

GREAT NORTHERN MINE'S PROGRESSIVE REHABILITATION AND CLOSURE PLAN

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Environmental Authority Holder – Great Northern Mining Pty Ltd
C/- Hetherington Exploration & Mining Title Services (Qld) Pty Ltd, Po Box 49, Spring Hill
LPO Spring Hill Qld 4004

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1. Introduction

This report documents the rehabilitation planning and background information for the Great Northern Mine (GNM) operated by Great Northern Mining Pty Ltd. GNM and the neighbouring three Capricorn Sapphire Pty Ltd mining leases are owned by FURA (see website <https://www.furagems.com/>). FURA is the world's single largest producer of Sapphires. Our blue, green, teal and 'parti' or multi-hued sapphires are gaining recognition in the fashion and luxury world for their natural beauty and exotic appeal. FURA is building a global market with state-of-the-art grading system for these magnificent gems. Queensland sapphires even feature in the crown jewels of European monarchs. In the late 20th century, Australia accounted for nine-tenths of global sapphire supplies. FURA is actively working on marketing of Australian Sapphires with an intent to regain their lost glory on the global platform.

The content of this report aims to meet the relevant guidance notes published by the Qld Department of Environment and Science including "Guideline – Progressive Rehabilitation and Closure Plans (PRC plans)" ESR/2019/4964 V2 and "Submission of a progressive rehabilitation and closure plan" ESR/2019/4967 V3.00.

PRCP Order

- Project Planning –
 - Baseline Information
 - Site Locations
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 - Primary Mine Features
 - Type of Mining Operation
 - Rehabilitation Planning
- Community Consultation –
- Post-Mining Land Use
 - Assessment of PMLU options
 - Details of each PMLU
- Non-Use Management Areas –
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 - Landform design
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- Risk Assessment –
- Monitoring and Maintenance
- Large Tables
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2. Baseline Information

2.1.Site Topography

GNM is located east of the Sapphire to Rubyvale Road. Figure 14 displays the regional topography of the area with the remnant olivine basalt plugs to the west. Figure 15 displays the local topography. Watersheds drain west to east with the lease area undulating.

2.2.Climate

The Rubyvale area experiences cool to mild winters and warm to hot summers. Winters are usually drier, and the summer is characterised by “wet season” rains. Sapphire has recorded a mean annual rainfall of 618mm with a 10%ile of 373mm and a 90%ile of 903mm. Table 1 list monthly totals for Sapphire.

Table 1: Rainfall - Sapphire Post Office (BAM Station 035062)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	93.8	114.4	61.7	34.6	29.6	29.9	26.6	19.3	21.4	36.7	60.0	82.3
Median	79.8	77.8	36.0	13.0	13.6	15.0	9.9	6.1	4.9	25.1	46.5	65.0
Highest Daily	176.0	246.4	170.0	114.0	88.0	96.3	120.7	79.0	66.0	117.0	122.4	196.9

Mean maximum temperature at Emerald Airport range from 34.7°C in January to 23.4°C in June with mean minimum temperatures ranging from 22.3°C in January to 9.1°C in July. Table 2 lists the Monthly Mean Daily Global Solar Exposure at the Emerald Airport.

Table 2: Monthly Mean Daily Global Solar Exposure

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	24.9	23.1	21.7	18.8	15.8	14.1	15.3	18.3	21.5	24.1	25.5	25.9	20.7
Lowest	19.2	17.5	16.6	13.9	13.7	11.2	12.6	15.7	15.5	20.7	17.1	19.6	17.7
Highest	29.2	28.4	25.3	21.2	17.6	15.9	17.5	20.3	24.1	27.0	29.5	29.8	22.8

The windiest months at Emerald are September, October and November. The prevailing wind is from the southeast and is usually less than 5km/hr.

Table 3 list the monthly evaporation rates in the Emerald-Capella region.

Table 3: Evaporation Rates

January	230mm
February	185mm
March	180 mm
April	145mm
May	115mm
June	90mm
July	90mm
August	135mm
September	170mm
October	230mm
November	240mm
December	220mm.
Average	5.7mm/day.

2.3.Climate Change

The management of GNM understands that the climate will change over time. This change may have an impact along with property management and soil fertility change on the pasture on “Subera” and the ability to achieve completion criteria. The impact is likely to be on pasture composition and productivity. Any change may impact on the future land use or productivity. GNM will seek a change to completion criteria by EA amendment if the completion criteria do not reflect the pasture on the background property “Subera”.

2.4.Geology

Geological Setting

GNM is currently mining sapphires from a large low-grade alluvial deposit on the property “Subera”, a pastoral lease situated approximately 40km west of Emerald in Central Queensland. The deposit is the most significant found in Queensland in the past 40 years. The deposit occupies an area of approximately 400 hectares and is situated approximately 2km east of the existing Anakie- Rubyvale Gemfields. The area is within Departmental Policy Area 1D which restricts the maximum size of lease allowed and therefore many leases are required to cover the deposit.

The sapphire deposits on the property “Subera” are covered by the Emerald 1:250,000 Geological Sheet (Sheet SF/55-15) and the Rubyvale 1:100,000 Geological Sheet (Sheet 8451). The oldest rocks in the area are pre-Devonian to middle Ordovician (400 to 500 million years old) schist, phyllite, quartzite, slate and crystalline limestone of the Anakie Metamorphics.

Geology

The Anakie Metamorphics are in part intruded by the Upper Devonian (360 million years old) Retreat Granite, forming part of the Anakie Inlier, which lies to the northwest of the GNM Mining Leases (MLs). To the west, lie fluviatile sediments of the Devonian-Carboniferous (300 to 400 million years old) Drummond Basin.

The MLs are situated within the Permian (250 million years old) Bowen Basin, and cover Cainozoic and Quaternary (0 to 65 million years old) alluvial sediments. These sediments are composed of detritus derived from the erosion of the Anakie Metamorphics, the Retreat Granite and the sediments of the Devonian-Carboniferous Drummond Basin and the Permian Bowen Basin.

Evolution

Many Tertiary (25 to 65 million years old) olivine basalt plugs intrude both the Anakie Inlier and the Drummond Basin sequence. These basalts are known locally as the Hoy Basalts and are thought to be the source of sapphire and zircon found in the Tertiary and Quaternary gravels in the Anakie area.

During the Tertiary period, extensive basaltic volcanic activity brought sapphires to the surface in the Rubyvale-Sapphire-Anakie area. These sapphire-bearing volcanic rocks were laid down over older igneous and metamorphic rocks of the Drummond Range (west of “Subera”). High rainfall over much of eastern Australia during the Tertiary period resulted in extensive erosion of the Drummond Range, and the production of a widespread blanket of alluvial sediments on surrounding lowlands. Selective concentration of sapphire within some

of the coarse boulder alluvial (“wash”) in the Rubyvale-Sapphire-Anakie area during this time, led to the formation of economic concentrations of sapphire. The wash on “Subera” varies in thickness between 1m and 4m and comprises very coarse pebbly to boulder sediments that are overlain by an overburden of fine to medium-grained sandy clays. The pebbles and boulders making up the sapphire-bearing wash consist mainly of quartzite and hornfels (a fine-grained metamorphic rock) with minor amounts of granite and basaltic rocks.

2.5.Site Hydrology and fluvial networks

The major watercourses draining the project area are Policeman and Retreat Creeks. Retreat Creek to the south of the project area is the only named Creek in the vicinity. There are no flood plains on the lease area. The creeks are part of an easterly watershed system with their waters flowing into the Nogoia River approximately 15km northeast of Emerald. The creeks are ephemeral flowing following prolonged wet weather.

Both streams regularly flood out of the low flow channel. There are several drainage lines between Policeman’s Creek and Retreat which pond water for a period following rain.

To mitigate the risk of surface run-off or floodwaters entering active pits, GNM will not mine low lying reserves if BOM forecasts are for wetter than average seasons. All voids are protected by a bund constructed around the pits. Worked water collated in pits is pumped to the return water pond in the active Plant Area for use in the washing process. Worked water is used preferentially over water from the licenced bore.

Water quality of property stock water storages was tested in 2009, 2020 and 2022. Results are shown in Table 4 below. Groundwater and stock water storage water quality are similar with slightly elevated salt levels in the recycled water within the Plant Area. Water quality reflects the geology of the area and the fact that mining occurs in the weathered zone above the “Line of Oxidisation” (LOX line).

Table 4: Water Quality Results

Site	Date	pH	Electrical Conductivity	TDS
			milliSiemens/cm	mg/L
Promised Land 2 Tails Return Water	29/04/2020	8.02	2100	1407
Promised Land 2 Tails Pond Dry Tails	29/04/2020	8.01	2670	1789
New Laneway Return Water Pond	15/07/2009	8.69	2180	1461
New Laneway Return Water Pond	15/07/2009	9.27	2550	1709
West Lagoon Return Water Pond	15/08/2022	7.66	1821	1220
West Lagoon Return Water Pond	15/08/2022	8.87	1537	1030
West Lagoon Dry Tails Pond	15/08/2022	8.45	2647	1773
Bore	29/04/2020	8.01	374	251
Bore	15/08/2022	6.79	375	251
Retreat Stock Water Storage	28/04/2020	8.10	430	288
Old Laneway 1 Stockwater Storage	15/04/2009	9.14	484	324
Old Laneway 1 Stockwater Storage	29/04/2020	8.00	190	127
Old Laneway 2 Stock Water Storage	29/04/2020	7.90	160	107
Old Laneway 2 Stock Water Storage	15/08/2022	8.57	175	117
Pointsetta Stock Water Storage	28/04/2020	8.08	313	210
Pointsetta Stock Water Storage	15/08/2022	9.60	314	210
Nardoo Stock Water Storage	28/04/2020	8.06	204	137
Nardoo Stock Water Storage	15/08/2022	8.75	220	148
Pig Stock Water Storage	28/04/2020	8.02	210	141
Pig Stock Water Storage (low level)	15/08/2022	9.07	2850	1910
Stock Water Storage (near Tryangle West)	29/04/2020	8.33	602	403
Dam (near Eastern Ck)	15/07/2009	8.98	385	258
Dam (near Eastern Ck)	29/04/2020	7.99	213	143
Drainage line Nardoo	15/08/2022	7.40	214	143
Lagoon Stock Water Storage	15/08/2022	9.33	210	141
North Pit Area 2 drainage line	15/08/2022	8.89	312	209
NF2 Nardoo North	15/08/2022	8.83	262	175
Drainage line to NF2	15/08/2022	8.43	237	159
Pit 21 Stock Water Storage	15/08/2022	9.43	597	400

2.6.Flooding

The major watercourses draining the project area are Policeman and Retreat Creeks. Retreat Creek to the south of the project area is the only named Creek in the vicinity. As such, there are no flood plains on the lease area. The creeks are part of an easterly watershed system with their waters flowing into the Nogoa River approximately 15km northeast of Emerald. The creeks are ephemeral flowing following prolonged wet weather.

Both streams regularly flood out of the low flow channel. There are several drainage lines between Policeman's Creek and Retreat which pond water for a period following rain.

2.7. Hydrogeology

Conceptual groundwater model is shown in Figure 1. Groundwater is confined to the quaternary flowing from West to East. Inflow occurs primarily where the quaternary is on the surface. Groundwater levels on “Subera” vary around 35 metres below ground level. The current maximum depth of economic mining is 12 metres well above the groundwater table.

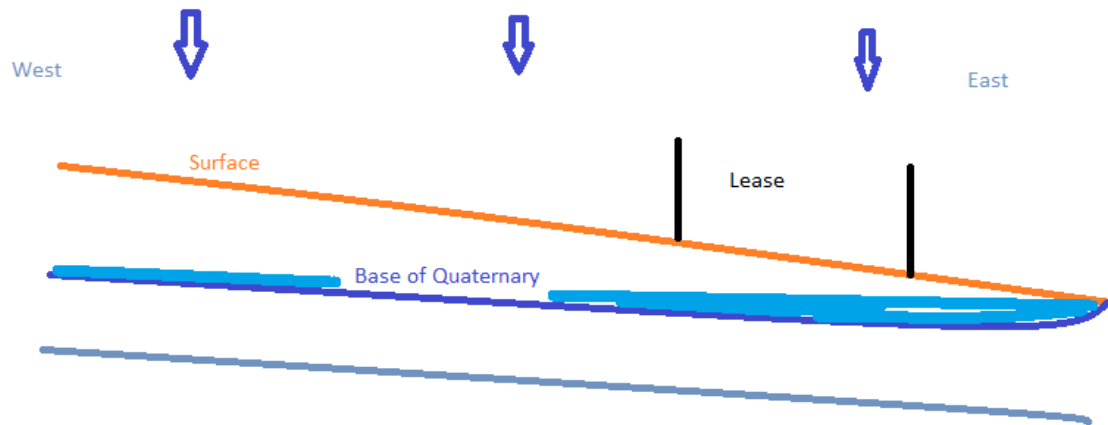


Figure 1: Conceptual Groundwater Model

2.8. Groundwater levels and properties

GNM has one registered bore RN89318 and a Water Licence 403159 with an annual allocation of 150ML. Annual take for 2019/2020 and 2020/2021 has been 150ML. Water quality was tested in 2020. pH was 8.01 and Electrical Conductivity was 374 milliSemiens/cm.

The bore draws water from an aquifer approximately 35m below the surface. A bore pump is installed with a capacity of 40,000 litres per hour. The bore supplies water to the Plant Area and the main industrial area as required.

The bore's location is within the Highlands Groundwater Management Area as described in the Water Plan (Fitzroy Basin) 2011. At that location, taking of water for any purposes that are not exempt (e.g. stock and domestic) require an authorisation. The water plan has a moratorium on the taking of additional water.

2.9. Soil Types

Soils on the low lying areas of “Subera” MLs are grey-black alluvial cracking clay soils on Cainozoic alluvial sediments. Soils on the Quaternary uplands are texture contrast. These soils are moderately fertile. The soils are up to one metre deep in the drainage lines, but only the first 100mm contains humic material vital for rehabilitation. Topsoil i.e., the top 100 -200mm of the profile is stripped from each domain, stockpiled on the perimeter of the disturbed area, and redistributed evenly across the disturbed area once the desire landform has been formed.

No detailed soil mapping has been undertaken but from a regional scale, the land systems covered by the project are described in 'Lands of the Nogoa – Belyando Area, Queensland' CSIRO 1967.

1. Alpha Land System

This consists of alluvial plains with box and texture-contrast soils in non-basaltic alluvium. The limitations affecting this land system are low nutrient status and moderate to severe physical properties affecting plant growth.

2. Monteagle Land System

This land system is described as lowlands with box and texture contrast soils on slightly stripped Tertiary land surface. The limitations affecting this land system are moderate to severe physical properties affecting plant growth and slightly to moderately affected by salinity.

3. Humboldt Land System

This land system is described as lowlands and plains with blackbutt and brigalow and texture contrast soils formed on acid clay exposed within the Tertiary weathered zone. The limitations affecting this land system are moderate to severe physical properties affecting plant growth and moderately affected by salinity.

2.10. Land Stability

"Subera" has been extensively cleared and developed with improved pastures. The landform is stable with low to moderate slopes. GNM is committed to return disturbed areas to a slope of less than 15%. Except for the legacy areas of the Main Dam Site and Reject Hill, the rehabilitated landform is within 2 metres of the pre-mined contours. Reject Hill is one of the rehabilitated areas certified. GNM has no control over the background landholder's management practices. This poses a risk to rehabilitation timeframes and outcomes if the property is mis-managed as all rehabilitated areas will be grazed.

The town common has pre-existing degradation/erosion in many areas including the GMN leases. The leases have been extensively mined by fossickers and small miners with little to no rehabilitation or salvaging of topsoil. This with the ongoing grazing of the town common exposes any sloping areas to ongoing erosion. GNM two leases on the town common have areas of slopes, depressions holding water and with ML 70286 an elevated overburden dump which is now traversed with a power line making further reshaping of the area unsafe. The local community accept the condition of the town common and fossicking areas as part of the ambience/uniqueness of the area and is part of the continuing attraction of the area to tourists.

2.11. Vegetation Communities

Four land zones (Table 5 and Figure 16) with associated regional ecosystem communities (Table 6, Figure 17 and Figure 18) covered the lease area prior to clearing.

Table 5: Land Zones

Land Zone	Description	Regional Ecosystems
3	Cainozoic Alluvial Plains and Piedmont Fans	11.3.2/11.3.3/11.3.1/11.3.25 (50/25/15/10)
4	Cainozoic clay deposits gently undulating plains	11.4.8/11.5.3 (65/35)
4	Cainozoic clay deposits gently undulating plains northeast	11.4.8/11.4.9/11.5.3 (50/30/20)
5	Cainozoic sand deposits extensive flats or gently undulating plains	11.5.3

Table 6: Regional Ecosystem Communities

Regional Ecosystems	Vegetation Communities
11.3.2/11.3.3/11.3.1/11.3.25 (50/25/15/10)	Poplar Box Woodland on alluvial plains (50%) Coolabah Woodland (25%) Brigalow/Blackbutt (15%) River Red Gum fringing drainage lines (10%)
11.4.8/11.5.3 (65/35)	Blackbutt/Brigalow (65%) Poplar Box Woodland (35%)
11.4.8/11.4.9/11.5.3 (50/30/20)	Blackbutt/Brigalow (50%) Brigalow (30%) Poplar Box Woodland (20%)
11.5.3	Poplar Box Woodland

The area of the MLs has been extensively modified since the area was first settled. Current mapping for the lease area is shown in Figure 19. Extensive clearing of the virgin timber followed by regular chaining for regrowth control has reduced the woody vegetation to sparse regrowth < 2m in height. A range of introduced pasture species plus grazing pressure has reduced the presence of native ground cover except for low-lying areas. Except for Bambatsi, the introduced species do not flourish in these areas. Bambatsi has only been introduced in the last few years.

A variety of floral species remain on the MLs. The predominant species remaining are brigalow (*Acacia harpophylla*), belah (*Casuarina cristata*), wilga (*Geijera parviflora*) and current bush (*Carissa ovata*). There are a few bauhinia trees (*Lysiphyllum hookeri*) in the area and narrow leaved ironbark (*Eucalyptus crebra*). Ground cover is comprised on grasses, herbs and sedges. The grass species comprise both native and introduced species.

Essential Habitat mapping is shown in Figure 20. Areas mapped at Essential Habitat are excluded from mining in the Environmental Authority. Mapped Essential Habitat and creek lines with woody vegetation are excluded from the area available for mining in the PRCP. Matters of State Environmental Significance are shown in Figure 21

2.12. Fauna

The lack of mature vegetation and the grazing of cattle has also had an impact on the native fauna assemblages on the MLs.

Native species that have been recorded in the area include the grey kangaroo, plains turkey (bustard), and various species of waterbird including the brolga. Feral species include rabbits, pigs and cats.

2.13. Properties and Productivity

The land capability of the “Subera” leases is Class V1.

The drainage lines of Policemen’s Creek and the area between Policemen’s Creek and Retreat Creek are waterlogged for some time after heavy rainfall. Due to the water logging, pasture species such as buffel and rhodes grass do not grow. Bambatsi panic, a pasture species recently introduced into the mix, does tolerate water logging with individual plants identified during the January 2022 monitoring. These low-lying areas are covered with a variety of native grasses and sedges. These species are not highly palatable but maintain the stability of the area. The vegetation on the rehabilitated areas will be consistent with areas not disturbed by mining.

3. Site Location

GNM leases are 40km as the crow flies West Northwest of Emerald. The leases are east of the Sapphire to Rubyvale Road and approximately 65km by road to Emerald via the Capricornia Highway.

4. Project Description

4.1. Mining Tenements

GNM holds 69 leases on “Subera”. Leases are listed in Table 17. Figure 22 shows the lease outline whilst Figure 23 shows the individual leases on “Subera”. Great Northern Qld Pty Ltd was granted the initial leases on “Subera” in 1998.

GNM holds two MLs on the “Scrub Lead” Fossicker’s Area (see Table 18). ML 72085 (Figure 24) and ML 72086 (Figure 25) have been extensively mined prior to GNM acquiring the leases. Figure 24 and Figure 25 shows the area mined by GNM as a shaded polygon within the lease boundary.

4.2. Underlying landholders

Great Northern Mining leases except for ML70285 and ML 70286 occur on the property “Subera” owned by S & A Benny (see Figure 26). ML70285 and ML 70286 are located within the “Scrub Lead” designated fossicking land on the town common and are owned by the State.

4.3. Pre-mining land use

Mining occurs within the existing designated area of the environmental authority, which includes 1515 ha of grazing land on “Subera” (total 3,048 ha) and 26 ha of Scrub Lead designated fossicking land (total 1,541 ha). Parts of “Subera” and the Scrub Lead

Fossicking Area have been mined by others over many years and leases have lapsed or been abandoned leaving land unrehabilitated. ML 70285 and ML 70286 have been selectively mined and rehabilitated by GNM as shown by the shaded polygon. The rest of the MLs has been mined in the past leaving TSFs and elevated overburden piles.

“Subera” is a grazing property. The property produces beef running a breeding, growing, and fattening operation. “Subera” has been extensively modified for grazing by repeated treatment of woody regrowth and the sowing of improved pasture.

The Scrub Lead Fossicking Area has been part of the town common since the early days of Rubyvale and Sapphire. Local residences graze cattle, horses and camels on the town common.

4.4.Activities on the EA

The only ERA conducted on site is Schedule 3 20: Clay pit mining, dimension stone mining or mining gemstones (including the material from which gemstones are extracted) (c) more than 1,000,000t in a year.

Activities conducted on the lease include operating and maintaining fixed and mobile plant, storage of fuel and lubricants, storage of spare parts, wash plant and gem sorting infrastructure. The industrial area has an office, septic toilet and wash down bay. Rainwater tanks supply drinking water.

4.5.Primary Mine Features and Infrastructure

An industrial area is located on “Subera” (see Figure 27). The area contains office accommodation, gem sorting, workshop, laydown yard and a mini plant for the washing of exploration holes.

Next to the office are the elevated rehabilitation areas of Main Dam Site and Rejects Hill. This rehabilitated Tailings Storage Facility (TSF) is a legacy of past mining activity when all wash was carted to this central point for washing. The elevated landform is the accumulation of wash less gemstones. Current mining operations utilise a mobile plant to reduce the haulage distance between mining pits and the Plant Area. The reduced haul distance facilitates the return of tails and oversize to mining pits eliminating overburden deficits and elevated TSFs.

The disturbed domains (see Figure 27) are either designated as mining pits, proposed Plant Areas, active Plant Areas or mining/Plant Areas undergoing rehabilitation. Given the short duration of mining, the disturbed¹ footprint changes continuously.

Roads and access tracks for both mining and pastoral activities cover the lease area.

4.6.Existing Rehabilitation

Rehabilitation of mining area was a priority for GNM when Daryl Mosely acquired GNM in 2003. The rehabilitation technique described later in Section 8 is the technique utilised to rehabilitate all disturbed domains on the MLs. Minor changes in technique are a result of the continuous improvement cycle as the miner searches for opportunities to improve the rehabilitation outcome or reduce the time and effort required to achieve the nominated rehabilitation milestones.

¹ Disturbed defined as areas that have not reached RM5.

GNM committed to the rehabilitation of all disturbances on the acquired leases by a process of exploration and mining around the legacy areas to allow rehabilitation whilst maintaining a profitable operation. It took 15 years for the acquired disturbance to reach RM5 i.e., “ripped/seeded”. Rehabilitation of the Main Dam Site and Rejects Hill was the costly exercise as GNM had to operate the Main Dam Site area as a Plant to achieve sufficient cover in the accumulated wet tails to cap this area.

Current disturbed and rehabilitated domains are shown in Figure 27 and Table 7. A summary of lease statistics is presented in Table 8 and Table 9. GNM has a track record at rehabilitation with 81% of the area disturbed by mining either rehabilitated (RM5) or certified rehabilitation.

GNM has two tranches of rehabilitated domains certified in 2014 and 2020. Individual domains certified are listed in Figure 27.

Rehabilitated areas include Plant Areas as these facilities have a capacity of approximately 2 years of production. Plant Areas have been successfully rehabilitated. Rejects Hill and Lois Lane are certified rehabilitation domains containing tails ponds. The area’s geology, lithology or water quality indicate that all materials in a TSF are inert. This is supported by the rehabilitation outcomes. The rehabilitation technique for future rehabilitation is as described in Section 8.

Appendix A contains a description of each GNM rehabilitated domain. Appendix B presents the accumulated Stocktake monitoring results on rehabilitated domains.

Table 7: Current Domains (Jan 2022)

Domain	Area (ha)	Domain	Area (ha)
Pointsetta	4.2	Tryangle 1	5.9
Laneway West	2.0	Tryangle 2	0.2
Nardoo South	2.1	Tryangle 3	0.6
North Pit East	3.0	New Laneway	13.6
Vella Pit	2.0	Heartbreak	1.5
Main Dam Site	11.3	Just Looking	5.2
Rejects Hill	10.5	Lagoon	4.4
Industrial Area	0.7	West Lagoon	16.1
Main Dam Hardstand	1.5	Retreat	5.5
North Pit Area 2	0.8	North Retreat	6.5
North Pit Area 3	8.2	Promised Land	20.2
Nardoo	5.6	Promised Land 2	12.3
Pig Pit	7.3	Windmill	3.3
South East Pit	1.5	Tryangle East	8.8
ML 7157	1.9	Tryangle West	11.6
Eastern Creek	12.6	BOT	3.1
South Pit	7.4	Banana	2.9
Creek View	4.4	Small Hill	0.6
Cattle Yard	2.0	Road	0.0
Nunan	2.4	Tracks	0.0
Lois Lane	6.4		
Old Laneway	13.4		
		Total	240.1
Certified Rehabilitation (RM5)			
Rip/Seed (RM6)			
Disturbed/Partially Rehabilitated			
Infrastructure			
Plant Areas			

Table 8: Disturbance Categories by Area (Jan 2022)

Disturbance Categories	Area (ha)
<i>Mining</i>	19
<i>Plant Area/Tails Ponds</i>	18
<i>Landholder Infrastructure</i>	7
<i>Infrastructure rehab reqd</i>	1
<i>Roads/Tracks</i>	1
<i>Rehabilitated</i>	122
<i>Certified Rehabilitation</i>	73
<i>Certification Application</i>	0
Total	240

Table 9: Disturbance Categories % (Jan 2022)

Disturbance Categories	%
<i>Mining/Plant Area</i>	15%
<i>Rehabilitated (RM5)</i>	51%
<i>Certified Rehabilitation</i>	30%
<i>Other</i>	4%

4.7. Mining operation

The operation is typical of other sapphire machinery miners in the vicinity. The topsoil and overburden are removed by bulldozer and stored separately. The wash material is selectively mined by excavator, loaded into trucks, and taken to the plant area for processing.

The planned footprint of a domain will be mined in a form of terrace mining. Topsoil will be stripped and pushed out of the footprint of the pit and overburden piles. Overburden is pushed off a block approximately 50 by 50 metres to expose the wash. Once wash is mined and carted to the Wash Plant, overburden from the next planned block will be pushed onto the mined area. The post mining landform will be achieved over mined out blocks as the mining progresses through the planned disturbance. For mining pits, the rehabilitation milestones up to seeding (RM 1 to RM5) may be achieved for initial blocks mined within months of mining commencement and before the final wash has been removed. The formation of the final landform may be delayed with the last blocks whilst sufficient oversize or tails from the Plant Area is returned to overcome any identified overburden deficit. The additional fill is placed in the bottom of the pit prior to reshaping the last of the overburden.

Areas designated as future Plant Areas are identified prior to mining. With Plant Areas, the topsoil is stripped and pushed or carted to the perimeter of the planned Plant footprint in the first instance to prevent re-handling. Placement of overburden is planned to create the landform required to set up a mining pit as a Plant Area. Plant Areas require one or two ponds for recycled water used for processing and a larger dry pond. A built-up area next to the dry tails ponds is required for the processing plant. Areas within the domain footprint not

required for the plant will be treated as mining blocks with rehabilitation being achieved sequentially over the mining blocks.

4.8.Wash Plant

Wash Plants are constructed in exhausted mining pits and typically have the capacity for two years. A Plant Area comprises an elevated pad on which the physical plant is located to allow gravity to be used for tails disposal. Typically, 3 ponds are constructed using overburden and lined with clay to prevent the loss of process water. The larger pond adjacent to the physical Plant stores the dry tails with two smaller ponds to trap the wet tails and store return water. The Plant is located close to the areas mined.

The wash is hauled to a stockpile area and fed by a loader to a dry screening plant where up to 35% of the feed (oversize (plus 18mm)) is rejected. This material is either returned to the mining pits by the trucks on their return journey or used for earthworks. The remaining 65% of sapphire bearing gravels is washed using a trommel and pulsator to a concentrate. No chemicals are used in the process. Manual and mechanical sorting of sapphires from the concentrate is undertaken at the Industrial area. The quantity of concentrate is less than 0.01% of the wash. The dry tails mainly sands and gravels settles out of the tails stream rapidly. Dry tails can be walked on immediately on settling out. Trafficability for all machinery occurs within days. The dry tails can be mined for removal once the beach is wide enough to form a bund. Wet tails are fine and retain water for some time.

The oversize material from the plant is used capping of wet tails and backfilling exhausted mining pits to achieve the desired landform of +/- 2 metres from the original surface.

The Plant operates until there is sufficient overburden located in the bunds, dry tails and oversize to reshape the domain to achieve the final landform whilst capping the wet tails/return water pond.

4.9.Mining Sequence

As GNM has been mining the leases for 23 years and several operators are long term employees, there is considerable knowledge of the previous domains mined and location of the wash. Exploration originally was conducted by exposing the wash with excavators and visually assessing or small-scale processing of the recovered wash. GNM now owns a Lodrill drill (see Figure 28) purchased from the USA to obtain better resource definition including depth and width of the sapphire bearing "wash". This drill can recover a 900mm core sample. Wash is carted to the Industrial Area for washing in the mini plant. A potential mining area is grid sampled to determine the extent of gem bearing wash. Once a resource is mapped large enough to become a future plant area e.g., 7-8 hectares, exploration is concentrated on nearby areas to minimise the haul length improving mining efficiency. Exploration aims to understand the full extent of gem bearing wash in the area as the mining operation aims to exhaust all reserves in the locality. Given the spasmodic nature of the wash location and the fact that not all wash contains sufficient gems to make mining economic, the mapping of gem bearing wash is not always successful. The disturbance of certified rehabilitation has occurred twice in the last two years as GNM continues to explore and mine nearby areas to fully exhaust the resource.

4.10. Area available for Mining

Land available for mining is shown in Figure 31. The available land is land that is not covered by Matters of State Environmental Significance dated 2022, patches of woody vegetation or tree lined drainage lines. The area covers all areas previously mined.

4.11. Proposed Duration of Operation

Great Northern Qld Pty Ltd was granted mining leases on “Subera” prior to 1999. The leases were purchased by Daryl Mosley in 2003 under the name of Great Northern Mining Pty Ltd. FURA purchased Great Northern Mining Pty Ltd in 2021.

GNM or its predecessors have held leases on “Subera” for 23 years. There is evidence of mining in the area prior to the leases being granted in 1999.

Fossicking and small-scale mining has occurred in the region since 1891. Industrial scale mining in the region has occurred since the 1960s.

The company plans to mine until resources identified during the ongoing mining operations are exhausted. A time frame of 30 years is realistic. Individual leases will be relinquished as the resource is exhausted.

4.12. Rehabilitation Planning

Figure 27 shows the areas mined and rehabilitated up to 2021 by GNM or in the case of legacy areas acquired with the purchase of the Company shows the domains rehabilitated. The timeframe for mining selected areas is from 2 months to 3 years. Designated Plant Areas are in exhausted mining pits. These designated areas are reserved of approximately 2 years to ensure continuity of operations. Plants Areas typically operate for two years. Plant areas take up to 5 years once available for rehabilitation to reach the ripped/seeded stage i.e. RM5.

Future mining is planned to exhaust economic gem reserves from south to north. However, overburden ratios, gem demand or the need to integrate the resources of GNM with the adjoining Nardoo resources may influence where GNM mines. Mining will continue in clusters of disturbed domains around the Plant Areas for efficiency.

Mining will continue to occur in discrete domains no matter where future mining occurs. This will allow rehabilitation to continue to be part of the mining sequence. Domains have ranged in size from 0.2ha to 20.2 ha with an average of 5.8ha.

The PRCP schedule programs mining to continue over the available area (Figure 31) until 2052 with final lease relinquishment in 2062.

4.13. Closure Vision

On successful relinquishment of GNM’s MLs, the leases on the Scrub Lead will once again be available for fossickers. With the leases on “Subera” mining will cease with grazing the sole land use. As the rehabilitation plans to return the land to approximately the original landform +/- 2metres for the “Subera” leases, the topography will remain as it is today. The post mining landform is shown in Figure 32. The Common leases have been mined previously and are likely to be mined again by others after lease relinquishment. There is no planned change to the current landform (see Figure 33).

5. Community Consultation

5.1. Consultation undertaken in developing the proposed PRCP

GNM has taken a two-pronged approach to community consultation about their leases. Community consultation and responding to the community is important for the two leases on the town common. GNM is a temporary land user on “Subera” with two parties to deal with regarding rehabilitation and closure. These are the landholder and the Department of Environment and Sciences. The landholder has set out his vision for rehabilitation and closure to GNM. The responsibility to consult with the community lies with the landholder.

“Subera” Leases

The compensation agreements for leases on “Subera” are akin to the Conduct and Compensation Agreement required for coal and gas exploration. The agreement sets out the conduct i.e., the objective of returning the land after mining to grazing land to the satisfaction of the landholder and the compensation which is based on a rate for the total area disturbed per annum. As a temporary land user under a compensation agreement, GNM has no rights to determine the land outcome on “Subera” land. The land outcome is at the direction of the landholder. Other stakeholders if dissatisfied with the mine’s rehabilitation outcomes are obliged to consult the landholder.

A representative of the landholder lives on and manages the grazing operation on “Subera”. This person is in regular contact as he conducts his daily routine on the property. Communications between the Manager (Mine & Plant Operations) and the owners of “Subera” have been ongoing since the leases were originally granted to ensure that both parties understand what is happening and what is planned with regarding to mining and rehabilitation. The objective is to ensure that both the mining and the grazing operations can operate together successfully with mining returning the disturbed areas to pasture as soon as practical. Communication includes face to face meetings, telephone calls, written correspondence, and face to face meetings. Communications are vital to ensure that there is a clear understanding of the mine plan, rehabilitation outcomes and property management. The ongoing agreement of the mining and rehabilitation of each domain will influence the miner’s mining and rehabilitation program.

The PRCP reflects the agreements made between the property owner and mine management on all aspects including property infrastructure and rehabilitation outcomes since mining commenced. The initial agreement on mine outcomes was signed in 2002. The landholder has supported the certification of rehabilitation areas. Given this ongoing liaison, no specific consultation with the landholder was considered necessary in preparing this PRCP. A register of recent communications with the owners of “Subera” is listed in Table 14.

Community

The community of Rubyvale/Sapphire is GNM’s key community stakeholder regarding the Scrub lead leases on the town common. GNM was owned by Daryl Mosely from 2003 to 2021. Daryl was born on the Gemfields and remains connected to the local community. FURA has taken steps to maintain GNM’s long standing relationship with the community

aiming to ensure that communication channels are open allowing the community to raise any issue either operational or rehabilitation with GNM representatives.

GNM has not been approached by other stakeholders with regard to their operation or rehabilitation outcomes.

Common Leases

Community

FURA has taken steps to maintain GNM's long standing relationship with the community aiming to ensure that communication channels are open allowing the community to raise any issue either operational or rehabilitation with GNM representatives.

John Merritt, Bilyarra Consulting Pty Ltd meet with Mitch Brown, Rubyvale Gem Gallery in January 2022 to inspect the proposed Rubyvale Parkland Project proposed by the Rubyvale community. Mitch was asked for comment on the two mining leases held by GNM on the Scrub Lead. Mitch stated that the mining leases on the Scrub lead decreased the area available for fossickers. Fossicking is a draw card for tourists and tourists are the life blood of the local community.

A register of community liaison conducted by FURA, owner of GNM and Capricorn Sapphire Pty Ltd is listed in Table 15.

5.2. Consultation on future rehabilitation

“Subera” Leases

Communications with the owners of “Subera” (Table 16) will be ongoing with the frequency of communications depending on the issues at hand which range of renewal of compensation agreements to liaison on interactions on a day-to-day basis to closure.

Communication will include face to face meetings, telephone calls, written correspondence and face to face meetings. Communications are vital to ensure that there is a clear understanding of the mine plan, rehabilitation outcomes and property management by both parties. All these issues are interrelated and ensure ongoing operational and closure success in the eyes of the Landholder.

No consultation with local stakeholders is planned with regard to future rehabilitation as GNM obligations with regard to rehabilitation are set out in the Conduct and compensation agreement with the current landholder. The property “Subera” is a commercial grazing operation and as such any consultation with the community is seen by GNM as an obligation of the landholder not GNM. As a matter of fact, community consultation on the rehabilitation outcomes on “Subera” is most likely to be deleterious to the ongoing relationship between GNM and the landholder.

Common Leases

GNM will liaise (Table 16) with the Qld Sapphire Miners Association and local advocates e.g. Mitch Brown to discuss the community expectations for rehabilitation and lease relinquishment when the decision is made to make the two leases available for rehabilitation. Liaison will again be required when GNM is preparing the documentation to demonstrate achievement of RM6. All recommendations from the community will be reviewed by

management as the endorsement of the rehabilitation outcomes by the Rubyvale/Sapphire community is key to lease relinquishment. Lease relinquishment will require the approval of the Department of Resources.

6. Post-mining Land Use

State and Council Planning Regulations

The MLs lie in the Central Highlands Regional Council (CHRC) and the CQ Region. The CHRC Planning Scheme 2016 states that Lot 9 PT203 is included in the Rural Zone – Gemfields Present. An extract from the Planning Scheme for the property is listed in Figure 34. The property lies within the Nogoia River catchment and the GBR catchment. There are no specific requirements listed in the Planning Scheme.

CQ Regional Plan October 2013 prioritises Agricultural Areas within the region (see Figure 35). The mapped area does not cover “Sibera”. However, the PMLU of grazing for that area is consistent with the priority. There are no specific requirements listed in the Regional Plan.

The Scrub Lead leases are within the area covered by the Sapphire/Rubyvale designated fossicking land. Relevant legislation is the Fossicking Act 1994 and Fossicking Regulation 2019.

Development Approval

There are no developmental approvals over land underlying the MLs.

Previous/Current Land Use

The mining leases are divided into two discrete groups being those leases lying within the boundary of the property “Subera” and the 2 common leases that lie within the “Scrub Lead Fossicker’s Land”. The PMLU for the leases on “Subera” is grazing (see Figure 30) and the 2 leases on the town common will continue to operate under the conditions stipulated for the Scrub Lead Fossicker’s Land i.e., land for fossicking (see Figure 29).

Leases listed in Table 17 lie within the property “Subera” owned by a third party. GNM has compensation agreements with the owners of “Subera” for the term of the mining leases. The financial terms of the compensation agreements are based on actual hectares available for mining. At lease relinquishment, the land will remain part of the property “Subera”. The land for the term of the mine lease of the lease area will continue to be an integral portion of the property. The miner is for the term of the tenure under the compensation agreement required to liaise with the landholder gaining his agreement on mining. On lease relinquishment, management decisions on the land will continue with the landholder.

GNM holds written agreements with the landholder for the transfer of the Industrial Area, stock water storages, certain roads and tracks and any poly pipelines at lease relinquishment. Any future stock water storages will be the subject of written agreements prior to inclusion in the rehabilitation process for a particular domain. All domains certified have received written sign off from the landholder as to being capable of sustaining grazing and are of a standard consistent with the surrounding grazing land. Acceptance by the

landholder supported by the certification by the Department of rehabilitated domains demonstrate the proposed land use is viable and consistent with how the land was used before mining. Importantly, grazing is a land use with an economic return. A vital pre-requisite to a sustainable post mining land use.

Leases listed in Table 18 are held within the Scrub Lead Fossicker's Land on the town common. This land is covered under the Qld Fossicking Regulation 1994 which sets out the rights and obligations of fossickers. On lease relinquishment this land will be administered solely under this regulation. The land at lease relinquishment will be a viable entity within the Scrub Lead and "Fit for Purpose". There is no infrastructure on the 2 common leases. There is an ongoing economic benefit to the State from the Scrub Lead Fossicker's Land. A vital pre-requisite to a sustainable post mining land use.

Community Consultation

Local stakeholders were not consulted over the nominated post mining land use as the post mining land use was pre-determined. Under the conduct and compensation agreement with "Subera" owners, the land is leased to GNM for mining and will be returned to "Subera" landholders on rehabilitation to continue to be utilised as grazing land. The two leases on the town common are part of the Scrub Lead Fossicker's land under the Qld Fossicking Regulation 1994.

PMLU Summary

The PMLU for all mining leases held by GNM is consistent with how the land was used before to the leases being granted. "Subera" will a grazing property prior to, during and post relinquishment of GNM's mining leases. The 2 leases on the town common were part of the "Scrub Lead Fossicker's Land" prior to the grant of the mining leases and will return to being available land on lease relinquishment. The land continues to be grazed by the animals running on the town common.

Stable Condition

Parcels of land rehabilitated to date have been assessed as certified rehabilitation. This has demonstrated that the rehabilitation is in a stable condition as the land has been proven to be safe i.e., minimal erosion gullies and no active or gaping subsidence, no demonstrated environmental harm to the rehabilitated land or water draining from these landscapes and can sustain the nominated PMLU. The commitment to return the disturbed land to within 2 metres of the pre-mining landform results and rehabilitate areas with the topsoil and subsoils of the area with pasture species dominated by the existing pasture species of the area results in no material change to the landscape. There is no material chance to the landscape's erosional stability.

7. Non-Use Management Areas

No NUMAs are proposed.

8. Rehabilitation and Management

8.1. Hydrogeology

The major watercourses draining the project area are Policeman and Retreat Creeks. Retreat Creek to the south of the project area is the only named Creek in the vicinity. As such, there are no flood plains on the lease area. The creeks are part of an easterly watershed system with their waters flowing into the Nogoa River approximately 15km northeast of Emerald. The creeks are ephemeral flowing following prolonged wet weather.

Both streams regularly flood out of the low flow channel. There are several low-lying drainage lines between Policeman's Creek and Retreat which pond water for a period following rain.

Conceptual groundwater model is shown in Figure 1. Groundwater is confined to the quaternary flowing from West to East. Inflow occurs primarily where the quaternary is on the surface. Groundwater levels on "Subera" vary around 35 metres below ground level. The current maximum depth of economic mining is 12 metres well above the groundwater table.

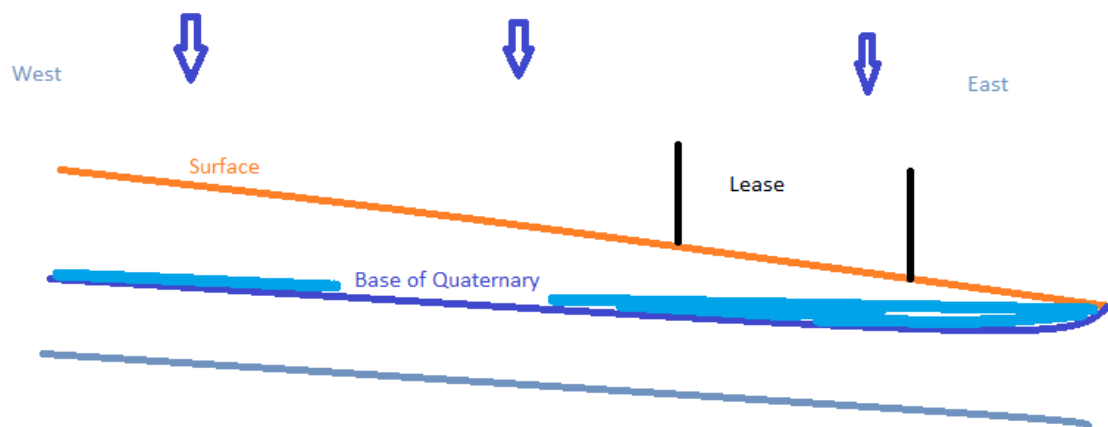


Figure 2: Conceptual Groundwater Model

GNM has one registered bore RN89318 and a Water Licence 403159 with an annual allocation of 150ML. Annual take for 2019/2020 and 2020/2021 has been 150ML. Water quality was tested in 2020. pH was 8.01 and Electrical Conductivity was 374 milliSemiens/cm.

The bore draws water from an aquifer approximately 35m below the surface. A bore pump is installed with a capacity of 40,000 litres per hour. The bore supplies water to the Plant Area and the main industrial area as required.

The bore's location is within the Highlands Groundwater Management Area as described in the Water Plan (Fitzroy Basin) 2011. At that location, taking of water for any purposes that

are not exempt (e.g. stock and domestic) require an authorisation. The water plan has a moratorium on the taking of additional water.

Table 4 in Section 2.5 lists water quality results for the groundwater, stock water storages, the Plant Area and standing water across “Subera”. Observed water quality is consistently within cattle drinking water guidelines for all waters tested. These observations demonstrate that there has been in the past any changes to surface water or ground water quality from mining activity.

8.2.Flooding

The major watercourses draining the project area are Policeman and Retreat Creeks. Retreat Creek to the south of the project area is the only named Creek in the vicinity. As such, there are no flood plains on the lease area. The creeks are part of an easterly watershed system with their waters flowing into the Nogoa River approximately 15km northeast of Emerald. The creeks are ephemeral flowing following prolonged wet weather. Both streams regularly flood out of the low flow channel. There are several drainage lines between Policeman’s Creek and Retreat which pond water for a period following rain.

GHM does not propose to leave a final void on “Subera” at closure. Overburden from the mining pits will be stockpiled in the final mining pits. This overburden and tails and oversize from the Plant Area will allow the landform to be returned to the pre-mine landform +/- 2 metres.

The Common Leases at the grant of the lease was not fully rehabilitated with ponded water in low lying areas (see Figure 24 and Figure 25). Mining is planned over a limited area of the two leases with the rehabilitation planned to maintain the existing landform. Ponded water in mining voids exist over the entire town common and are part of the “ambience” of the area.

8.3.Soil and Capping Assessment

8.3.1. Topsoil

Soils on the low-lying lands are grey-black alluvial cracking clay soils. Soils on the Quaternary uplands are texture contrast. Soils are moderately fertile with the clay soils suitable for growing of crops, provided sufficient water is available. The soils are up to one metre deep, but only the first 100mm contains humic material vital for rehabilitation. Topsoil i.e., the top 100 -200mm of the profile is stripped from each domain, stockpiled on the perimeter of the disturbed area and redistributed evenly across the disturbed area once the desired landform has been formed.

Topsoil stripped, stockpiled, and placed back on the reshaped landform has successfully rehabilitated areas on the “Subera” leases. Mining has taken place over the extent of the “Subera” leases to date with rehabilitation success. Past performance gives GNM confidence that the stripped and stockpiled topsoil will be suitable for successful rehabilitation of domains for the life of mine. It is acknowledged that topsoil quality varies over “Subera” to some extent. This variation can be observed visually. However, the topsoil on “Subera” supports pasture on all areas away from the drainage lines. The drainage lines support native grasses, sedges and Nardoo which is the vegetation aimed for in low-lying areas. The variation is reduced during the topsoil stripping with the mixing of all topsoil as it is pushed off the proposed mining area to be stockpiled and then pushed back into place in

the rehabilitation. This variation in topsoil quality can be observed in cropping land and even irrigated cropping land when observing the “heat maps” of yield generated from the headers or the tagged cotton bales. With either cropping land or pasture, the soil profile produces the desired vegetation albeit with a natural variation.

No ongoing soils surveys are proposed as the rehabilitation technique can establish and maintain a pasture regime across the property delivering the stated PMLU. The critical aspect regarding topsoil is the adherence to the topsoil management plan of stripping and stockpiling as identified in Section 9.

Previous mining on the Scrub Lead Fossickers disregarded topsoil management with many areas of the town common, including the two GNM leases now devoid of topsoil. However, the overburden and wash do achieve a standard of rehabilitation accepted in this area.

8.3.2. Waste Characterisation (Hostile Spoil)

The geology and evolution of the Rubyvale-Sapphire-Anakie sapphire deposits demonstrate that the components of the wash and the overburden are inert and do not leach or breakdown to a potentially damaging material. All mining occurs in the weathered zone above the LOX line. All mining occurs above the groundwater table removing the risk of anaerobic conditions.

The Gemfields covers an area of almost 900 square kilometres. The area has been mined for 100 years with the “Subera” leases mined for at least 30 years. There are no reports of hostile spoil or seepage into surface water or groundwater across the area.

Worked water recirculated in the wash plant in 2009, 2020 and 2022 had an Electrical Conductivity (milliSemiens/cm) from 2,000 to 3,000 (see Table 10). This level of salinity is only slightly elevated over the groundwater reading of ~380 milliSemiens/cm and meets stock water drinking guidelines. This level of conductivity demonstrates that the overburden and wash has been transported, leached and deposited in the region.

Table 10: TSF Water Quality

Site	Date	pH	Electrical Conductivity	TDS
			milliSemiens/cm	mg/L
Promised Land 2 Tails Return Water	29/04/2020	8.02	2100	1407
Promised Land 2 Tails Pond Dry Tails	29/04/2020	8.01	2670	1789
New Laneway Return Water Pond	15/07/2009	8.69	2180	1461
New Laneway Return Water Pond	15/07/2009	9.27	2550	1709
West Lagoon Return Water Pond	15/08/2022	7.66	1821	1220
West Lagoon Return Water Pond	15/08/2022	8.87	1537	1030
West Lagoon Dry Tails Pond	15/08/2022	8.45	2647	1773
Bore	29/04/2020	8.01	374	251
Bore	15/08/2022	6.79	375	251

GNM has 2 certified rehabilitated domain that contained a Plant Area i.e. Rejects Hill and Lois Lane with its associated TSFs. Rejects Hill/Main Dam Site is an elevated Plant Area. Figure 3 shows the area in plan view in 2001. Green Polygon is the now certified rehabilitation of Rejects Hill. Figure 4 shows the area looking north-east in 2017.



Figure 3: Rejects Hill 2001



Figure 4: Rejects Hill 2017

The above evidence demonstrates that the GMN leases do not contain hostile spoil with ARD potential or saline seepage. There is no justification for any further overburden characterisation.

8.3.3. Capping Assessment

Capping is not used in the rehabilitation or proposed to be used as all strata mined are capable of sustaining vegetation when covered with topsoil.

8.4.Landform Design

“Subera” Leases

The final landform for all future mining on “Subera” will be within 2 metres of the pre-mine topography except for any future stock water storages. The past mining technique with a fixed plant area beside the industrial area led to an accumulation of wash trucked in from satellite pits. The outcome is the elevated Main Dam Site and Rejects Hill. Reject Hill is a certified rehabilitation area. The GNM certified rehabilitation provides further evidence of the safe and stable rehabilitated landform. Reject’s Hill is now grazed with the fence excluding stock from the area being removed in 2021. Removal of the fence was a decision of the landholder.

Since the introduction of the mobile wash plant, the landform of rehabilitated domains has replicated the pre-mine landform. This outcome can be achieved by the mining method

going forward. With no change to the pre-mine landform with the exception of Main Dam Site/Reject's Hill, no further modelling or specific landform requirements are proposed. With no change to the landform proposed by mining, the safety and stability of the proposed landform at closure will not be altered from the pre-mine landform's safety and structural stability.

Common Leases

The two Scrub Lead leases as part of the Scrub Lead fossicking area will potentially be subjected to future mining once relinquished by GNM. ML 70286 has an elevated area of overburden which is now covered by a local power line preventing any further reshaping of the area.

The planned final landform for the current leases will maintain the landform existing at lease grant.

8.5.Cover Design

As covered in Section 8.3.2 Waste Characterisation (Hostile Spoil), GNM has not identified a risk of hostile spoil. No capping is proposed.

8.6.Water Management

No contaminants have been observed during the 23-year mine life that will limit the final land use under the rehabilitation methodology. This is supported by the evidence from the wider Gemfields where mining has been carried out for 100 years. Standing water in the drainage lines on "Subera", the GNM bore, dams, stock water storages and even the TSF are sub 2,000 mg/L TDS and typically <500mg/L indicating low total salinity levels (see Table 10). Individual salts, potential contaminants, must be lower levels than the overall TDS level. The elevated TSF Reject's Hill has no toe seepage evident.

No voids will be left at closure. Current drainage lines will not be diverted by mined landforms at closure.

8.7.Revegetation

"Subera" is a grazing property with GNM as a "lessee". The rehabilitation objective for the "Subera" leases as outlined in the Compensation Agreements is to return the land following mining and rehabilitation to the landholder so that he can continue to manage the property as a grazing property. As a grazing property, most of the mined land will be returned to pasture (RA2). The other revegetation objectives for land on "Subera" is to return to the landholder at closure the industrial area including shed (RA3) and specific roads and tracks (RA4).

The two mining leases on the town common are part of the Fossickers Lead and will be return to this use on lease relinquishment (RA1).

All proposed mining areas on "Subera" are discussed with the landholder prior to disturbance. Agreement to mine will include an agreed outcome for each domain. Typically, a domain will be returned to pasture (RA2). Pasture is dominated by buffel and Indian blue grass on elevated areas whilst the native sedges, grassed and Nardoo dominate the low lying areas. If the disturbance includes tracks or fences (RA4), agreement will be reached on the temporary and final locations for these farm assets. The landholder and the Miner

may agree that a stock water storage will be included. If so, this stock water storage will be documented in a written agreement between the Landholder and the Miner and will be added to Table F2 in the Environmental Authority by agreement.

Common Leases rehabilitation aims to return the land to a similar condition to the current landform and vegetation.

There are no plant species of conservation significance relevant to the mine's approval to be included in the seed mix. No fauna habitat is targeted with the rehabilitation technique. The desired pasture desired by the "Subera" landholder is buffel grass. However, Indian bluegrass is becoming the dominant species in significant areas of "Subera" pasture. Pasture in low lying area will be native sedges, grasses and Nardoo.

Rehabilitation milestones RM1 to RM6 will be met by pasture on "Subera" (RA2). Completion criteria for pasture cover are set from the levels in Stocktake. Analogue or reference sites may be used to justify pasture cover levels if these do not meet the described completion criteria or to demonstrate the higher levels of weed in the transect. In low lying areas analogue sites may be used to compare rehabilitated sites. A selected analogue site will be non-mined land adjacent to the targeted domain.

Mining areas will be rehabilitated within 2 years of removing the last of the wash from the void. Plant Areas will be rehabilitated within 5 years of the cessation of processing at this pit.

Rehabilitated areas will be monitored and maintained to ensure that the rehabilitation milestone of certified rehabilitation is obtained within 10 years of achieving RM 5.

Access tracks no longer required for mining that are not required for use by the landholder will be ripped and seeded. Topsoil is not stripped off any tracks. Tracks and roads to be transferred to the landholder (RA4) will achieve RM8. On achieving RM7, the industrial area on "Subera" will be transferred to the landholder on closure.

Rehabilitation Methodology

The planned footprint will be mined in a form of terrace mining. Topsoil will be stripped off planned mining areas and stockpiled outside the area set aside for mining blocks and the associated overburden. Overburden will be pushed off a block approximately 50 by 50 metres to expose the wash. Once wash is mined and carted to the Wash Plant, overburden from the next planned block will be pushed onto the mined area. The post mining landform will be achieved over mined out blocks as the mining progresses through the planned disturbance. For mining pits, the rehabilitation milestones up to seeding (RM 1 to RM5) may be achieved for initial blocks mined within months of mining commencement and before the final wash has been removed. The formation of the final landform may be delayed with the last blocks whilst sufficient oversize or tails from the Plant Area overcomes any identified overburden deficit. The additional fill is placed in the bottom of the pit prior to reshaping the last of the overburden.

The plant footprint may not require all the area of a mined pit. Areas not required will be treated as a mining pit and rehabilitated accordingly. This action could see areas of the disturbance treated as mining pits rehabilitated up to 7 years prior to the designation of the entire pit as reaching RM5.

The rehabilitation methodology described applies to mining pits. The methodology described has been applied to all domains presented in this report. A Plant Area includes tails and return water ponds described under PRCP guidelines as a TSF. Further details on operation and rehabilitation of Plant Areas are described in Section 8.8.

Area that are disturbed for mining only will be available once all planned wash is mined and carted to the Plant Area and any overburden deficit rectified with tails or oversize from the Plant Area. The schedule allows 2 years for rehabilitation up to RM5 to occur. Plant Areas may be an entire domain or part of a domain. Plant Areas will be available once the physical Plant has been removed from the site. The schedule allows 5 years to reach RM5 for a Plant Area.

RM1 through to RM5 will be performed sequentially in the nominated 2-year period. Seeding i.e., RM5 will occur at any time of the year once RM3 has been achieved. Seeding will not be performed at a set time of the year.

Milestones 1 to 5 will be achieved for portions of a domain reach the designated criteria. RM 6 will be assessed for the entire domain.

Rehabilitation Milestone 1 – Final landform achieved

The final landform for all domains will confirm with the pre-mine contours. This is critical with disturbances in low lying areas where the final landform must approximate the pre-mining contours to allow the local drainage networks to function. Mining and Plant Area pits will be returned to a landform less than 15% slopes with all other domain types returned to less than 5% slopes. The desired landform is obtained through the placement of overburden and oversize or tails from the Plant Area as required.

If the domain is to include a stock water storage area, overburden may have to be removed to achieve the desired void. These storages are lined with clay material from the upper horizons of the overburden and drainage lines into the void lined with oversize from the Plant Area to minimise erosion.

Rehabilitation Milestone 2 – Topsoil placed

Topsoil reserved for each individual domain is pushed by dozer over the final landform creating a uniform layer equating to the quantity of topsoil stripped from that domain. No ameliorants have been used or are proposed to be used in the rehabilitation process.

Rehabilitation Milestone 3 - Topsoil smoothed

The topsoil is smoothed. As the topsoil is a black-brown clay, the spread topsoil is often lumps which make it difficult to spread evenly over the landform. GNM uses a heavy inverted track from a dozer pulled by a chain linked to the dozer ripper to drag over the area to break up and evenly distribute the topsoil prior to ripping and seeding.

Rehabilitation Milestone 4 – Landform including topsoil ripped

The area is ripped with a grader or dozer. Usually, GNM rips with the rear tyres of a grader.

Rehabilitation Milestone 5 – Area seeded with desired seed mix

A drum seeder towed behind the grader spreads the pasture seed on top of the ripped ground. The weight of the seed and subsequent rainfall sows the seed into the ground permitting germination.

The seed mix may change from time to time based on availability of cultivars and feedback from the landholder. Current seed mix is 35% buffel grass, 35% rhodes and 30% bambatsi panic planted at 10kg/ha. The seed mix is purchased from an Emerald business that supplies pasture seed to the grazing industry. The cultivars of buffel and rhodes included will depend on availability at time of purchase. Biloela or Gayandah are the preferred buffel cultivars. A diploid and a tetraploid rhodes grass cultivar is preferred in equal portions.

Indian bluegrass (*Bothriochloa pertusa*) is endemic to the region. Areas of pasture on “Subera” are dominated by Indian bluegrass. At no time has the landholder indicated that they wanted these areas to be returned to native species.

Rehabilitated domains on “Subera” have achieved the status of certified rehabilitation without the use of ameliorants and no ameliorants are proposed to be used in future site preparation for rehabilitation.

Rehabilitation Milestone 6 – Achievement of PMLU

Criteria for achieving RM6 are listed in the schedule. These criteria are listed in the Environmental Authority EPML00439113 (July 2020) Table F3.

Rehabilitation Milestone 7 – Achievement of PMLU for Industrial Area

Criteria for achieving RM6 are listed in the schedule. These criteria are listed in the Environmental Authority EPML00439113 (July 2020) Table F3.

Rehabilitation Milestone 8 – Achievement of PMLU for Roads and Tracks

Criteria for achieving RM6 are listed in the schedule. These criteria are listed in the Environmental Authority EPML00439113 (July 2020) Table F3.

Rehabilitation Milestone 9 – Achievement of PMLU for Scrub Lead MLs

Proposed criteria are Total projective cover, slope and erosion similar to analogue transects. Analogue transects will be located in ML or adjacent to ML on Scrub Lead. Photo points will assist with evidence that criteria have been reached.

Rehabilitation Milestones submitted in the schedule are listed in Table 13. The nominated rehabilitation milestones are based on the rehabilitation stages used by GNM since owning the leases. The key milestones are RM5 (ripped/seeded) and RM6 when the domain is capable of certification. At RM5, 97% of the total cost of rehabilitation has been sunk. Costs remaining to reach RM6 are the cost of maintenance and monitoring. Rehabilitation milestones 7 and 8 are milestones for areas not mined but disturbed that will be retained by the landholder on relinquishment of the last of the “Subera” leases.

8.8. Tailings Storage Facilities i.e. Plant Area Characterisation

8.8.1. Plant Area Description

Area that will serve as future Plant Areas are identified prior to mining. With Plant Areas, the topsoil is stripped and pushed or carted to the perimeter of the planned Plant footprint in the first instance to prevent re-handling. Placement of overburden is planned to create the landform required to set up a mining pit as a Plant Area once all wash is removed for processing. Plant Areas require one ponds for recycled water used for processing, one pond for wet tails and a larger dry tails pond. A built-up area next to the dry tails pond is required for the processing plant. Overburden is stockpiled on the pond perimeters. This overburden combined with oversize and dry tails is used to obtain the final landform and to cap the wet tails. Plant Areas (see Figure 5) typically have the capacity for two years of tails.

Areas within the domain footprint not required for the plant will be treated as mining blocks with rehabilitation being achieved sequentially over the mining blocks.

The wash is hauled to a stockpile area and fed by a loader to a dry screening plant where up to 35% of the feed (oversize @ plus 18mm) is rejected being conveyed onto a truck (see Figure 6). This material is either returned to the mining pits by the trucks on their return journey or used for earthworks. The remaining 65% of sapphire bearing gravels is washed using a trommel and pulsator to a concentrate. No chemicals are used in the process. The waste stream flows by gravity onto the dry tails beach. The pipe is continuously moved to manage the beach and wet tails/return water flow. Dense rocks from the trommel and pulsator are collected in the base of the Plant. This material containing the sapphires is removed daily and further separated in the Industrial Area. Dense rocks are less than 0.01% of the wash tonnage with the sapphires are a similar % of the dense rocks.

Given the slight expansion of the overburden and wash on mining, there is sufficient material to backfill all voids to ground level.



Figure 5: Wash Plant

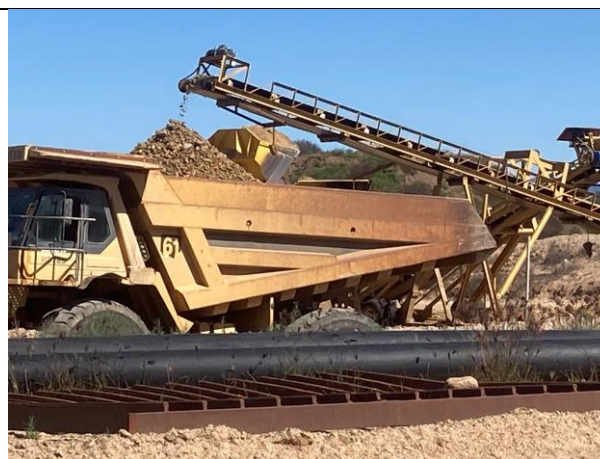


Figure 6: Oversize from Screen conveyed into Truck

Dry Tails

Dry tails deposit on an elevated beach with water and wet tails flowing off. The dry tails are sands and gravels and are trafficable immediately (see Figure 7). As the dry tails beach

expands, the bund and the dry tails (Figure 8) can be removed maintaining a bund of dry tails to contain the return water and wet tails.

Particle Size distribution is shown in Figure 9 with the full test report for Atterberg Limits displayed in Figure 36. Soil particle density is 2.66 t/m³ (Figure 38). The size distribution and density analysis support the field experience of immediate trafficability of dry tails.

Dry tails are alkaline and low salinity consistent with surface water quality (see Table 11).



Figure 7: Dry tails beach



Figure 8: Dry Tails Vertical Face

Table 11: Analyte Analysis

Sample date:	15/08/2022	Dry Tails	Wet Tails
pH 1:5 (Soils)			
pH Value	pH Unit	9.9	9.5
Electrical Conductivity (saturated paste)			
Electrical Conductivity	µS/cm	209	2,680
Moisture Content (Dried @ 105-110°C)			
Moisture Content	%	7.2	72.0

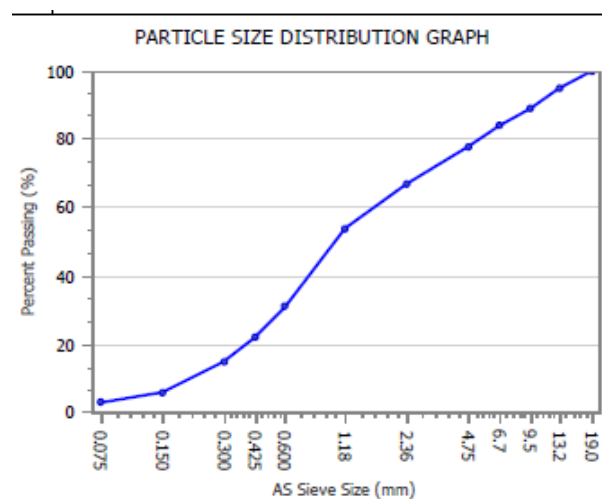


Figure 9: Particle Size Distribution – Dry Tails

Wet Tails

The wet tails are deposited in the standing water. As the dry tails beach expands, the beach forces the wet tails into the first of the ponds. Ideally, the objective is to fill the first of the ponds with wet tails not the second.

A full test report for Atterberg Limits displayed in Figure 37 with particles less than 0.075mm. Soil particle density could not be measured (see Figure 39). The size distribution and density support site knowledge and the accepted timeframe of a maximum of 5 years to achieve RM2.

The wet tail's pH and salinity equate to TSF water quality (see Table 11). Water content of wet tails is high. Moisture content for Promised Land 2 wet tails which has been available for rehabilitation for 2 years is 70%. The wet tails surface rapidly crusts on drying (see Figure 10). Vegetation has established and grown on this pond (see Figure 11). Recent crowding of the wet tails has drowned the vegetation. Crowding and drying out of the wet tails take time and is the reason for the maximum of 5 years scheduled from a Plant Area being available to achieving RM2 i.e., final landform achieved. GMN crews understand the nature of the wet tails and have successfully rehabilitated all wet tails to date with two Plant Areas achieving certified rehabilitation status in addition to two areas achieving RM5.



Figure 10: PL2 Wet Tails showing crusting



Figure 11: PL2 Wet Tails - Vegetation Growth

The mined wash nor the overburden is hostile as all material is above the “Line of Oxidation”. Wash is sand, gravels and gemstones eroded from the line of volcanoes west of the leases and deposited in the region by the great rivers flowing at that era. TSF have been successfully rehabilitated with “Rejects Hill”, a TSF/oversize dump being successfully certified. All new Plant Areas including TSFs will be within metres of the pre-mine landform and less than 15% is slope.

8.8.2. Tailings Characterisation

The geology and evolution of the Rubyvale-Sapphire-Anakie sapphire deposits demonstrate that the components of the wash and the overburden are weathered and inert and do not leach or breakdown to a potential contaminant. All mining occurs above the LOX line in weathered material. All mining occurs above the groundwater table removing the risk of anaerobic conditions.

The Gemfields have been mined for 100 years with the “Subera” leases mined for at least 30 years with no evidence of low pH (<5) soils or surface waters. Any pyritic material exposed to water and oxygen will oxidise within 6 months lowering the pH of the material and any resultant run-off.

Worked water (Table 12) recirculated in the wash plant in 2009 and 2020 had an Electrical Conductivity (milliSemiens/cm) from 2,000 to 3,000. This level of salinity is only slightly elevated over the groundwater reading of 374 milliSemiens/cm. This level of conductivity again demonstrates that the overburden and wash has been transported and deposited in the region.

Table 12: TSF and Bore Water Quality

Site	Date	pH	Electrical Conductivity	TDS
			milliSemiens/cm	mg/L
Promised Land 2 Tails Return Water	29/04/2020	8.02	2,100	1,407
Promised Land 2 Tails Pond Slimes Pond	29/04/2020	8.01	2,670	1,789
New Laneway Return Water Pond	15/07/2009	8.69	2,180	1,461
New Laneway Return Water Pond	15/07/2009	9.27	2,550	1,709
Bore	29/04/2020	8.01	374	251

GNM has 2 certified rehabilitated domains that contained a Plant Area i.e. Rejects Hill and Lois Lane with its associated dry and wet tails. Rejects Hill/Main Dam Site is an elevated Plant Area. Figure 12 shows the area in plan view of Rejects Hill in 2001. Green Polygon is the now certified rehabilitation of Rejects Hill. Figure 13 shows Rejects Hill looking north-east in 2017.



Figure 12: Rejects Hill 2001



Figure 13: Rejects Hill 2017

The Guideline “Progressive Rehabilitation and Closure Plans” states that “Tailings storage facilities (TSF) commonly contain some of the most hazardous materials on a mine site and may represent a significant long-term risk to environmental values”. The site geology, ground water and successful certification of the rehabilitation of two Plant Areas with associated TSFs demonstrate that GNM TSFs whilst challenging to rehabilitate the wet tails do not represent a significant long-term risk to environmental values.

Plant Area Rehabilitation Methodology

The rehabilitation methodology for Plant Areas is similar to the rehabilitation of mining pits with the exception being the time taken to achieve RM1 i.e., to safely cover the wet tails with sufficient dry tails or overburden to allow stages RM 2 to RM 6 to occur. A portion of the Plant Area is a TSF under PRCP guidelines.

Oversize, overburden and dry tails are used to cap the wet tails to achieve RM1. The dry tails are shaped to create the desired landform with excess used to crowd and cap the wet tails. Areas achieving the final landform within the domain will progress through the Rehabilitation Milestones.

The Plant will continue to operate until the wet tails and dry tails ponds are filled to capacity. On removal of the Plant to a new domain, the plant area will be available for rehabilitation. The first step will be to remove any available water by pumping the water to the new Plant Area. Bunds and drains will be installed to create a free draining landform for the duration of the rehabilitation process. The dry tails pond is trafficable for dozers immediately. Dry tails may have already been utilised for back filling of mining voids to achieve the final landform. Initial dozer push is to push excess overburden and dry tails towards the wet tails and return water ponds. Overburden from the surrounds of the wet tails and return water ponds is used to slowly cap the wetter areas. The pushing of the fill from all sides of the wetter areas by a D7 size dozer crowds the wet tails. Time is required to cover the wet tails with overburden keeping it within the footprint of the ponds. The wet tails will gradually settle with time. This is accommodated by overfilling the area. Wet tails will settle sufficiently prior to milestone RM6. This slow process takes the total time to achieve RM5 for a plant area to 5 years. GNM is trialing a process of mixing oversize and wet tails in mining pits once the wash has been removed prior to pushing the remaining overburden in place and topsoiling. There is always a deficit of overburden in mining pits with the removal of wash with this deficit is typically made up with dry tails and oversize. The volume of wet tails is limited to what the voids in the oversize can accommodate. The mix supports heavy machinery allowing RM1

to be achieved immediately. This trial if proved successful will reduce the volume of wet tails in the Plant Area with the potential to reduce the time taken to achieve RM1 over the wet tails.

8.9.Voids

GNM does not plan to leave any voids in the landform at the completion of mining and presentation of the closure vision. This will be achieved by stockpiling an overburden, tails and oversize inventory during the last years of mining to backfill the last mining voids and rehabilitate the Plant Area. The critical aspect of leaving no voids will be the timing of the filling of the Plant Area. The rehabilitated landform incorporates stock water storages. There may be future stock water storages constructed with GNM following due process.

8.10. Underground mining

GNM has not conducted underground mining on the “Subera” or town common leases. No future underground mining is planned.

8.11. Built Infrastructure at Closure

GNM holds written agreements with the “Subera” landholder for the transfer of the Industrial Area, stock water storages, certain roads and tracks and any poly pipelines at lease relinquishment. Any future stock water storages will be the subject of written agreements prior to inclusion in the rehabilitation process for a particular domain.

The two leases on the town common do not have any built infrastructure owned by GNM.

9. Risk Assessment

The Manager (Mine & Plant Operations) is the responsible person for all operations on site including rehabilitation. Rehabilitation is integrated into the mining process. The mining pits are rehabilitated as mining progresses with the last area of disturbance rehabilitated once sufficient fill is placed in the last void to overcome any overburden deficit.

Risk Management demands a risk rating for identified aspects/hazards with existing controls in place. GNM has achieved certified rehabilitation in 25 domains covering 72ha and rehabilitation in 15 domains covering 122ha. Rehabilitation has been an integral part of the mining operations since 2003. Whilst there are several factors that may cause delay in achieving RM5 that can be successfully managed to meet the commitment of 24 months between a domain being available for rehabilitation and meeting RM1, the risk assessment is focused on identified risks in achieving RM6 with existing controls.

The annual rehabilitation monitoring and inspections for the Annual Return aims to check the disturbance and the status of all rehabilitated areas and report back to the Manager (Mine & Operations).

The risk matrix for the assessment is shown in Table 19. The risk register is shown in Table 20.

10. Monitoring and Maintenance

Maintenance

Maintenance of areas that have achieved RM5 is an ongoing process with issues identified by the mining crew treated immediately. In addition, a consultant conducts an inspection prior to the preparation of the annual return in March and annual rehabilitation monitoring mid-year. Maintenance issues observed are discussed with the Manager (Mine & Plant Operations) at the close out meeting and any maintenance documented in the report to management.

Examples of issues and the maintenance program for rehabilitated areas are:

- ☐ Subsidence caused by rainfall wetting the backfill and compacting the profile. Maintenance is to backfill the area if the subsidence renders the landform unsafe or impacts on drainage lines.
- ☐ Poor establishment of pasture. Maintenance is to re-rip and seed again.
- ☐ Settlement of tails ponds. The initial landform of these known areas of risk is 2 to 4 metres higher than the proposed long-term profile to allow for settlement. There is usually sufficient fill in the area to allow the filling of the subsidence if subsidence is more than anticipated. Alternatively dry tails from the current Plant Area is carted to the area and pushed into place with a dozer.

Monitoring Routine

Rehabilitation areas are inspected twice per year by an environmental consultant engaged by GNM. Observations by this suitably qualified and experienced professional, mine management and the landholder or his representative are the key to on-going successful rehabilitation through timely maintenance.

The January/February inspection aims to verify the disturbance statistics for the Annual Return. A report is provided to management detailing the verified disturbance categories as at 31 December the previous year. This report includes a summary of the previous year's rehabilitation maintenance and recommendations for maintenance for the coming year.

The April-June visit inspects rehabilitated domains with issues of maintenance raised with management. A yearly monitoring report is produced. Domains will be monitored using the Stocktake methodology on one to three transects to collect a sufficient dataset to demonstrate the achievement of the cover and weed criteria for RM6. If pasture cover is below the set criteria in the PRCP schedule or weed levels are higher than the set criteria then base line monitoring will occur for benchmarking of nearby pasture.

The Stocktake website is <https://stocktakeglm.com.au/about.html>. Key to this process is the monitoring of total cover levels of pasture, weed and species present in a 50cm by 50cm quadrat 34 times over a 100m transect. Transects are randomly selected with GPS coordinates recorded for the start and end of the quadrat. Monitoring results to date are listed in Appendix B. Pasture yield is estimated using Brigalow Belt Pasture Photo Standards for Buffel Grass <https://futurebeef.com.au/resources/brigalow-belt-pasture-photo-standards/>.

Pasture yield and cover for transects are compared with output from <https://www.longpaddock.qld.gov.au/aussiegrass/products-information/rainfall-and-pasture->

[growth-maps/](#). To date, the output from the long paddock website is too coarse to compare against the actual transect but it does allow comparison at the property scale.

If analogue sites are required for comparison, transects will be selected from the area adjacent to the domain that are consistent with the desired outcomes for the domain.

Annual monitoring of rehabilitation has occurred since 2012 with a successful application for certification occurring in 2014 and 2020. Completion criteria are listed in the EA issued in 2006 with completion criteria for roads/tracks to remain as landholder access and stock water storages added in 2020. These completion criteria have been transferred to this document.

Rehabilitation Milestone Monitoring

Rehabilitation Milestones submitted in the schedule are listed in Table 13. The nominated rehabilitation milestones are based on the rehabilitation stages used by GNM since owning the leases.

Records will be kept by the consultant engaged to conduct the monitoring program. Each disturbance polygons will be inspected at the twice a year monitoring for completion of each rehabilitation milestone with the exception of RM6, cross checked with a discussion with the Manager (Mine & Plant Operations) and recorded in the yearly monitoring report (see Table 21).

The consultant will be responsible for the preparation of a report demonstrating the RM6 has been achieved by a particular domain.

Discrete portions of a disturbance polygon may be progressed through RM1 to RM5 at the discretion of the Manager (Mine & Plant Operations). The entire polygon will be assessed for RM6.

Post Closure Monitoring

No post closure monitoring is proposed as the PRCP schedules forecast mine closure in 2062. The first domains were declared certified rehabilitation in 2012. At closure, the initial domains certified will be 50 years older and managed by the landholder. With management of the rehabilitated areas handed over to the landholder on achieving RM6, after 50 years the proportioned responsibility of the miner for the ongoing success of the pasture is limited.

11. Tables

Table 13: Rehabilitation Milestones

Milestone reference	Rehabilitation milestone	Milestone criteria
RM1	Desired final landform achieved	a) area reshaped to final landform with slopes of less than 15%; b) overburden deficit managed with dry tails or oversize carted from Plant Area; c) plant water ponds crowded and capped during reshaping to promote drying slowing this step with plant areas; b) drainage lines in final landform are continuous with surrounding landform; and c) no voids with exception of stock water storages.
RM2	Topsoil placed	Stockpiled topsoil off disturbed area distributed uniformly over disturbed area.
RM3	Topsoil smoothed	Area smoothed with chain/used track behind dozer
RM4	Landform including topsoil ripped	Area ripped with grader or dozer
RM5	Area seeded with desired seed mix	10kg/ha of pasture grasses applied.

RM6	Achievement of PMLU i.e. land in a condition to be returned to background landholder	i) Pasture a) 50% of quadrats have achieved total projective pasture cover exceeding 30% using the Qld DAF Stocktake monitoring procedure b) Total projective cover of weeds will be less than 5% of total projective cover or less than background levels on nearby pasture land c) Cover in low lying wet areas will be assessed on the native sedges and forbs typically found on these areas on "Subera" with 50% of quadrats have achieved total projective cover exceeding 30% using the Qld DAF Stocktake monitoring procedure; and d) slope of spoil dumps, tails ponds, dams and roads/tracks will be <15% whilst slopes of excavations/voids, topsoil dumps and Infrastructure will be >5%. ii) Road to Industrial area and cattle yards left by agreement with the landholder a) 6 metres wide b) have a formed crown with table drains each side c) may be gravelled; and d) drainage lines may be built up with gravel using poly pipe as culverts. iii) Access tracks left by agreement with the landholder a) 2 metres wide; b) disturbance limited to 2 wheel tracks; and c) will not be gravelled, have culverts or visible signs of erosion in the wheel tracks. iv) Stock Water Storages will a) retain water; b) have stable water entry points; and c) be safe for stock to enter when levels are greater than 30%. These criteria will be demonstrated by a time series of photographs. Storages will have water quality suitable for stock to drink demonstrated by Electrical Conductivity. Each domain will be inspected and signed off by SQEP as safe and stable. Each domain will be inspected and signed off by Landholder that he is willing to accept responsibility for future management of this area as rehabilitated.
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RM7	Achievement of PMLU i.e. land in a condition to be returned to background landholder	Industrial Area a) all rubbish and waste removed b) all equipment and services not required by landholder removed c) Letter from background landholder that area is in acceptable condition and landholder is in future responsible for area.
RM8	Achievement of PMLU i.e. land in a condition to be returned to background landholder	i) Road to Industrial area and cattle yards not disturbed by mining and left by agreement with the landholder a) 6 metres wide; b) have a formed crown with table drains each side, c) may be gravelled; and d) drainage lines may be built up with gravel using poly pipe as culverts. ii) Access tracks not disturbed by mining and left by agreement with the landholder a) 2 metres wide; b) have disturbance limited to 2 wheel tracks; and c) will not be gravelled, have culverts or visible signs of erosion in the wheel tracks. Signed letter from landholder that the roads and tracks are in an acceptable condition and that landholder will in future be responsible for these property assets. Domain inspected and signed off by SQEP as safe and stable.
RM9	Achievement of PMLU i.e. land in a condition similar to remainder of ML/Scrub Lead	Total projective cover, slope and erosion similar to analogue transects. Analogue transects will be located in ML or adjacent to ML on Scrub Lead. Feedback from community consultation documented.

Table 14: Communication with Owners of “Subera”

Date	Details of communication	Decision/Outcome
Dec-20	Seasons Greetings send to the Land owner by Text.	message
Jan-21	Message sent to confirm e-mail address	responded
Feb-21	Requested to confirm documentation was received	confirmed
Mar-21	Send a message to request a call date	responded
Mar-21	Send a message to give land owner new e-mail address for receiving e-mails	responded
Apr-21	requested mail to be sent for annual compensation.	mail received
Apr-21	Land Owner asked to borrow a machine to clean some tracks on farm.	Dozer 7 borrowed
Aug-21	Land owner requested assistance to clear roads for private use on farm	grader borrowed
Oct-21	Land owner advised that there was a broken water pipe	repaired that day.
Nov-21	Ask about Rain recorder	24mm on 7 Nov 2021
Nov-21	Ask about Rain recorder	31mm on 10 Nov 2021
Feb-22	missed call from land owner	met up face to face and had general chat.
Mar-22	message to ask if Land owner received agreements	followed with a phone call.
Mar-22	missed call from land owner	Miner called back to discuss details of compensation
Apr-22	message from land owner to borrow a machine	followed with a phone call to understand nature of job.
Apr-22	e-mail communication of compensation agreements for review	Agreed on site visit
Apr-22	message sent to request meeting on site for lease renewal	met up on 11th April with Landowner to site visit to inspect leases up for renewal and also discuss the new access road for adjoining MLA
May-22	Phoned land owner to confirm agreement signed	confirmed and will mail signed copy.

Table 15: Community Liaison

Date	Community / Authority	Actions requested/ required and discussed	Date Implemented
Apr-21	Gemfest	Sponsorship for the upcoming Gemfest (Community Event) in August	Aug-21
May-21	Gemfields Community Support Assoc	Requested to assist in Monthly Publication - Half yearly supply	Jun-21
May-21	Gemfields Community Support Assoc	Requested to assist in meal preparation for Meals on Wheels - Monthly assistance for one year	Jun-21
May-21	Queensland Sapphire Miners Association	Provide two Laptops for the Miners to access Mymines online and other Mines Department site	Jul-21
Aug-21	Gemfields Lapidary Club	Club requested assistance in supply of 10 units for skin polishing as the current units are broken	Sep-21
Aug-21	Gemfields Lapidary Club	Supply of Lower grade material to generate funds in Club Auction / 20 pcs provided	Sep-21
Sep-21	Queensland Sapphire Miners Association	Association requested help in supplying lower grade material as there is a short supply for the wash bags which they sell during tourism season / agree to provide 25KG's every Q @ subsidised rate of 250\$ a KG	Sep-21
Sep-21	Gemfields Lapidary Club	Supply of Lower grade material for Skin Polishing / Agree to provide 10 pcs a month from Jan22	Jan-21
Jan-22	Gemfields Community Support Assoc	Requested to help in providing COVID prevention kits to the community	Jan-21

Table 16: Community Consultation Plan

Objective	Engagement	Frequency	Released Information	Feedback consideration
Successful closure of "Subera" leases achieving the PMLU of grazing with associated infrastructure returning the land to the background landowner for grazing	Face to face meetings Telephone calls Field Inspections Written Agreements with Landholder	Ongoing at least 10 times per year until 2062 (see Table 14 to understand past frequency of meetings)	Future mining locations for discussion and agreement with landholder prior to disturbance. Visual inspections with Landholder	Liaison to agree on outcomes for each planned disturbance and subsequently to ensure agreed outcomes for each disturbance polygon have been achieved
Successful closure of Scrub Lead leases with land returned to its background land use of Fossicking Area	Face to face meetings with locals and local community groups	1. When leases are available for rehabilitation 2. Prior to and during preparation of RM6 report	Visual inspection of the leases at the two nominated times with GMN disturbance pegged. Any requested information would be provided if available.	1. Discussion on standard and extent of rehabilitation 2. 1 plus discussion on acceptance of rehabilitation std

Table 17: Mining Leases on “Subera”

ML No.	PERMIT NAME	AREA (ha)
ML70304	MOSLEY 1	20.0
ML70305	MOSLEY 2	94.3
ML70357	GRID	31.9
ML6830	TRY-ANGLE	19.9
ML70229	“SUBERA” PLUS TWENTY	19.5
ML70230	“SUBERA” PLUS TWENTY ONE	19.6
ML70199	“SUBERA” PLUS THIRTEEN	24.2
ML70200	“SUBERA” PLUS SIXTEEN	85.0
ML7168	“SUBERA” NINETY EIGHT	20.0
ML7174	“SUBERA” ONE O FOUR	20.0
ML7175	“SUBERA” ONE O FIVE	20.0
ML7176	“SUBERA” ONE O SIX	20.0
ML7180	“SUBERA” ONE ONE O	19.8
ML7181	“SUBERA” ONE ONE ONE	13.2
ML7182	“SUBERA” ONE ONE TWO	14.4
ML70195	“SUBERA” PLUS FOURTEEN	20.0
ML2185	“SUBERA” ONE	15.0
ML2187	“SUBERA” THREE	20.0
ML2188	“SUBERA” FOUR	20.0
ML2190	“SUBERA” SIX	20.0
ML2191	“SUBERA” SEVEN	20.0
ML6854	NUNAN FIVE	20.0
ML6855	NUNAN SIX	20.0
ML6856	NUNAN SEVEN	20.0
ML6857	NUNAN EIGHT	20.0
ML6858	NUNAN NINE	20.0
ML6859	NUNAN TEN	20.0
ML6860	NUNAN ELEVEN	18.2
ML6865	NUNAN SIXTEEN	20.0
ML6866	NUNAN SEVENTEEN	4.7
ML6867	NUNAN EIGHTEEN	18.6
ML6868	NUNAN NINETEEN	19.9
ML6869	NUNAN TWENTY	19.9
ML6870	NUNAN TWENTY TWO	18.2
ML6875	NUNAN TWENTY SEVEN	20.0
ML6876	NUNAN TWENTY EIGHT	19.9
ML6877	NUNAN TWENTY NINE	20.0
ML6878	NUNAN THIRTY	17.9

ML No.	PERMIT NAME	AREA (ha)
ML6880	NUNAN THIRTY TWO	18.2
ML6890	NUNAN FORTY TWO	20.0
ML6891	NUNAN FORTY THREE	18.2
ML6892	NUNAN FORTY FOUR	17.0
ML6932	NUNAN EIGHTY THREE	16.8
ML6933	NUNAN EIGHTY FOUR	13.5
ML7138	"SUBERA" TWO	20.0
ML7139	"SUBERA" FIVE	6.0
ML7142	"SUBERA" EIGHT	20.0
ML7143	"SUBERA" NINE	20.0
ML7144	"SUBERA" TEN	20.0
ML7145	"SUBERA" SEVENTEEN	19.9
ML7155	"SUBERA" EIGHTY FIVE	20.0
ML7156	"SUBERA" EIGHTY SIX	20.0
ML7157	"SUBERA" EIGHTY SEVEN	20.0
ML7158	"SUBERA" EIGHTY EIGHT	20.0
ML7159	"SUBERA" EIGHTY NINE	20.0
ML7160	"SUBERA" NINETY	20.0
ML7161	"SUBERA" NINETY ONE	20.0
ML7162	"SUBERA" NINETY TWO	20.0
ML7163	"SUBERA" NINETY THREE	20.0
ML7164	"SUBERA" NINETY FOUR	20.0
ML7165	"SUBERA" NINETY FIVE	20.0
ML7166	"SUBERA" NINETY SIX	20.0
ML7167	"SUBERA" NINETY SEVEN	20.0
ML7169	"SUBERA" NINETY NINE	20.0
ML7170	"SUBERA" ONE HUNDRED	20.0
ML7171	"SUBERA" ONE O ONE	20.0
ML7172	"SUBERA" ONE O TWO	20.0
ML7173	"SUBERA" ONE O THREE	20.0
ML7177	"SUBERA" ONE O SEVEN	19.5
ML7178	"SUBERA" ONE O EIGHT	19.6
ML7179	"SUBERA" ONE O NINE	19.7

Table 18: Mining Leases on "Scrub Lead"

ML No.	PERMIT NAME	AREA (ha)
ML70285	NINE TO FIVE	17.2
ML70286	REDBACK	9.7

Table 19: 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 20: Risk Register

Risk / Threat (Aspect)	Overview of Current Controls, Measures & Actions In Place	Maximum Probable Outcome (With Current Control Measures)		
		CONSEQCE	LIKELIH'D	CURRENT RISK
Inadequate topsoil to rehabilitate discrete disturbance domain to depth equal to original topsoil depth	Topsoil Management Plan	4 Significant	2 Unlikely	Moderate
Water logging leads to subsidence of rehabilitated area making area unsafe	Maintenance Program e.g. backfill subsided areas if unsafe	4 Significant	2 Unlikely	Moderate
Settlement of tails is greater than planned making area unsafe	Planned Maintenance Program - Redoze area to remove subsidence or cart in additional fill	3 Moderate	2 Unlikely	Moderate
Poor establishment of pasture preventing domain achieving criteria set out in RM6	Rip and seed area again	3 Moderate	2 Unlikely	Moderate
Overburden or topsoil changes across the project area preventing disturbance domains achieving RM6	Not occurred to date or expected in future	3 Moderate	1 Rare	Low
External factors beyond the control of the Operator reduce the opportunity to achieve RM6 within the nominated PRCP schedule period e.g. climate change, critical pasture species not flourishing in area, property management changed resulting in a decline in property pasture productivity/ land condition.	Negotiation of amendment of completion criteria with background landholder and the Department	5 Major	3 Possible	High
Insufficient fill to create desired landform or cover wet tails in TSF	Oversize or dry tails carted from current Plant Area to negate volume deficit	3 Moderate	1 Rare	Low
Rainfall accumulated in void slowing rehabilitation process.	Pump accumulated water to Plant Area for use	3 Moderate	1 Rare	Low
Wet weather prevents mining areas declared available in June being completed by December next year	Nominated timing gives the biggest window of dry weather in a yearly cycle; disturbed areas mining areas progress around polygon allowing progressive reshaping as part of the mining process	2 Minor	3 Possible	Moderate
Weather unfavourable limiting pasture development preventing domain reaching Rehabilitation Milestone 6 in nominated timeframe of 10 yrs	PRCP schedule nominates a period of 10 years between RM5 and RM6 to leave sufficient time for favourable weather conditions to progress pasture development. Annual monitoring will track progress and trigger maintenance as required	3 Moderate	3 Possible	Moderate

Table 21: Milestone Assessment

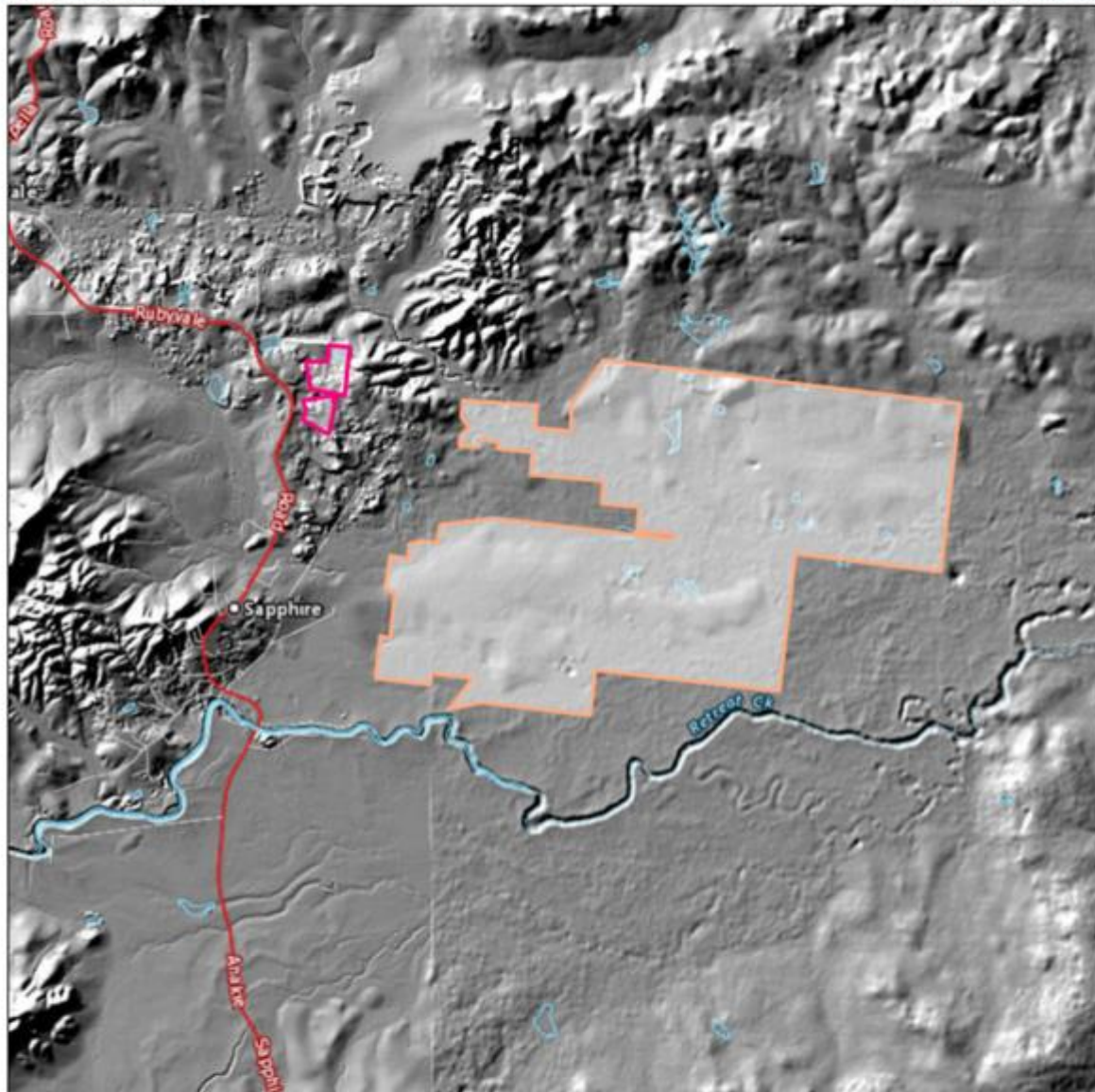
Milestone reference	Rehabilitation milestone	Milestone Assessment
RM1	Desired final landform achieved	Visual Observation at twice per year monitoring
RM2	Topsoil placed	Visual Observation at twice per year monitoring
RM3	Topsoil smoothed	Visual Observation at twice per year monitoring
RM4	Landform including topsoil ripped	Visual Observation at twice per year monitoring
RM5	Area seeded with desired seed mix	Visual Observation at twice per year monitoring and interview with Manager (Mine & Plant Operations)
RM6	Achievement of PMLU i.e. land in a condition to be returned to background landholder	Annual monitoring and reporting Landholder sign-off
RM7	Achievement of PMLU i.e. land in a condition to be returned to background landholder	Annual monitoring and reporting Landholder sign-off
RM8	Achievement of PMLU i.e. land in a condition to be returned to background landholder	Annual monitoring and reporting Landholder sign-off

Great Northern Mine

Topography

571458.51E 7412120.96N (Zone 55)

583282.66E 7412058.90N (Zone 55)



571401.42E 7400368.30N (Zone 55)

583216.11E 7400306.03N (Zone 55)

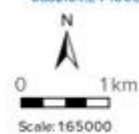
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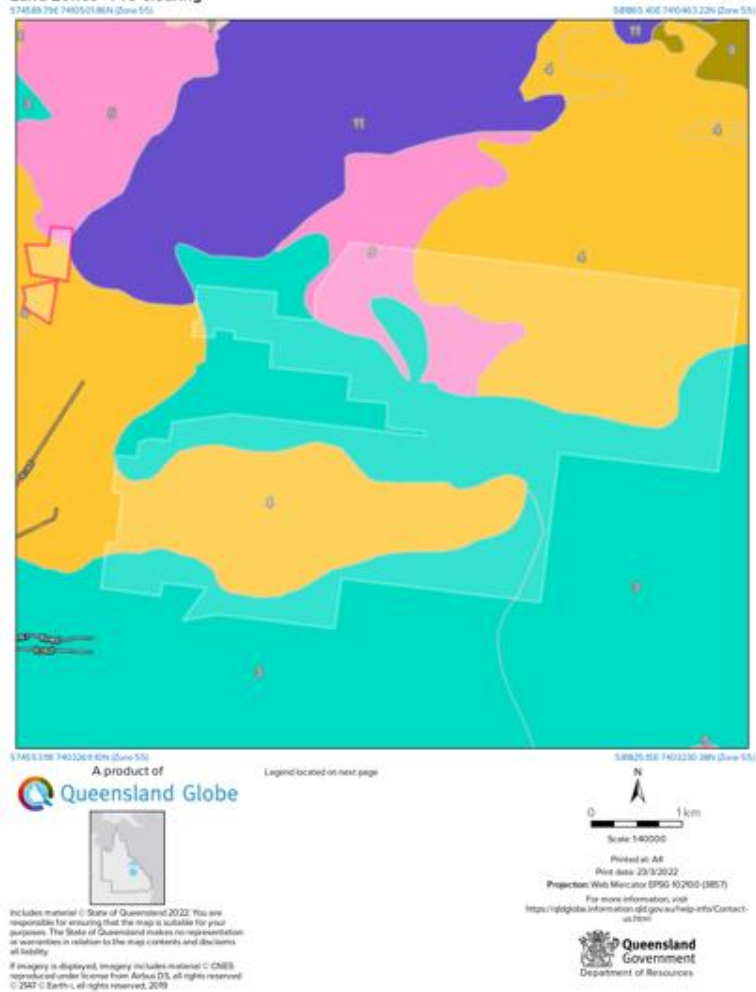
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Figure 15: Local Topography

Great Northern Mine

Land Zones - Pre-clearing



Great Northern Mine

Land Zones - Pre-clearing

Legend

ML 70286.kmz - poly	Landzone - preclear
ML 70285.kmz - poly	1. Quaternary marine deposits
Subera MLs.kmz - poly	2. Quaternary coastal dunes and beaches
Railway	3. Cainozoic alluvial plains and piedmont fans
Road	4. Cainozoic clay deposits, gently undulating plains
Crossing	5. Cainozoic sand deposits, extensive flat or gently undulating plains
Bridge	6. Cainozoic inland dunefields
	7. Cainozoic duricrusts formed on a variety of rock types
	8. Cainozoic igneous rocks, flood basalts forming extensive plains and occasional low scarps
	9. Cainozoic/Proterozoic consolidated fine grained sediments
	10. Cainozoic/Proterozoic consolidated medium to coarse grained sediments
	9-10. Cainozoic/Proterozoic consolidated sediments (SEQ)

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Queensland Herbarium (2022)
Biodiversity Status of Pre-clearing
Regional Ecosystems of Queensland,
Version 12.1 (December 2022); State of
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Figure 16: Land Zones

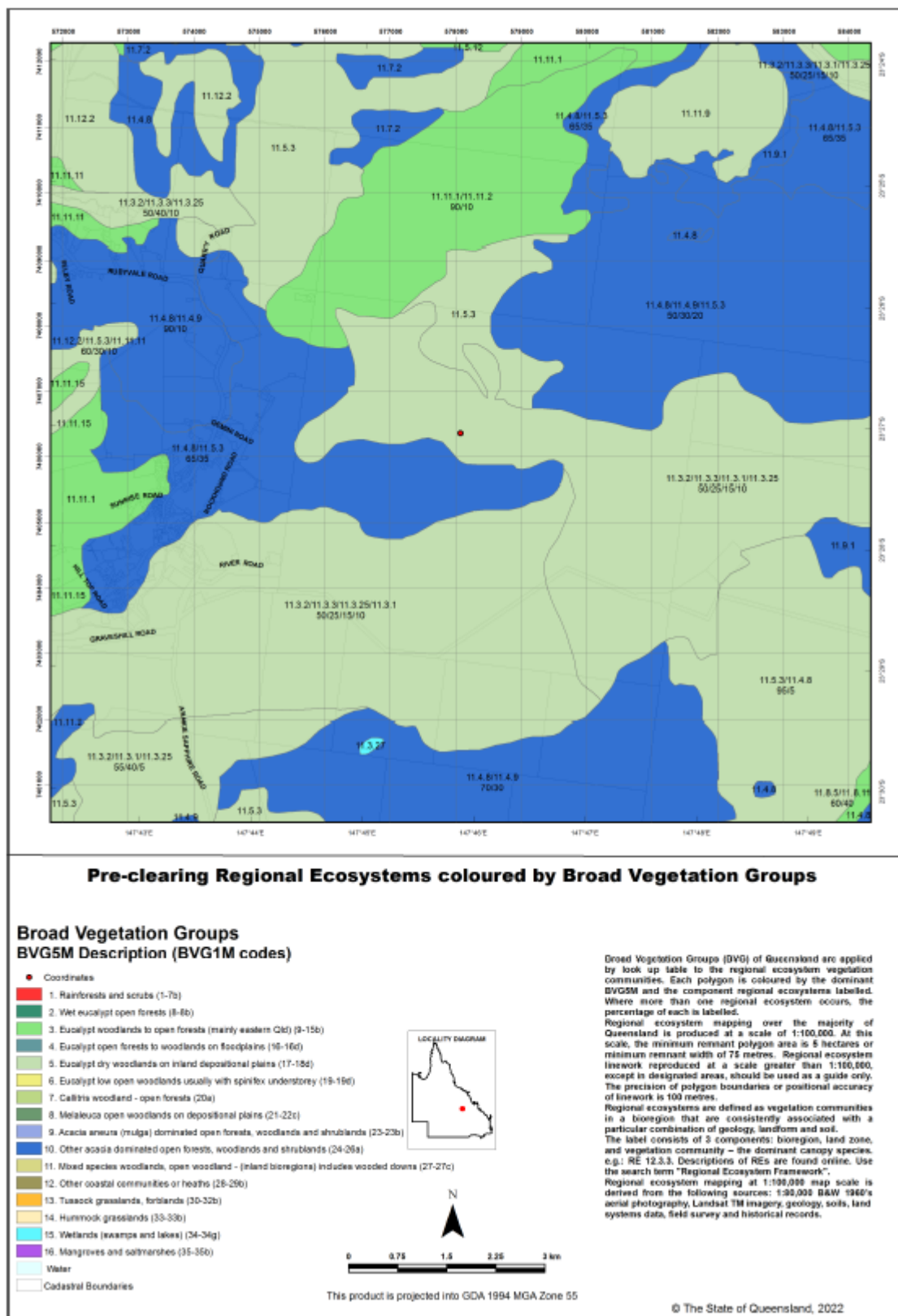


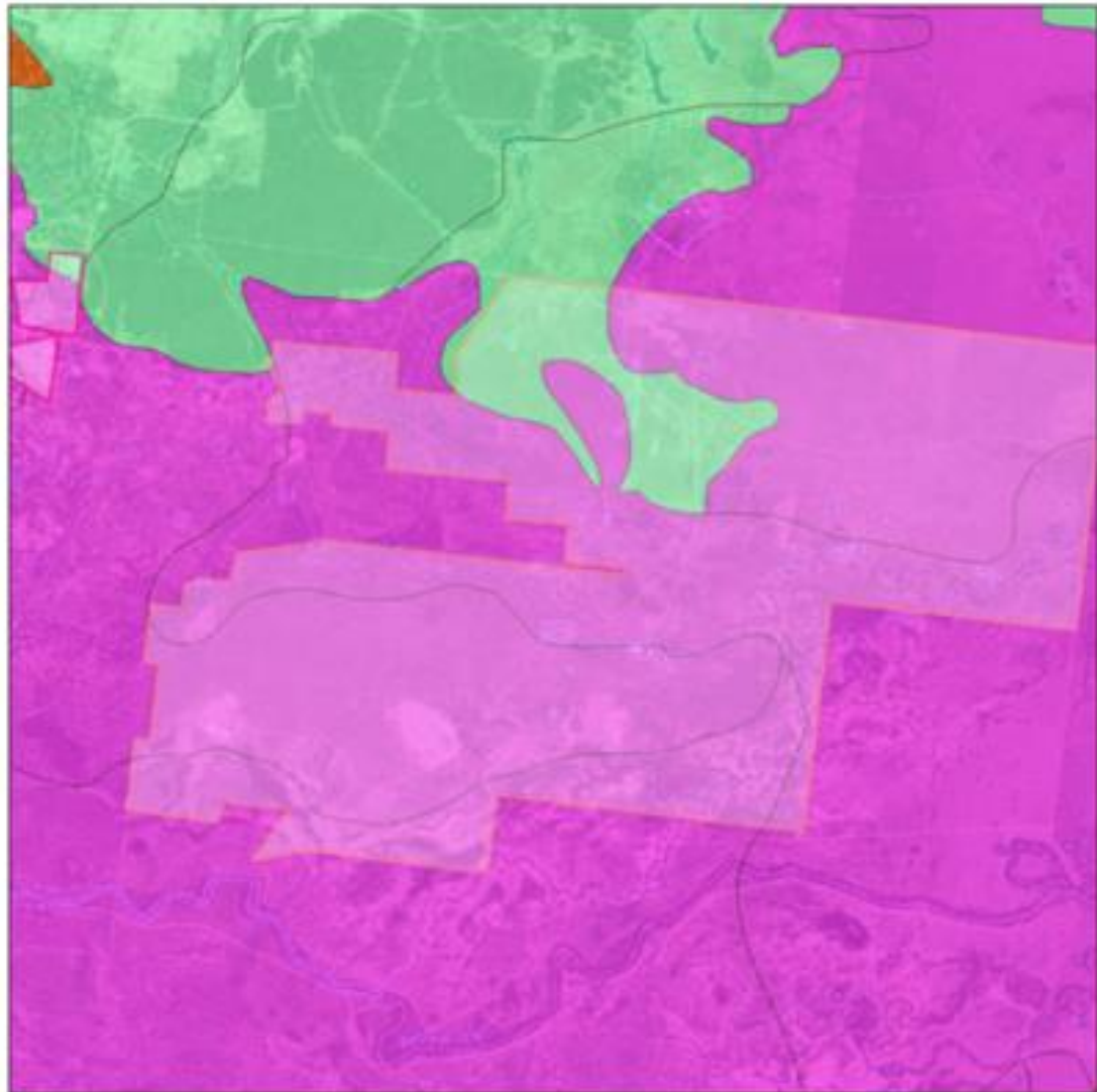
Figure 17: Pre-clear REs by Broad Vegetation Groups

Great Northern Mine

Pre-clearing Regional Ecosystems

57460776E 7400225.55N (Zone 50)

5870386E 7409885.2N (Zone 50)



574632.22E 7400026.99N (Zone 50)

587666.28E 7402080.46N (Zone 50)

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Pre-clear area containing endangered RE

Pre-clear area containing of-concern RE

Pre-clear area containing least-concern RE

Figure 18: Pre-clear REs - Biodiversity Status

581908.00E 7410704.59N (Zone 55)

Figure 19: Biodiversity Remnant Status

Great Northern Mine

Essential Habitat

574512.02E 7400875.96N (Zone 55)

581748.02E 740048.98N (Zone 55)



574476.19E 740285.503N (Zone 55)

581748.02E 740286.35N (Zone 55)

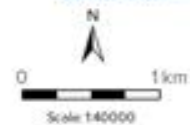
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 Essential habitat map

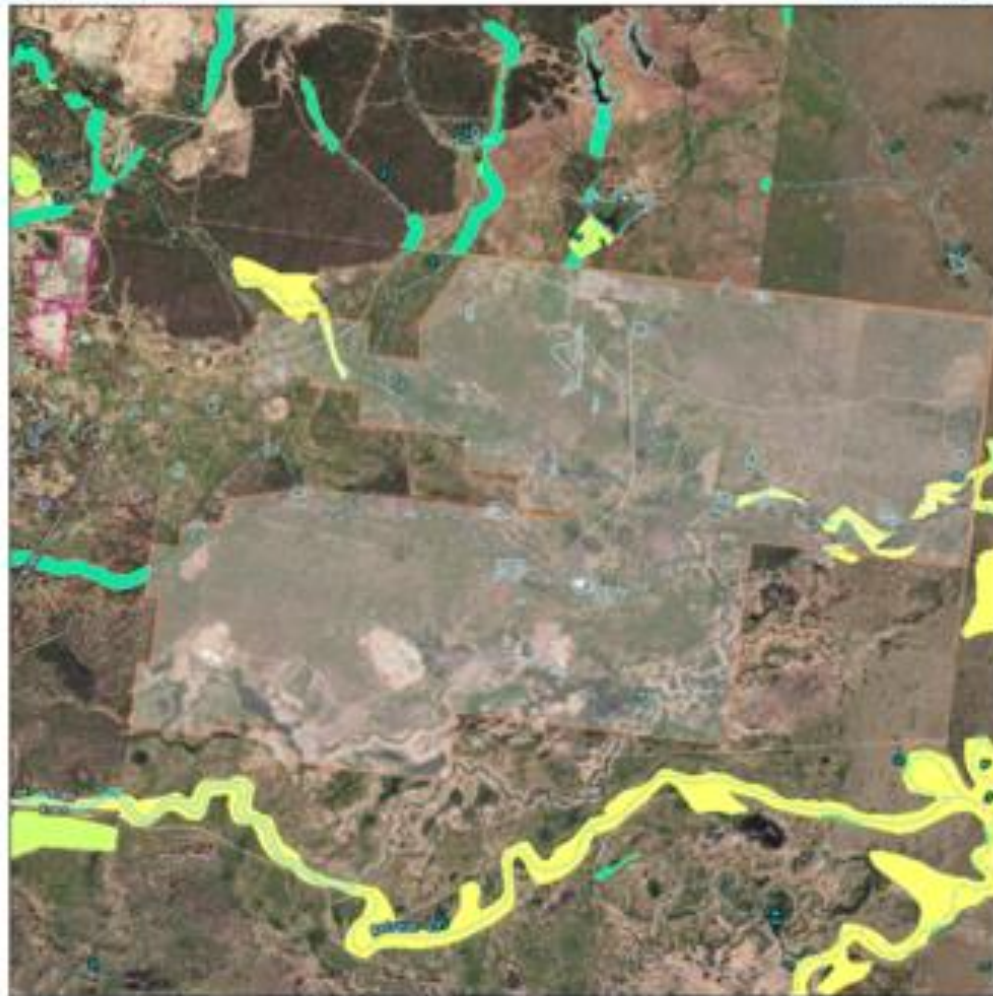
Figure 20: Essential Habitat

Great Northern Mine

MSES

5 140 44 20 140 00 734 (Zone 55)

5 140 75 40 140 00 734 (Zone 55)



5 140 44 20 140 00 734 (Zone 55)

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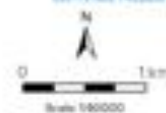
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5 140 75 40 140 00 734 (Zone 55)



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MSES regulated vegetation
[category C- endangered or of
concern]



MSES regulated vegetation
[essential habitat]



Figure 21: Matter of State Environmental Significance

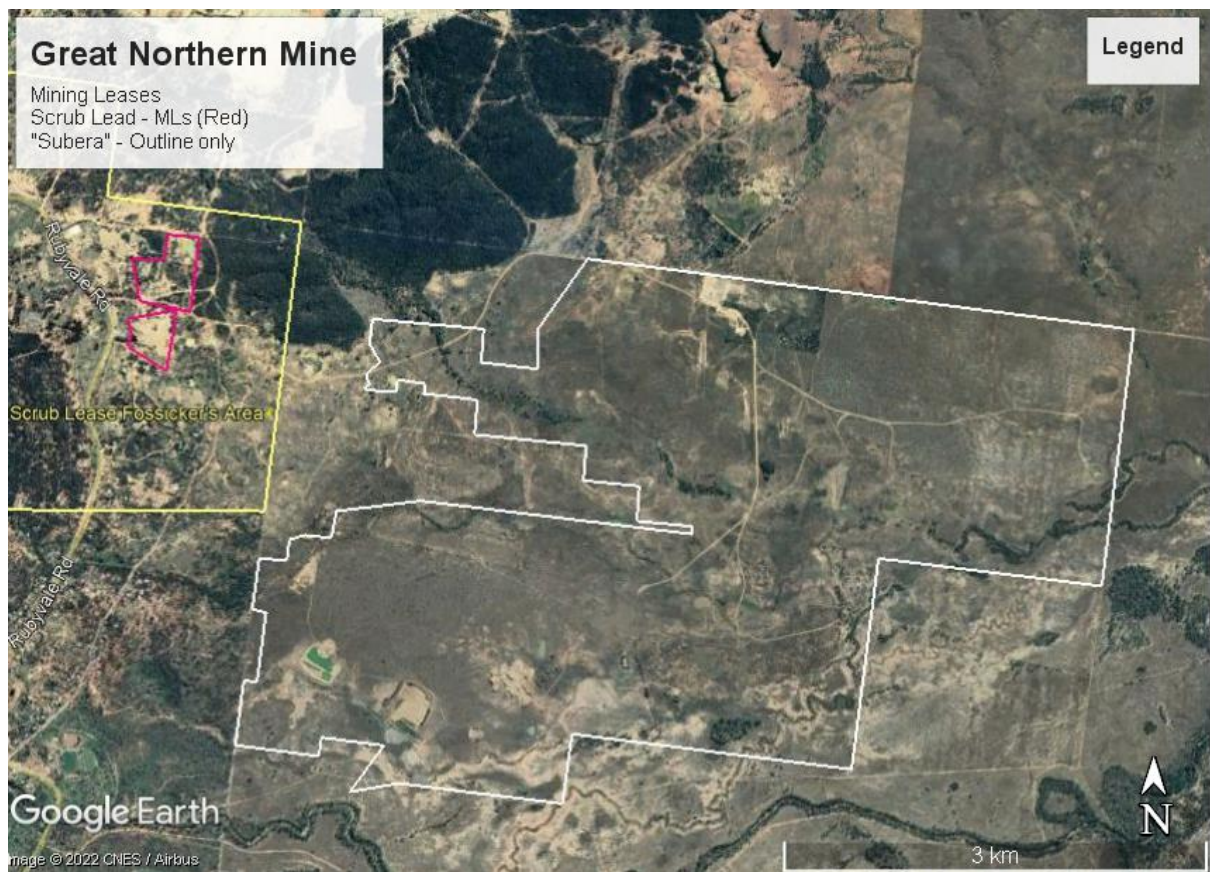


Figure 22: Mining Lease Outline

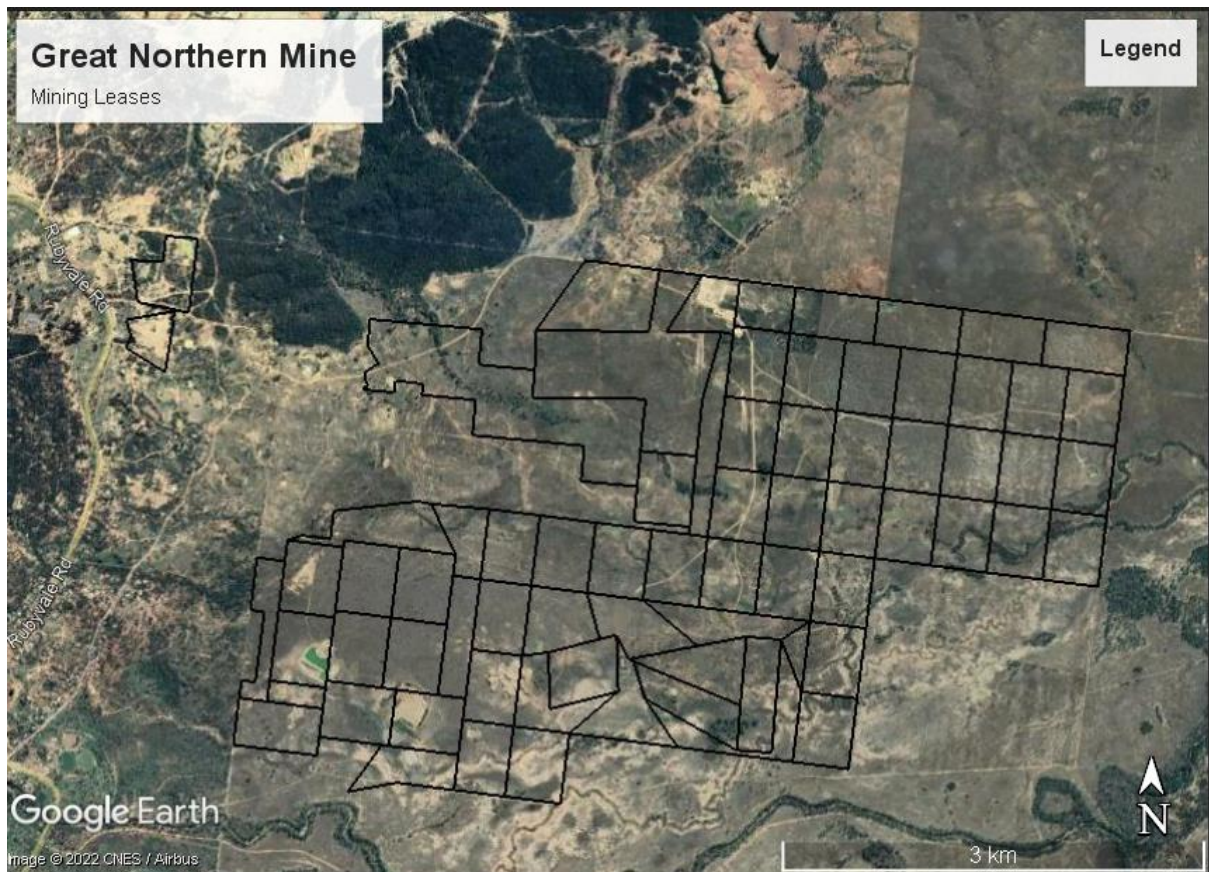


Figure 23: Individual Mining Leases

Great Northern Mine

ML 70285



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Legend: ML outline – orange; GNM rehabilitation – shaded polygon

Figure 24: ML 70285 showing disturbance from previous mining

Great Northern Mine

ML 70286

57454315E 7407977.34N (Zone 55)

575088.00E 7407974.57N (Zone 55)



574540.48E 7407435.58N (Zone 55)

575085.23E 7407432.89N (Zone 55)

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Legend: ML outline – orange; GNM rehabilitation – shaded polygon

Figure 25: ML 70286 showing disturbance from previous mining

Great Northern Mine

"Subera"

574807.56E 7409462.32N (Zone 55)

582082.66E 7409423.56N (Zone 55)



574770.77E 7402230.07N (Zone 55)

582042.29E 7402191.23N (Zone 55)

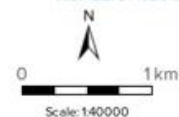
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Figure 26: "Subera" Property

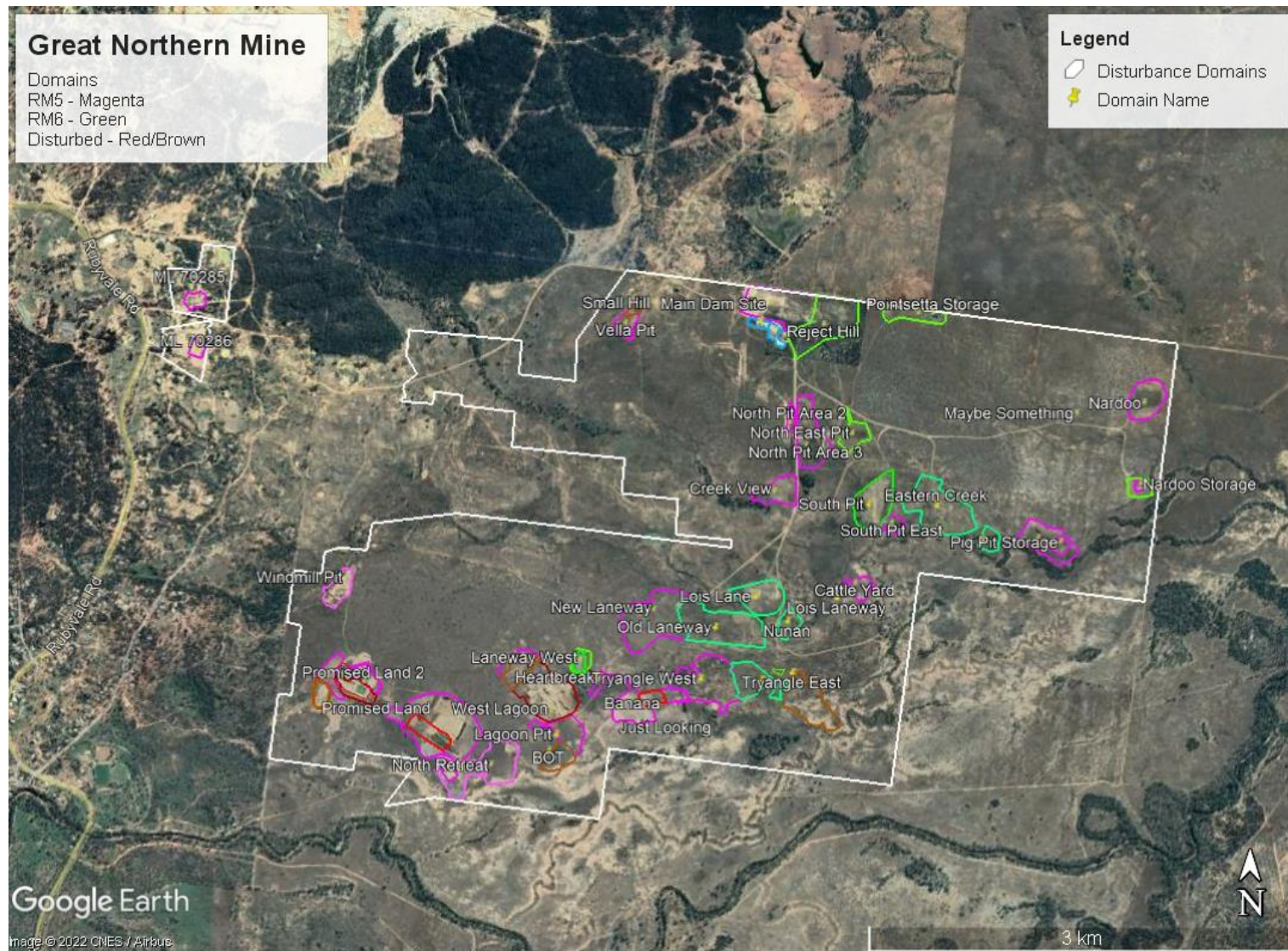


Figure 27: Disturbance Domains



Figure 28: LoDrill used for Exploration

Great Northern Mine

PMLU Common Leases - Fossicker's Land

574117.66E 7408810.13N (Zone 55)

575738.16E 7408801.88N (Zone 55)



574109.55E 7407198.86N (Zone 55)

575729.87E 7407190.61N (Zone 55)

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Legend  PMLU – RA1 Scrub Lead Fossickers Area

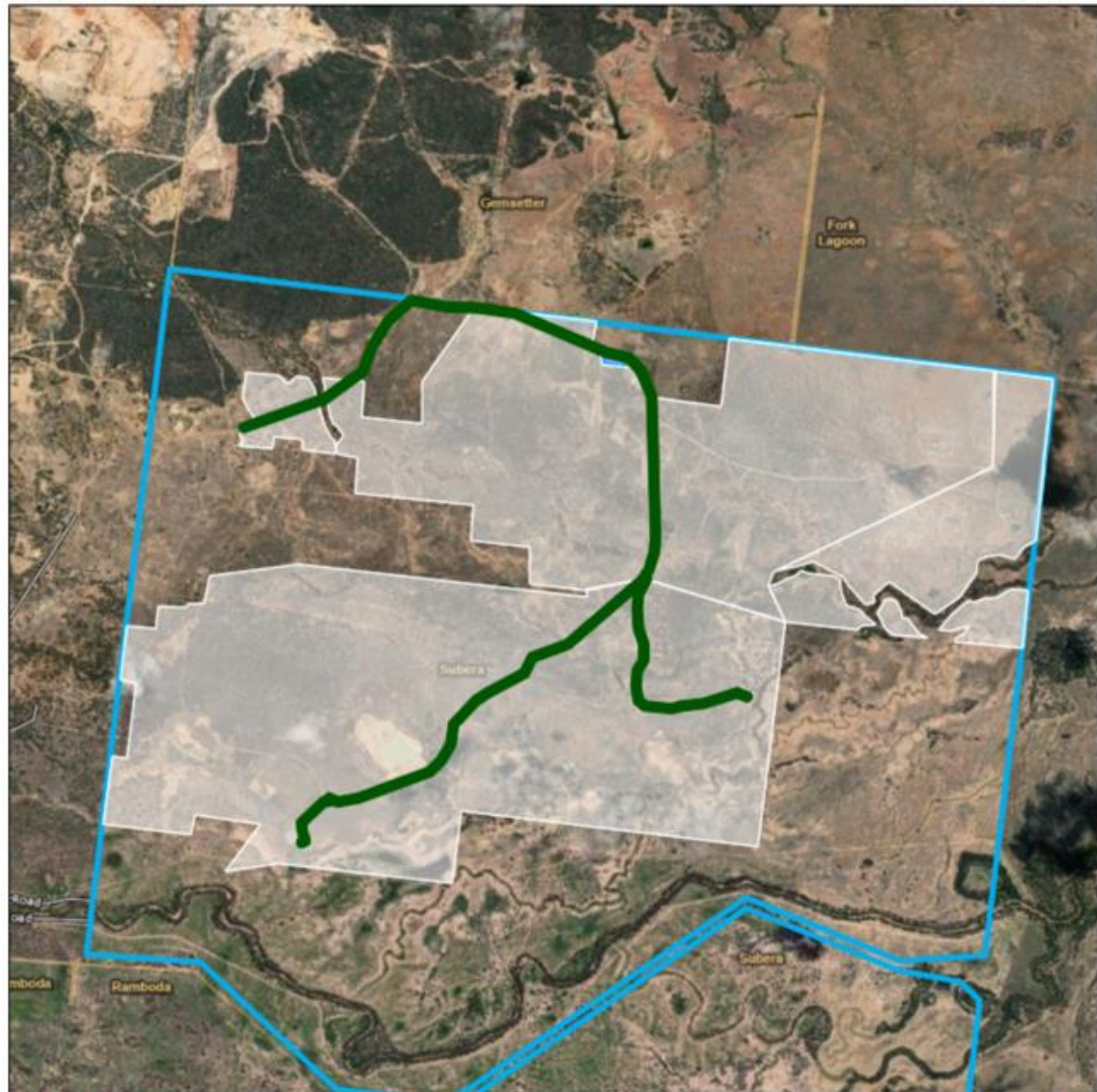
Figure 29 : PMLU Common Leases

Great Northern Mine

PMLU Grazing - "Subera" Leases inc Roads and Infrastructure

574807.22E 7410282.55N (Zone 55)

582073.02E 7410243.85N (Zone 55)



574770.49E 7403059.55N (Zone 55)

582032.72E 7403020.77N (Zone 55)

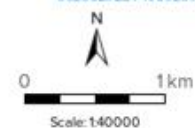
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Legend:

RA2 - Grazing & Maximum Disturbance Footprint – shaded area;

RA 4 - Roads – 

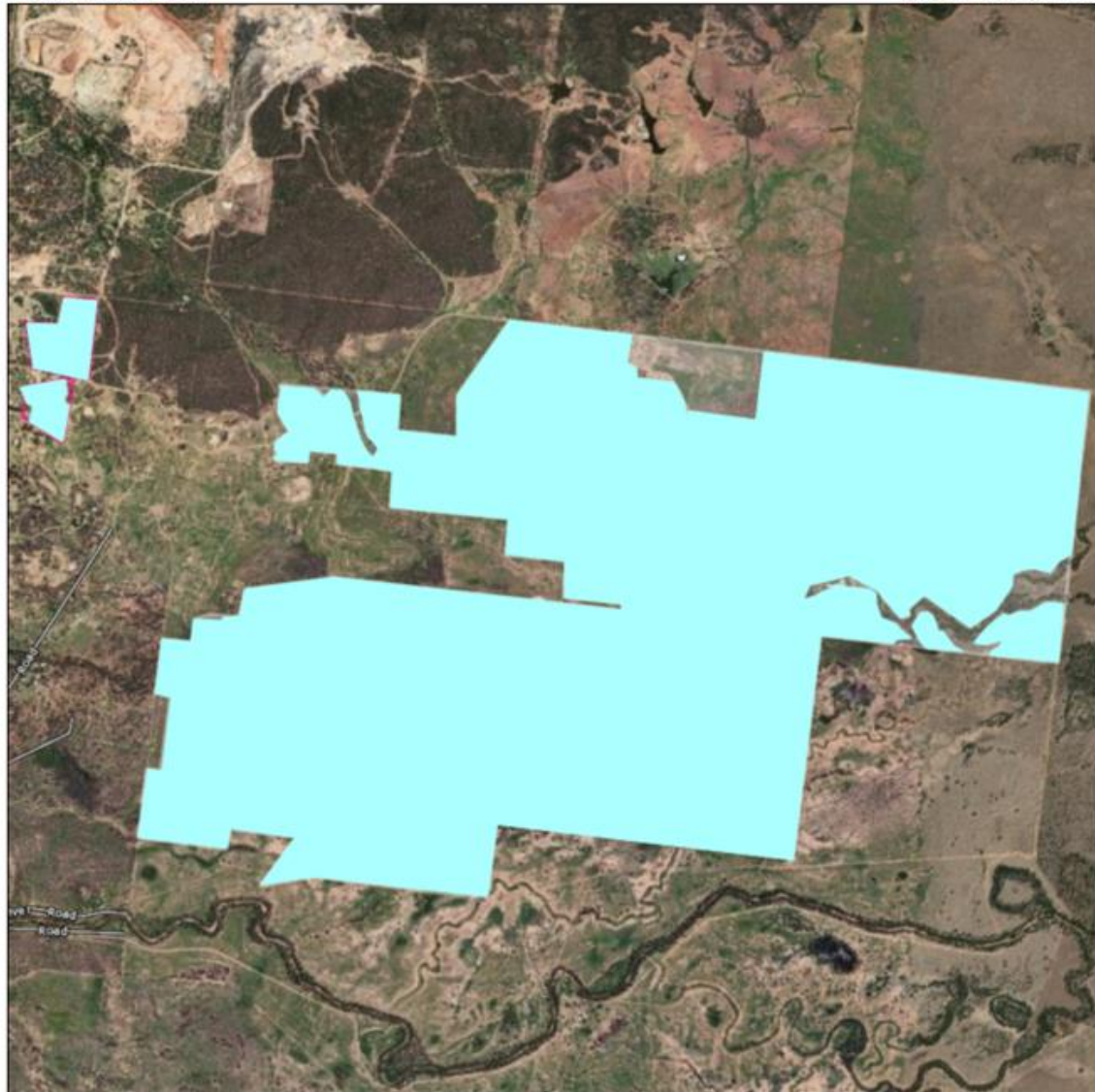
RA 3 - Industrial Area -small blue polygon

Figure 30: PMLU "Subera" Leases

Available Land

574561.26E 7410387.51N (Zone 55)

581836.82E 7410348.89N (Zone 55)



574524.61E 7403154.81N (Zone 55)

581796.58E 7403116.10N (Zone 55)

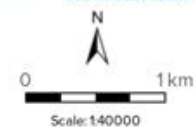
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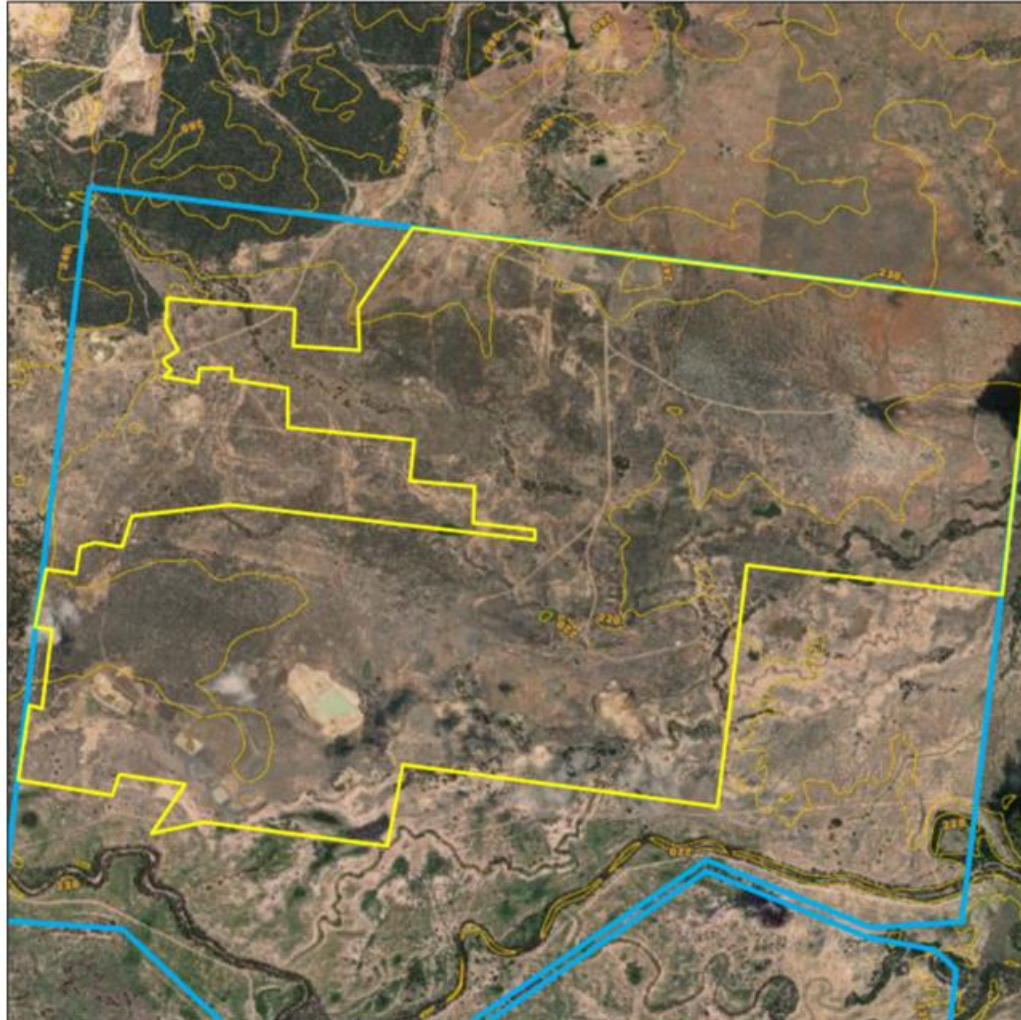
Figure 31: Land available to Mining

Great Northern Mine

Final Landform "Subera" Leases

575365.53E 7409682.14N (Zone 55)

581722.84E 7409648.23N (Zone 55)



575333.14E 7403362.07N (Zone 55)

5816877.2E 7403328.09N (Zone 55)

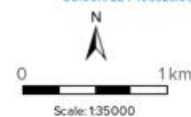
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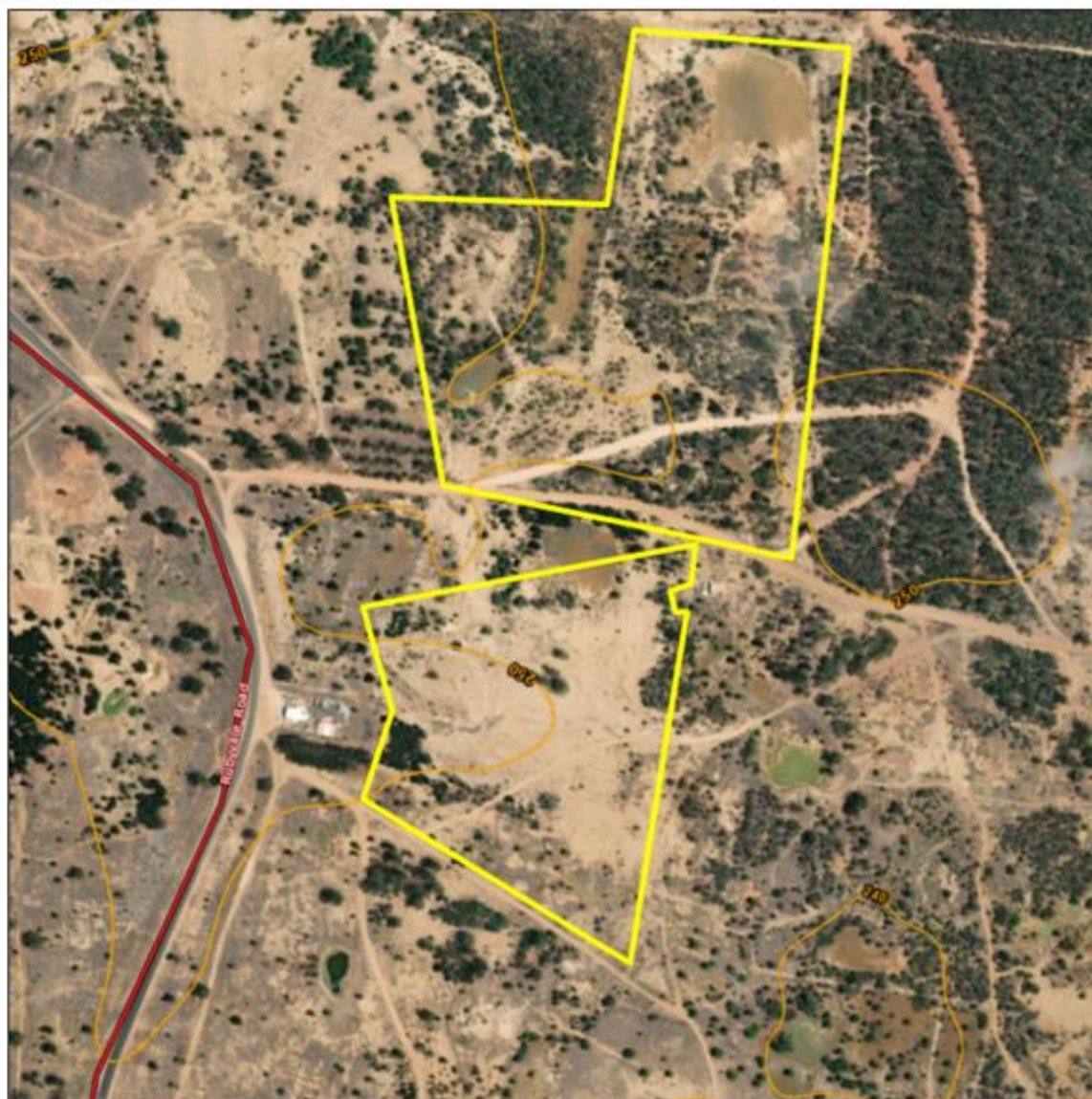
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Figure 32: Closure Landform "Subera" – Contours 10m intervals

Great Northern Mine

Final Landform



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Figure 33: Final Landform "Common Leases" – Contours 10m intervals

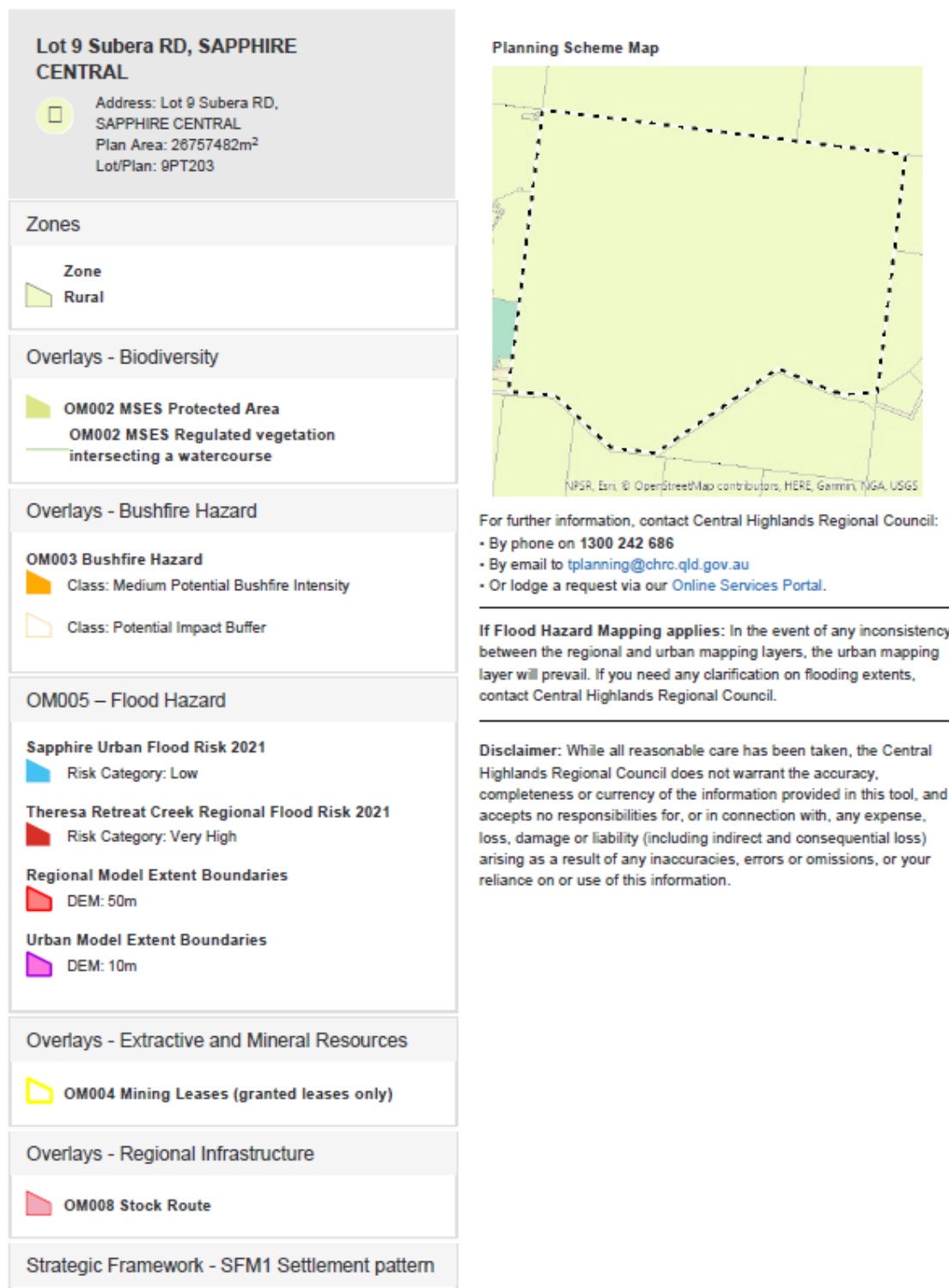


Figure 34: CHRC Planning Scheme

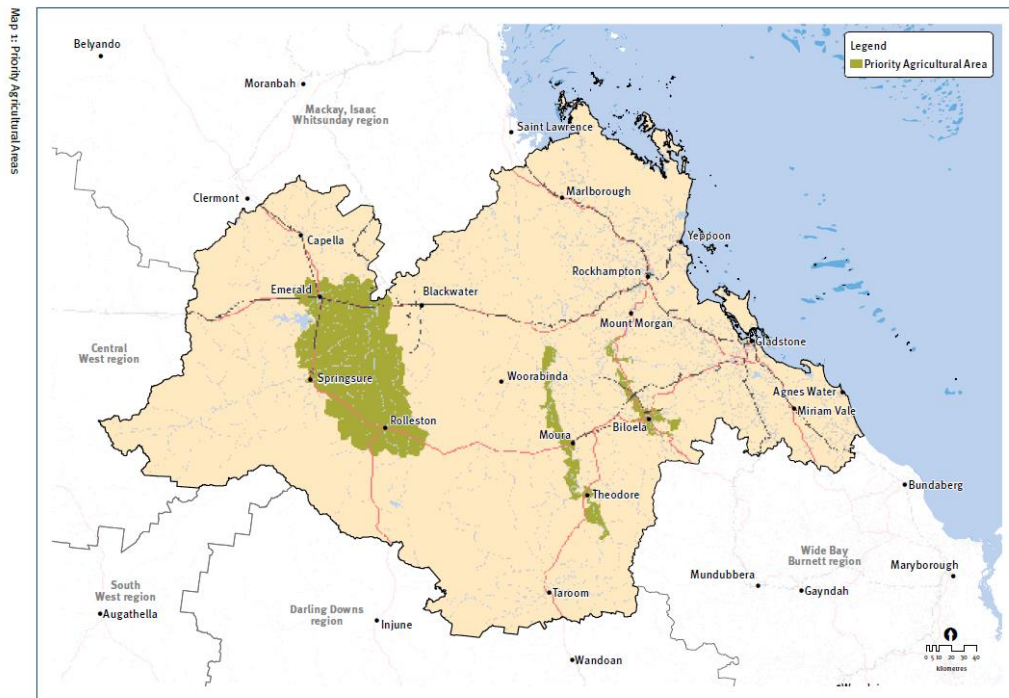


Figure 35: CH Regional Plan Agricultural Priority Area

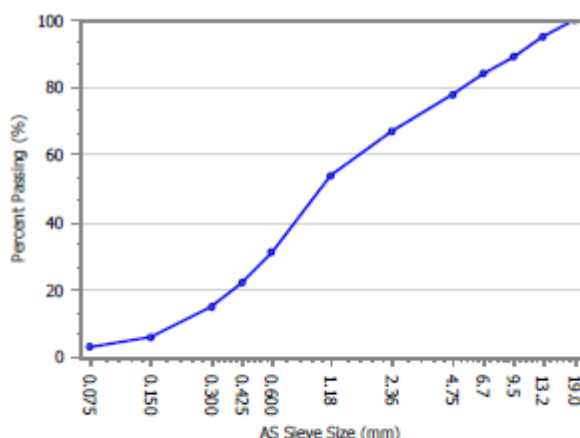
QUALITY OF MATERIALS REPORT

Client:	Bilyarra Consulting Pty Ltd	Report Number:	4708/R/25653-1
Client Address:	260 Blanchs Road, Thangool	Project Number:	4708/P/798
Project:	Tailings Testing	Lot Number:	
Location:	Thangool	Internal Test Request:	4708/T/14620
Component:	Tailings	Client Reference/s:	31/08/2022 - Dry / Wet Tailings
Area Description:	Wet / Dry	Report Date / Page:	8/09/2022 Page 1 of 1

Test Procedures	AS1289.3.6.1, AS1289.2.1.1, AS1289.3.1.2, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS 1289.3.3.1		
Sample Number	4708/S/68114	Location	Dry Tailings
Sampling Method	Tested As Received		
Date Sampled	31/08/2022		
Sampled By	Client		
Date Tested	2/09/2022	Material Source	Sapphire TSF
Drying Methods	PSD: / ATT:Oven Dried	Material Type	Tailings
Atterberg Preparation	Dry Sieved	Material Description	Sandy GRAVEL, Brown

AS Sieve (mm)	Specification Minimum (%)	Percent Passing (%)	Specification Maximum (%)
19.0		100	
13.2		95	
9.5		89	
6.7		84	
4.75		78	
2.36		67	
1.18		54	
0.600		31	
0.425		22	
0.300		15	
0.150		6	
0.075		3	

PARTICLE SIZE DISTRIBUTION GRAPH



Test Result	Specification Minimum (%)	Result	Specification Maximum (%)
Liquid Limit (%)		25	
Plastic Limit (%)		18	
Plastic Index (%)		7	
Linear Shrinkage (%)		3.5	
Linear Shrinkage Defects		-	

Remarks	Results apply to the sample/s as received.,
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 Accredited for compliance with ISO/IEC 17025 – Testing Accreditation Number: 1986 Corporate Site Number: 4708		 Approved Signatory: Colin Scott Form ID: W85MCRP Rev 2
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Figure 36: Particle Size Distribution – Dry Tails

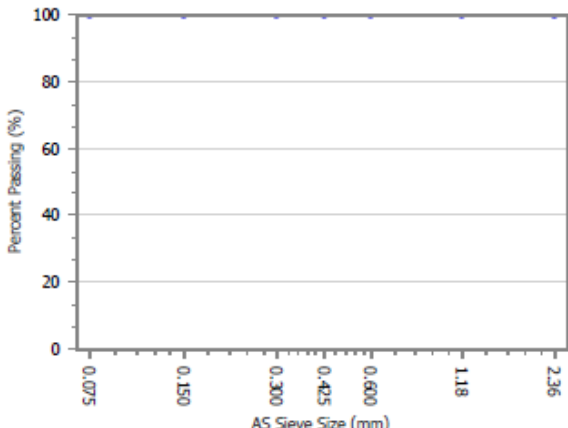
QUALITY OF MATERIALS REPORT

Client:	Bilyarra Consulting Pty Ltd	Report Number:	4708/R/25685-1
Client Address:	280 Blanchs Road, Thangool	Project Number:	4708/P/798
Project:	Tailings Testing	Lot Number:	
Location:	Thangool	Internal Test Request:	4708/T/14620
Component:	Tailings	Client Reference/s:	31/08/2022 - Dry / Wet Tailings
Area Description:	Wet / Dry	Report Date / Page:	19/09/2022 Page 1 of 1

Test Procedures	AS1289.3.6.1, AS1289.3.1.2, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS 1289.3.3.1		
Sample Number	4708/S/68113	Location	Wet Tailings
Sampling Method	Tested As Received		
Date Sampled	31/08/2022		
Sampled By	Client		
Date Tested	2/09/2022	Material Source	Sapphire TSF
PSD Preparation		Material Type	Tailings
Atterberg Preparation	Dry Sieved / Oven Dried	Prep Material > 53.0mm (%)	

Material Description		Silty CLAY	
AS Sieve (mm)	Specification Minimum (%)	Percent Passing (%)	Specification Maximum (%)
2.36		100	
1.18		100	
0.600		100	
0.425		100	
0.300		100	
0.150		100	
0.075		100	

PARTICLE SIZE DISTRIBUTION GRAPH



Test Result	Specification Minimum (%)	Result	Specification Maximum (%)	Test Result	Specification Minimum (%)	Result	Specification Maximum (%)
Liquid Limit (%)		101		0.075/0.425 Fines Ratio		1.00	
Plastic Limit (%)		55		PI x 0.425 Ratio (%)		4600.0	
Plastic Index (%)		46		LS x 0.425 Ratio (%)		1900.0	
Linear Shrinkage (%)		19.0		Linear Shrinkage Defects	Cracking and Curling		

Remarks	Results apply to the sample/s as received.
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 Accredited for compliance with ISO/IEC 17025 – Testing Accreditation Number: 1986 Corporate Site Number: 4708		 Approved Signatory: Colin Scott Form ID: W85Rep Rev 3
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Figure 37: Particle Size Distribution - Wet Tails



SOIL PARTICLE DENSITY REPORT

Client:	CONSTRUCTION SCIENCES - GLADSTONE	Report Number:	2128/R/73883-1
Client Address:	8 KINGDON STREET, GLADSTONE	Project Number:	2128/P/1335
Project:	General Testing	Lot Number:	
Location:	Gladstone	Internal Test Request:	2128/T/31195
Component:	John Merrit - Tailings Testing	Client Reference/s:	4708/CC/704
Area Description:		Report Date / Page:	19/09/2022 Page 1 of 1
Test Procedures:	AS1289.3.5.1		
Sample Number	2128/S/143909	Sample Location	
Sampling Method	Tested As Received	Location	Dry Tailings
Date Sampled	31/08/2022		
Sampled By	Client		
Date Tested	15/09/2022		
Material Source	-	Material Type	-
Soil Particle Density (Fine)		Soil Particle Density (Coarse)	
Percent of Fine Fraction (%)	67.0	Percent of Coarse Fraction (%)	33.0
Temperature of Test (C°)	20	Temperature of Test (C°)	21
Supplied Result Reference	-	Supplied Result Reference	-
Average Particle Density Fine (t/m³)	2.64	Average Particle Density Coarse (t/m³)	2.72
Soil Particle Density (t/m³)		2.66	

Remarks	Results apply to the sample/s as received.
 Accredited for compliance with ISO/IEC 17025 – Testing Accreditation Number: 1986 Corporate Site Number: 2128	 Approved Signatory: Peter Clark Form ID: W14Rep Rev 1

Figure 38: Soil Density - Dry Tails



SOIL PARTICLE DENSITY REPORT

Client:	CONSTRUCTION SCIENCES - GLADSTONE	Report Number:	2128/R/73882-1
Client Address:	8 KINGDON STREET, GLADSTONE	Project Number:	2128/P/1335
Project:	General Testing	Lot Number:	
Location:	Gladstone	Internal Test Request:	2128/T/31195
Component:	John Merrit - Tailings Testing	Client Reference/s:	4708/CC/704
Area Description:		Report Date / Page:	19/09/2022 Page 1 of 1

Test Procedures:	AS1289.3.5.1		
Sample Number	2128/S/143908	Sample Location	
Sampling Method	Tested As Received	Location	Wet Tailings
Date Sampled	31/08/2022		
Sampled By	Client		
Date Tested	15/09/2022		
Material Source	-	Material Type	-

Soil Particle Density (Fine)		Soil Particle Density (Coarse)	
Percent of Fine Fraction (%)	-	Percent of Coarse Fraction (%)	-
Temperature of Test (C°)	20	Temperature of Test (C°)	-
Supplied Result Reference	-	Supplied Result Reference	-
Average Particle Density Fine (t/m³)	2.56	Average Particle Density Coarse (t/m³)	-

Soil Particle Density (t/m³)	-
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Remarks	Results apply to the sample/s as received.		
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Accredited for compliance with ISO/IEC 17025 – Testing		
	Accreditation Number: 1986	
	Corporate Site Number: 2128	
		Approved Signatory: Peter Clark
		Form ID: W14Rep Rev 1

Figure 39: Soil Density - Wet Tails

Page : 3 of 3
 Work Order : EB2225499
 Client : CASH SALES QUEENSLAND
 Project : ----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	DRY TAILS	WET TAILS	----	----	----
Sampling date / time					15-Aug-2022 00:00	15-Aug-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2225499-001	EB2225499-002	-----	-----	-----
				Result	Result		---	---	---
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.9	9.5	----	----	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		85	404	----	----	----
EA032: Electrical Conductivity (saturated paste)									
Electrical Conductivity (Saturated Paste)	----	1	µS/cm		209	2680	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		7.2	72.0	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		1.2	7.6	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g		1.9	15.4	----	----	----
Exchangeable Potassium	----	0.2	meq/100g		<0.2	0.4	----	----	----
Exchangeable Sodium	----	0.2	meq/100g		1.1	14.4	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g		4.2	37.9	----	----	----
Exchangeable Sodium Percent	----	0.2	%		27.0	38.1	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		0.6	0.5	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	34.2	----	----	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		<10	330	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		<10	840	----	----	----
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		<10	<10	----	----	----
Magnesium	7439-95-4	10	mg/kg		<10	<10	----	----	----
Sodium	7440-23-5	10	mg/kg		120	1430	----	----	----
Potassium	7440-09-7	10	mg/kg		<10	<10	----	----	----
ED093T: Total Major Cations									
Sodium	7440-23-5	50	mg/kg		330	5160	----	----	----
Potassium	7440-09-7	50	mg/kg		360	1750	----	----	----
Calcium	7440-70-2	50	mg/kg		900	3980	----	----	----
Magnesium	7439-95-4	50	mg/kg		980	7320	----	----	----

13. Appendix A - Rehabilitated GMN Domains

This appendix provides a history of all rehabilitation areas to date. The rehabilitation process for previously rehabilitated area is described in Section 8 of the PRCP.

The rehabilitation of all domains that have been rehabilitated to date i.e., reached milestone RM5 or in some cases RM6 has followed the process described in Section 8. Several disturbed domains were acquired by Great Northern Mining Pty Ltd when they purchased GNM in 2003. The relevant areas are identified individually in this Appendix. All these legacy disturbances by the previous owner of GNM have been rehabilitated.

Mining in the area by other parties exists with the current status of rehabilitation as left by the miner at the time. Mining in the area predates 1998 with no records of the areas mined. One unrehabilitated disturbance remains beside Tryangle West. There is a breached dam south of the Industrial Area that is a legacy of previous mining activity.

NARDOO PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2000	2013	

Disturbance by previous owner: 0.95 ha

Area of disturbance by GNM: 4.65 ha

Area of rehabilitation: 5.6 ha

Nardoo Pit was mined in 2002 by the previous tenure owner. The pit had been left open pending further mining by GNM, which occurred during 2012-13. The whole area was rehabilitated to a stable flat landform in early 2013 as soon as mining of the area was completed.

Good rains fell in early 2014 facilitating some germination of grasses and colonising weeds including Salsola. Grasses continued to establish following storm rains during Dec 2014 to Feb 2015. This was followed by a dry period in late summer and winter. A small area of subsidence was backfilled in April 2014.

Vegetation monitoring with 'Stocktake' was undertaken on two sites in April 2016. One transect had only 12% of quadrats with >30% cover and colonising weeds such as salsola and pigweed were present. The other transect had 85% of quadrats with >30% cover which consisted of introduced pasture species. Established introduced grasses were mainly buffel grass and urochloa. Vegetation has established well on most of the site however, closer inspection revealed areas of subsidence, and some sparsely vegetated areas which require further contour ripping and reseeded.

No Stocktake monitoring was carried out in 2017 as the backfilling and maintenance had disturbed the site. Pastures grasses germinated and required more time to establish. Undisturbed rehab areas have excellent pasture cover. Nardoo Pit was visited in April 2018. Further subsidence was noted and maintenance carried out. Stocktake monitoring was carried out on the southern part of the site, which has good grass cover with 100% introduced species recorded.

No monitoring was carried out in 2019. Maintenance was completed in the last 12 months in the north and eastern margins of the disturbance. Further minor subsidence was noted. Most of the rehabilitation is good as demonstrated in the 2018 monitoring results. Buffel die back was present in the surrounding pasture.

One transect was monitored in 2020. Cover levels were low especially in the second half of the transect. Observations in 2020 reveal that cover levels are improving except for the northern edge and the centre of the disturbance. There is a dominance of buffel in the pasture.

No maintenance was performed in 2020. The northern pit edge and the centre continue to be the areas where cover levels needs to improve. The grade change along the northern pit edge has low cover levels and is the point for initiation of rill erosion. Subsidence was observed in the centre. Ponding in low lying areas prevents the establishment of pasture grasses.

NARDOO SOUTH STOCKWATER STORAGE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2000	2015	

Area of disturbance: 2.1 ha

Area of rehabilitation: 2.1 ha

Area of storage: 0.43 ha

Mining commenced some time before 2001. Nardoo South Stock water Storage was constructed from a pit at the request of the landowner. A small topsoil stockpile that remained on the site was spread then ripped and seeded in Jan 2015. Erosion gullies at the corners of the dam were filled with rock fraction from the screening plant in May 2015. Pasture around the dam has established well in 2015. 'Stocktake' monitoring was carried out in April 2016. 82% of quadrats recorded > 30% cover. Buffel grass is dominant with the occasional Bluegrass clump

In 2020, drainage lines into the storage are in good condition. Water edges allow easy access to water for the cattle. Entry points for water are stable. Water quality was recorded pH 8.06 Electrical Conductivity 204 μ S/cm.

LANEWAY WEST STOCKWATER STORAGE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
	2011	2020

Area of disturbance: 2.0 ha

Area of rehabilitation (including storage): 2.0 ha

Area of storage: 0.95 ha

Laneway West Stock water storage was constructed in December 2011 at the request of the landowner. The storage filled again with water during heavy storms in Dec 2014-Feb 2015

causing some erosion of the banks. Erosion gullies were filled with oversize in April 2015. Vegetation around the excavation was recorded as sparse in 2020 because of the continuous and extensive use by cattle. Site was inspected in 2020. Edges continue to be firm for cattle watering with water quality of pH 7.96 Electrical Conductivity 241 $\mu\text{S}/\text{cm}$. Water entry points continue to be stable.

CATTLE YARD PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2011	2012	

Area of disturbance: 1.96 ha

Area of rehabilitation: 1.96 ha

Cattle yard pit is located in a drainage line with vegetation typical of the area i.e. sedges, Roly Poly and Nardoo. Surface water from the surrounding land drains through this area into Policeman's Creek.

The pit was mined in late 2011. The site was rehabilitated during the second half of 2012. The site has been contoured to blend with the surrounding flood plain. A small area of subsidence was backfilled in 2014. The rehabilitation was inspected in May 2014 and good germination of introduced grasses and some colonising weeds such as Salsola were present. Grasses have continued to establish but long dry periods have limited establishment of some areas. Monitoring will continue for subsidence.

Transect monitoring occurred in 2022 with transects lying within and adjacent to the disturbed area. Monitoring will continue in 2023 with the aim to compare the vegetation within the disturbed area to the surrounding vegetation as the area in the vicinity of the Pit.

POINTSETTA PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
Prior 2003/2012	2012	2020

Original disturbance: 2.5 ha (including storage of 0.68 ha)

New disturbance: 1.65 ha

Area of rehabilitation: 4.15 ha

The original Pointsetta Pit was mined by the previous tenure holder prior to 2003. As part of the 2.5 ha of rehabilitation of the site, a stockwater storage was constructed at the request of the landowner. Further mining was carried out by the current tenure holder on an adjacent site in 2012. The area of 1.2 ha included a small pit. This and the haul road of 0.45 ha were rehabilitated immediately after mining was completed. The storage walls are stable and in good order.

EASTERN CREEK PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2002/2009	2003/2009	2014

Area of disturbance: 12.6 ha

Area of rehabilitation: 12.6 ha

Area of Stock water storage: 1.38 ha

Eastern Creek area was mined by the previous tenure owner in 2002 and included the building of a stock water storage for the landowner. The area was rehabilitated in 2002-3 except for two open pits at either end of the area – NW Eastern Creek Pit and NE Eastern Creek Pit. Additional mining took place adjacent to NW Eastern Creek pit in 2009 and both this new site and the open NW Eastern Creek Pit were rehabilitated in November 2009. Vegetation monitoring was undertaken at these sites in 2012, 2013 and 2014. Subsequent inspections showed an area of subsidence. This was corrected in early 2013.

Eastern Creek stock water storage is in good order and stable.

NORTH PIT EAST

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2002	2003/2013	2014

Area of disturbance: 3.0 ha

Area of rehabilitation: 3.0 ha

This area was mined and rehabilitated in 2002-3, prior to GNM's tenure and an open pit remained to the east on ML 7167. The open pit was rehabilitated in Oct 2013.

Quadrat vegetation monitoring of the pre 2013 rehab took place prior to 2010 and was replaced by "Stocktake" method in 2012, 2013 and 2014. The area was mapped in May 2014 in order to establish where mining disturbance occurred pre 2003. Some areas with Brigalow regrowth may have been used for temporary topsoil and overburden storage. These areas have a buffel pasture throughout the regrowth, similar to unmined regrowth areas.

A large low area in the centre of the rehabilitation contains thick clumps of native Reed Grass interspersed with areas of green couch. This provides green pick for cattle in the drier months. Buffel grass has established in thick clumps on the upper slopes with 97% of quadrats recording over 30% grass cover. Some parthenium is present, scattered through the pasture. Parthenium is also present in the adjacent unmined Brigalow regrowth.

Vegetation continued to improve, and no subsidence has been observed so that vegetation monitoring using "Stocktake" began in April 2016. Results show rehab with approximately 80% of quadrats containing >30% cover and the introduced buffel and urochloa species predominating. Two more transects were recorded in April 2017. Results show cover levels are good with approximately 80% of quadrats containing >30% cover with buffel, urochloa

and Indian bluegrass predominating. *Bothriochloa pertusa* (Indian bluegrass) was recorded incorrectly as a native species. Three small areas of drill hole subsidence were found in and backfilled in 2016.

Two more transects were recorded in April 2018 confirming that the area is stable and has revegetated successfully with >80% of quadrats containing > 30% cover and introduced pasture species, buffel and urochloa dominant. The area has been well grazed.

NORTH PIT Areas 2 and 3

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2013	2013/2014	

Area of disturbance: 9.0 ha

Area of rehabilitation: 9.0 ha

Two test pits were excavated on either side of the haul road in Oct 2013 and immediately rehabilitated. The strip on the eastern side of the road is North Pit Area 3 whilst the strip on the western side of the road is called North Pit Area 2. This included some reshaping of the previous rehab along the haul road. Subsidence occurred at the test pits sites after the following wet season. Maintenance was carried out on the eastern test pit site in Apr 2014 and the western test pit site in late 2014. Further subsidence has occurred at the eastern test pit after good rain during the 2016-17summer. Further backfilling was carried out in April 2017.

One quadrat was monitored on the western side of the road (Area 2) and one quadrat on the eastern side of the road (Area 3) in 2019. Two drill holes were found to have subsided during the inspection These areas were flagged for backfilling.

OLD LANEWAY

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2000	2004	2014

Area of disturbance: 13.4 ha

Area of rehabilitation: 13.4 ha

Area of storages: 1.2 ha

Mining commenced prior to 2000. Stocktake monitoring was carried out on two pre-2003 mined and rehabilitated sites that were subsequently reshaped, ripped and reseeded and by the current owner in 2004. Both sites have well established grass cover with 88-93% of quadrats recording over 30% cover. The pasture consists mainly of introduced species including Buffel grass and Katambora Rhodes. Native grasses include Blue Grass and Flinders Grass. The area partially covers two stock water storages.

NEW LANEWAY

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2003/2007	2013	

Area of disturbance: 13.6 ha

Area of rehabilitation: 13.6 ha

The previous owner of GNM opened up this area prior to 2003. Mining recommenced in 2007 and disturbance at New Laneway consisted of a mining pit and a Plant Area with 2 large tailings ponds and associated water recycling ponds. Rehabilitation was completed progressively on Laneway during 2011-2013. The two tails ponds continued to dry out with smoothing of one pond in 2015. The remaining slurry pond rehabilitation was completed in 2016 with smoothing in 2022.

No evidence of subsidence was observed during yearly inspections. All areas have good cover but the pastures require more time to establish. Cattle have grazed the area.

Area 1 was rehabilitated in 2011 and now has excellent cover. Area 2 was rehabilitated 18 months later in late 2012 and this area has good cover but did not receive the same follow up rainfall and so more colonizing weeds such as salsola and pigweed and native grasses have established ahead of the introduced pasture grasses. A trace of Parthenium is also present. Area 3 was also rehabilitated in late 2012. The tails ponds rehabilitated in 2014.

All areas inspected in April 2017 have good cover, however salsola and colonising weeds predominate in some areas. Indian bluegrass is the main pasture grass with buffel and urochloa recorded in some quadrats. Cattle graze this area.

Four Stocktake transects were recorded in April 2018 on Area 1. Grass cover was excellent with all transects recording 97 – 100% of the desired cover of 30-50% or greater. The dominant pasture grass was Indian bluegrass. The site is well-grazed. Small areas of one tails ponds remain to settle. 3 transects were monitored in 2019. Rehabilitation continues to improve. Tails ponds continue to subside and are used as a cattle camp. A transect either side of the road was monitored in 2020 in the vicinity of previous transects. T1 was northern side of the road. Cover levels continue to improve on the northern side of the area. T2 is on the southern side of the road. There is a dominance of Indian bluegrass in the low-lying areas with buffel present in better drained areas. The two tails ponds have shown little settlement in the past year in 2020.

LANEWAY WEST STOCK WATER STORAGE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2011	2011	2020

Area of disturbance: 2 ha

Area of rehabilitation: 2 ha

Area of storage: 0.95 ha

Laneway West Stock Water Storage was constructed in December 2011 from a test pit, at the request of the landowner. The storage filled again with water during heavy storms in Dec 2014-Feb 2015 causing some erosion of the banks. Erosion gullies were filled with rock mulch in April 2015. The storage was full again after good rain during the 2016-17 summer.

LOIS LANE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
	2009	2014

Area of disturbance: 6.4 ha
Area of rehabilitation: 6.4 ha

4 ha of plant site was rehabilitated in 2007-8 and the tails pond secured (fenced) in 2008 to allow for drying out. 0.9 ha of this pond and adjacent topsoil storage was rehabilitated in 2009 leaving only 0.02 ha of tails drying out. Rehabilitation of the tails dam was completed in 2010.

Quadrat monitoring was undertaken in 2007-8 but the pasture was slow to establish. The area was inspected in 2012 however Stocktake monitoring was not carried out due to weediness in the area (predominately Phasey Bean). This was chained and fertilized with urea in early 2013 to reduce the weed cover and encourage the grasses to establish. Three transects were recorded in May 2014. Good cover was recorded with 53-88% of quadrats showing greater than 30% cover. Dominant grasses vary across the area. The main introduced species were Katambora Rhodes and Bambatsi Panic. Native species observed included Bluegrass, Flinders Grass and Native Rhodes grass. Traces of Parthenium are scattered throughout the area.

REJECTS HILL

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
Pre 2003	Pre 2003	2020

Area of disturbance: 10.5 ha
Area of rehabilitation: 10.5 ha

The Rejects Hill on MLs 7182 and 7181 was formed and rehabilitated by the previous project owner, GTN Resources. However, vegetation was patchy so that GMN carried out maintenance of the hill area in October 2004 and included contour ripping and seeding in an effort to minimize further erosion, maximize rainfall infiltration and enhance ground cover in this area.

In May 2013, two "Stocktake" transects were recorded on the Hill. Both showed excellent grass cover with 83-89% of transects with > 30% cover of buffel grass. Significant erosion gullies were present around the hill at this time. In 2014-15, work was undertaken to stabilise the gully erosion sites around Rejects Hill. This work was carried out using the rock fraction from the adjacent screening plant and these areas now act as rock drains. Similar work was completed later to stabilise the gully erosion on eastern side of the hill.

Inspection in July 2015 showed that vegetation was already establishing on the rocky areas and the rock drains have remained stable under heavy storm rainfall conditions of January and February 2015. The erosion gully sites have continued to revegetate and no further erosion is evident. Cattle have not been allowed to graze this area although pig damage was noted in 2014. "Stocktake" vegetation monitoring was undertaken in April 2016 on three new sites around the hill. All showed excellent cover of well established buffel grass with a good growth of introduced legumes, Townsville Stylo and Siratro. The first two transects crossed rock waterways where cover is limited and reduced the overall percentage of >30% transects.

The fence was removed in 2021 incorporating the Hill into the neighbouring paddock. This action was an initiative of the landholder.

CREEK VIEW

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2012	2013	

Area of disturbance: 4.2 ha
Area of rehabilitation: 4.2 ha

Creekview was mined in 2012-2013. The western portion of 1.5 ha was rehabilitated in Nov 2012 and the remaining 2.7ha in Sept 2013. Stocktake monitoring was initially completed on one transect in April 2016. Good grass cover was observed with 74% of transects recording >30% although this is predominately native grasses but with pasture grasses establishing. Buffel grass and urochloa are the two pasture grasses observed. The area was inspected in 2019. Button grass was well established and the dominate species on upper slopes. Black soil areas did not have the same levels of establishment.

Maintenance was performed in 2020 with strips ripped with a grader in the upper slopes of the foot-print to encourage pasture establishment and trap runoff from upstream. The 2021 transect cover levels are consistent with previous monitoring. Introduced pasture grasses have dominated the native grasses since 2017. The ripped strips have not improved cover levels to date. Pasture yield was estimated at 1,500 kg/ha in 2022.

SOUTH EAST PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
Pre 2003	2014	

Area of disturbance: 1.63 ha
Area of rehabilitation: 1.63 ha

This pit was disturbed prior to July 2003 by the previous GNM owners and remained open until 2014 although some backfilling occurred in the interim and the site was made safe for cattle. The site was rehabilitated in Nov 2014 (1.5ha). A track, which was opened up for

access (i.e., topsoil pushed aside), was also rehabilitated. (0.13ha) Topsoil was respread and the track was deep ripped.

Timely rainfall in December and January 2015 initiated a good strike of pasture grasses providing good ground cover. Cattle have grazed this area continuously. Bare areas noted in April 2016 were harrowed and re-seeded in 2016. Stocktake monitoring began in April 2017 and showed varying results of 58 and 26 percentage cover of >30%. Time was required for establishment of pasture grasses. Introduced pasture grasses include buffel and urochloa. Approximately 50% of the cover is provided by Indian bluegrass. An area of waterlogging was mapped adjacent to the site. This is a naturally low area, being close to the original path of Policeman's Creek and may have been mined historically. Stocktake monitoring was carried out in 2018 and showed good improvement in grass cover with over 80% of sites with the required cover. There is a high percentage of Indian bluegrass, which is good at colonising bare areas. There is good cover on the temporary access track. One quadrat was monitored in 2019. Buffel die-back was observed along the transect.

NUNAN

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
	2009	2014

Area of disturbance: 2.4 ha

Area of rehabilitation: 2.4 ha

Nunan was a test pit that was rehabilitated in 2009. Transects were monitored in 2012 and 2013.

MAIN DAM SITE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2003-2014	2018	

Area of Disturbance: 11.3 ha

Area of rehabilitation: 11.3 ha

The main dam site was used for processing pre-2003 and was re-commissioned in 2012 so that mining on the northern part of the leases could be finalized and rehabilitation of all legacy sites could be completed including the main dam site itself. The site was decommissioned in late 2014 and 8.4 ha was rehabilitated leaving 2.6 ha of wet tails drying out. Rehabilitation of the remainder of the site was completed in 2018.

Maintenance work was carried out on the batters and areas where erosion occurred following heavy storm rains in January and February 2015. Vegetation cover on the batters is good, but elsewhere is patchy, with colonising weeds such as pigweed prevalent and buffel grass as the main pasture grass. The wet tails are continuing to dry out. The 8.5 ha that was rehabilitated in 2014 required maintenance in 2019. Some areas have very good grass cover and others are not so good in 2018. Slopes on the southern side had begun to erode and required maintenance. Maintenance of the area was performed in 2019 along

with the covering and rip seeding of the wet tails. Germination was poor mainly due to the season in the rehab with the exception of the northern slope where better quality topsoil was able to be used. Gully erosion has initiated on the southern slope. Toe of southern slope has prolific growth. This growth is due to the ongoing seepage from the ponds. This area will be inspected again in 2020 to determine if further maintenance is required. Native legumes are prolific. Large areas of the top of the slope are bare of vegetation but has a rock scree to protect the area from erosion.

The 2020 inspection of the older section of the area found the area stable with good rock cover in areas with low vegetation cover but this cover contains a diverse range of species. Southern slope in the older area is well grassed. In the new section, some vegetation is establishing in the gullies on the top and western and southern slopes. The northern slope continues to have better cover levels. Cover overall remains poor. The ponds continue to subside with increased vegetation levels. One transect in the older rehabilitation was monitored in 2020. The transect ranged from a rocky topsoil where cover levels were low (40% of quadrats @ > 30% cover) to a clay topsoil with increased cover (88% of quadrats @ > 30% cover).

LAGOON PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2012	2016	

Area of disturbance: 4.4 ha

Area of rehabilitation: 4.4 ha

Lagoon Pit was opened up in 2012. Mining and rehabilitation occurred progressively and the last open pit was rehabilitated in 2016. Processing finished in 2015. The site was contoured to reflect the existing landform, which contained a "lagoon". The site is visited annually and again in 2018. Some cracking and areas of subsidence has occurred. The site is weedy with salsola and other colonising weeds and only occasional pasture grasses. Maintenance of the rehab was carried out in 2018/2019 with the area ripped and seeded.

VELLA PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
	2014	

Area of disturbance: 2.0 ha

Area of rehabilitation: 2.0 ha

This pit was inherited with the purchase of ML 70357 from Vella Sapphires. It was rehabilitated in October 2014, backfilled, topsoiled and seeded. It has been inspected regularly and revegetation is slow to establish. The area was inspected in May 2019. Vegetation is still sparse but the area is stable.

The small hill pit was opened up in 2022. A portion of this disturbance covers the area of Vella Pit rehabilitation reducing the Vella Pit footprint.

PIG PIT inc PIG PIT STOCK WATER STORAGE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2003/2014	2014	

Area of disturbance: 7.3 ha

Area of rehabilitation: 7.3 ha

Area of storage: 0.97 ha

Pig Pit was mined and left in a disturbed state by the previous owners of GNM prior to July 2003. (1.7 ha). The site remained unchanged until 2014 when another pit was opened up to the west of the original site and further mining took place. The original pit was enlarged at the request of the owner and a stock water storage constructed. Rock waterways have been established leading into the dam. All disturbance was rehabilitated during Sept-Nov 2014.

The dam has stabilised well and is frequented by cattle. Areas of rehabilitation close to the creek have excellent cover with good buffel grass cover. Parthenium levels have declined over time. The rehabilitation in the western pit section is establishing well but there are bare patches near the dam, which require further maintenance. Pig Pit was not inspected during April 2017. Maintenance of subsidence occurred in 2019. Pig Pit was inspected in April 2018. The storage area is in good order. Rehabilitation is patchy. There are some well-vegetated areas near the stock water storage. The contoured area of western pit has grassed up well and is well grazed.

Pig Pit was inspected again in May 2019. Rehabilitation remains patchy. Two transects were monitored in 2020. One transect (Pig Storage) was on the heavy clay soils to the east of the storage whilst the second was in the middle of the disturbance along a transect which run from a low lying area south-east up a gentle slope. Buffel was dominant along the Pig Storage transect. Due to the disturbance from cattle, Parthenium was present however overall cover levels were good. Whilst cover levels recorded (88% >30%) were good for the second transect, the majority of the cover was the annual barnyard grass.

The slope on the north of the disturbance was re-ripped and seeded in 2020. A cattle supplement continues to be fed in dry seasons from troughs on the disturbed area.

The area of disturbance was revised in 2022 based on a review of past images in Qld Globe and field observations.

COMMON LEASES ML 70285 70286

Mining took place in 2013. Rehabilitation was carried out on these leases in early 2014. To date, the area has not been seeded. There was no topsoil available for spreading on ML70286 as the area was bare and has been mined by several different proponents over the years. Little ground cover is present on the rehabilitation on either lease due to the lack of topsoil.

ML 70285

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2013	2014	

Area of disturbance: 1.6 ha

Area of rehabilitation: 1.6 ha

The area did not have any topsoil due to long term fossicking in the Scrub Lead. Vegetation is beginning to establish in 2016 and consists of pigweed and acacia shrubs. The decision was taken not to do any further maintenance as the current vegetation is typical of colonisers on degraded landform with no topsoil on the Scrub Lead.

Central Highlands Quarrying Company has established a road through the area.

ML 70286

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2013	2014	

Area of disturbance: 1.2 ha

Area of rehabilitation: 1.2 ha

Sparse ground cover has established on ML 70286. This lease has been previously mined and re-mined and hence there was a total lack of topsoil to salvage and re-use. GNM carried out reshaping of some historic mining areas adjacent to their mine pit, while machinery was on site in 2013 and 2014. Erosion is occurring on certain places after they were subjected to large high intensity rainfall events in January and February 2015 soon after reshaping was completed. This effectively accelerated the development of small gullies on some slopes. Erosion gullies have since stabilised. The entire area of the ML is devoid of ground cover.

PROMISED LAND NO1

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2014		

Area of disturbance: 20.3 ha

Area of rehabilitation: 20.3 ha

Promised Land No 1 was opened up in 2014 and processing began in 2015. The site consisted of a processing plant site with associated dry tails pond, wet tail pond and return water pond. A total of 5.22ha of pits was rehabilitated in 2016-7. Further rehabilitation of 2.3 ha of adjacent pits was carried out in 2017 and early 2018. Rehabilitation of the wet tails began in 2018 and is continuing. The area surrounding the tails rehabilitated as at May 2019 was 12.5 ha. Due to the high grazing pressure within the paddock, the rehabilitation of the slimes area is being heavily grazed with young pasture plants being pulled from the ground. Bambatsi has established in the rehab. The wet tails pond and return water pond was fenced during 2022 to exclude cattle from the area.

PROMISED LAND NO 2

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2016	2022	

Area of disturbance: 12.3 ha

Area of rehabilitation: ha

Promised Land No 2 (PL2) was opened up to the west of Promised Land No 1 in 2016. The plant site was moved to PL2 during 2018. PL2 includes goat [pit which is adjacent. 1.3 ha of rehabilitation occurred in early 2017 in the west of the disturbance and is grassing up well. A further 1.74 ha was rehabilitated in late 2017. At May 2019, germination in this area of rehabilitation was sparse though topsoil spread in the area was of reasonable quality. Backfilling and rehabilitation of the wet tails and return water pond continues.

WINDMILL PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2019	2020	

Area disturbed: 3.3 ha

Area rehabilitated: 3.3 ha

Windmill Pit was opened up in 2019 with wash carted to PL2 for processing. The wash in Windmill pit is down to 12 metres below ground which is a deep pit for GNM to mine. The opportunity was taken during the 2019 monitoring to complete one transect of monitoring on the area planned for disturbance for reference. Area was rehabilitated in 2020.

JUST LOOKING

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2018	2018	

Area of disturbance: 5.2 ha

Area of rehabilitation: 5.2 ha

Just Looking was mined and rehabilitated in 2018. Drainage lines through the disturbance have been restored. All areas were ripped and seeded. Establishment has been poor to date. Whilst the pasture seed mix has been planted over the topsoiled area, it is expected that this low lying area will ultimately be covered with sedges and Nardoo, the typical vegetation on "Subera" for water logged areas.

HEARTBREAK PIT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab

Area of disturbance: 1.52 ha

Road Disturbance: 200 metres by 10m wide or 0.2 ha

Area of rehabilitation: 1.32 ha

It is not possible to identify the disturbed area on either side of the existing access road. Vegetation in the area is sedges, Nardoo and native grasses typical of water logged areas on "Subera".

WEST LAGOON

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2018		

Area disturbed: 16.1 ha

Area rehabilitated: ha

Mining commenced in 2018. The area was shaped and made fit for purpose in 2020. Processing will start in West Lagoon in mid-2020. Further mining may take place in the north-west.

RETREAT inc RETREAT STOCK WATER STORAGE

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2017	2019	

Area disturbed: 5.5 ha

Area rehabilitated: 5.5 ha

Mining took place in 2017 – 2018. Following a request from the landholder, a stock water storage was constructed in the void left at the cessation of mining. The area including the storage was rehabilitated in 2019. Rock was placed in the storage entry points in 2019 to stabilize the area. In the interim, the storage has been filled. The storage blends into the drainage line on which it is located. Ground cover levels remain low around the storage.

The area was inspected again in 2020. The storage's water levels remain high. Entry points to the storage remain stable. Water quality was pH 8.1 Electrical Conductivity 430 $\mu\text{S}/\text{cm}$. Lack of rain and continual grazing has limited the pasture establishment

NORTH RETREAT

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2019	2020	

Area disturbed: 6.5 ha

Area rehabilitated: 6.5 ha

North Retreat was mined in 2019 with rehabilitation of the area completed in early 2020 after the overburden deficit was backfilled with oversize from the processing plant at PL2. The area was inspected in April 2020. The established pasture was being grazed heavily with young plants being pulled from the ground. The area was densely covered with Roly Poly at the 2022 inspection. Young pasture plants could be found growing under the cover of the dead Poly Poly.

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TRYANGLE WEST

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2020	2021	

Area of disturbance: 11.6 ha

Area of rehabilitation: 11.6 ha

Mining commenced at Tryangle West in 2020. Mining progressed to the east to meet the previously mined Tryangle Pit. An area of certified rehabilitation on Tryangle Pit was disturbed in the mining of Tryangle West. As the initial mining occurred through one of the "Subera" lane ways, the lane way was mined and a replacement laneway was rehabilitated through the middle of the disturbance early in 2020. The area to the west of the lane way was rehabilitated by May 2020 with a portion of the mined out disturbance ready for rehabilitation to the east of this area. The area was inspected in April 2020. No rainfall had occurred since completing the rehabilitation leaving the area bare of any vegetation. Mining ceased and the area completed rehabilitated in 2021. The initial area rehabilitated has good germination and establishment.

When inspected in 2022 there was still a visual difference in growth and establishment between the initial and later sown areas. The wet weather had delineated the low lying areas within this disturbance which remained water logged at the time of the 2022 inspection. This area will not progress to pasture. Due to the low lying nature of both Banana and Tryangle West, the haul road from Lagoon West to Tryangle East was relocated to the main track back to the bore and then along the gravelled road to the Cattle yard giving the mine all weather access from Tryangle East to the Plant in West Lagoon.

TRYANGLE EAST

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2021		

Area Disturbed: 8.4 ha
Area Rehabilitated: 0 ha

Mining commenced in 2021. Mining continues in the shallow Tryangle East in 2022 on the eastern extents. This pit remains a potential future Plant Area. In 2022, the haul road was changed to link up with the access road to the cattle yards via the bore back to Lagoon West.

BANANA

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2021	2022	

Area Disturbed: 2.9 ha
Area Rehabilitated: 2.9 ha

Mining commenced in Q2 2021 and was completed by the end of 2021. Final rehabilitation was delayed to Q1 2022 due to the wet weather. Banana is located in the drainage line running through BOT, Just Looking, Heartbreak and Lagoon.

BANKING ON IT (BOT)

Mining Commenced	Rehabilitation (RM5)	Certified Rehab
2021		

Area Disturbed: 7.8 ha
Area Rehabilitated: 0 ha

Mining of this area commenced in late 2021. The eastern portion of this pit is in a drainage line. Mining finished in 2022 in the north of the disturbed area which waits backfilling with dry tails and oversize from the West Lagoon plant prior to the final reshape and topsoiling.

14. Appendix B - Stocktake Monitoring Results

The following tables are the tabulated results from the Stocktake monitoring conducted on GNM.

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Old Laneway 1	2012	578412E 7405949N				3	97	100	47	53	Not recorded
ML6857 north		578473E 7405881N									
Old Laneway 1	2013	578361E 7405950N			25	47	38	100	95	trace	5%
ML6857 north		578441E 7405901N									
Old Laneway 2	2012	578449E 7205705N				25	75	100	88	12	Not recorded
ML6868 south		578450E 7405804N									
Old Laneway 2	2013	578453E 7405820N			38	29	32	100	94	5	1%
ML6868 south		578509E 7405751N									
Old Laneway unmined	2013	578448E 7405904N	35	24	32	9		41	10	80	10%
		578576E 7405890N									
Old Laneway east	2014	578666E 7405692N	3	9	32	41	15	88	80	20	Trace Parthenium
		578653E 7405777N									
Old Laneway mid	2014	578511E 7405878N	3	6	32	41	20	93	76	24	Trace parthenium
		578559E 7405796N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
NW Eastern Creek Pit	2012	579958E 7406674N				41	59	100	74	26	Salsola
ML7166/7165		580009E 7406757N									
NW Eastern Creek Pit	2013	579980E 7406694N	3	6	21	44	27	92	87	13	Trace
ML7166/7165		580030E 7406779N									
SW Eastern Creek Pit	2014	579981E 7406653N	6	6	18	47	23	88	40	60	
ML7166/7159		579882E 7406658N									
NE Eastern Ck	2014	580310E 7406573N	6	26	15	12	41	68	30	70	Trace parthenium
		580328E 7406476N									
Eastern Ck mid	2014	580192E 7406673N	12	6	15	67		82	95	5	
2002 rehab		580125E 7406600N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Lois Lane 1	2014	578935E 7406071N	3	9	32	56		88	94	6	
		578887E 7405982N									
Lois Lane 2	2014	578789E 7405947N	12	24	38	26		64	79	21	Trace parthenium
		578721E 7406019N									
Lois Lane 3	2014	578812E 7406004N	23	24	18	35		53	80	20	Trace Phasey Bean
		578882E 7406068N									Trace parthenium

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
ML6856/6867	2012	578983E 7405793N					100	100	100	0	Not Recorded
		579085E 7405798N									
ML6856/6867	2013	578989E 7405848N			15	27	58	100	95	5	3 parthenium plants
		579070E 7405790N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
ML7157	2012	580523E 7406384N			20	24	56	100	64	36	Not recorded
		580434E 7406342N									
ML 7157	2013	580501E 7406408N	9	9	3	80		83	90	10	7 parthenium plants
		580447E 7406332N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
ML7168 Old rehab	2012	579144E 7407186N			6	44	50	100	91	9	Not recorded
		579194E 7407275N									
ML7168 Old rehab	2013	579166E 7407276N	3	6	18	65	9	92	84	16	5 parthenium plants
		579139E 7407181N									
North Pit	2014	579238E 7407136N	3		12	32	53	97	47	53	Trace parthenium
old rehab		579158E 7407077N									

Mining Area		Transect coordinates GDA94	Transect	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			Coordinates									
			AGD 84									
				<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
South Pit 1	2012	579712E 7406795N	579597E 7406614N	27	24	24	21	4	49	88	12	Not recorded
ML7166		579629E 7406743N	579514E 7406562N									
South Pit 1	2013	579713E 7406795N	579598E 7406614N	24	21	24	32	0	56	73	27	Trace
ML7166		579628E 7406745N	579574E 7406564N									
South Pit 2	2012	579712E 7406795N	579598E 7406612N	39	6	12	33	10	55	80	20	Not recorded

ML7166		579692E 7406698N	579578E 7406517N									
South Pit 2	2013	579626E 7406741N	579511E 7406560N	15	6	35	29	15	79	100	0	Trace
ML7166		579577E 7406655N	579642\$ 7406474N									
South Pit 3	2012	579657E 7406524N	579543E 7406343N	32	9	15	41	3	59	97	3	Not recorded
ML 7159		579683E 7406621N	579569E 7406440N									
South Pit 3	2013	579686E 7406662N	579751E 7406481N	9	15	44	32	0	76	100	0	Trace
ML 7159		579660E 7406570N	579545E 7406389N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %			Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native		
Tryangle 1	2012	578755E 7405262N		3	9	53	35	97	97	3		Not assessed
		578668E 7405262N										
Tryangle 1	2013	578828E 7405512N			12	47	41	100	95	5		trace
		578740E 7405460N										
Tryangle 2	2013	578701E 7405473N			3	76	21	100	96	4		trace
		578711E 7405493N										
Tryangle	2013	578986E 7405404N	9	9	26	47	9	82	50	50		trace

old workings		579024E 7405315N										
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Mining Area	Year	Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Laneway West	2017	577651E 7405595N	30	26	41	3	0	44	54	46	Half of transects are near cattle drinking area. Weeds are more prevalent in these quadrats
		577630E 7405495N									Salsola is present in these quadrats with some colonising weeds.
											Occasional Parthenium

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Nardoo South 1	2016	581453E 7406813N	0	18	47	20	15	82	85	15	A colonising weed in one quadrat only
		581468E 7406718N									
Nardoo South 2	2016	581548E 7406807N	12	6	29	47	6	82	88	12	Few colonising weeds and a trace Parthenium
		581588E 7406716N									
Nardoo South	2017	581493E 7406713N	0	9	15	76	0	91	100	0	Trace Parthenium
		581581E 7406760N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
North Pit 1	2016	579578E 7407193N	6	15	32	24	23	79	60	40	Some colonising weeds and trace Parthenium
		579501E 7407131N									
North Pit 2	2016	579591E 7407176N	0	18	30	26	26	82	67	33	None recorded
		579551E 7407086N									
North Pit 1	2017	579495E 7407191N	15	9	41	35	0	76	77	23	Trace Parthenium, salsola
		579441E 7407112N									
North Pit 2	2017	579518E 7407121N	12	0	70	18	0	88	47	53	Pigweed in 2 quadrats
		579440E 7407060N									Parthenium in 1 quadrat
North Pit 1	2018	579491E 7407049N	0	6	13	13	2	82	86	9	Salsola in 3 quadrats
		579476E 7407149N									
North Pit 2	2018	579586E 7407105N	0	9	44	44	3	87	80	20	None recorded
		579536E 7407188N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Pointsetta old rehab	2014	579912E 7407984N		6	18	70	6	94	50	50	Trace weeds
		579814E 7408000N									
Pointsetta	2014	579795E 7407951N	29	32	18	6	15	39	20	80	Trace weeds
new rehab		579734E 7408031N									
Pointsetta	2016	579912E 7407984N	9	12	44	26	9	79	80	20	None
old rehab		579814E 7408000N									
Pointsetta	2016	579801E 7408023N	6	29	32	27	6	65	80	20	None
new rehab		579736E 7407946N									
Pointsetta	2017	579862E 7407963N	3	23	33	41	0	74	74	26	Salsola in 1 quadrat

old rehab		579958E 7407932N									
Pointsetta new rehab	2017	579832E 7407974N	19	30	33	18	2	53	70	30	Salsola in 3 quadrats
		579735E 7407996N									

Mining Area	Year	Transect coordinates	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Reject Hill 1	2013	579113E 7407727N	9	6	27	35	21	83	100	0	Legumes present.
		579168E 7407656N									Trace of weeds.
Reject Hill 2	2013	579265E 7407791N	0	12	38	27	24	89	100	0	Legumes present.
		579335E 7407727N									Trace of weeds
Reject Hill 1	2016	579308E 7407959N	18	6	29	44	3	72	100	0	Transect crossed a rock waterway.
		579266E 7408053N									
Reject Hill 2	2016	579331E 7407933N	18	15	26	32	9	67	100	0	Transect crossed a rock waterway.
		579296E 7407840N									
Reject Hill 3	2016	579916E 7407893N	3	0	20	65	12	97	100	0	
		579107E 7407815N									
Rejects Hill 1	2017	579368E 7407958N	9	15	12	64	0	76	100	0	Townsville stylo in 47% of quadrats
		579267E 7407957N									
Rejects Hill 2	2017	579454E 7408009N	12	20	33	23	12	68	100	0	T Stylo And Siratro In 13% of quadrats
		579363E 7408049N									

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Nardoo Pit 1	2016	581545E 7407473N 581645E 7407473N	47	41	12	0	0	12	62	38	Some colonising weeds including salsola and pigweed Buffel & Urochloa
Nardoo Pit 2	2016	581558E 7407422N 581592E 7407345N	6	9	44	26	15	85	100	0	

Nardoo Pit 1	2018	581621E 7407385N 581530E 7407351N	0	15	38	12	35	85	100	0	Buffel & Urochloa
Nardoo Pit 2	2018	581508E 7407314N 581483E 7407405N	0	12	35	41	12	88	100	0	Buffel & Urochloa
Nardoo Pit 1	2020	581484E 7407335N 581544E 7407253N	26	18	35	21	0	56	82	18	Button grass dominated the natives

Mining Area	Year	Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15 %	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Cattleyard Ref	2022	579603E 7406011N 579111E 7405976N	15	12	20	53	0	-	0	6	Broad leaf weeds dominant
Cattleyard T1	2022	579597E 7406103N 579501E 7406074N	0	3	47	41	9	24	24	0	Broad leaf weeds dominant Indian bluegrass dominate 24%

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Weeds
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Creekview 1	2016	578987E 7406776N 578892E 7406740N	6	20	27	38	9	74	20	80	Salsola, colonising weeds and trace Parthenium
Creekview 2	2016	579061E 7406757N 579027E 7406663N	6	20	38	30	6	74	40	60	Salsola
Creekview	2017	578900E 7406712N 578999E 7406704N	18	18	38	26	0	64	75	15	Indian bluegrass, Salsola, colonising weeds and trace Parthenium
Creek View	2021	578916E 7406711N 578943E 7406558N	9	24	38	29	0	67	56	15	29% of quadrats dominated by weeds; Indian bluegrass dominant
Creek View	2022	578946E 7406787N 578973E 7406693N	0	3	29	50	18	97	85	0	Indian bluegrass dominant; Roly Poly and galvanised burr dominant weeds

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Main Dam Site	2020	578922E 7408034N 579032E 7408050N	24	26	29	18	3	50	88	3	Weeds and Salsoa 9% Buffel dominant

Mining Area		Transect coordinates GDA94	Percentage Ground Cover for Each Cover Class						Dominant pasture grasses %		Comments
			<15%	15-30%	30-50%	50-90%	>90%	>30%	Introduced	Native	
Pig Storage	2020	581029E 7406343N 580994E 7406250N	9	21	38	29	3	70	85 Buffel dominant	15	Button grass dominant native; Parthenium in disturbed area near cattle pads; 4 quadrats sampled cattle pads as transect was close to storage.
Pig	2020	580805E 7406435N 580824E 7406339N	3	9	29	59	0	88	26	74	Prolific barnyard grass in low lying area