabilitation of the sites	• Access tracks to remain post mining • Post mine land use • Infrastructure post mining.	Landholder happy with the extent of work undertaken by Gumigil to limit the impact of 60+ years of mining. LH was happy with the post mine land use as native bush, but insists that opportunistic cattle access to the site would not be blocked or an issue with that Land use	Confirmed retention of tracks upon discussion on which tracks to be kept	Retain sufficient tracks for site access
30/06/22	Landholder 2	Face to Face	Discussion on requirements of PRCP	Visual impact of Slopes	Manager has seen the change in the slopes in his 16years and is satisfied that the approach of the rehabilitation is good.	The outcomes of the rehabilitation will be related to him.	Final PRCP will be discussed
30/06/22	Landholder 3	Face to Face	Discussions on requirements of PRCP	Visual impact of slopes Control of sediment	The Kennies have been on Develin for 4 years. They can see the slopes in the distance and have wondered if controls were in place for control of the sediment. Informed of the sediment basins and controls	They have no objection to anything with the mine and are happy with a PRCP being drawn up	Final PRCP will be discussed
30/06/22	Landholder 4	Face to Face	Discussions on requirements of PRCP	Control of Sediment Future of the mine.	Sediment controls explained. Community would be advised before any further mining would be commenced	Happy to be kept informed	Final PRCP will be discussed
21/09/22	Landholder 5	Face to Face	Discussions on requirements of PRCP	Control of sediment Future of the mine	Steven has held Develin Creek for 40yrs and has seen the slopes transform from large scars to ones that are slowly emerging into the background. Sediment control explained	Happy to be kept informed	Final PRCP will be discussed
25/10/22	Landholder 6	Face to Face	Discussion on the future of the mine	The mine was considered good for the community when it was operating.	Satisfied that the approach was the correct one.	Happy to be kept informed.	Final PRCP will be discussed
27/10/22	Landholder 7	Phone call	Discussion on requirements of PRCP	Was not of a concern for Ross.	Satisfied the approach was the correct one	Happy to be kept informed.	Final PRCP will be discussed
11/23	Interested Person	Face to face	Discussion on requirements of PRCP	Interested in PRCP outcome	This was a brief conversation with Billy, As we move forward we will discuss more with the group.	Happy to be kept informed.	Final PRCP will be discussed.

Table 26: Rehabilitation Milestones

Milestone reference	Rehabilitation milestone	Milestone criteria
RM1	Site decommissioning	1.1 With the exception of any infrastructure to remain with written agreement from the landholder or for the purposes of rehabilitation, the following are complete: (a) All services disconnected, terminated and removed. (b) All buildings and any associated infrastructure demolished and removed off-site. (c) All roads, concrete areas and hardstand removed. (d) All machinery and equipment removed. (e) All dams filled in and decommissioned. (f) All rubbish and waste removed.
RM2	Remediation of Contaminated Land	2.1 Contaminated land investigation document completed in accordance with the EP Act including a site investigation report, and, where required, a validation report and/or a draft site management plan. 2.2 Contaminated and hazardous material either remediated in-situ or removed/transported to a facility lawfully able to accept the material. 2.3 A SQP certifies that no contamination unsuitable for the post-mining land use remains or is occurring.
RM3	Landform development and reshaping	**Applicable to all rehabilitation areas:** 3.1 All earthworks completed after 2025 are in accordance with the design specification from an AQP. 3.2 Erosion and sediment control systems installed post closure are in accordance with the design specification from an AQP. **Slopes:** 3.3 Landform slopes achieve the following: (a) Tops ≤ 25% (RA1). (b) Sediments (gullies) ≤ 17% (RA3). (c) Sediment dam walls ≤ 33% (RA3). (d) Exploration pits, tracks and maintenance and infrastructure areas at the natural surface (RA2). 3.4 Independent AQP has surveyed the final landform and certified that **RM3.1 – RM3.3** (inclusive) have been achieved.
RM5	Revegetation (Native Ecosystem)	**Eastern Cut Top (RA2)** 5.1 Seeding of all surfaces completed using a rehabilitation mix comprising of the species permitted. 5.2 Hay mulch to a minimum depth of 10mm **Eastern Cut Sediment Gullies and Sediment Basins (RA4)** 5.3 Seeding and/or the strategic planting of tubestock on areas disturbed after 2025 to decommission sediment and sediment basins completed comprising of the species permitted in accessible areas. **Exploration Pits, Tracks, Maintenance and Infrastructure Areas (RA3)** 5.4 Seeding of all surfaces completed using a rehabilitation mix comprising the species permitted. **Applicable to all rehabilitation areas** 5.5 Independent AQP has certified the achievement of **RM5.1 – RM5.4** (inclusive).

Milestone reference	Rehabilitation milestone	Milestone criteria
RM6	Achievement of surface conditions	6.1 Total groundcover (combination of understorey vegetative cover, other organic material (i.e. sticks, leaf litter) and inorganic material (i.e. rocks) falls within the range of that occurring among the array of analogous sites as listed in Table 16: Analogue Site Location. 6.2 Dominant native tree, shrub and ground layer species that define the pre-mining ecosystem are established and natural recruitment of native species is evidenced. 6.3 Introduced species classified as category 3 weeds as per the *Biosecurity Act 2014* comprise ≤ 5% vegetative cover, confirmed by an AQP in annual monitoring. 6.4 No evidence of erosion classified as 'moderate' or 'severe'. 6.5 An AQP considers that any erosion present will not compromise the achievement of the PMLU to a stable condition. 6.6 All erosion requiring intervention has been remediated. 6.7 To identify necessary sediment dam maintenance and confirm the stable condition of the faces and readiness of sediment dams to be removed, all sediment dams must be: (a) Inspected quarterly, and (b) Inspected within two (2) weeks of a >75mm daily rainfall being recorded at the Marlborough Creek gauging station (-22.9679, 149.8693), and (c) Photo monitored annually. 6.8 To confirm that no sediment is being transported from gullies 1, 2, 3, 4, 5, 6 or 7 (beyond that which naturally occurs), cross section monitoring for sediment deposition must be undertaken at three (3) locations on Marlborough Creek downstream of gully 4 every ten (10) years. 6.9 Surface water runoff is non-polluting to receiving waters and complies with Table 5 – Surface water quality limits (PRCP_EPML00421413_V1). 6.10 An Independent AQP has certified the achievement of **RM6.1** – **RM6.9** (inclusive).
RM7	Achievement of post mining land use to a stable condition (native ecosystem)	7.1 Final landform survey confirms no infrastructure, including any matters listed in RM1, remains with the exception of any infrastructure agreed to remain with written agreement from the landholder. 7.2 A hazard assessment has been completed by an AQP and confirms that safety hazards in rehabilitated areas are not significantly different to surrounding unmined landscapes subject to the same land use. 7.3 The land is structurally and erosionally stable. 7.4 Sediment basins have been decommissioned and are stable and non-polluting. 7.5 Vegetation surveys demonstrate that native tree, shrub and vegetative ground cover, and native tree, shrub and ground layer species richness are within the range of, or exceed, that among the array of analogous sites specified in Table 16: Analogue Site Location. 7.6 An AQP certifies that rehabilitation areas have a vegetative structure and native species composition that falls within the range of, or exceeds, that occurring among the array of analogous sites specified in Table 16: Analogue Site Location. 7.7 All rehabilitation areas are certified by an AQP as achieving the relevant land suitability classification (conservation) in Table 14: Completion criteria - Land Suitability (Conservation) classes. 7.8 Surface water quality results monitored monthly during flow at, but not limited to, the locations specified in EA must not exceed the limits in Table 5 – Surface water quality limits of the Schedule (PRCP_EPML00421413_V1) for a minimum of 5 consecutive years. 7.9 Independent AQP certifies achievement of RM7.1 – RM7.8 (inclusive).

Table 27: RA1timeframes

<table>
<tr><th colspan="3">Post-mining land uses (PMLU)</th></tr>
<tr><td colspan="2">**Rehabilitation area**</td><td>RA1</td></tr>
<tr><td colspan="2">**Relevant activities**</td><td>Western Cut Top, Sediments and Sediment Basins (gullies 6 and 7)</td></tr>
<tr><td colspan="2">**Total rehabilitation area size (ha)**</td><td>10.2</td></tr>
<tr><td colspan="2">**Commencement of first milestone: RM1**</td><td>10/12/2035</td></tr>
<tr><td colspan="2">**PMLU**</td><td>Native Ecosystem</td></tr>
<tr><td>**Date area is available**</td><td>10/12/2035</td><td></td></tr>
<tr><td>**Cumulative area available (ha)**</td><td>10.2</td><td>10.2</td></tr>
<tr><td>**Milestone completed by**</td><td>10/12/2036</td><td>10/12 /2041</td></tr>
<tr><td>**Milestone Reference**</td><td colspan="2">**Cumulative area achieved (ha)**</td></tr>
<tr><td>**RM6**</td><td>10.2</td><td></td></tr>
<tr><td>**RM7**</td><td></td><td>10.2</td></tr>
</table>

Table 28: RA2 timeframes

Post-mining land uses (PMLU)						
Rehabilitation area	RA2					
Relevant activities	Eastern Cut Top					
Total rehabilitation area size (ha)	16.6					
Commencement of first milestone: RM1	10/12/2100					
PMLU	Native Ecosystem					
Date area is available	10/12/2100			10/12/2136		10/12/2145
Cumulative area available (ha)	5.0	5.0		16.6	16.6	16.6
Milestone completed by	10/12/2101	10/12/2111	10/12/2135	10/12/2137	10/12/2144	10/12/2146
Milestone Reference	**Cumulative area achieved (ha)**					
RM1	5.0			16.6		
RM2	5.0			16.6		
RM3	5.0			16.6		
RM4	5.0			16.6		
RM5	5.0			16.6		
RM6		5.0			16.6	
RM7			5.0			16.6

Table 29: RA3 timeframes

Post-mining land uses (PMLU)			
Rehabilitation area		RA3	
Relevant activities		Exploration Pits, Infrastructure, Maintenance Areas and Access Tracks	
Total rehabilitation area size (ha)		5.0	
Commencement of first milestone: RM1		10/12/2136	
PMLU		Native Ecosystem	
Date area is available	10/12/2136		
Cumulative area available (ha)	5.0	5.0	5.0
Milestone completed by	10/12/2137	10/12/2141	10/12/2146
Milestone Reference	**Cumulative area achieved (ha)**		
RM1	5.0		
RM2	5.0		
RM3	5.0		
RM4	5.0		
RM5	5.0		
RM6		5.0	
RM7			5.0

Table 30: RA4 timeframes

Post-mining land uses (PMLU)			
Rehabilitation area		RA4	
Relevant activities		Eastern Cut Sediments and Sediment Basins (gullies 1, 2, 3, 4 and 5)	
Total rehabilitation area size (ha)		14.9	
Commencement of first milestone: RM1		10/12/2100	
PMLU		Native Ecosystem	
Date area is available	10/12/2126		
Cumulative area available (ha)	14.9	14.9	14.9
Milestone completed by	10/12/2127	10/12/2138	10/12/2169
Milestone Reference	**Cumulative area achieved (ha)**		
RM1	14.9		
RM2	14.9		
RM3	14.9		
RM4	14.9		
RM5	14.9		
RM6		14.9	
RM7			14.9

Table 31: Management Milestones

Milestone reference	Management milestone	Milestone criteria
MM1	Achievement of landform design and surface requirements	**Faces** MM1.1 Slopes of faces do not exceed angle of repose. MM1.2 Erosion and sediment control structures, if required, have been installed and are operating as designed to minimise instability of the landform from erosion. MM1.3 Drainage measures and structures have been installed and are directing overland flow from the tops away from the faces. **Pit Walls** MM1.4 Overall slope ≤ 200%. MM1.5 A minimum of 200mm of overburden on benches for pits wall constructed after 30 September 2025. MM1.6 Seeding of all bench surfaces after 30 September 2025 completed using a rehabilitation mix derived from the species permitted. MM1.7 Independent AQP certifies achievement of **MM1.1 to MM1.6** (inclusive).
MM2	Achievement of sufficient improvement	**Faces** MM2.1 The safety of Faces for humans, livestock and wildlife is consistent with similar slopes in the surrounding landform. MM2.2 An AQP certifies that the vegetation on faces is dominated by native species occurring in the array of analogue sites specified in Table 16: Analogue Site Location and includes endemic species and/or species of conservation significance. **Pit Walls** MM2.3 An AQP certifies that the vegetation on the pit wall benches is dominated by native species occurring in the array of analogue sites specified in Table 16: Analogue Site Location and includes endemic species and/or species of conservation significance. MM2.4 No evidence of erosion classified as 'moderate' or 'severe' is evident in pit wall batters or benches. **All improvement areas** MM2.5 All improvement areas are certified by an AQP as achieving the relevant land suitability classification (conservation) in Table 13: Land Suitability (Conservation) Goals MM2.6 All improvement areas are erosionally stable such that they will not negatively impact on the stability of any adjacent or downstream undisturbed areas or rehabilitation areas, or rehabilitation areas' ability to retain its PMLU. MM2.7 A geotechnical stability assessment will be undertaken by a AQP and will be certified as: (a) being consistent with accepted engineering standards and methodologies that are appropriate to the reasonably foreseeable consequences of instability, and (b) demonstrating that geotechnical instability is unlikely to negatively impact on the stability of any adjacent or downstream undisturbed areas or rehabilitation areas, or rehabilitation areas' ability to retain its PMLU. MM2.8 Independent AQP certifies achievement of MM2.1 to MM2.7 (inclusive).

Table 32: IA1

Non-use management area (NUMA)				
Improvement area	IA1			
Relevant activities	Faces (1, 2, 3 4, 5 ,6 and 7)			
Total size (ha)	23.2			
Commencement of first milestone: MM1	10/12/2025			
NUMA	Non-Use Management Area			
Date area is available	10/12/2035		10/12/2100	
Cumulative area available (ha)	7.6	7.6	23.2	23.2
Milestone completed by	10/12/2036	10/12/2041	10/12/2101	10/12/2114
Milestone Reference	**Cumulative area achieved (ha)**			
MM1	7.6		23.2	
MM2		7.6		23.2

Table 33: IA2

Non-use management area (NUMA)		
Improvement area	IA2	
Relevant activities	Pit walls	
Total size (ha)	2.1	
Commencement of first milestone: MM1	10/12/2132	
NUMA	Non-Use Management Area	
Date area is available	10/12/2136	
Cumulative area available (ha)	2.1	2.1
Milestone completed by	10/12/2137	10/12/2146
Milestone Reference	**Cumulative area achieved (ha)**	
MM1	2.1	
MM2		2.1

Table 34: Risk Matrix

		Likelihood				
		Rare	Unlikely	Possible	Very likely	Extremely Likely
Consequence	Major	5	10	15	20	25
	Significant	4	8	12	16	20
	Moderate	3	6	9	12	15
	Minor	2	4	6	8	10
	Low	1	2	3	4	5

Very high risk
High risk
Moderate risk
Low risk

Table 35: Risk Register

	Overview of Current Controls, Measures & Actions In Place	Maximum Probable Outcome (With Current Control Measures)		
Risk / Threat (Aspect)		**CONSEQUENCE**	**LIKELIHOOD**	**CURRENT RISK**
Failure of rehabilitation to achieve rehabilitation milestones				
Skeletal topsoil unable to be recovered prior to disturbance limiting rehabilitation success	Trials have demonstrated that rehab can be established without topsoil if the rehab methodology is followed; Conservative stripping volumes have been assumed and topsoil placed in strips to maximize value of resource	Minor	Unlikely	Low
Spoil physical and chemical characteristics prevent/limit establishment of tree and shrub layer	Spoil amelioration for establishment by the application of lime (to address the Ca/Mg imbalance) and general fertilizer will temporarily improve fertility of soil in contact with establishing seedlings	Minor	Unlikely	Low
Seed mix is unsuitable for the locality	Use seed from locally occurring species only; Species mix selected tailored to rehabilitation objective	Minor	Unlikely	Low
Failure of establishment due to climate and time of year for planting	Trials have demonstrated that successful establishment and natural regeneration of the local vegetation occurs in all seasons and all years in all domains. - 60 years of evidence	Minor	Possible	Moderate
Weeds – species not endemic to the area establish in rehab areas	Only locally occurring species selected for seed mix Spoil amelioration targets establishment phase ensuring that in the long term the spoil profile continues to be hostile (chemical, physical and low water holding capacity) to species not endemic to the area Wash down of machinery coming onto site.	Significant	Rare	Low
Bush fire affecting disturbed areas that have regenerated	Existing rehabilitation has been subject to fire on two occasions with the plant assemblages proving resilient and post fire showing no lasting impact	Low	Possible	Low
Periods of drought impacting on the naturally regenerated plant assemblages	Initial monitoring and observations demonstrate that the disturbed areas of the mine site naturally regenerate and continue to	Low	Very Likely	Low

	evolve into mature novel ecosystems.			
Species of significance fail to establish in rehabilitation	Seed or propagules of species of significance have been introduced successfully into rehabilitation areas; Monitoring has demonstrated that species of significance will establish naturally in rehabilitation areas.	Low	Possible	Low
Failure to achieve rehab objectives in scheduled timeframe	Trials and observations of rehabilitated areas undertaken to quantify length of time required to achieve rehab objectives	Moderate	Unlikely	Moderate
Remobilisation of sediment in sediment ponds when head cuts advance through the sediment basin wall and into sediment	Stabilisation of sediment in basins by rapid establishment of vegetation prior to allowing failure. On-going monitoring of failed sediment basin during operational phase to demonstrate failure mode is stable.	Significant	Unlikely	Moderate
Future mining of the current Eastern Cut Tops with extension on of mining to the north impacting on the stability of the current landform.	All waste to be dumped within current void and footprint of future mining; Proposed landform drains surface runoff on the Tops away from Face down natural landform to the south; Stage mining will permit early rehabilitation of the existing area of Tops Monitoring of current domains of Tops and Terraced Pit Walls has demonstrated that revegetation has been successful with introduction of plants of conservation significance.	Significant	Unlikely	Moderate
Climate change impacts	completion criteria aligned with nearby analogue sites	Moderate	Unlikely	Moderate
Overburden has high levels of micro-nutrient e.g. Nickel and Cobalt	Local plants have evolved and adapted to this environment. Local provenance will harvested and spread on rehab surface	Minor	Unlikely	Low
Failure of engineered structures i.e. sediment basins. Bunding around edges of Faces is considered part of the final landform.	Design, inspection, maintenance and repair by suitably qualified persons whilst the structures are incorporated in the rehabilitation phase. Gumigil commits to decommission sediment	Low	Very Likely	Low

	basins prior to submission of Rehab Areas for certification.			
Decontamination of site required due to hydrocarbon contamination	Mining ceased in 2005 with no contamination visible on site. Future mining will store hydrocarbons in above ground storage with all waste removed from site	Minor	Unlikely	Low
Failure of the NUMA to achieve agreed management milestones				
Spoil physical and chemical characteristics prevent/limit establishment of tree and shrub layer	Vegetation growth on gully 7 Faces and benches on existing pit walls demonstrate that establishment and survival of vegetation occurs	Minor	Unlikely	Low
Weeds – species not endemic to the area establish on NUMAs	Overburden is hostile (chemical, physical and low water holding capacity) to species not endemic to the area	Significant	Rare	Low
Bush fire affecting disturbed areas that have regenerated	Faces 6 and Face 7 have been subject to fire on two occasions with the plant assemblages proving resilient and post fire showing no lasting impact	Low	Possible	Low
Periods of drought impacting on the naturally regenerated plant assemblages	History of regeneration over 50 years demonstrate that the disturbed areas of the mine site naturally regenerate and continue to evolve into mature novel ecosystems	Low	Very Likely	Low
Species of significance fail to establish in rehabilitation	Monitoring has demonstrated that species of significance have established on gully 7 Face	Low	Possible	Low
Failure to achieve milestone criteria	Western Cut Faces and existing pit walls have demonstrated that milestone criteria can be achieved	Moderate	Unlikely	Moderate

Climate change impacts	Milestone criteria contain limited vegetation objectives. Achievement of these objectives have been observed in older areas.	Moderate	Unlikely	Moderate
Overburden has high levels of micro-nutrient e.g. Nickel and Cobalt	Local plants have evolved and adapted to this environment	Minor	Unlikely	Low

14. Figures

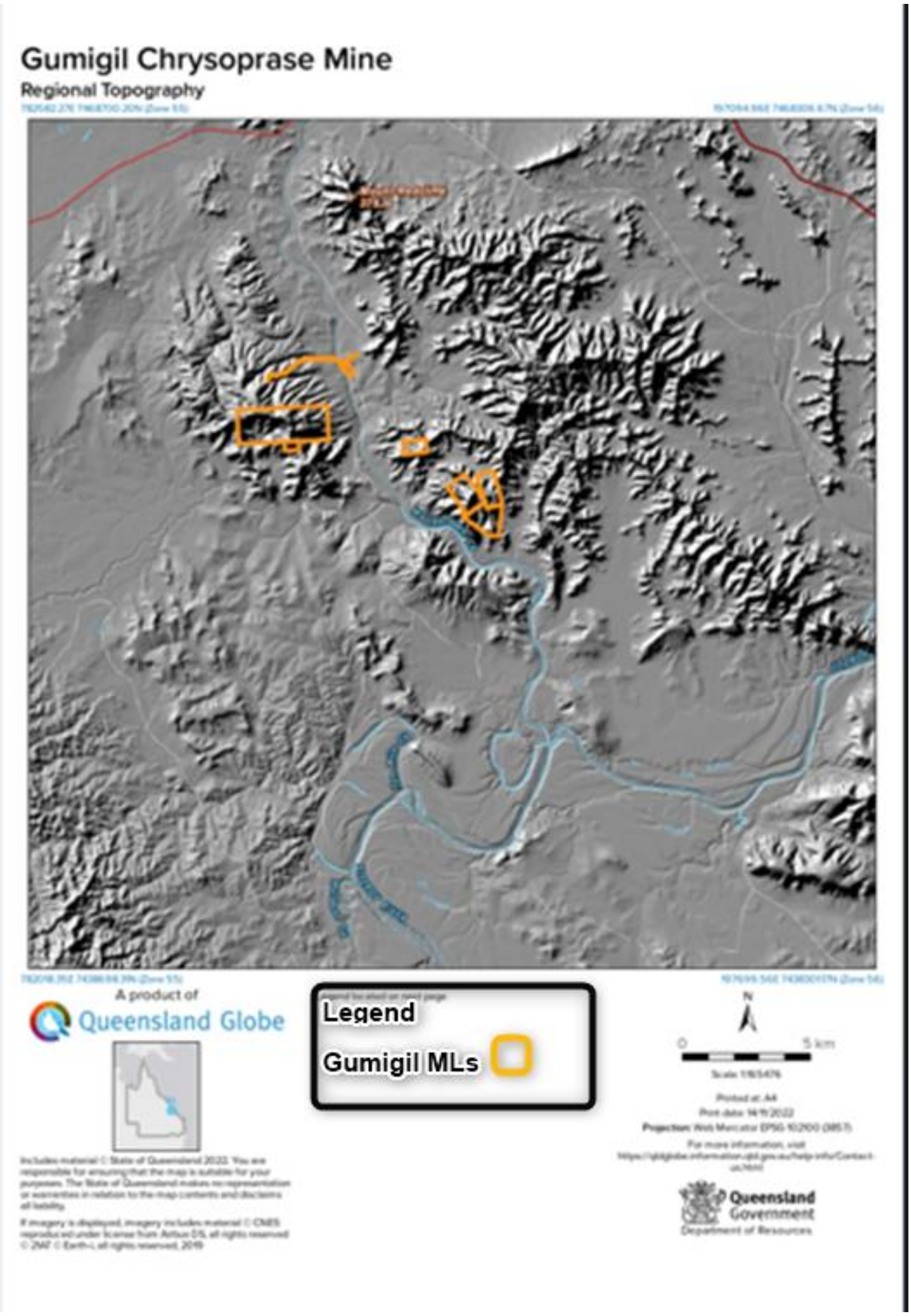


Figure 33: Regional Topography

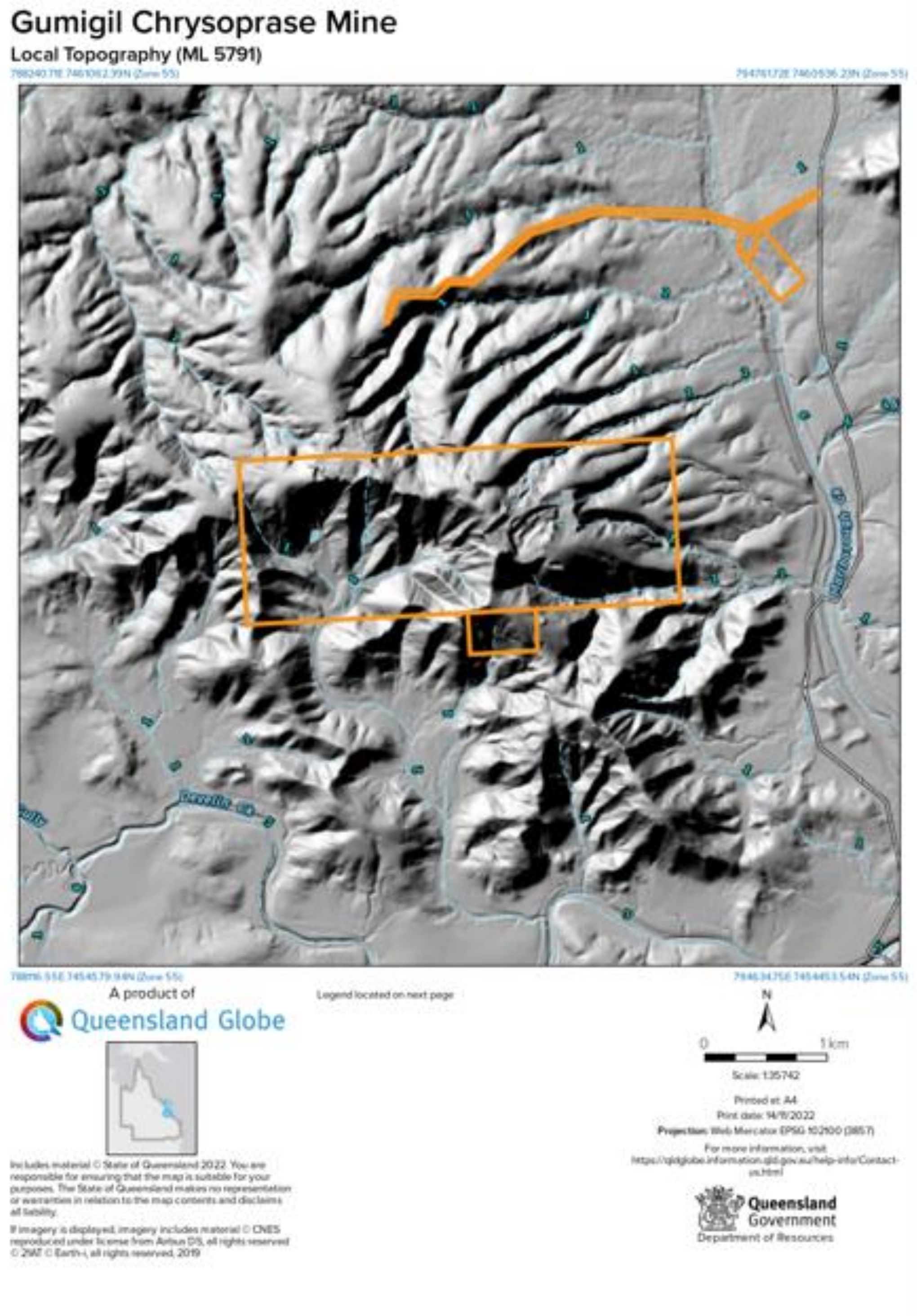


Figure 34: Localised Topography

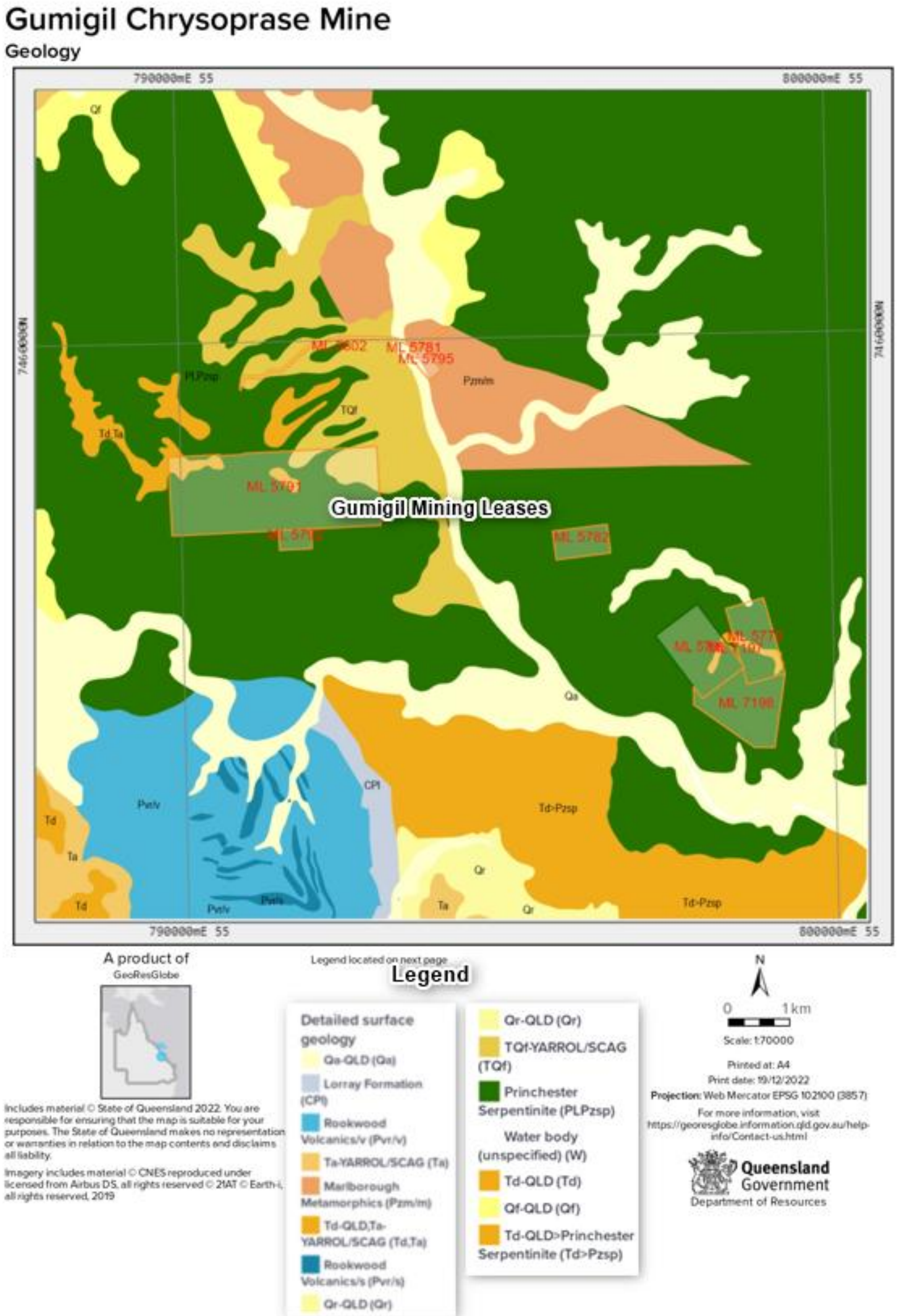


Figure 35: Geology

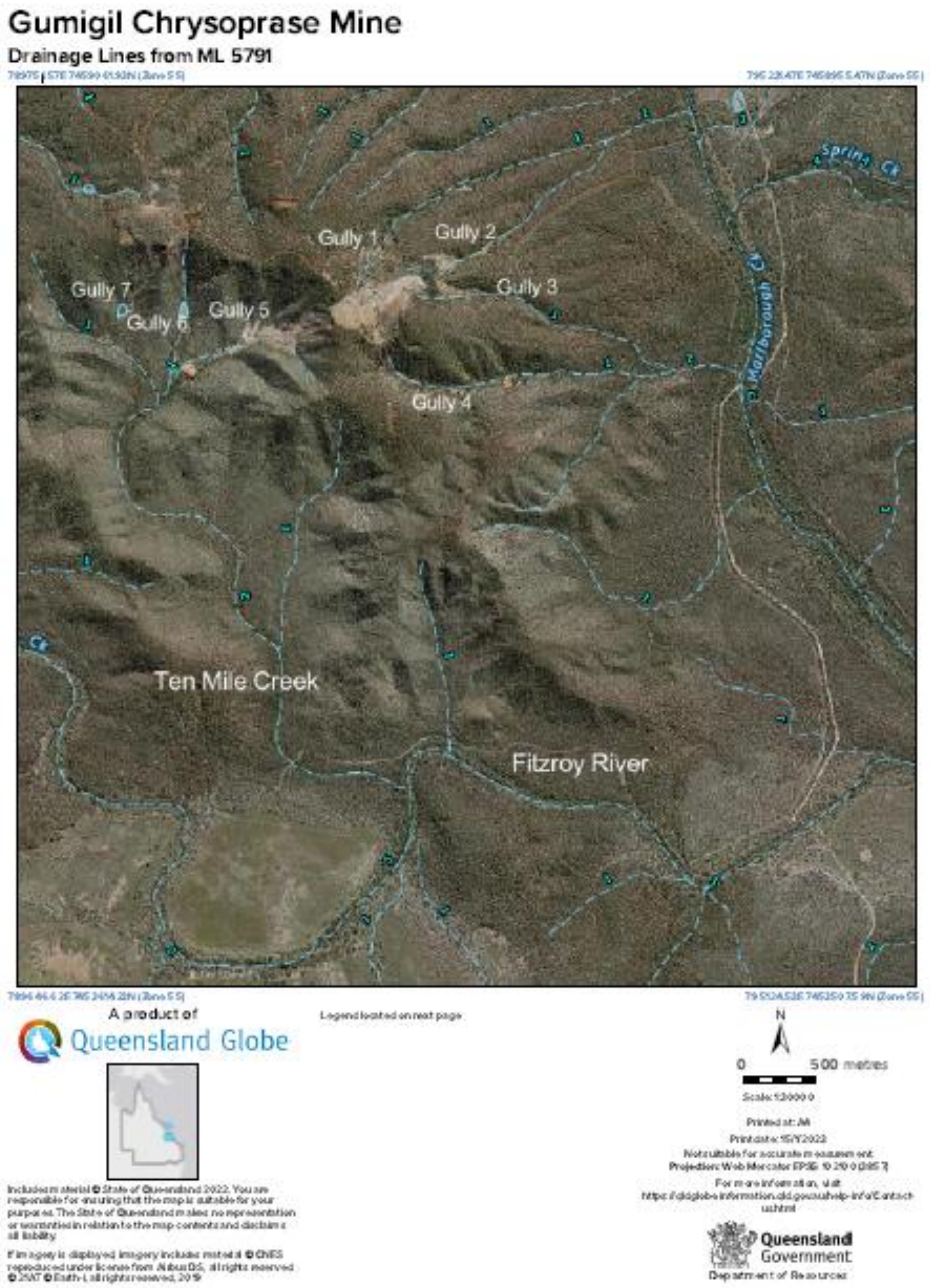


Figure 36: Regional Streams

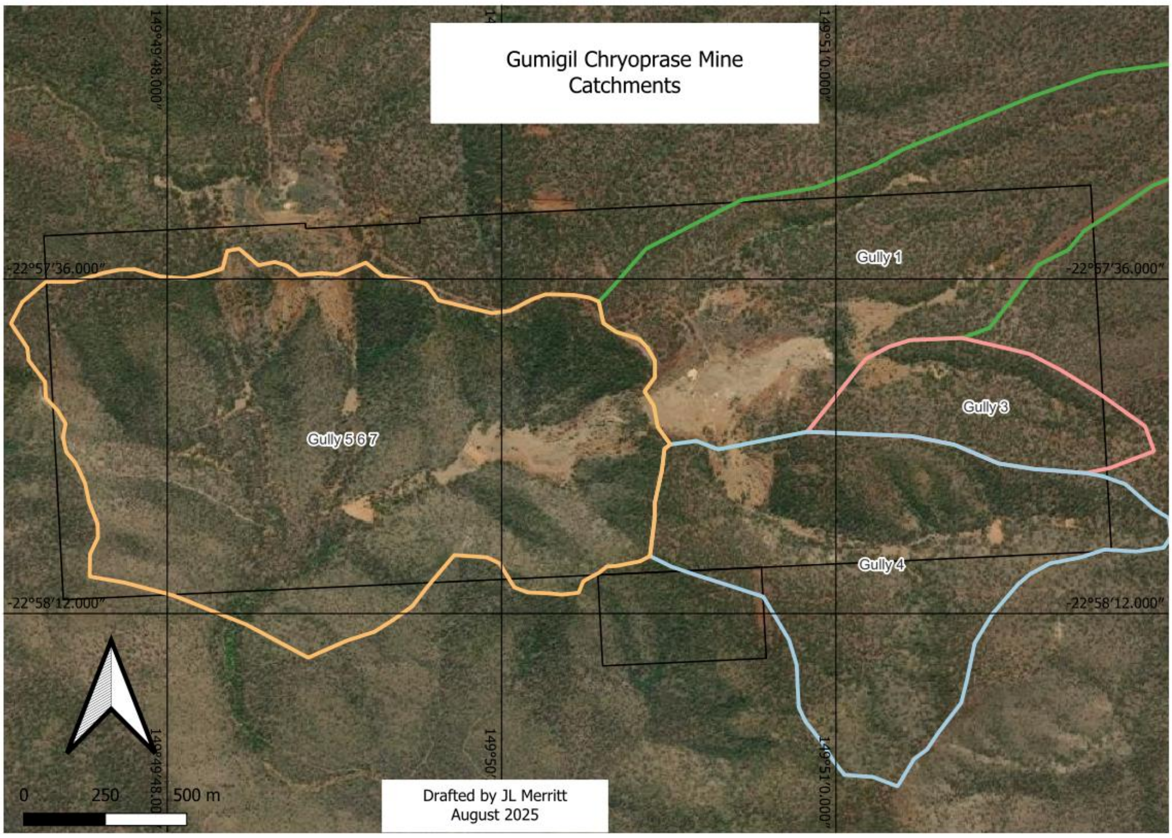


Figure 37: Gully Catchments

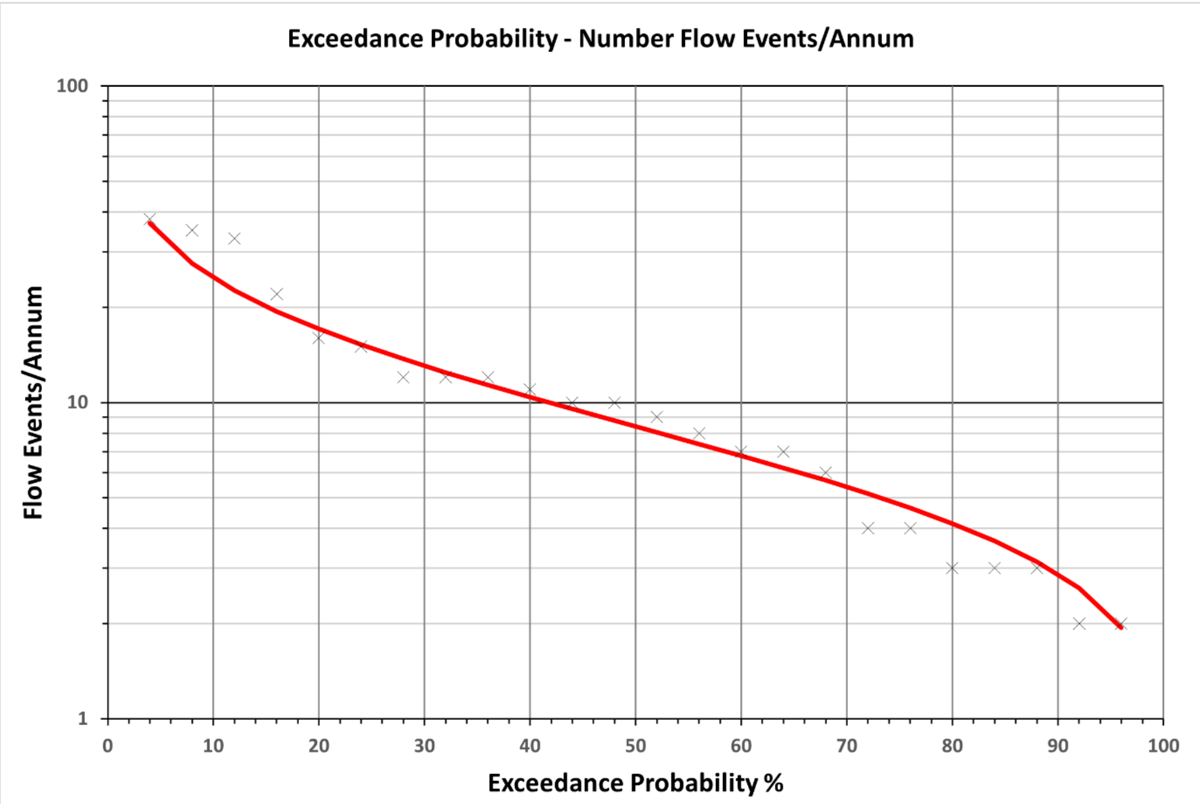


Figure 38: Exceedance Probability – No of Flows/Annum

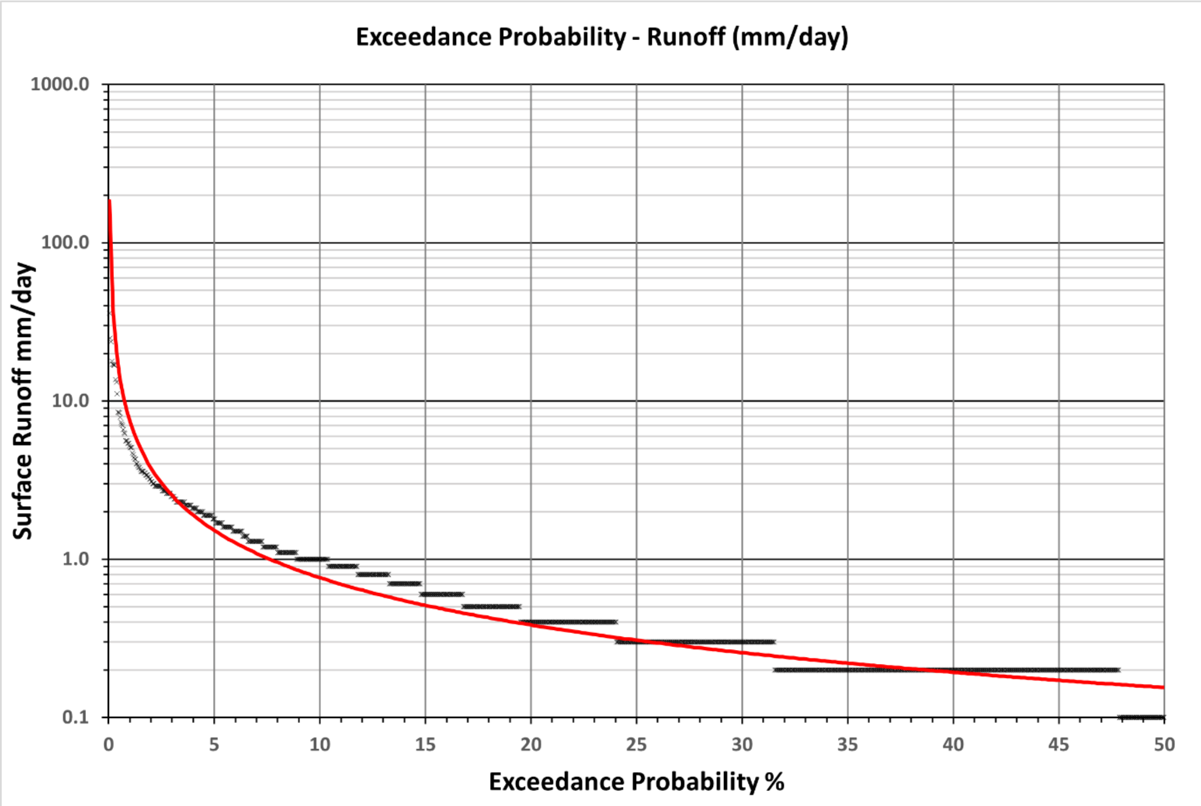


Figure 39: Exceedance Probability - Runoff (mm/day)

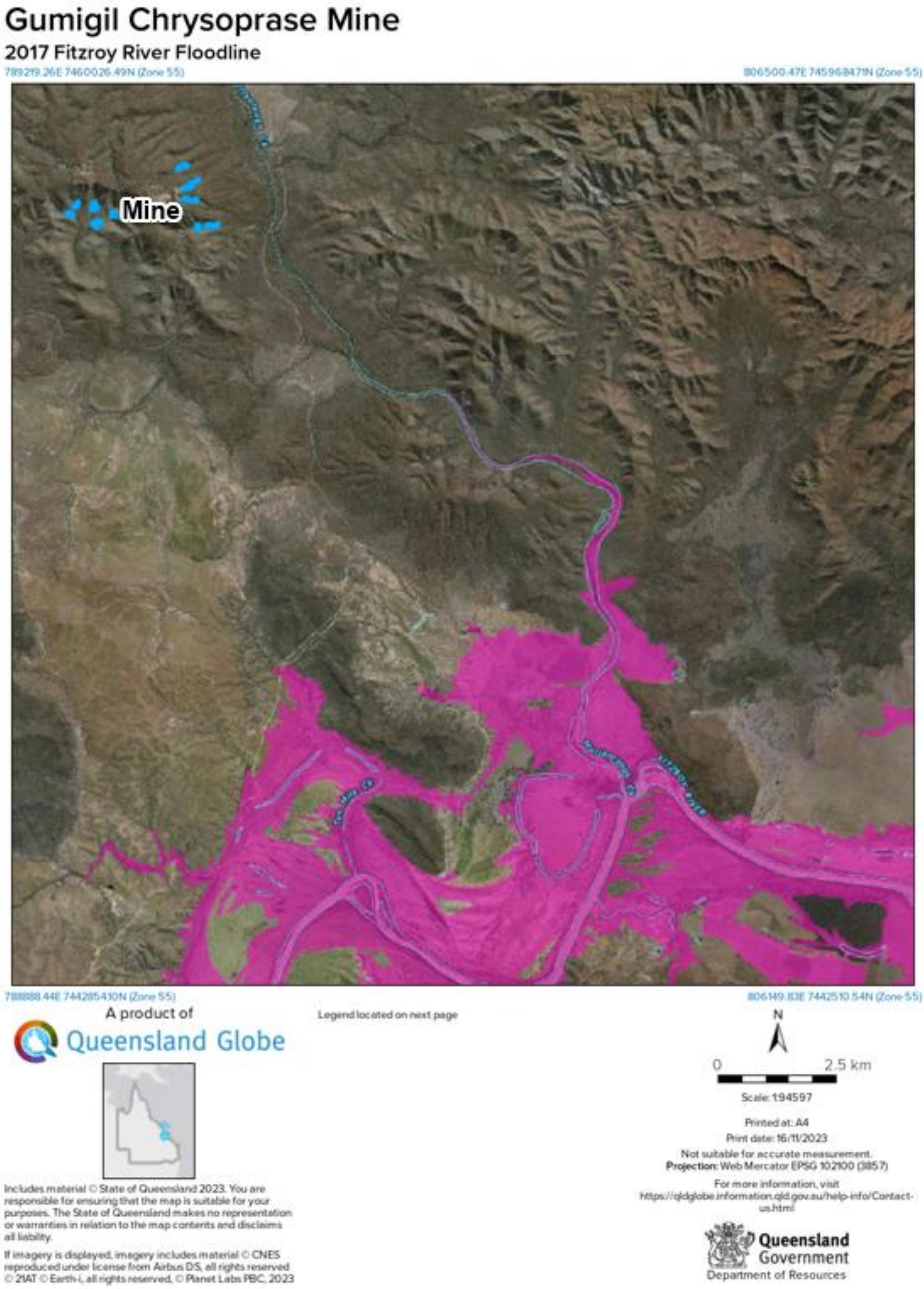


Figure 40: 2017 Fitzroy River floodline

Figure 41: Mine Elevation

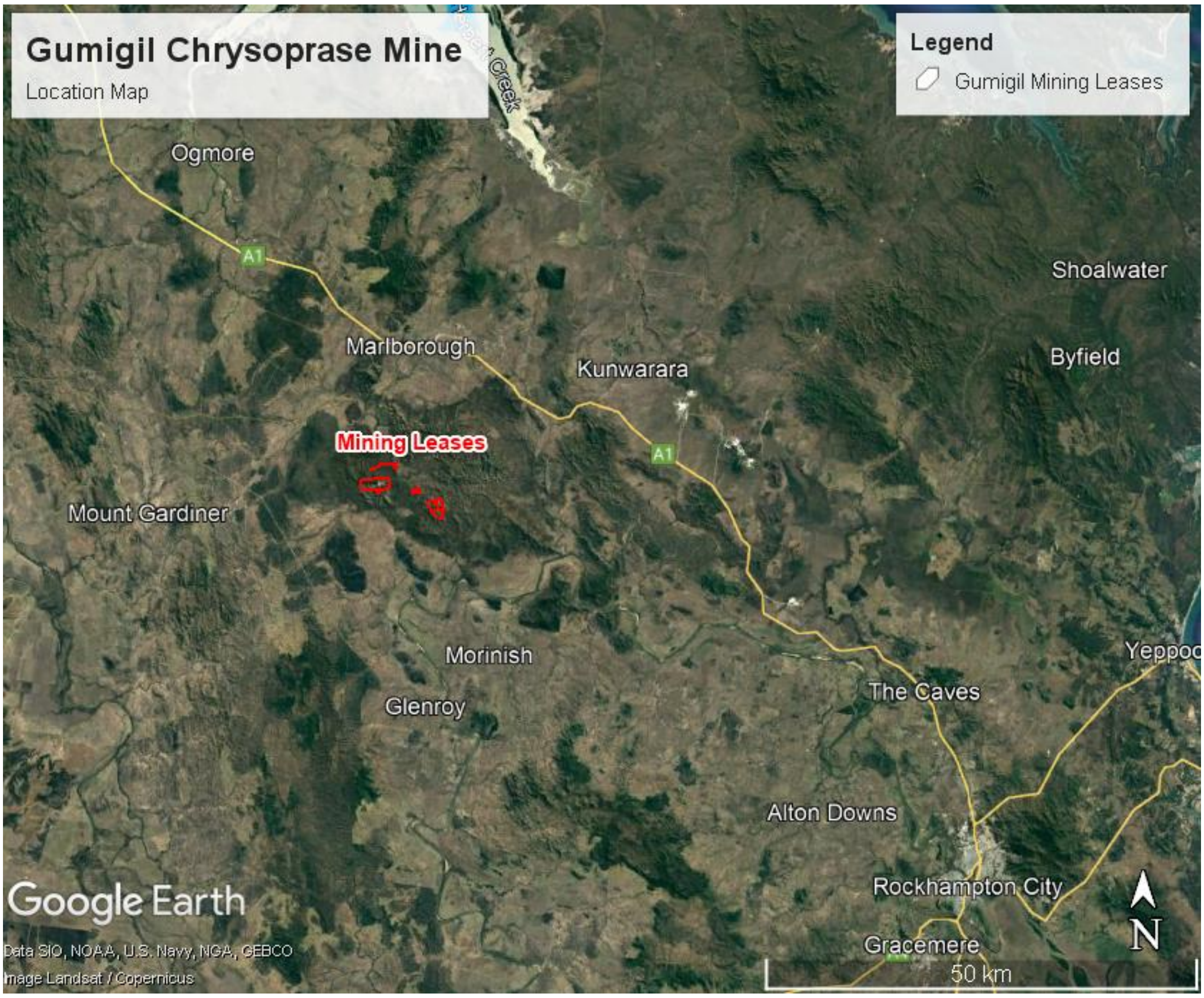


Figure 42: Location

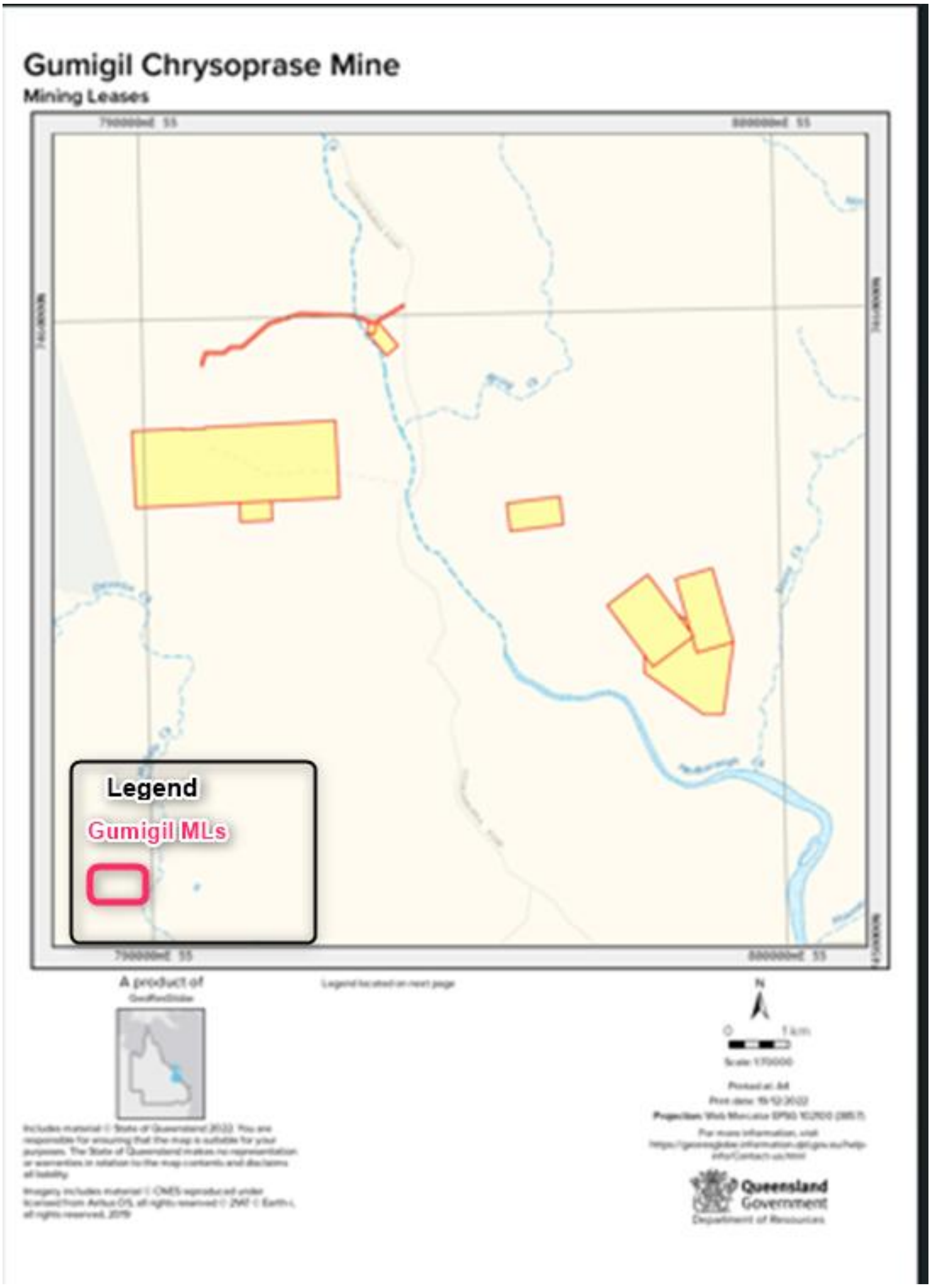


Figure 43: Gumigil Mining Leases

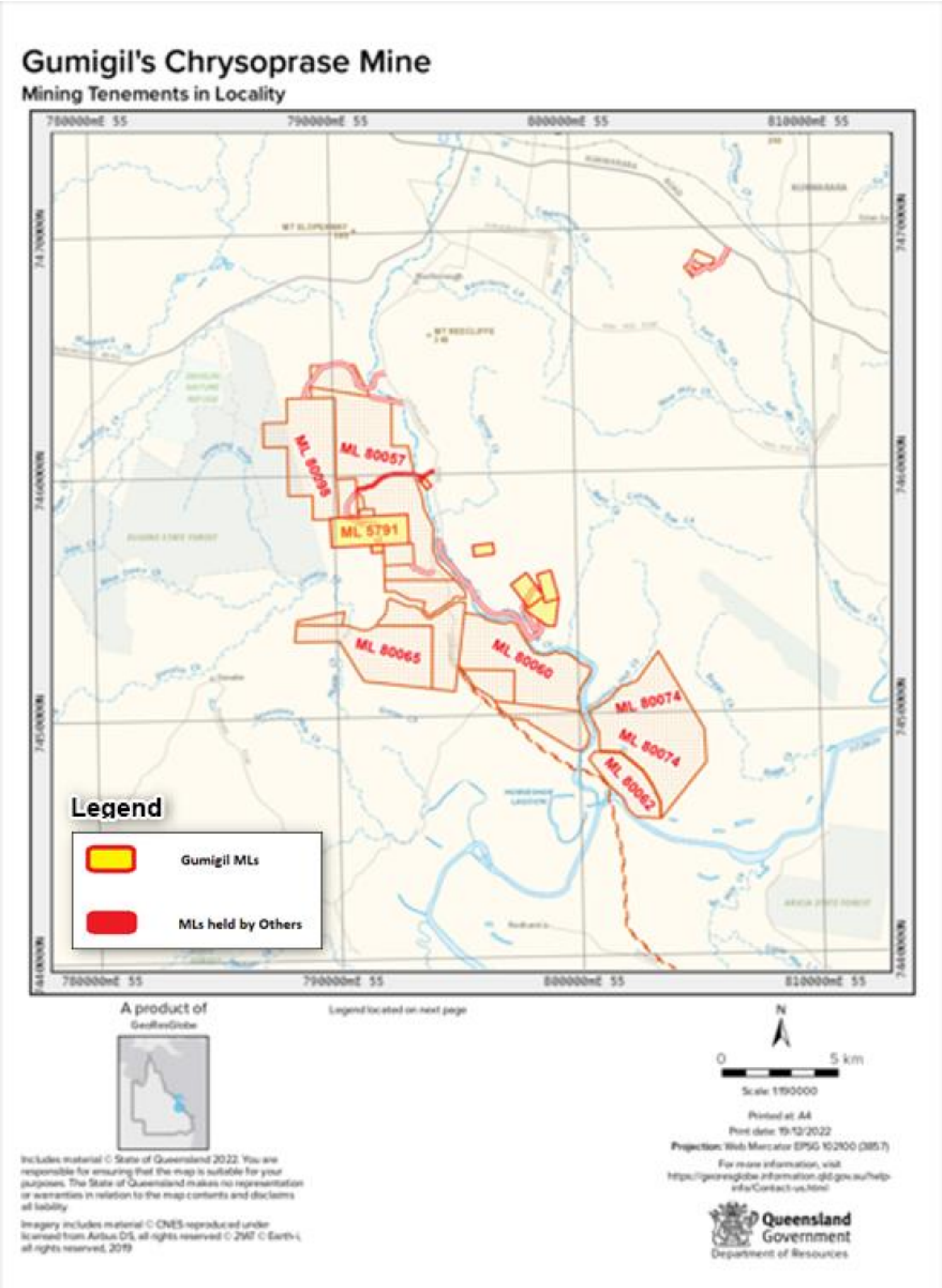


Figure 44: All Mining Tenements

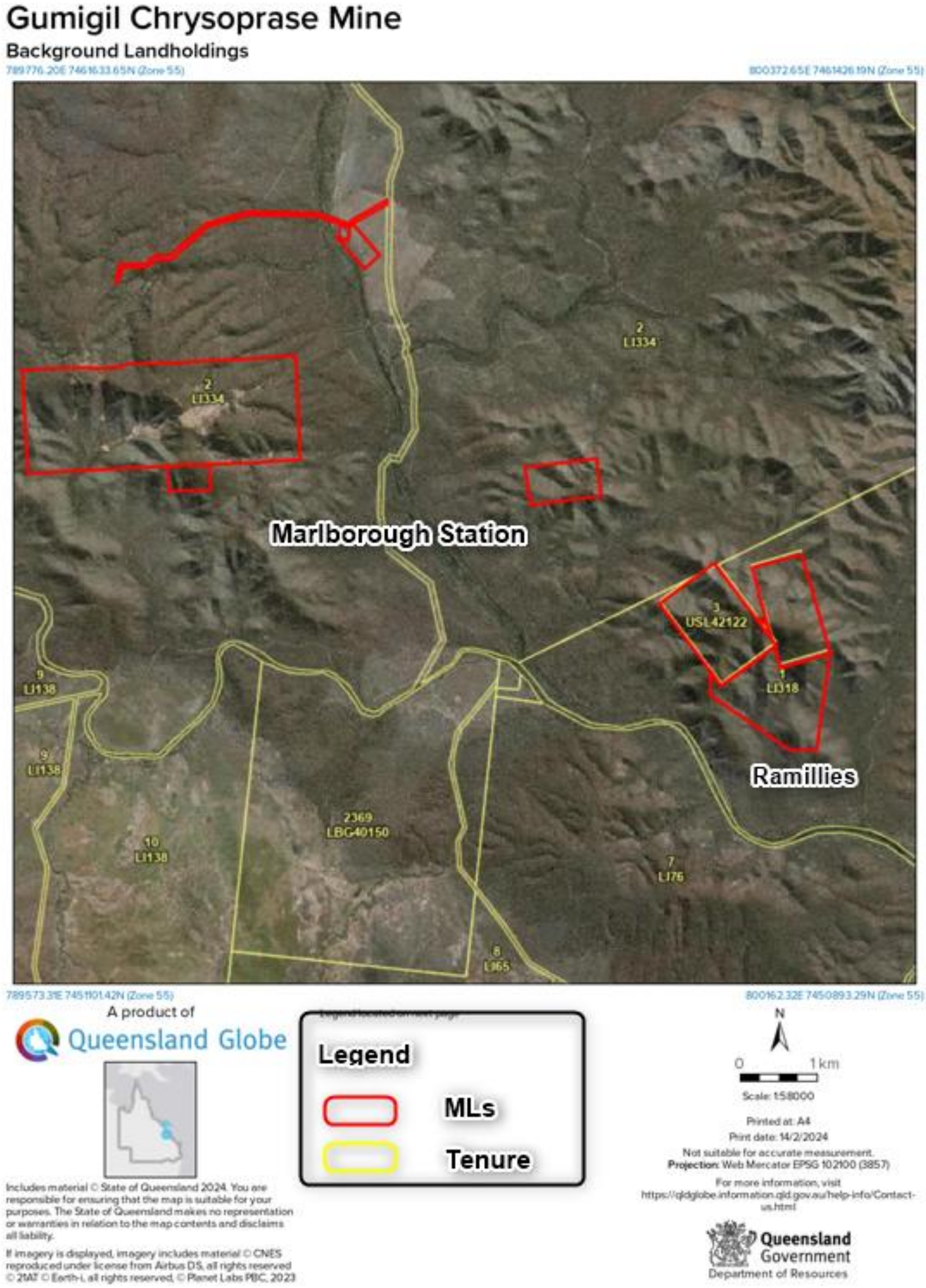


Figure 45: Background Landholders

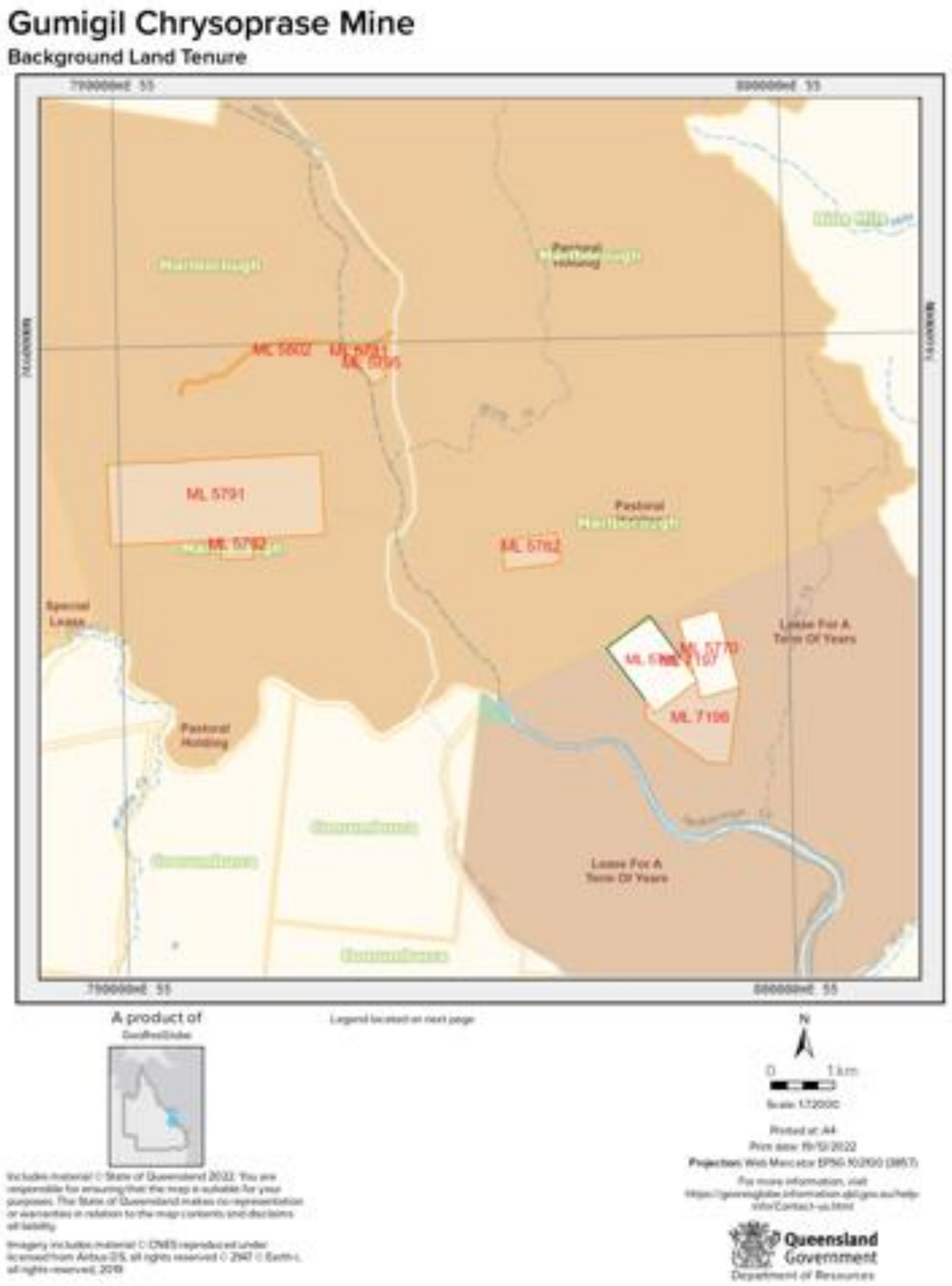


Figure 46: Background Land Tenure

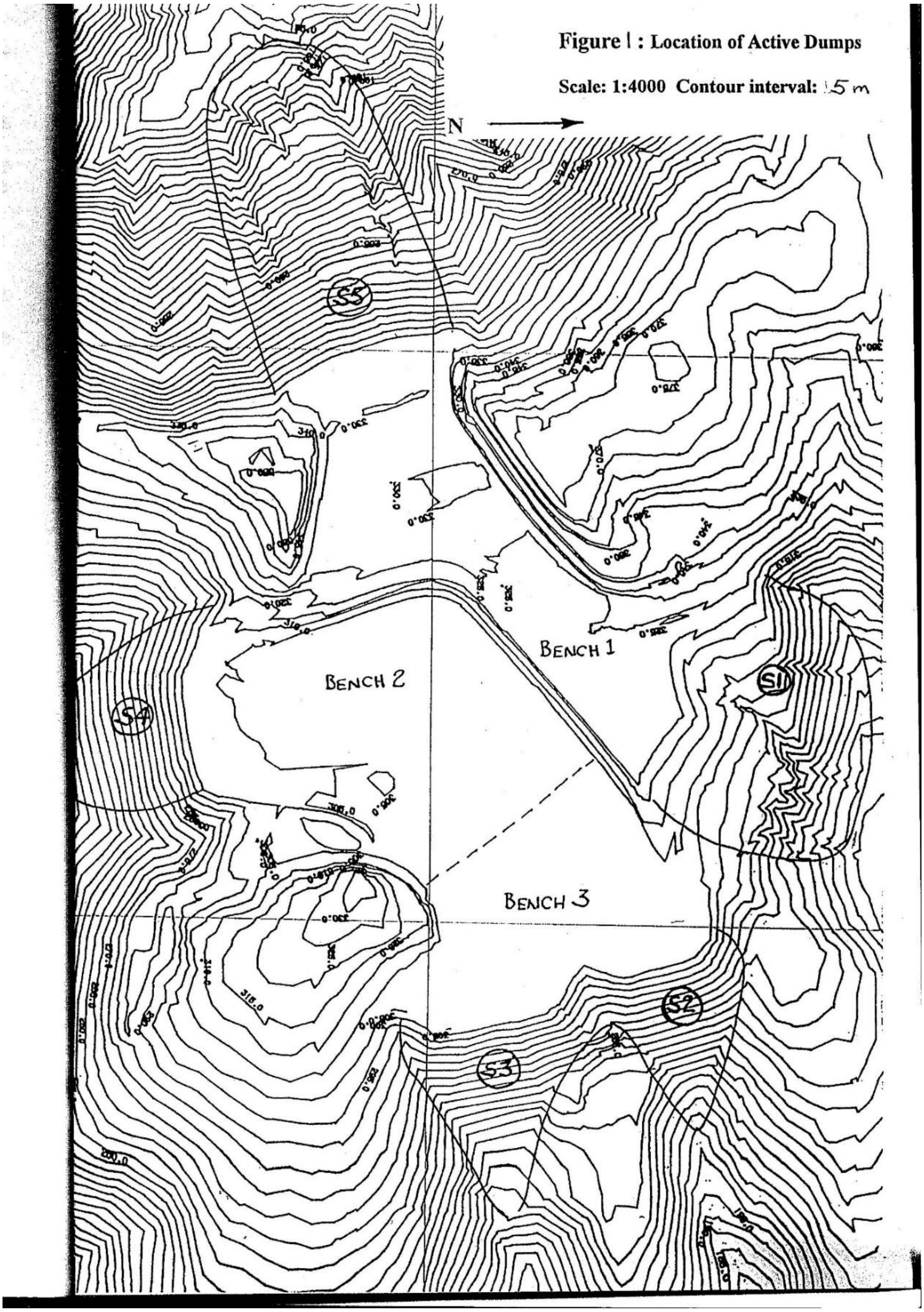


Figure 47: Eastern Cut Bench Location

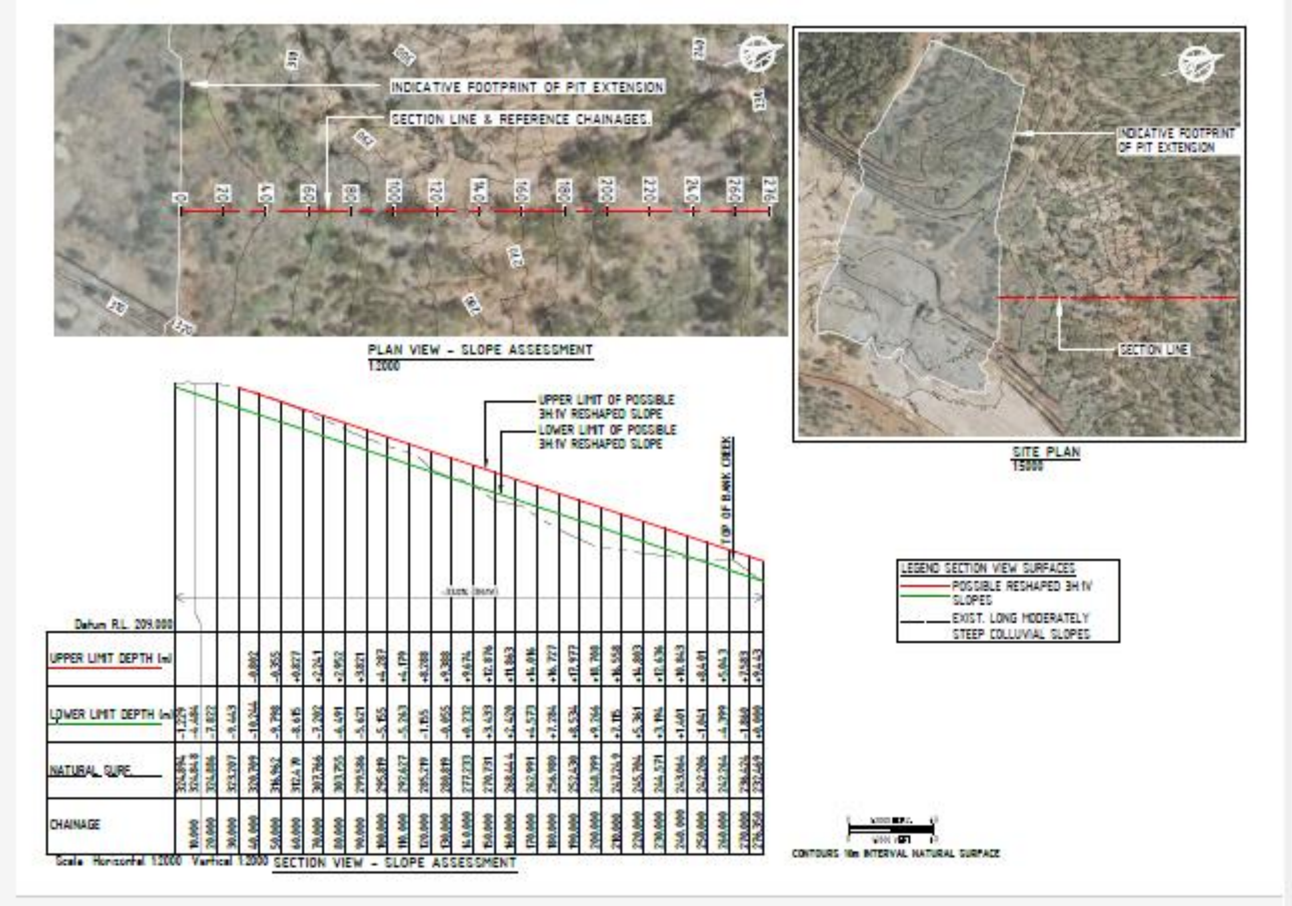


Figure 48: Predicted Impact of Reshaping

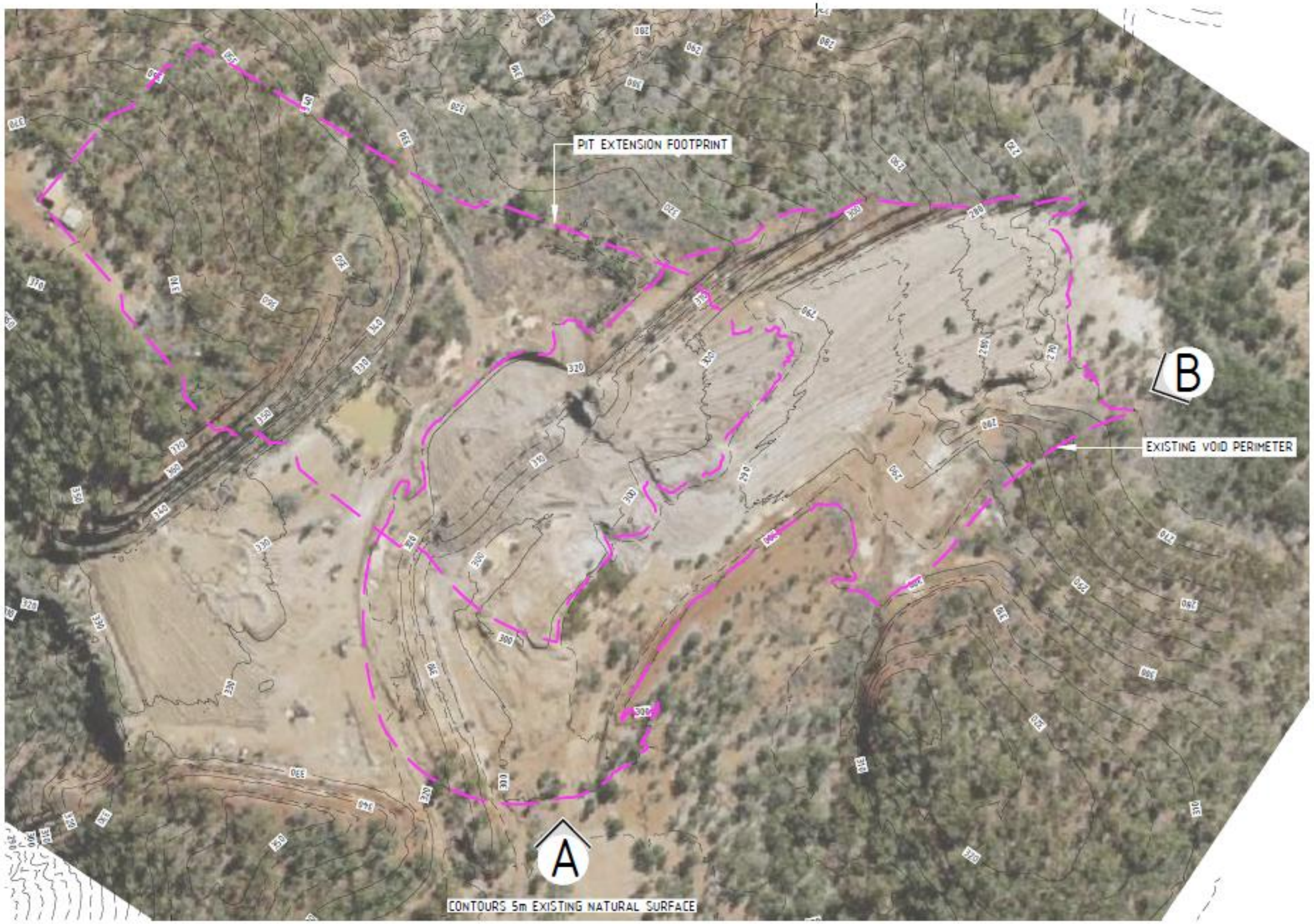


Figure 49: Existing Landform Future Mining Area

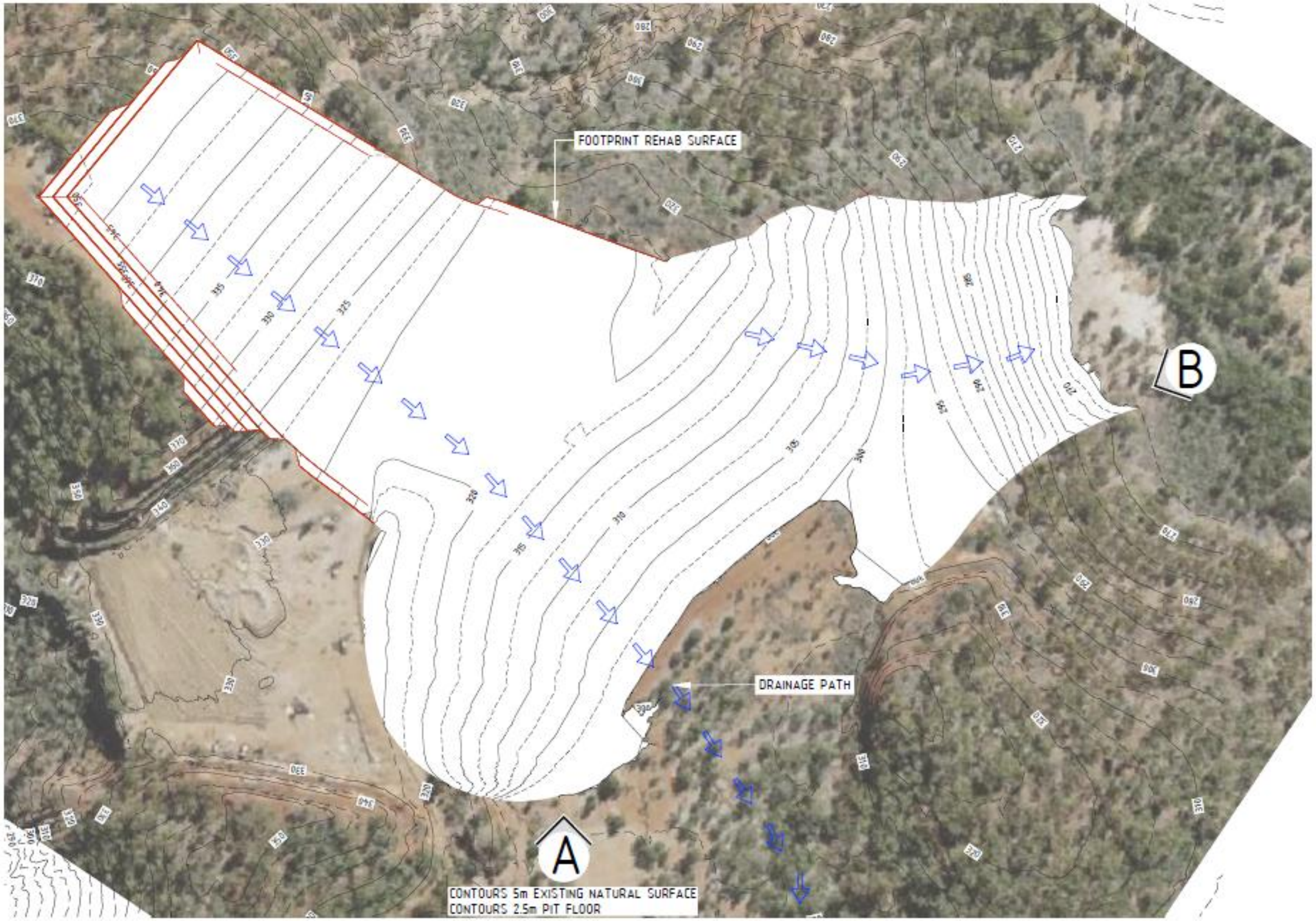


Figure 50: Final Landform

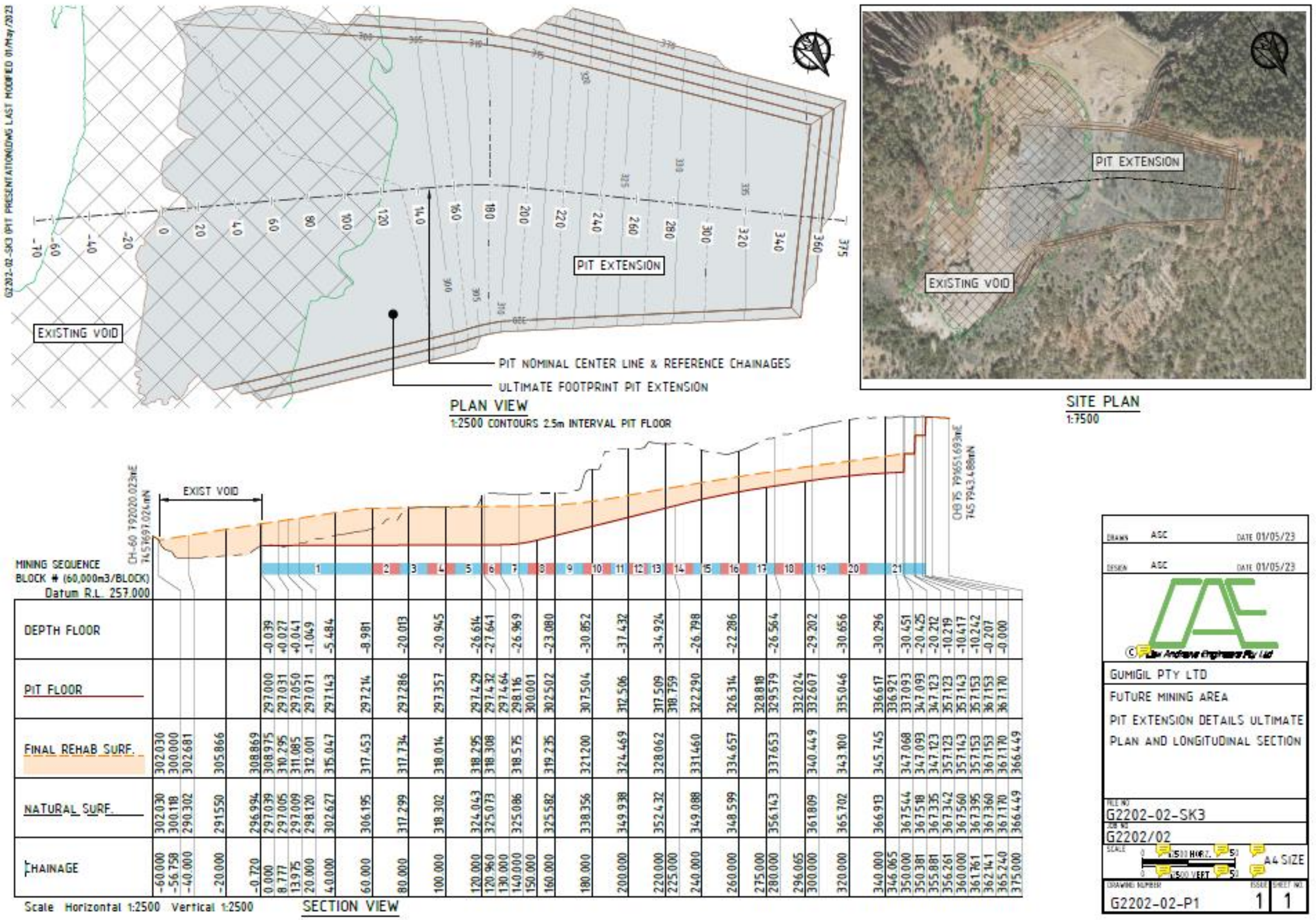


Figure 51: Pit Extension Details

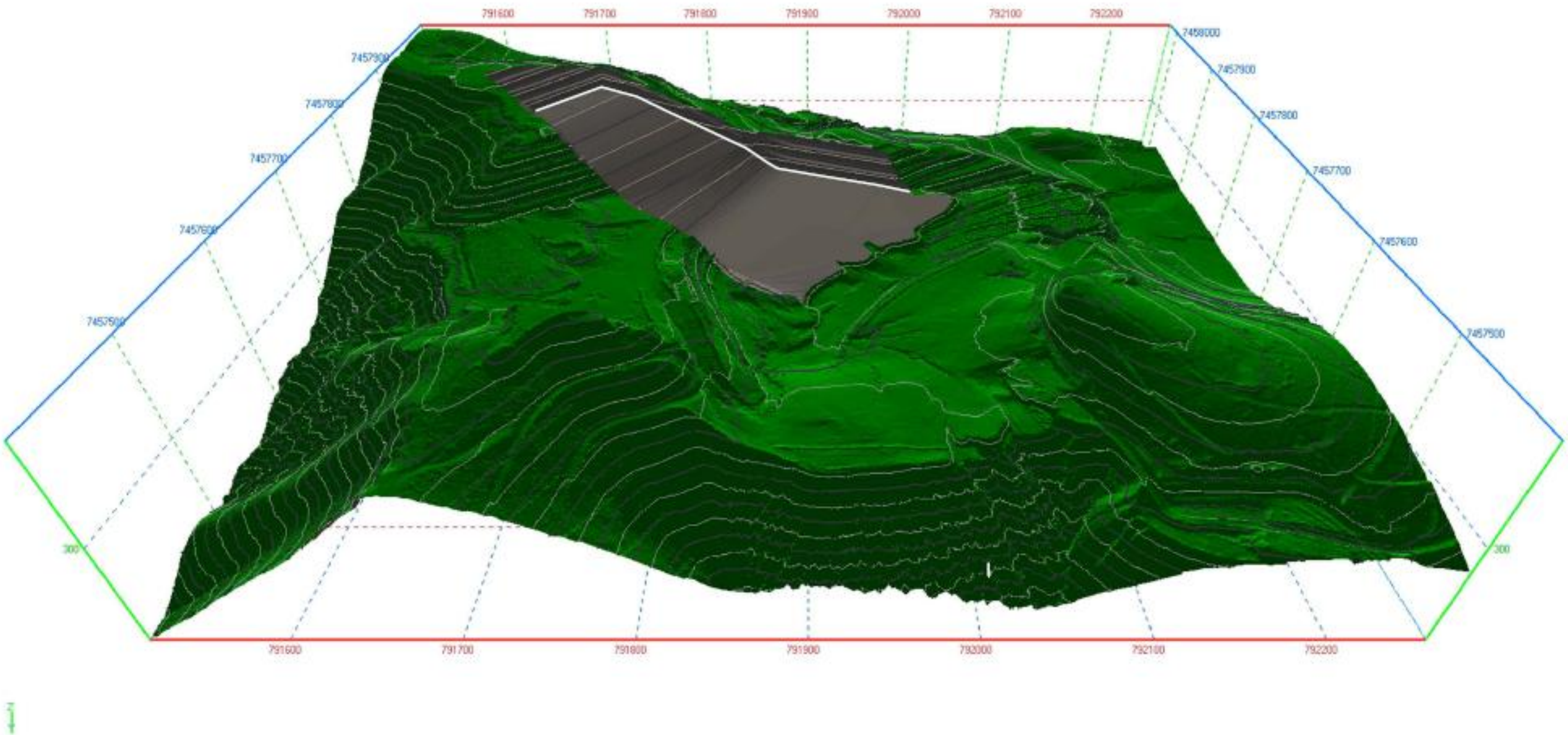
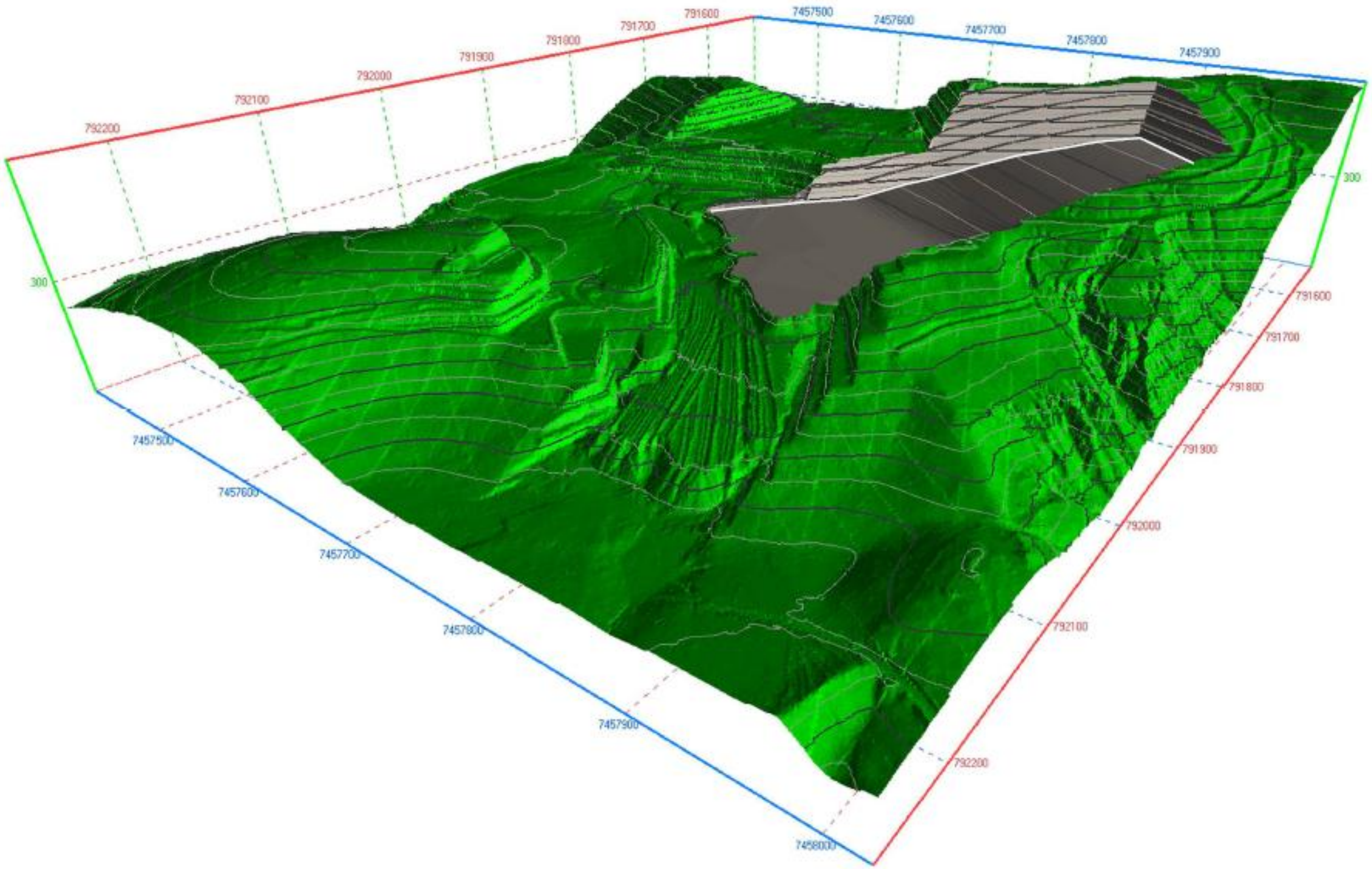


Figure 52: Future Mining Area Pit Floor



3V:1H DISTORTION

Figure 53: Pit Floor – Future Mining Area

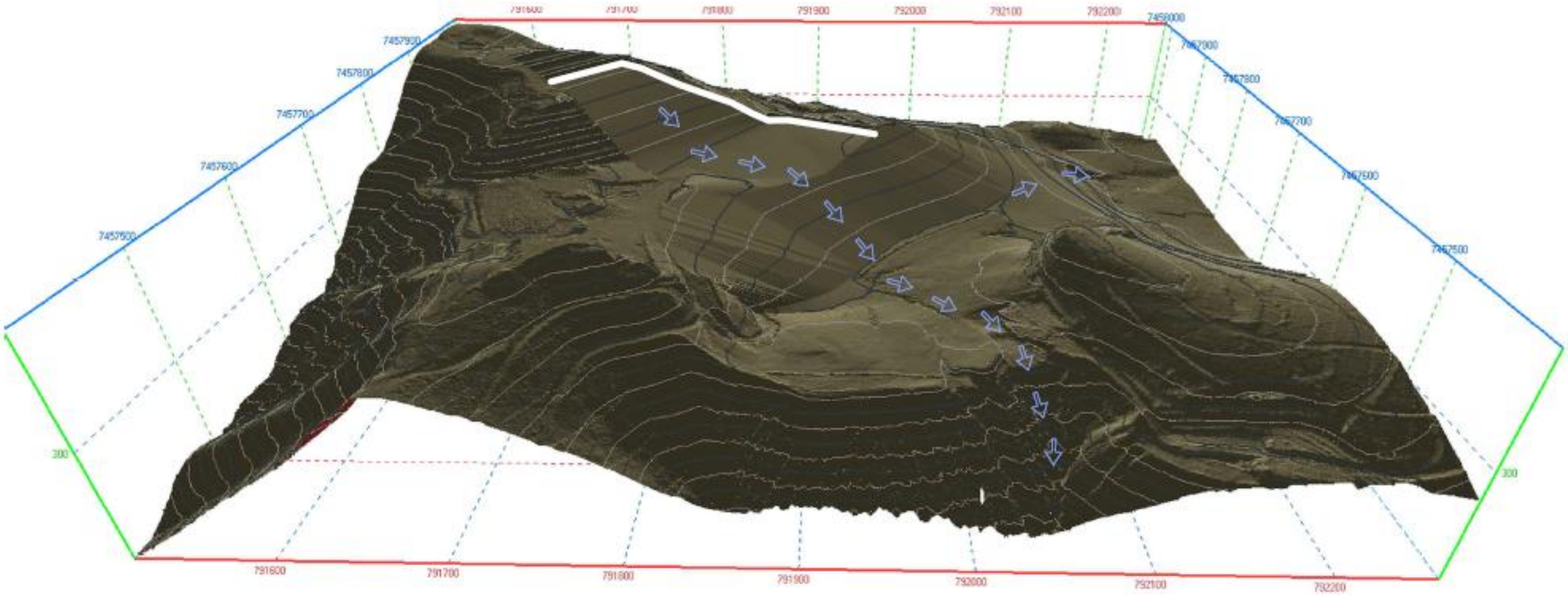


Figure 54: Final Landform - water flow (3:1 distortion)

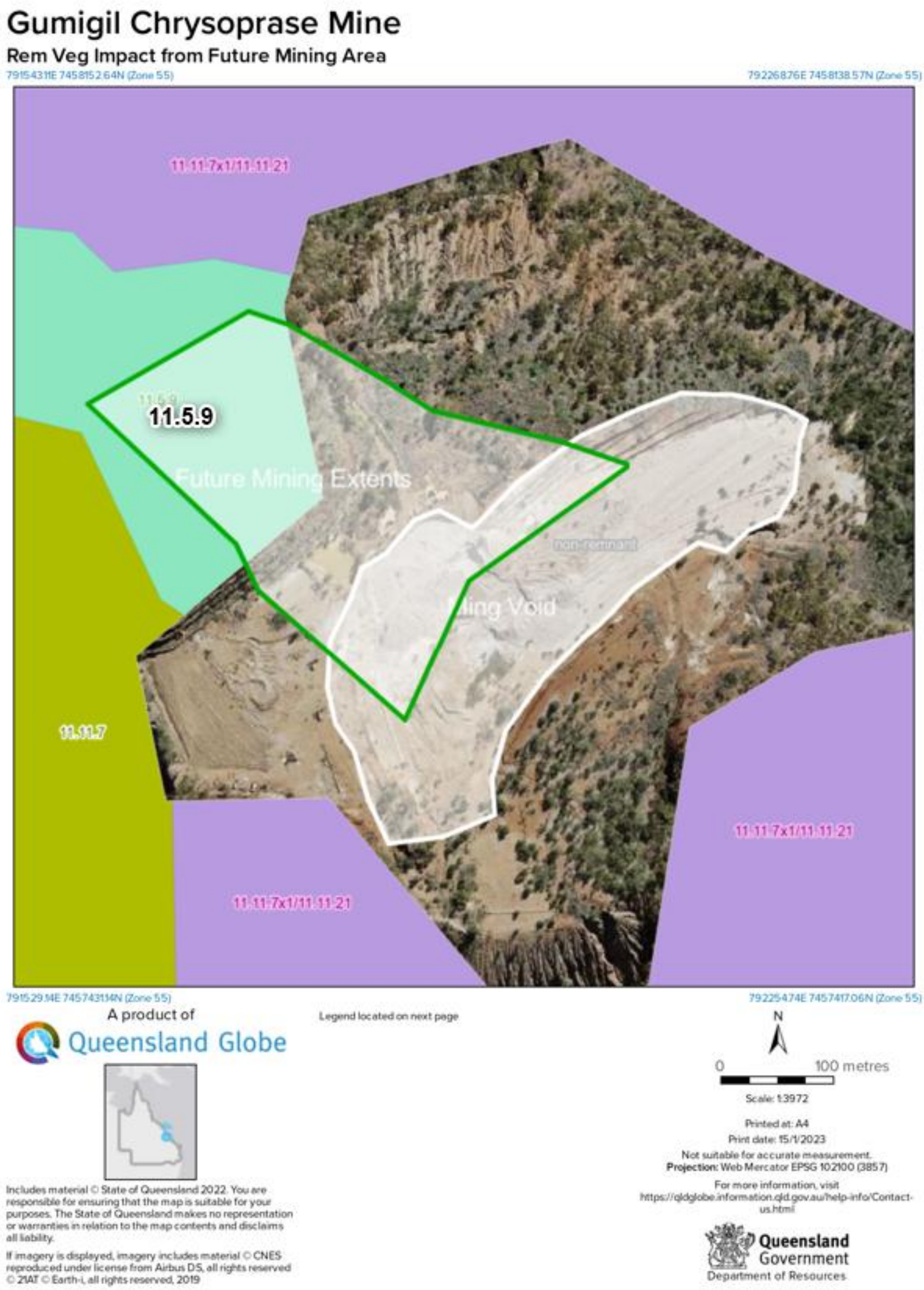


Figure 55: Mapped RE's

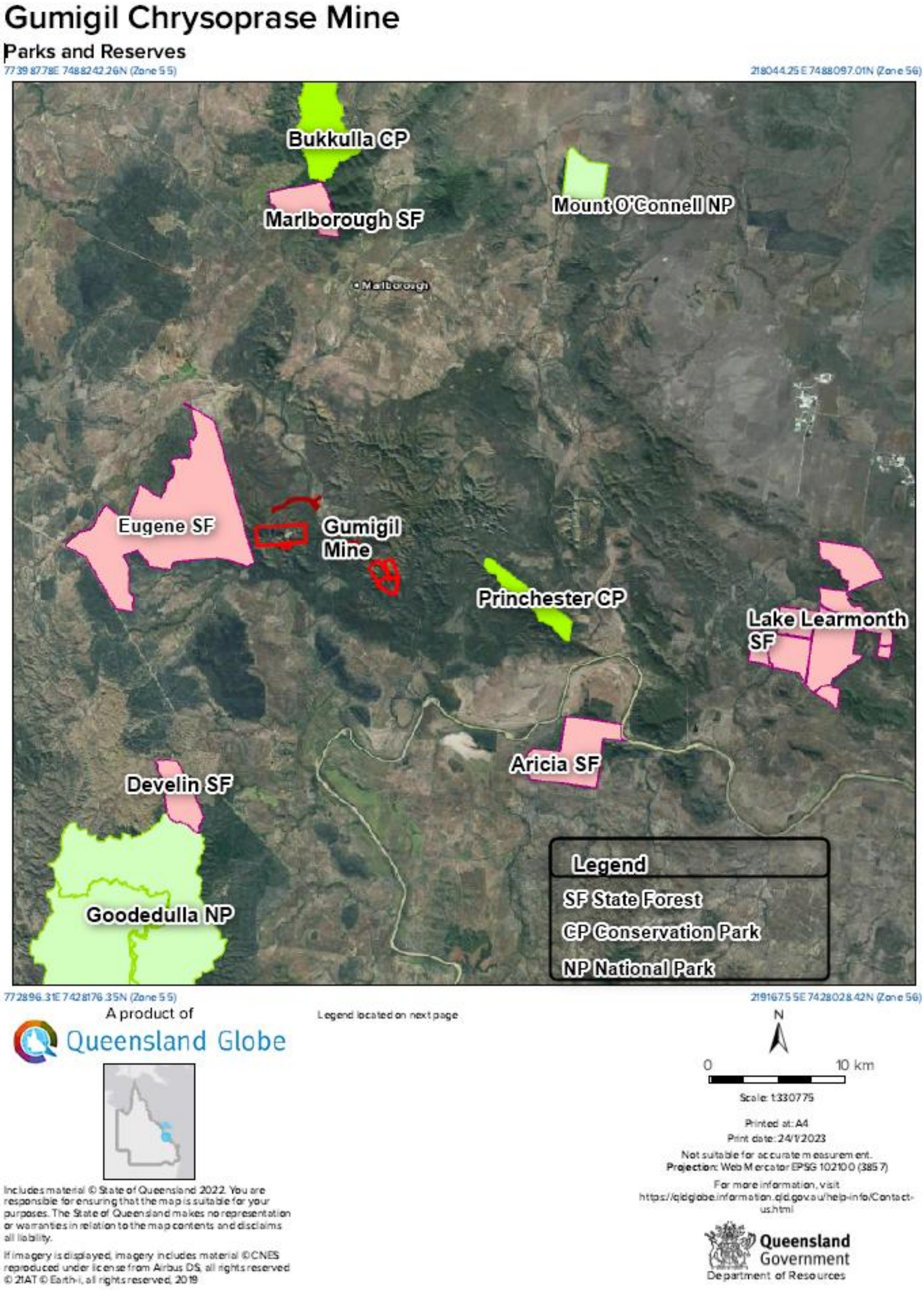


Figure 56: Parks and Reserves

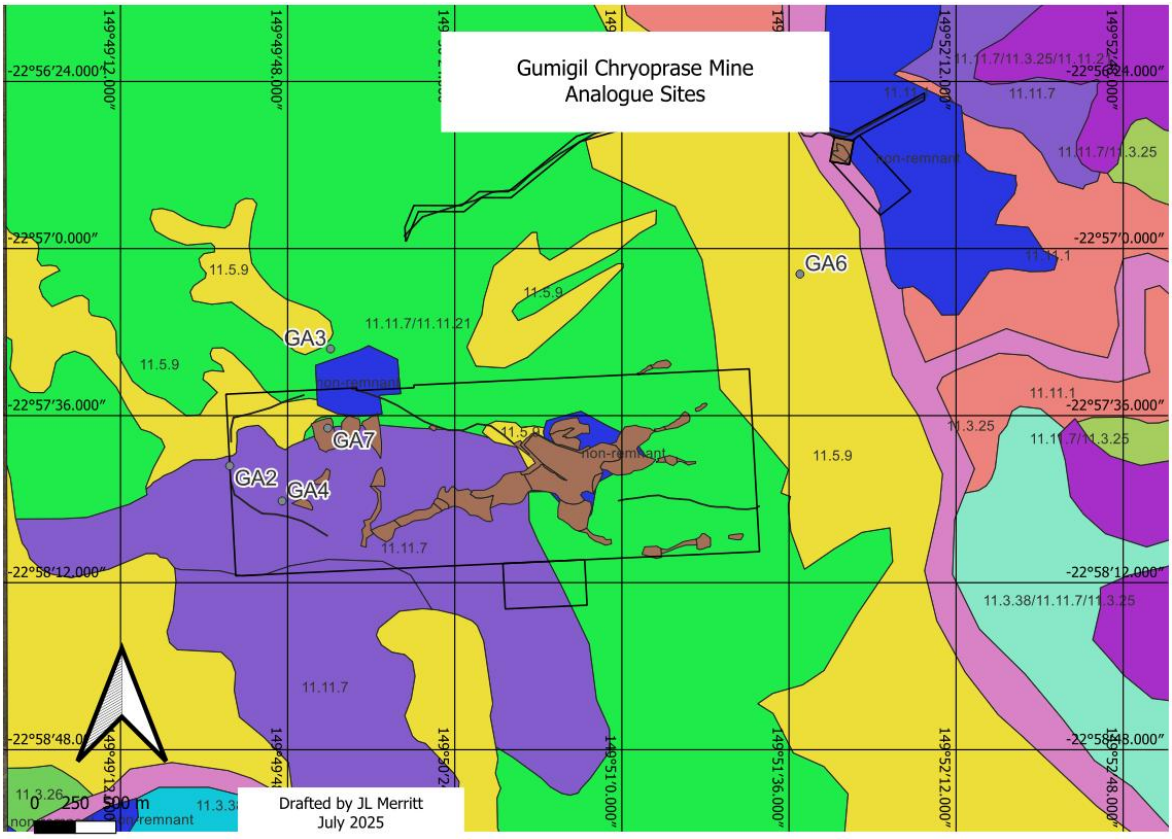


Figure 57: Analogue Sites

Figure 58: Gully 1,2 Monitoring Site - February 2024

Figure 59: Gully 5,6,7 Monitoring Site - February 2024

15. Appendix A

Tops

Bench 2 – November 2022

Bench 3 – November 2022

Bench 3 – November 2022

Bench 3 slope 3 early 2000s

Bench 3 Slope 3 – November 2022

Dark Stone Cut – November 2022

Gully 3 top – November 2022

Slope 2 before

Slope 2 November 2022

Western Cut 1999

Western Cut – November 2022

Western Cut Tops and upper Face of Gully 7 – November 2022

Western Cut Top – November 2022

Faces

Gully 7 Face – November 2022

Gully 6 Face from the top of Face – January 2024

Gully 7 Face at toe - January 2024

Terraced Pit Walls

Bench 2 Terraced Pit Wall - 1975

Pit Wall Terrace - 2023

Sediment /Sediment Basin Walls

Tubestock on Sediment Basin wall – November 2022

Rehabilitated Colluvial Apron Western Cut – November 2022

Gully 4 Sediment Basin 2 sediment in basin – November 2022

Gully 4 Sediment Basin 2 d/s slope wall – November 2022

Exploration Pits, Infrastructure and Tracks

Fuel Storage Area – April 2023

16. Appendix B

Marlborough Creek – Cross Section Monitoring

In 2001, cross sections in three locations in Marlborough Creek downstream of gully 4 were installed to monitor the creek geomorphology following the 1999 incident releasing sediment off the lease. The sites were located by permanent markers. These cross sections were monitored again in 2023.

The sites were located at Coorumburra Road Crossing, Moores Hole Top and Moores Hole Lower (see Figure 60). Figure 61, Figure 62 and Figure 63 compare the cross sections over the 22-year period. Coorumburra Road Crossing has widened potentially due to removal of silt deposited in the incident whilst the lower two cross sections show little change. There is no evidence of ongoing deposition of sediment.

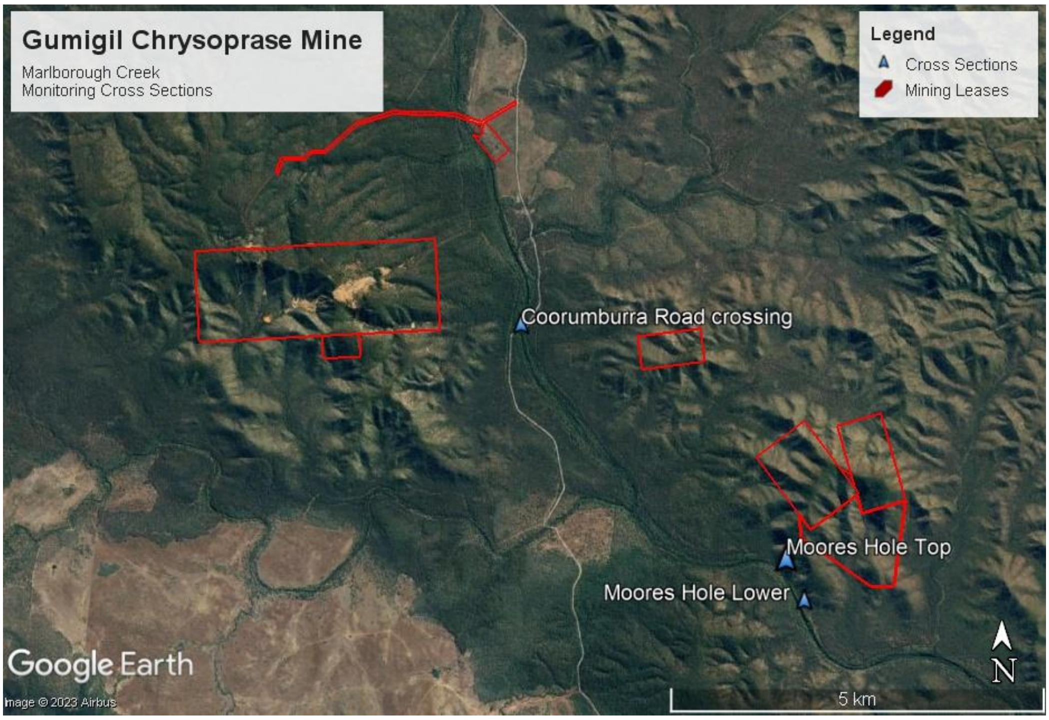


Figure 60: Marlborough Creek Cross sections

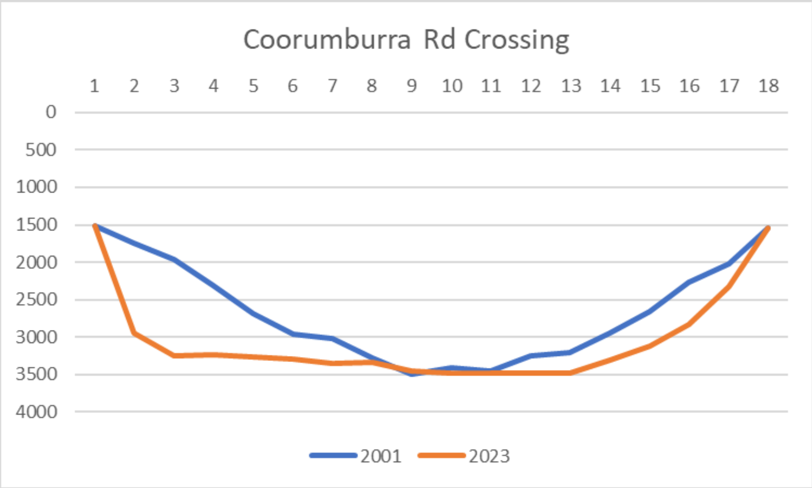


Figure 61: Coorumburra Rd Crossing

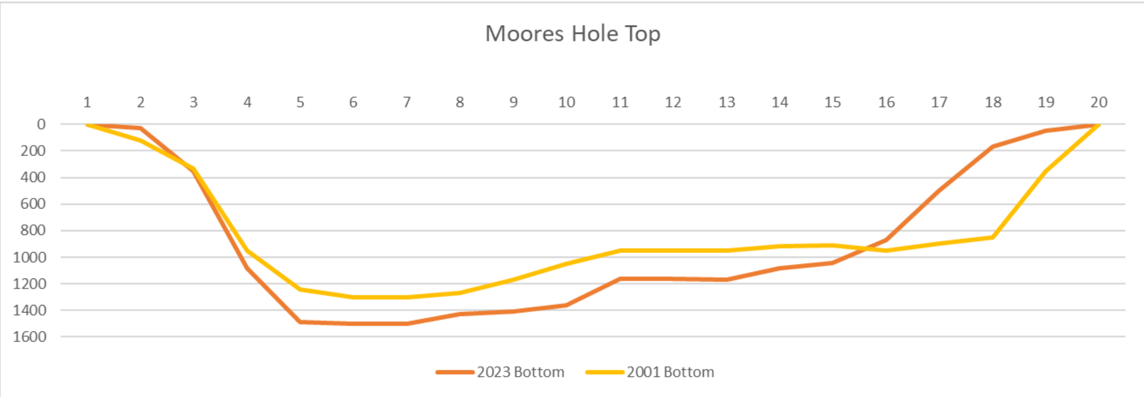


Figure 62: Moores Hole Top

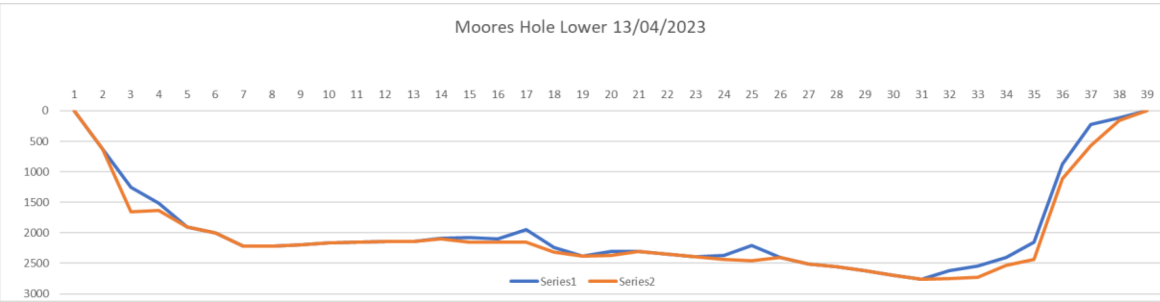


Figure 63: Moores Hole Lower