SARAJI EAST MINING LEASE PROJECT

Environmental Impact Statement

Appendix K-1

Rehabilitation Management Plan

BMA

BHP Mitsubishi Alliance

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Abbreviations

3P	Palatable, productive and perennial
AEP	Annual Exceedance Probability
BMA	BM Alliance Coal Operations Pty Ltd
CHPP	Coal Handling and Processing Plant
DEHP	Department of Environment and Heritage Protection
DES	Department of Environment and Science
DM	Dry matter
EA	Environmental Authority
EC	Electrical conductivity
EIS	Environmental Impact Statement
EPC	Exploration Permit for Coal
EPP	Environmental Protection Policy
ERA	Environmentally Relevant Activity
ERC	Estimated Rehabilitation Cost
EVNT	Endangered, Vulnerable and Near Threatened
FA	Financial Assurance
FPC	Foliage Projective Cover
FY	Financial Year
ha	Hectares
IDC	Index of Diversion Condition
IMG	Incidental Mine Gas
IRC	Isaac Regional Council
km	Kilometres
kg	Kilogram
LGA	Local Government Area
m	Metres
mg/L	Milligrams per litre
MIA	Mine Industrial Area
Mt	Million tonnes
Mtpa	Million tonnes per annum
mm	Millimetres
ML	Mining Lease
MLA	Mining Lease Application
NGO	Non-government organisations
PRCP	Progressive Rehabilitation Closure Plan
PVMA	Pesticides and Veterinary Medicines Authority
Qld	Queensland
RE(s)	Regional Ecosystem(s)
RMP	Rehabilitation Management Plan
RIDA	Regional interests development approval
ROM	Run-of-mine
SCL	Strategic Cropping Land
SMP	Subsidence Management Plan
SMUs	Soil mapping units
TARP	Trigger Action Response Plan

1.0 Introduction

1.1 Project overview

BM Alliance Coal Operations Pty Ltd (BMA) is seeking approval to develop the Saraji East Mining Lease Project (the Project) involving a single-seam underground mine and supporting infrastructure on Mining Lease Application (MLA) 70383 and MLA 70459 adjacent to, and accessed through, the existing BMA Saraji Mine open cut mine void within Mining Lease (ML) 1775 with supporting infrastructure also located on ML 70142.

Located approximately 30 kilometres (km) north of Dysart in Queensland (Figure 1), the Project will mine the coal as an underground longwall operation (approximately 5 km by 11 km) to produce an estimated 110 million tonnes (Mt) of high-quality metallurgical product coal over a 20-year life of mine. The Project will maximise the use of existing Saraji Mine infrastructure and operations on ML 70142 and ML 1775 including:

- underground mine entry/access via the existing open cut pit and highwall on ML 1775
- use of the Saraji Mine coal handling and processing plan (CHPP) for processing Project coal in years where run of mine (ROM) tonnes exceeds capacity of new Project CHPP
- haul roads and trucks for the transportation of ROM coal to the new Project CHPP and, where there is need and available capacity, excess ROM coal from the new Project CHPP to the existing Saraji Mine CHPP
- integrated power supply network for Saraji Mine and the Project
- use of existing Saraji Mine spoil dumps to distribute and dispose of dewatered tailings and rejects from the new Project CHPP.

Additional components for the Project include:

- a mine infrastructure area (MIA) and CHPP located on ML 70142
- conveyor system and haul road
- rail spur, balloon loop and signalling system
- network of IMG drainage bores and associated gas and water collection networks and access tracks.

The Project layout is shown in Figure 2. Mining and the infrastructure required to support the Project is conservatively estimated to disturb an area of 3,348 hectares (ha) (Figure 2) of land on MLA 70383 and MLA 70459, with some components of the Project overlapping with ML 1775 and ML 70142 related to the existing BMA Saraji Mine. Changes to the proposed land surface will occur progressively over the estimated 20 year mine life.

Disturbance from the Project mining activities can be considered in two broad categories:

- disturbance required to facilitate construction of surface infrastructure and incidental mine gas (IMG) drainage network (Stage 1)
- underground mining and subsidence following the underground long wall mining activities, including temporary ponding (Stage 2).

This Rehabilitation Management Plan (RMP) covers rehabilitation of the Project's underground operations, including the areas to be disturbed that overlap the Saraji Mine[1], plus land disturbed by mining activities on MLA 70383 and MLA 70459.

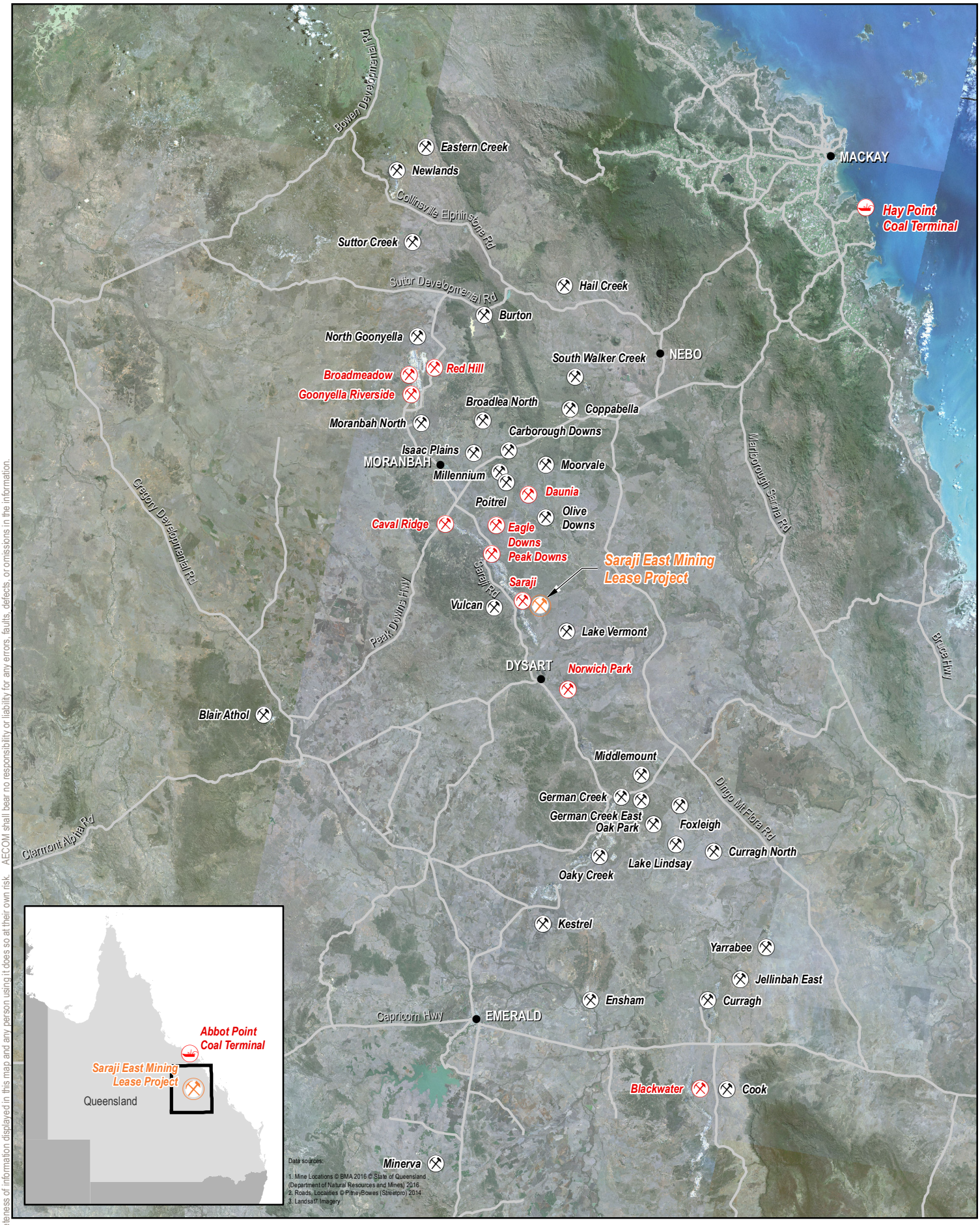
This RMP presents the preliminary mitigation, adaptive management and monitoring approach to be implemented following construction and subsidence of each panel to ensure the final landform is a safe, non-polluting and stable landform, and supports a sustainable land use.

[1] The relationship between rehabilitation for the Project and rehabilitation for the Saraji Mine is discussed specifically in Section 1.1.1

During detailed design, and progressively throughout the mining process, subsidence modelling and the Subsidence Management Plan will be updated in response to revised predictions based on Lidar-derived surface level data for the most recent subsided panels.

Once subsided and stable, progressive rehabilitation can occur in accordance with this RMP (BMA, 2024). The RMP will be incorporated and replaced by the Progressive Rehabilitation and Closure Plan (PRCP) once finalised. The RMP may be further refined as part of the development of the PRCP. Environmental Authority (EA) conditions for the Project will detail the requirement for the development of the PRCP.

NOTE: This plan has been drafted in support of the Project Environmental Impact Statement (EIS) and will be finalised prior to commencement of mining activities. The finalised plan will be assessment and certified by appropriately qualified and experienced person and provided to the administering authority for comment.



LEGEND

- Saraji East Mining Lease Project
- BMA Coal Terminal
- BMA Mine
- Other Mine
- Locality
- Major Road

N

Figure 1
Regional Context

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 5 10 20
Kilometres

Scale: 1:1,500,000 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

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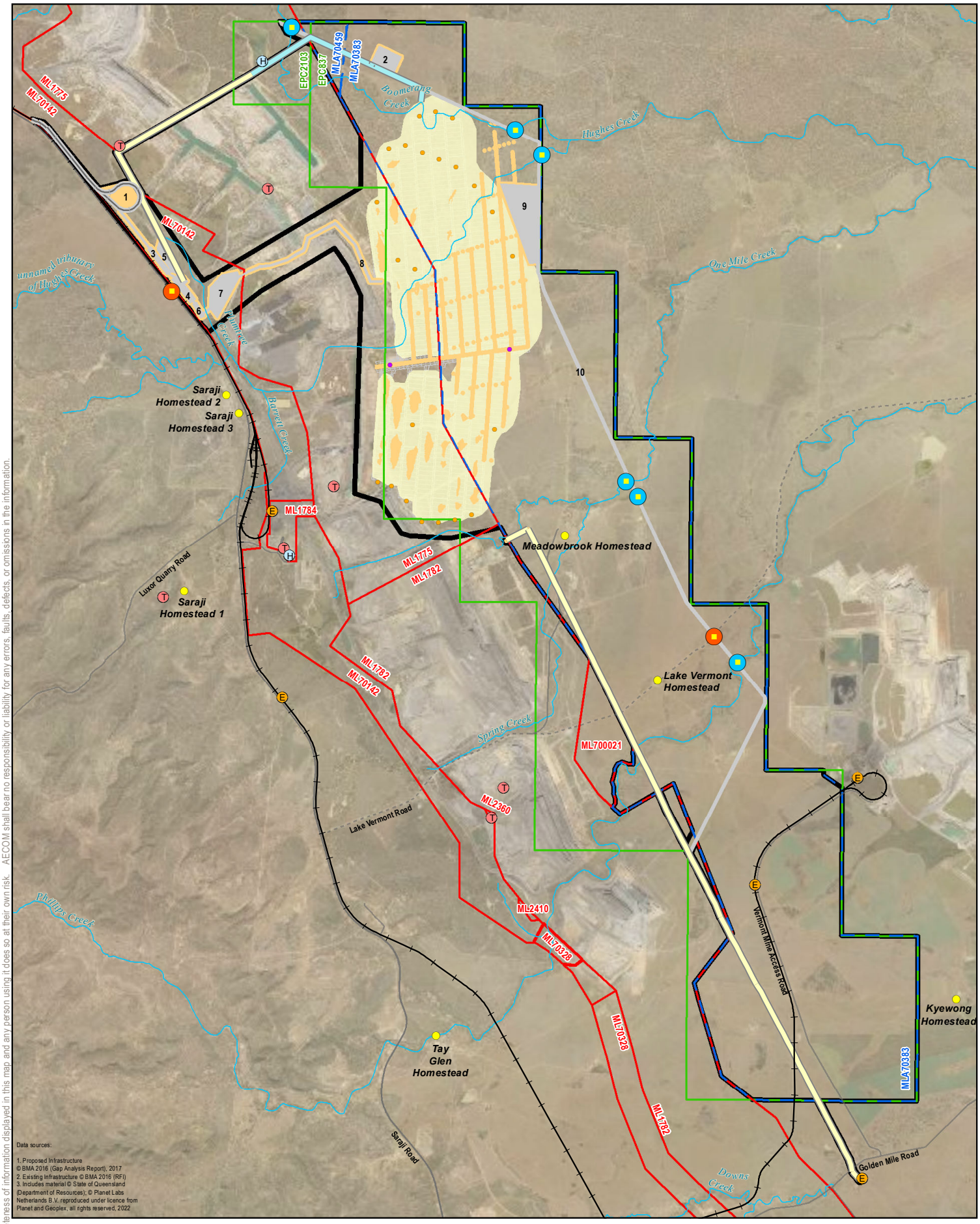

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LEGEND

- Homestead
- Project Site
- Project Footprint - Direct Impact
- Project Footprint - Indirect Impact
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Underground Mine Layout
- Surface Infrastructure
- Watercourses
- Existing Railway
- Private Access
- Public Road
- Rail Loop
- 66kV Powerline
- Pipeline
- Entry/Access point
- Watercourse crossing
- Substation
- Helipad
- Telecommunications Tower
- Flare
- Vent

Surface Infrastructure

1 Rail Loading Balloon Loop
2 Process Water Dam
3 Product Stockpiles
4 CHPP
5 Raw Water Dam
6 ROM Pad
7 Future MIA
8 Conveyor
9 Construction Village
10 Transport and Infrastructure Corridor

N

Figure 2
Project Layout

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

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Projection: Map Grid of Australia - Zone 55 (GDA94)

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1.1.1 Association with Saraji Mine Rehabilitation

The Project Site is located adjacent to and overlaps some areas which are currently approved as the existing BMA Saraji Mine. The Saraji Mine is an active, open cut mine operated by BMA under a management agreement. While the Project and Saraji Mine are two independent operations, overlap of operations will be accounted for in planning rehabilitation in common areas.

The Project will utilise existing Saraji Mine infrastructure where practical to avoid disturbance to new areas. The existing infrastructure to be utilised, includes:

- use of the Saraji Mine open cut pit for mine access and highwall entry to minimise the environmental impacts, costs, time and risks involved in construction of a new mine portal
- use of an integrated power supply network for Saraji Mine and the Project
- use of haul roads and trucks for the transportation of ROM coal from the new Project CHPP to the Saraji Mine CHPP (when required)
- use of the Saraji Mine CHPP for processing project coal in years where ROM coal exceeds 7 million tonnes per annum (Mtpa) (the capacity of the new Project CHPP proposed)
- use of Saraji Mine open cut pits to distribute and dispose of tailings and rejects (already authorised under Saraji Mine EA EPML00862313).

Where possible, additional above-ground infrastructure required for the Project will be located within previously disturbed areas on the Saraji Mine.

The Saraji Mine is approved to undertake open cut operations on ML 1775, ML 70142, ML 1784, ML 1782, ML 2360, ML 2410, ML 70294, ML 70298, ML 70328 and ML 700021 under EA Permit No. EPML00862313.

As required by Saraji Mine's EA EPML00862313 the Saraji Mine RMP was approved in 2022. The Saraji Mine RMP will be incorporated and replaced by the Saraji Mine PRCP once approved.

Rehabilitation works of the open cut mine and infrastructure at Saraji Mine will be carried out under the Saraji Mine RMP (or Saraji Mine PRCP once approved). The Saraji Mine RMP establishes rehabilitation goals, objectives and strategies to achieve rehabilitation by prioritising stability of the final landform, and the return of land use to cattle grazing, woodland habitat, watercourse and water storage where appropriate. This approach recognises the closure landform, the climate and the topsoil resources.

The Saraji Mine RMP recognises the final voids will not have a post-mining land use and provides for appropriate rehabilitation to achieve a safe, stable and non-polluting landform.

The current scope and timing of the Project will not change the rehabilitation objectives for the Saraji Mine. The existing Saraji Mine EA conditions will not need to be amended to allow rehabilitation to progress when Saraji Mine areas become available for rehabilitation. In the event the Project extends beyond the current mine life of Saraji Mine, the final closure and rehabilitation of the final void and shared infrastructure will be transferred to the Project in cooperation and agreement with Department of Environment and Science (DES) and amended EA conditions.

1.2 Purpose

BMA conducts progressive rehabilitation across available areas of the organisation's mining operations. Successful mine rehabilitation is contingent on suitable planning, including setting objectives, indicators and performance criteria to measure the progress of rehabilitation against.

The purpose of this RMP is to provide the framework within which progressive and final rehabilitation can be planned and executed for the Project. The RMP will be incorporated and replaced by the PRCP once finalised. The RMP may be further refined as part of the development of the PRCP. EA conditions for the Project will detail the requirement for the development of the PRCP.

Rehabilitation will comply with relevant regulatory requirements and approval conditions and proposed rehabilitation objectives in Table 1 to achieve rehabilitation goals of safe, non-polluting and stable landform with a sustainable land use.

Table 1 Rehabilitation objectives

Goal	Objective
Safety	The site is safe for humans and animals (including stock and wildlife), now and in the foreseeable future.
Non-polluting	Hazardous material is adequately managed. Material with potential to cause acid mine drainage will be adequately managed. Potentially contaminated water will be contained on-site.
Stable landform	Very low probability of unpredicted subsidence or slope slippage/slumping with serious consequences (including serious environmental harm). Landform design achieves appropriate erosion rates. Vegetation cover is established to minimise erosion.
Sustainable land use	Specified self-sustaining vegetation (natural or grassland for grazing) is established. Waterbodies to be retained on-site (if any) have a low risk of causing environmental harm. Land use is established with comparable management requirements to similarly used non-mined land.

To achieve the goals and objectives, rehabilitation of disturbed land will be conducted to ensure:

- suitable species of vegetation are planted and established to achieve the relevant post-mine land uses
- potential for erosion is minimised through appropriate design of landforms, and appropriate management of dust-generating activities
- the water quality of any residual waterbody meets criteria for subsequent use and does not have the potential to cause environmental harm
- the final landform is geotechnically stable and has a low risk of mass failure.

This RMP outlines how rehabilitation goals, objectives and strategies will be established and managed for the Project. The scope of the RMP includes:

1. identification of applicable legislative requirements
2. description of areas to be disturbed
3. establishment of a proposed post mining land use for disturbance areas
4. setting goals and objectives of rehabilitation
5. setting performance indicators and criteria for rehabilitation
6. identification of potential risks
7. establishment of a plan for progressive rehabilitation including a rehabilitation schedule
8. establishment of the monitoring and maintenance requirements.

1.3 Regulatory obligations

1.3.1 Mined Land Rehabilitation Policy

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* amends the *Environmental Protection Act 1994*, replacing the Plan of Operations and Financial Assurance (FA) with Estimated Rehabilitation Cost (ERC) and the PRCP.

An outcome of the *Mineral and Energy Resources (Financial Provisioning) Act 2018*, the Mined Land Rehabilitation Policy (DES, 2018) intends for land disturbed by mining activities to be rehabilitated to a safe and stable landform that does not cause environmental harm and is able to sustain a post mining land use which has been approved through a PRCP.

The Project will comply with the *Mineral and Energy Resources (Financial Provisioning) Act 2018* and develop a PRCP outlining the rehabilitation planning and schedule for a mine in accordance with the DES Guideline–Progressive rehabilitation and closure plans (2023). The Project PRCP is not required to be compiled as part of the EIS; however, it will be developed and submitted as agreed with DES prior to construction commencing. Therefore, whilst this RMP will inform the future Project PRCP, it will not include the level of detail required by a PRCP.

1.3.2 Rehabilitation hierarchy

The rehabilitation hierarchy of DES Guideline – Rehabilitation requirements for mining resource activities (EM1122 Guideline) outlines the preferred methodologies to mining activities that minimise the risk of environmental harm. The EM1122 Guideline states that strategies listed higher in the hierarchy should be adopted in preference to those listed lower, unless there are significant environmental, economic or social issues that override a higher selection. The rehabilitation hierarchy is summarised as follows, in order of preference:

1. avoid disturbance that will require rehabilitation – demonstrated as part of the EIS process
2. reinstate a “natural” ecosystem as similar as possible to the original ecosystem
3. develop an alternative outcome with a higher economic value than the previous land use
4. reinstate previous land use (e.g. grazing or cropping)
5. develop lower value land use
6. leave the Project site in an unusable condition or with a potential to generate future pollution or adversely affect environmental values.

In assessing the applicable goals of the hierarchy, BMA will consider the pre-mining land use, key landholder interests including stakeholder values, the potential uses of the rehabilitated land and the surrounding environmental values.

1.3.3 Biosecurity Act 2014

The *Biosecurity Act 2014* (Qld) imposes a general obligation on persons to take all reasonable and practical measures to mitigate or minimise the impact of biosecurity risks on human health, social amenity, the economy and the built environment. Failing to manage the impact of invasive plants and animals on a property is considered to exacerbate the effects or potential adverse effects of a biosecurity matter.

1.3.4 Relevant regulatory obligations

The RMP will form a part of the Project’s Environmental Management System and is intended to demonstrate how the Project’s rehabilitation goals, objectives and strategies will meet the obligations of the Mined Land Rehabilitation Policy (DES, 2018) and EA conditions. This RMP outlines how the rehabilitation goals, objectives and strategies will be established and managed at Project.

This RMP is applicable to the Project only and will be further refined as part of the development of the PRCP. This RMP should be read and implemented in conjunction with the Project’s Subsidence Management Plan (SMP) (BMA, 2024) which, among other aspects, outlines the controls required to monitor, minimise and mitigate the impacts associated with subsidence.

The RMP will meet the rehabilitation obligations outlined in:

- DEHP guideline: Application requirements for activities with impacts to land (Version 4, Department of Environment and Heritage Protection (DEHP), March 2017)
- DEHP guideline: Rehabilitation requirements for activities with impacts to water (Version 4.02, DES, March 2017)
- DEHLP guideline: Rehabilitation requirements for mining and resource activities (Version 2, DEHP, May 2014)
- Queensland Environmental Offsets Policy (Version 1.1, DEHP, December 2014).

Regulatory obligations and where they are addressed in the RMP are summarised in Table 2.

Table 2 Regulatory obligations for the Rehabilitation Management Plan

Description	Reference	RMP Reference
Provide a drawing/site plan showing the impacts arising from subsidence associated with the Environmentally Relevant Activity (ERA).	Guideline: Application requirements for activities with impacts to land (DEHP, 2017)	Section 1.0
Describe in detail all land disturbance associated with the ERA.	Guideline: Application requirements for activities with impacts to land (DEHP, 2017)	Section 2.2
Demonstrate how the ERA will be managed to minimise the extent and severity of disturbance. This should include identifying any staged disturbance, progressive rehabilitation, measures to manage or minimise impacts to biodiversity and any anticipated long-term impacts including identification of areas that will no longer provide any beneficial land use after ERA has ceased. Additionally, areas of subsidence must be identified.	Guideline: Application requirements for activities with impacts to land (DEHP, 2017)	Largely addressed in the EIS. Aspects relevant to rehabilitation in Sections 1.0,5.0 and 6.0
Where contaminant release to waters or disturbance of waters (i.e. reshaping of the bed and banks of a watercourse) is proposed, the applicant must identify how the Project Site will be rehabilitated. The RMP must provide for the following (where relevant): • a schematic representation of the watercourse, post disturbance clearly showing any realignment or reshaping of the features of the watercourse • rehabilitation objectives for contaminant levels within waters (including waters left in residual voids post operations) • decommissioning of bores • a monitoring program to demonstrate the rehabilitation success • completion criteria, indicators and objectives • procedures for rehabilitation maintenance or redesign.	Guideline: Application requirements for activities with impacts to water (DES, 2017)	Largely addressed in the SMP. Also considered in Sections 4.0, 6.0 and 7.0
RMP shall include general and site specific goals.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Section 4.0

Description	Reference	RMP Reference
The post mining land use for each domain must be identified.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Sections 3.0
RMP shall include risk assessment documenting the probability and consequence of future environmental harm for each domain.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Section 8.0
The applicant should consider the rehabilitation hierarchy when assigning a final land use. Rehabilitation objectives must achieve the highest practicable level in the rehabilitation hierarchy, address potential environmental impacts and propose a final land use that is acceptable to the local community, government and any other relevant stakeholders. Rehabilitation objectives must specify in sufficient detail so to be capable of assessment by the administering authority.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Section 4.0
Rehabilitation indicators must provide a defensible measurement of rehabilitation progress towards objectives.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Section 4.0
Completion criteria must provide a clear definition of successful rehabilitation for each domain. There must be at least one completion criteria for each indicator.	Guideline: Rehabilitation requirements for mining and resource activities (DEHP, 2014)	Section 4.0
Offsets are required where impacts to remnant vegetation are unavoidable.	Queensland Environmental Offsets Policy (DEHP, 2014a)	Addressed in EIS.

2.0 Environmental characterisation and Disturbance

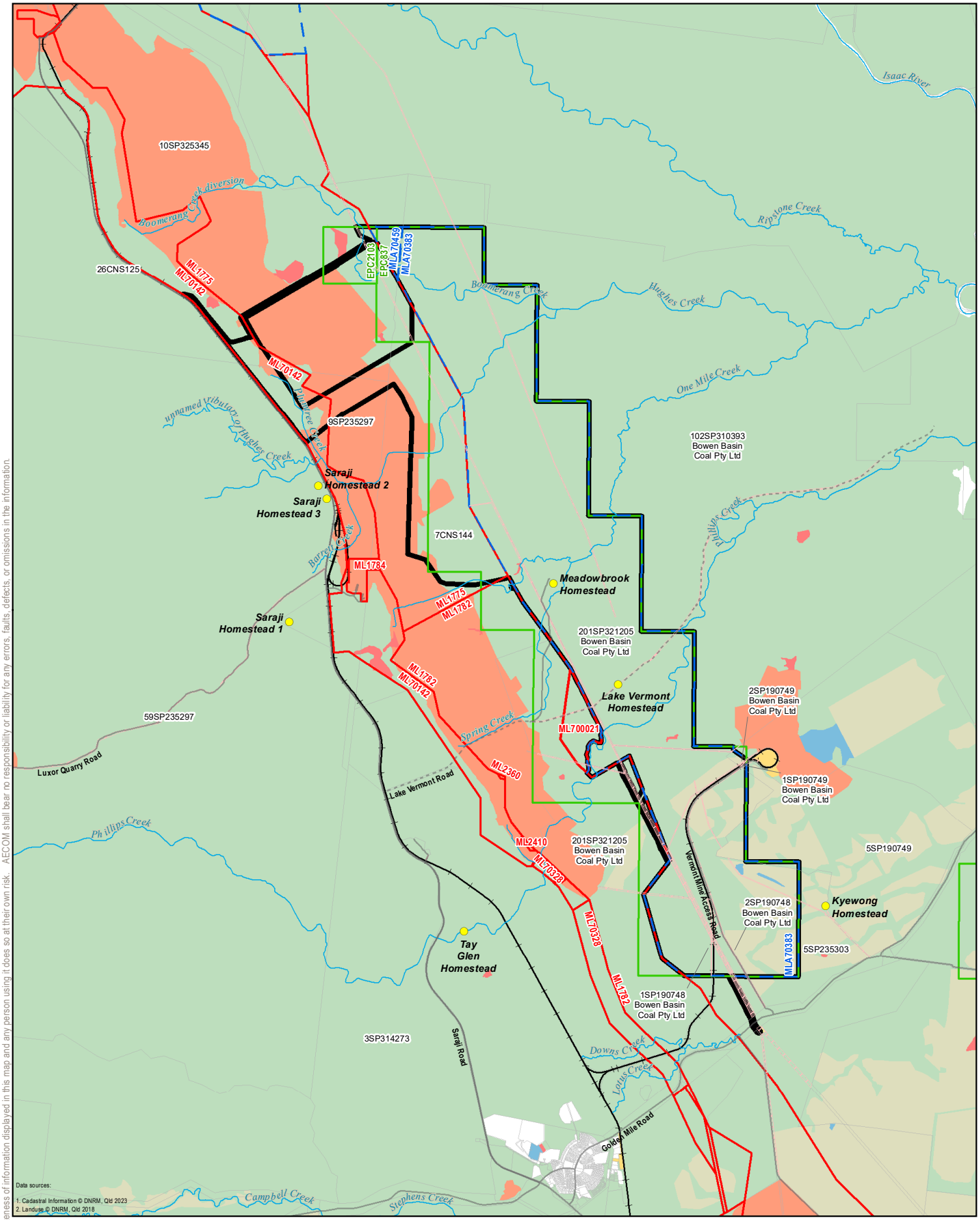
2.1 Pre-mining land use and suitability

2.1.1 Existing land uses

The Project is located within a rural area containing land mainly used for livestock grazing. Areas of cropping activity are located to the southeast of the Project Site. The area is sparsely populated with two homesteads located within the Project Site (Meadowbrook and Lake Vermont).

The Queensland Land Use Mapping Program maps land uses within the Project Site as shown in Figure 3. The land use types present within the Project Site include:

- mining
- grazing and native vegetation
- cropping
- reservoir/dam
- other minimal use.



LEGEND

- Project Site
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourse
- Existing Railway
- Homestead
- Private Access Road
- Public Road
- Lot boundary
- Easement

QLUMP Secondary Land Use

- Other minimal use
- Grazing native vegetation
- Cropping
- Utilities
- Transport and communication
- Mining
- Reservoir/dam

N

Figure 3
Land Use and Homesteads

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:158,094 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

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2.1.2 Land suitability units

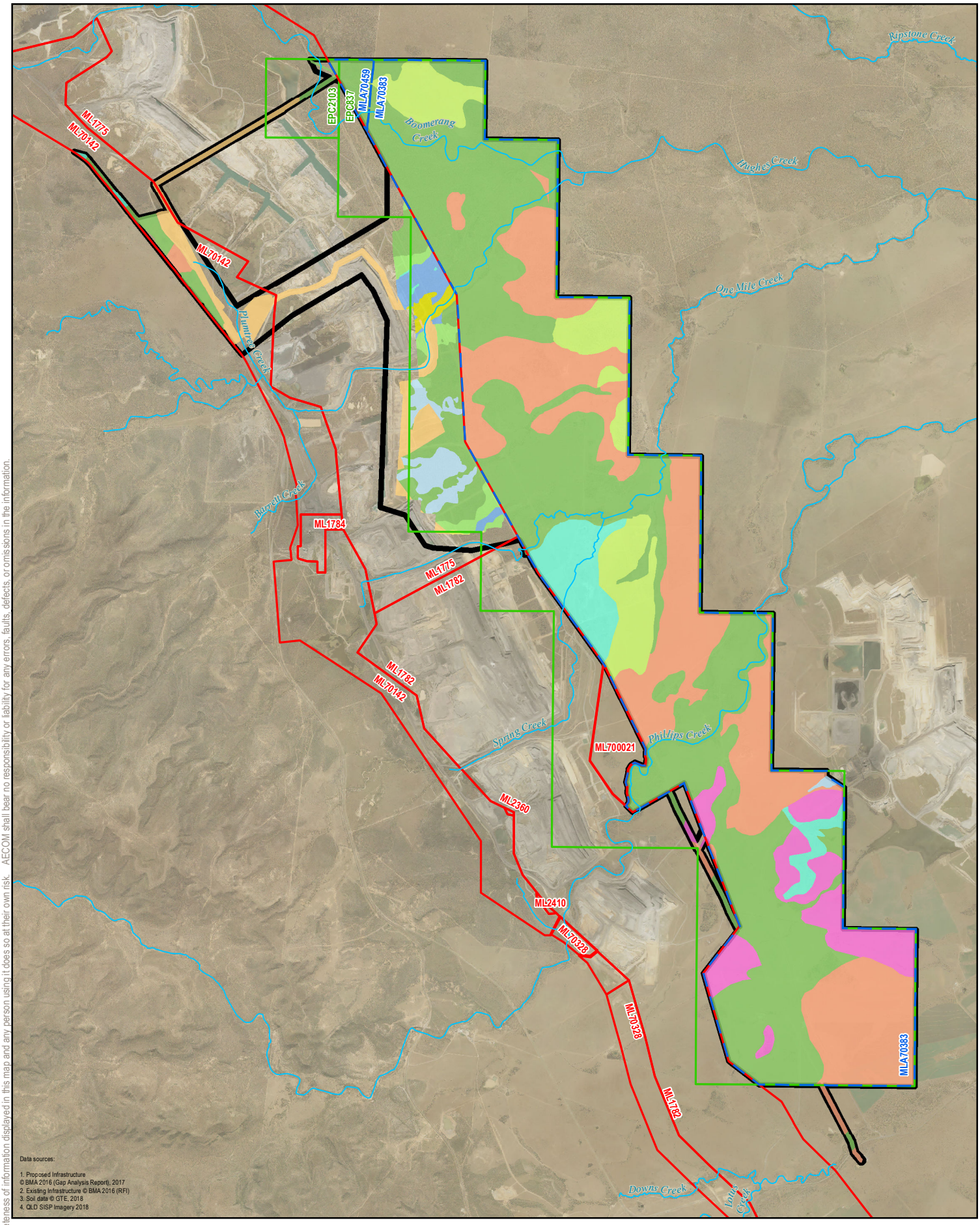
The topography of the Project Site is predominantly flat with channels associated with Hughes, Boomerang and Plumtree Creeks crossing the area of mining. The terrain within these catchments is undulating and land use is predominantly grazing and mining activities.

The Project Site includes areas of gently undulating plains with gradational to duplex sandy soils to uniform clays with microrelief to areas of drainage depressions near active alluvial areas. A soil assessment (GT Environmental, 2024) undertaken for the Project Site identified 26 soil mapping units (SMUs). Key outcomes of the soil assessment include:

- six SMUs have high to very high erosion potential
- acidic to neutral pH for most SMUs
- two SMUs (including 3 variants) were assessed as suitable to marginally suitable for cropping with soil water availability being the greatest limitation with remaining SMUs considered suitable for beef cattle grazing suitability
- topsoils for most SMUs were assessed as suitable for rehabilitation activities, including as a growth medium for natural vegetation on flat to gently undulating plains
- areas in the southern extent of the Project Site have been verified as meeting the definition as Strategic Cropping Land (SCL) (GT Environmental, 2020). All areas may not be currently used for cropping.

Across the Project Site, pre-mining land uses are mapped for:

- pre-mine beef cattle grazing suitability – Figure 4
- pre-mine rainfed cropping suitability – Figure 5
- agricultural land class – Figure 6
- verified SCL – Figure 7.



LEGEND

- Project Site
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourses

Grazing Suitability

- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 3 / 4
- Class 3 levees, class 5 on creek banks
- Class 4 levees, class 5 on creek banks
- Class 3 some, class 4 and 5 on stream banks and overlain banks
- Class 4 minor, class 5 in eroded or drainage areas
- Disturbance

N

Figure 4
Pre-mine Beef Cattle Grazing Suitability

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:115,483 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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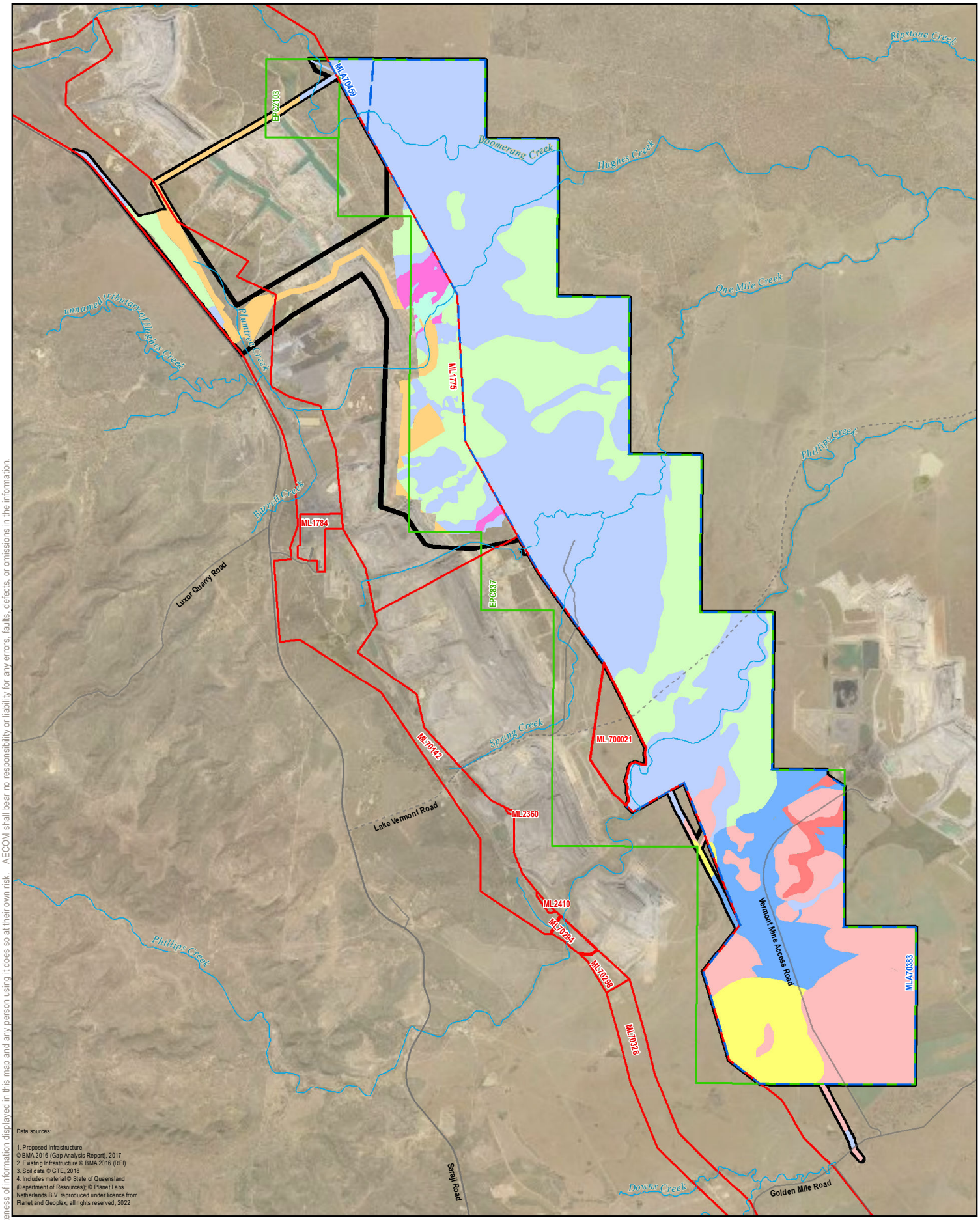

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LEGEND

- Project Site
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourse
- Private Access Road
- Public Road

Cropping Suitability

- Regional Frameworks Class 3
- Regional Frameworks Class 4
- Regional Frameworks Class 5
- Cropping Class 2 / Regional Frameworks Class 3
- Cropping Class 4
- Cropping Class 5
- Class 4 on levees, Class 5 on creek banks
- Class 4 minor, Class 5 on stream banks
- Disturbance

N

Figure 5
Pre-mine Rainfed Cropping Suitability

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:115,763 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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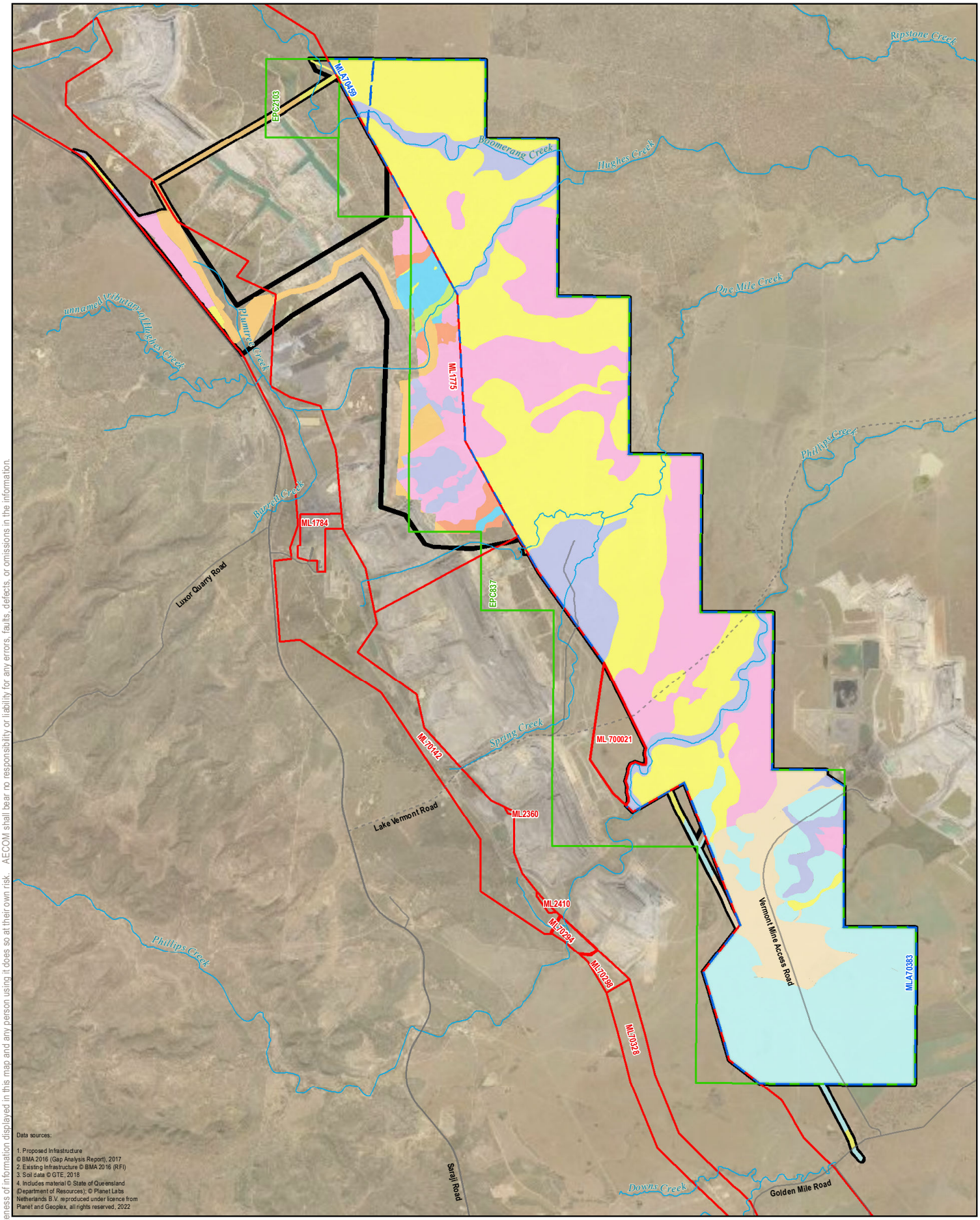

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LEGEND

- Project Site
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourse
- Private Access Road
- Public Road

Agricultural Land Class

- Class A1
- Class B
- Class C1
- Class C1 / C2
- Class C1 / C3
- Class C2
- Class C2 / C3
- Class C3
- Disturbance

N

Figure 6
Agricultural Land Classes

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:115,660 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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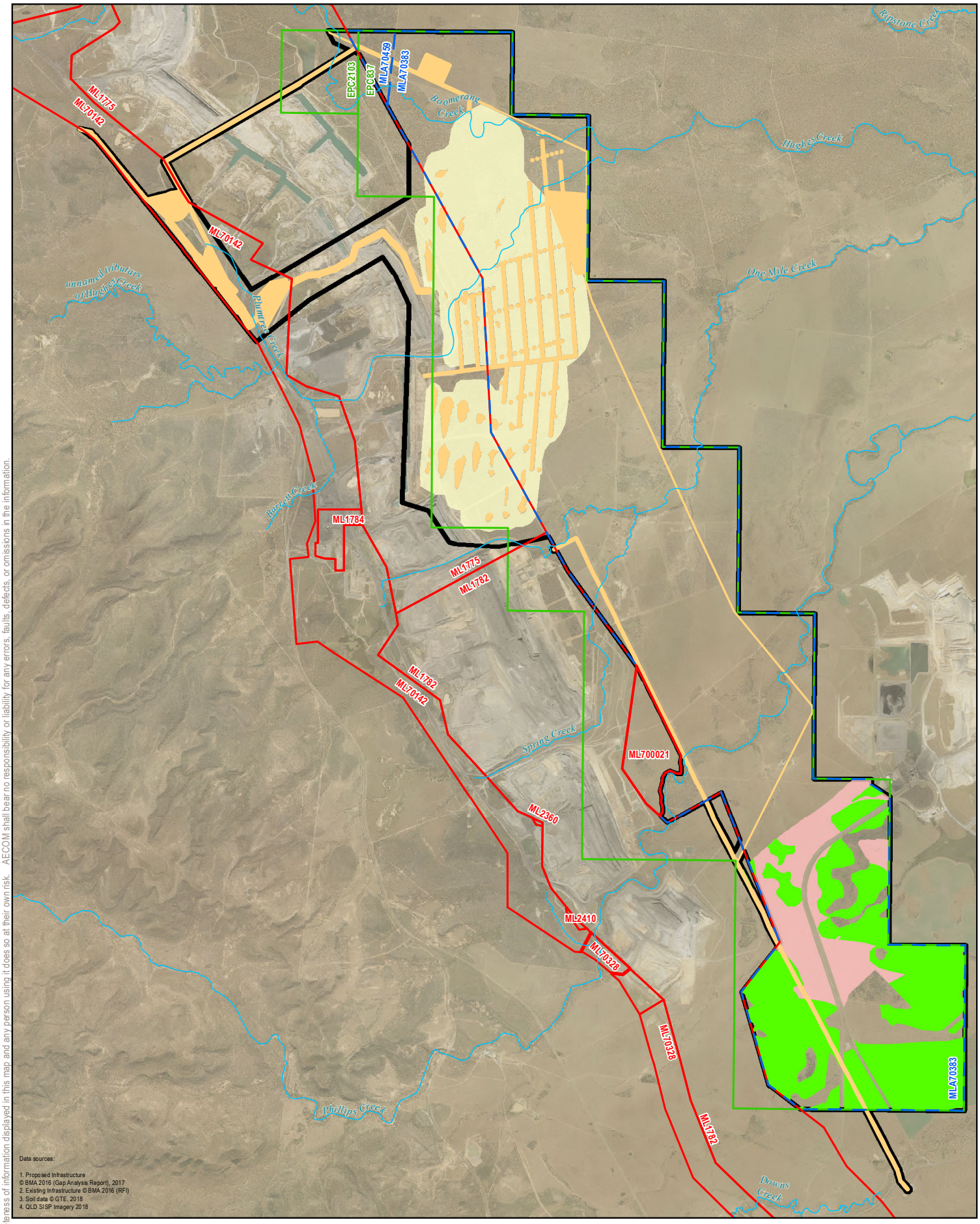

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LEGEND

- Project Site
- Project Footprint - Direct Impact
- Project Footprint - Indirect Impact
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourses

Strategic Cropping Land

- SCL - Verified SCL
- SCL - Non - SCL Area

N

Figure 7

Verified SCL across SCL Assessment Area

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:110,000 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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2.1.3 Surface water

Boomerang Creek, Hughes Creek and Plumtree Creek are previously modified by open cut mining operations west of the Project Site. Both Boomerang Creek and Hughes Creek flow through open cut MLs and contain diversion reaches, converging approximately 1 km downstream (east) of the Project Site. Plumtree Creek has no catchment upstream of the Project as the headwaters have previously been developed by the existing Saraji Mine. Typical of the ephemeral watercourses in the region, the waterways in the Project Site flow intermittently through the year in response to rainfall and runoff, with extended periods of no flow. Watercourses are mapped in Figure 8.

The Surface Water Quality Technical Report (AECOM, 2023) and Hydrology, Hydraulics and Geomorphology Technical Report (Alluvium, 2023) detail the baseline values within the Project Site. The baseline included assessment of the geomorphic character, behaviour and condition of the potentially impacted watercourses using qualitative (expert observation) and quantitative (terrain, hydraulic and sediment transport modelling) measures.

In general, the watercourses in the Project Site flow intermittently through the year in response to rainfall and runoff, with extended periods of no flow. The open cut mining operations west of the Project site have modified the catchment and landscape of the streams.

- Downstream of Peak Downs Mine, Boomerang Creek meanders south then east before joining Hughes Creek and making its way to the Isaac River. Boomerang Creek forms a continuous channel with relatively uniform symmetrical cross-section in straights and asymmetrical on bends. The channel bed is severely aggraded with excess sand several metres thick smothering bed forms and limiting habitat diversity. The system is generally accreting as it is in a transport limited state (it receives more sediment than it can transport). The transport limited state often limits the potential for bank erosion. A thick mud drape on the channel banks, generally colonised by fine roots allows for the steep banks to be stable.

  Existing cattle grazing disturbs channel bed and banks and limits potential for regeneration of riparian vegetation. This has led to a relatively dense line of *Melalueca leucadendra* and occasional *Eucalyptus tereticornis* overstory lining the banks, with an exotic grass ground cover, the density of which is a direct result of grazing regime. Mid story (shrub) vegetation is largely absent.

- Hughes Creek is single alluvial continuous channel with manmade diversion between open cut pits in the existing Saraji Mine. The diversion has a high angle bend into the most western of the northern panels in the Project Site. The diversion reach is a deeply cut, large channel with no floodplain connectivity. It is cut through dispersive subsoils and has been subject to considerable erosion and recently, rehabilitation effort. These rehabilitation works comprise covering the long and relatively steep diversion batter slopes with pit sourced sandstone. This type of pit sourced sandstone typically completely weathers to constituent parts in two to five years. As these works are recent, there is no vegetation on the batters. Some vegetation has been left in the low flow channel.

  There is existing active bank erosion where the channel capacity remains close to the diversion with decreasing erosion and increasing deposition moving downstream. Channel capacity decreases in a downstream direction. Where this occurs, flood connection with Boomerang Creek occurs.

- With no upper catchment, Plumtree Creek is a relatively short tributary of Boomerang Creek, commencing on the eastern edge of the existing Saraji Mine east then northeast to join with Boomerang Creek on the northern edge of the proposed underground mine plan. The remaining channel of the watercourse is a continuous single-thread, meandering channel with a flatbed grade with relatively low stream power. Longitudinal bed grade is controlled by Boomerang Creek downstream which has led to aggradation of the channel and reduced flows are reflected in colonisation by terrestrial vegetation in part and blanketed in clay in others, leading to ephemeral wetland development in channel. There are no signs of instability on Plumtree Creek within the Project Site.

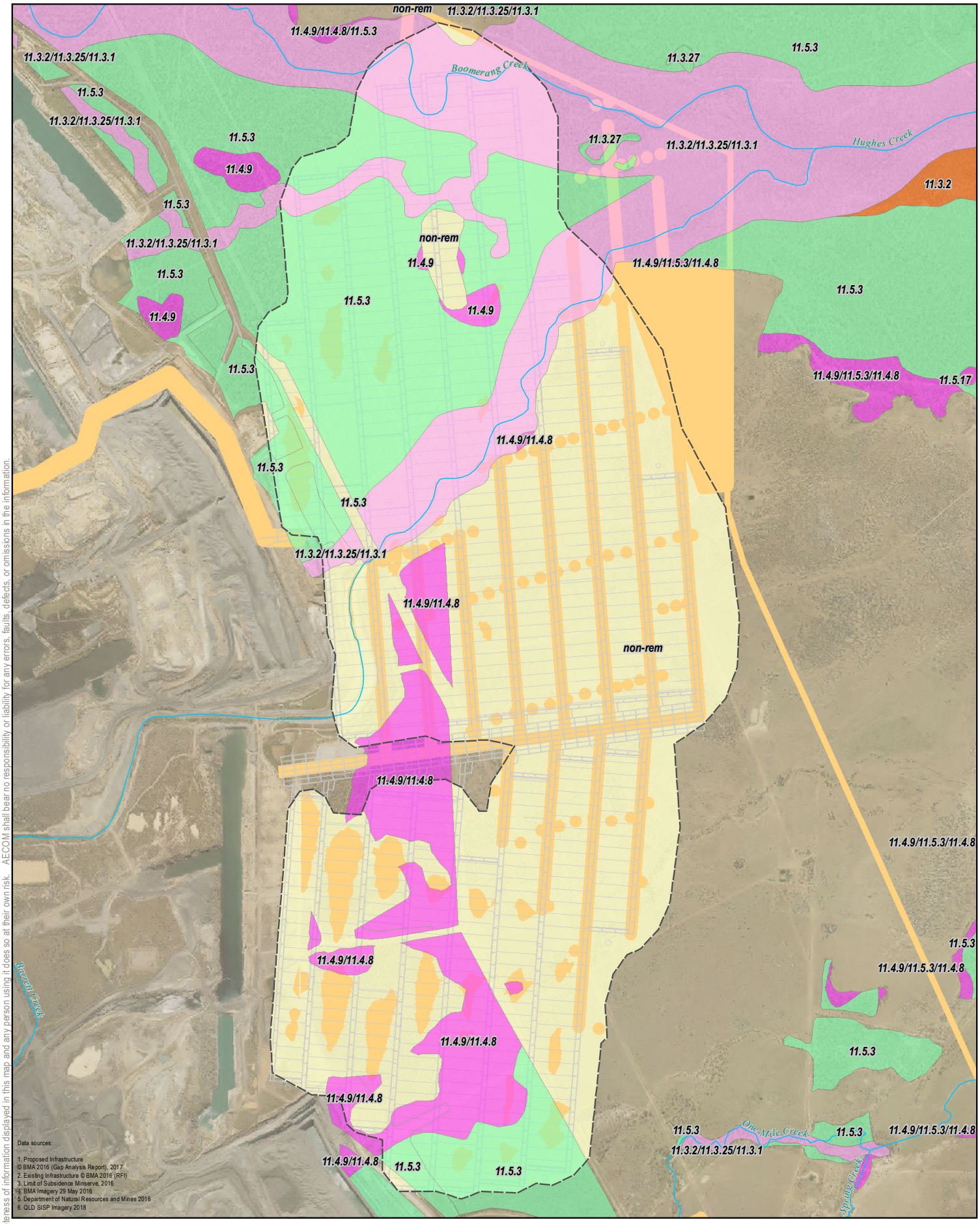
2.1.4 Ecology

The ecological values of the Project Site are considered typical for the northern Bowen Basin with large areas of land historically cleared for grazing. Although some large areas of remnant vegetation remain, most have been modified to some extent by historical and current land management practices. The most common modifications across the Project Site have been the removal of the shrub and ground layers and replacement with pasture grass species and the effects of cattle grazing.

The Project's Terrestrial Ecology Technical Report (AECOM, 2024a) documents the baseline for ecological values across the Project. Flora and fauna surveys were conducted to determine the ecological values of the Project Site with potential to be impacted, including threatened ecological communities and regional ecosystems (REs), and threatened fauna habitat such as riparian zones and alluvial woodland. This baseline will allow BMA to monitor net loss of biodiversity values.

Corresponding with the potential disturbance of the Project surface infrastructure and subsidence extent, groundtruthed vegetation mapping is shown in Figure 8. Ten regional ecosystem types were mapped with remnant vegetation mainly located in the northern portion of the Project Site or associated with watercourses.

An aquatic ecology survey (refer Aquatic Ecology Technical Report (Hydrobiology, 2023)) was undertaken for the Project in which no conservation significant species were identified. Impacts (notably subsidence) have potential to impact fish passage of the watercourses within the Project Site.



Data sources:

1. Proposed Infrastructure © BMA 2016 (Gap Analysis Report), 2017
2. Existing Infrastructure © BMA 2016 (RFI)
3. Limit of Subsidence Minserve, 2016
4. BMA Imagery 29 May 2016
5. Department of Natural Resources and Mines 2016
6. QLD SISP Imagery 2018

LEGEND

- Project Footprint - Direct Impact
- Project Footprint - Indirect Impact
- Underground Mine Layout
- Limit Of Subsidence
- Watercourse

Regional Ecosystems v10.1 (DNRM)

- Engangered dominant
- Engangered subdominant
- Of Concern dominant
- Least Concern

N

Figure 8
Subsidence extent, watercourses and Regional ecosystems

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.25 0.5 1
Kilometres

Scale: 1:40,000 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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2.2 Disturbance domains

Rehabilitation of potential impacts across the Project Site will be managed according to disturbance domains to assist in providing land use-specific rehabilitation objectives and performance indicators and criteria. These domains are representative of the activity occurring in each area (and therefore potential impact) and the potential post mining land use and capability of the land following completion of those activities.

The Project domains are:

- surface infrastructure
- mining impacted areas.

2.2.1 Surface infrastructure

Surface infrastructure disturbance domain for the Project (i.e. not being used for ongoing operation of Saraji Mine) includes:

- drill pads and infrastructure hardstand areas including the IMG network
- surface infrastructure located on MLA 70383 and MLA 70459, including accommodation camps, roads, bores, dams, pipelines, stormwater management systems, powerlines, CHPP, MIA and vent shafts.

Surface infrastructure is generally located in previously disturbed areas. The location of surface infrastructure is shown in Figure 2.

2.2.2 Mining impacted areas

Mining impacted areas represent the balance of Project Footprint above the longwall panels subject to subsidence effects.

Underground coal extraction will result in some degree of deformation of the overlying overburden strata (mining-induced subsidence). Vertical subsidence can vary from millimetres to metres subject to depth and extraction width parameters, with components of horizontal deformation from above the edges of coal extraction (and beyond), together with associated curvature, tilt and strain on the surface.

Subsidence predictions (Minserve, 2022) are used to assess impacts on surface topography (Minserve, 2022), water-dependent assets (3D Environmental, 2023), groundwater (SLR, 2023; AECOM, 2024) and the movement of water across the landscape (Alluvium, 2023).

Watercourses within the footprint of the predicted subsidence area comprise Hughes Creek and to a lesser extent Boomerang Creek and Plumtree Creek. Rehabilitation in subsided riverine areas will prioritise reinstatement of functioning watercourses and riparian vegetation supporting habitat connectivity.

The extent of subsidence predicted is provided in Figure 9. The RMP should be read in conjunction with the SMP for more detail regarding subsidence.

LEGEND

- Underground Mine Layout
- Limit Of Subsidence
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourses

Modelled Subsidence Contour

- < 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2.0m
- 2.0 - 2.5m
- 2.5 - 3.0m
- > 3.0m

N

Figure 9
Subsidence contours and extent

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.275 0.55 1.1
Kilometres

Scale: 1:40,000 (when printed at A4)

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3.0 Post mining land use

Prior to mining, Project ML areas were used for broad-scale cattle grazing. Much of the area has been either cleared or partially cleared. No areas were used for forage or cash cropping. Rehabilitation seeks to return land to compatible uses in accordance with the suitability of rehabilitated landforms to sustain the uses without causing degradation. The overriding principle is to create the most beneficial future use of rehabilitated land that can be sustained in view of a range of limiting factors (e.g. chemical and physical characteristics of surface material and final shape of landform).

Each disturbance domain has a nominated post-mine land use(s) (Figure 10), with a focus on returning the original ecosystem(s) to the site, or as second preference, re-instating a higher value land use or grazing land.

Indicative post mining land uses across the Project include:

- cattle grazing
- dryland cropping
- woodland habitat
- water storage
- watercourses.

The final landform at the Project Site will be suitable primarily for cattle grazing, with dryland cropping where SCL is verified (as identified in the southern portion of the Project Site in Figure 7) and woodland habitat restored in impacted areas of remnant vegetation communities.

The disturbance domains and potential PMLUs for the Project are summarised in Table 3. The rehabilitation objectives, indicators and completion criteria for each domain are discussed in Section 4.0. Rehabilitation methods and strategy for each domain are provided in Section 5.0.

Assigning PMLUs using this approach is in accordance with level one and two of the rehabilitation hierarchy (Section 1.3.2). Indicative distribution of each PMLU across the Project Site is shown in Figure 10, which will be further refined during development of the PRCP.

Table 3 Indicative post mining land uses for each domain

Domain	Post mining land use		
	Cattle grazing	Woodland habitat	Dryland cropping
Surface infrastructure	X		X
Mining impacted areas	X	X	

Adequate consideration of management aspects will be given from the early planning stage particularly from the viewpoint of access from adjoining un-mined grazing land, and compatibility with adjoining non-grazing mined lands.

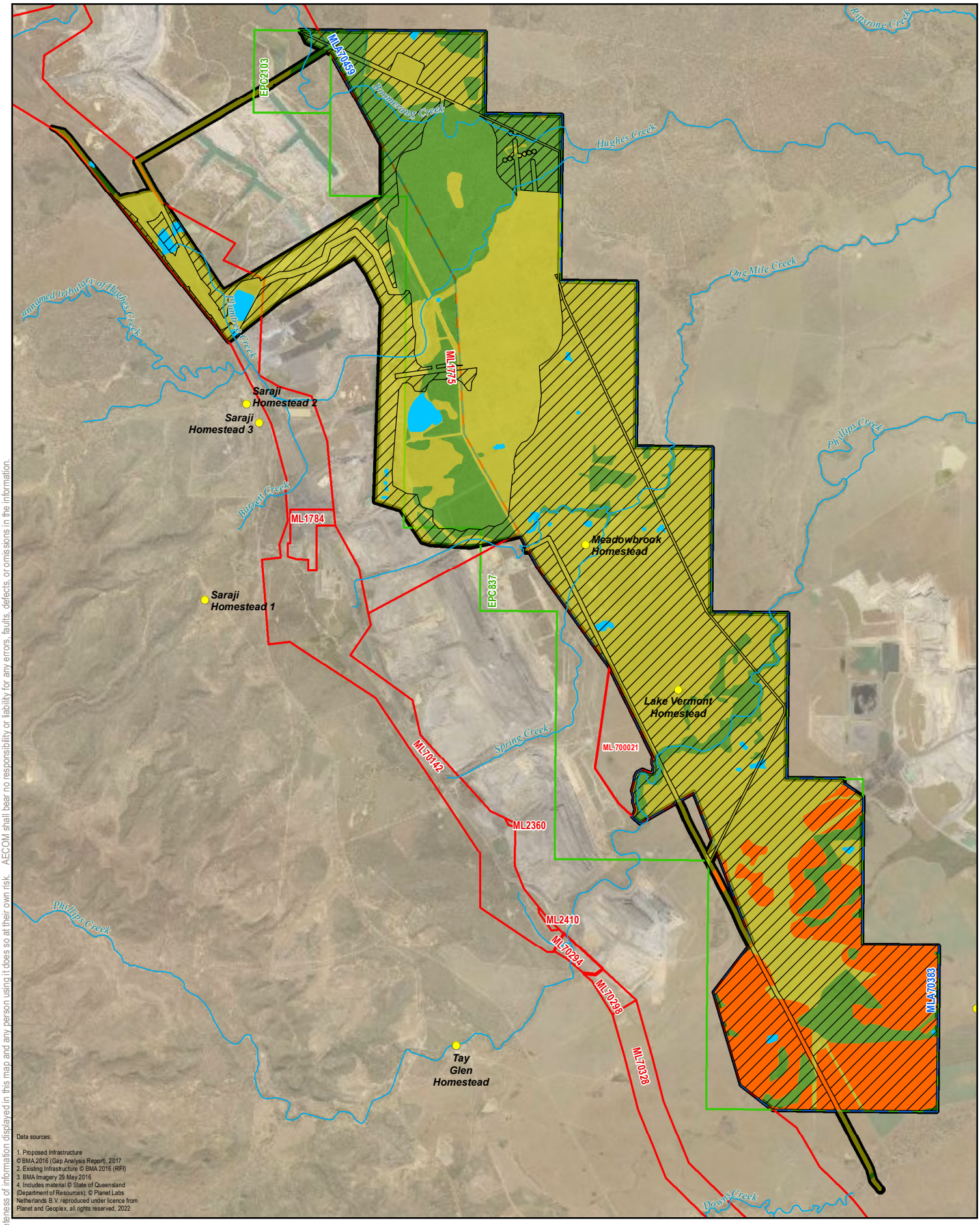
Where existing remnant vegetation occurs, consistent native vegetation communities will be re-established. The location of these areas will aim to link remnant native vegetation where possible and to return some conservation values. Rehabilitation of watercourses will restore appropriate riparian vegetation and link to other natural bushland areas along the creek system, promoting habitat connectivity. A minimum requirement will be to include key species of these communities in the revegetation specification (refer Section 6.4).

Watercourses will be stable and free flowing maintaining functional role within the landscape of the relevant PMLU. Overland flow within subsided panels will be maintained by gravity feed via contour drains to reconnect to the catchment, with rock-lining of steeper transition zones where necessary. If water storages are present at closure and are desirable to be retained by the landholder, they will need to comply with criteria in Table 4.

Dryland cropping areas as defined by GT Environmental (2024) will be restored to comply with the *Regional Planning Interests Act 2014* Statutory Guidelines 03/14 in accordance with the approved Restoration Plan to Support RIDA Application (RIDA ref: RPI121/001) for the Project (GT

Environmental, 2021). The construction and operation footprint of the powerline will be designed to minimise impact on the SCL by reducing the construction width right of way and carrying out restoration of overland flow and soil stability progressively following construction to achieve rehabilitation criteria in Table 4, which will be extended to the areas made available on decommissioning.

Upon mine closure, responsibility for the maintenance and management of rehabilitated land will remain with BMA as tenement holders. Once rehabilitation has satisfied completion criteria and is sustainable the land will be relinquished.



Data sources:

1. Proposed Infrastructure
© BMA 2016 (Gap Analysis Report), 2017
2. Existing Infrastructure © BMA 2016 (RFI)
3. BMA Imagery 29 May 2016
4. Includes material © State of Queensland (Department of Resources); © Planet Labs Netherlands B.V. reproduced under licence from Planet and Geoplex, all rights reserved, 2022

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LEGEND

- Project Site
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourse
- Homestead

Post Mine Land Use

- Water storage
- Woodlands habitat
- Cattle grazing
- Rainfed cropping
- Undisturbed Area

N

Figure 10
Indicative Post Mine Land Use

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:110,000 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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4.0 Rehabilitation objectives, indicators and completion criteria

The objectives, completion criteria, and indicators in Table 4 are drawn from BHP's Queensland Coal Rehabilitation Completion Criteria (BHP, 2018). The criteria, objectives and goals outlined in Table 4 are preliminary and final rehabilitation milestone criteria will be developed as part of the PRCP.

Final landform design parameters to be adopted to rehabilitate the mine domains will be identified in EA conditions to achieve the nominated PMLU. The design of each domain and integration into the final landform will ensure that design criteria parameters in EA are met and will incorporate appropriate drainage measures to manage surface water flows and control erosion.

On completing each rehabilitation milestone, BMA will demonstrate milestone criteria have been met and land is progressing toward the planned PMLU. The PRCP will outline and detail the rehabilitation milestone criteria and when each milestone is to be achieved.

Table 4 Preliminary Project completion criteria, objectives and indicators

Post mining land use	Goal	Objective	Indicator	Criteria
Cattle grazing	Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
	Stable	Rehabilitation is geotechnically stable	Factor of safety	≥1.5
		Rehabilitation is erosionally stable	Extent, slope gradient and groundcover	Groundcover >50% 70% of slopes within the Project disturbance footprint ≤20%
	Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH Electrical conductivity (EC) Turbidity	Not significantly different to upstream values
		Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: (a) the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water)) schedule documents water quality objectives for relevant groundwater chemistry zones; or, (b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.
	Able to sustain an agreed post mining land use	Rehabilitation is suitable for sustainable cattle grazing	Land suitability assessment for cattle grazing	Within the Project disturbance footprint, cattle grazing land suitability class of 2 or 3, or not different from pre-mining class if ≥4 Outside of the Project disturbance footprint, cattle grazing land suitability class not different from pre-mining class
Woodland habitat	Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference

Post mining land use	Goal	Objective	Indicator	Criteria
	Stable	Rehabilitation is geotechnically stable	Factor of safety	≥1.5 unless an alternative is justified by an appropriately qualified engineer
		Rehabilitation is erosionally stable	Groundcover (steep slopes, >15%)	80%
			Groundcover (lesser slopes, ≤15%)	50%
	Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
		Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: (a) the EPP (Water) schedule documents water quality objectives for relevant groundwater chemistry zones; or, (b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.
	Able to sustain an agreed post mining land use	Native bushland characteristics	Species richness Trees Shrubs Grasses	Species richness composing of: • ≥2 native tree species • ≥3 native shrub species • ≥4 native grass species.
			Tree canopy cover	≥16% by native tree species
Watercourse	Safe to humans and wildlife	Safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
	Stable	Rehabilitation is erosionally stable	Geomorphic index (IDC method)	Greater or equal to upstream or downstream values.

Post mining land use	Goal	Objective	Indicator	Criteria
	Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
	Able to sustain an agreed post mining land use	Riparian vegetation	Riparian vegetation index (IDC method)	Greater or equal to upstream or downstream values.
Water storage	Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
	Stable	Rehabilitation is geotechnically stable	Factor of Safety	≥1.5
		Rehabilitation is erosionally stable (banks and immediate surrounds)	Groundcover	>50%
	Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
		Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: (a) the EPP (Water) schedule documents water quality objectives for relevant groundwater chemistry zones; or, (b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.
	Able to sustain an agreed post mining land use	Rehabilitation retains water that is a potential resource for cattle grazing, with quality according to ANZECC guidelines version October 2000	TDS Calcium Magnesium Nitrate Nitrite Sulphate	≤5,000 milligrams per litres (mg/L) ≤1,000 mg/L ≤2,000 mg/L ≤400 mg/L ≤30 mg/L ≤1,000 mg/L

Post mining land use	Goal	Objective	Indicator	Criteria
Dryland cropping	Safe to humans and wildlife	Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use	Hazard assessment	No significant difference
	Stable	Rehabilitation is geotechnically stable	Factor of safety	≥1.5
		Rehabilitation is erosionally stable	Percentage of cultivation at >1% slope gradient with functional contour banks	100% of rehabilitated areas
	Non-polluting	Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters	pH EC Turbidity	Not significantly different to upstream values
		Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater	EC	Not significantly different to: (a) the EPP (Water) schedule documents water quality objectives for relevant groundwater chemistry zones; or, (b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.
	Able to sustain an agreed post mining land use	Rehabilitation is suitable for sustainable cropping	Land suitability assessment for cropping	Within the Project disturbance footprint, cropping land suitability class of 2 or 3, or not different from pre-mining class if ≥4 Outside of the Project disturbance footprint, cropping land suitability class not different from pre-mining class

5.0 Rehabilitation phasing and schedule

A plan and schedule for progressive rehabilitation will be established (as part of the future PRCP) to ensure rehabilitation occurs progressively in-line with the proposed mining sequence. Rehabilitation will be progressively undertaken on areas that cease to be used for mining or mine-related activities, or where subsidence has concluded, to reduce the amount of disturbed land at any one time.

Broadly the rehabilitation process will require rehabilitation milestones such as those below. Not all milestones will be relevant to all disturbance domains.

1. Infrastructure decommissioning and removal – services will be disconnected, removal of surface built and service infrastructure, monitoring equipment and boreholes unless demonstrated to be beneficial to the PMLU.
2. Remediation and/or management of contaminated land – relevant areas of surface disturbance will be subject to contaminated land investigations and any consequential actions to remediate.
3. Landform development and reshaping – incorporates subsidence crack repairs and reshaping of the final landform where required.
4. Surface preparation– incorporates soil preparation and other activities that may be required such as ripping, topsoiling and amelioration.
5. Revegetation – incorporates aspects such as seeding and fertilising.
6. Achievement of surface requirements – through monitoring and implementation of any improvements or maintenance.
7. Achievement of PMLU to a stable condition - the land is determined safe, structurally stable, does not cause environmental harm and is able to sustain the relevant PMLU.

Rehabilitation milestone and relevant domains are summarised in Table 5.

Table 5 Indicative rehabilitation milestones by domain

Rehabilitation milestone	Surface infrastructure	Mining impacted areas
Infrastructure decommissioning and removal	✓	
Subsidence appropriately developed (approx. 2 year after panel mining complete)		(as per SMP)
Remediation and/or management of contaminated land	✓	✓
Landform development and reshaping	✓	✓
Surface preparation	✓	✓
Revegetation	✓	✓
Achievement of surface requirements	✓	✓
Achievement of PMLU to a stable condition	✓	✓

The PRCP will address risks, consequences and timeframes for rehabilitation. The timing of rehabilitation activities is dependent on the mining schedule and when areas are deemed ‘available for rehabilitation’ in accordance with the PRCP guideline. The PRCP will be submitted to DES for approval prior to construction commencing.

The construction phase for the initial development of the Project is anticipated to span approximately two years – after which areas with construction infrastructure not proposed to be used during operational activities (for example the construction accommodation village) will be assessed for availability for rehabilitation. Most rehabilitation activities for the Project will occur during the operation period as subsidence impacts are realised and toward the end of mining when infrastructure is no longer required and decommissioned.

Subsidence impacts will be managed and remediated in response to monitoring as per the SMP and will be staged over the life of the Project in line with the mining schedule. It is anticipated that subsidence management will commence approximately two years after completion of mining of each longwall panel (generally one panel per year). The two-year timeframe allows for the full extent of

subsidence impacts to be realised. This timeframe is also consistent with the approved progressive rehabilitation timeframe within the EA for the BMA underground Broadmeadow Mine. At this time (i.e. two years after completion of mining each longwall panel) the relevant area would be considered available for rehabilitation.

The current proposed mining sequence and timing for land available for progressive rehabilitation is shown in Figure 11. This is based on the current assessed mine sequence and outputs from subsidence modelling (Minserve, 2022), but mine sequence variations are likely due to change in underground mine plan due to business or market conditions, changes in technology or improved resource information e.g. coal quality and geotechnical knowledge. Any change to the mining sequence will impact the planned rehabilitation sequence. An indicative program for progressive rehabilitation and area available is presented in Table 6.

Table 6 Indicative program for progressive rehabilitation and area available

Year of mining (end of year)[1]	Area (ha) available for progressive rehabilitation		Year available
	Cumulative area (ha)	Incremental area (ha)	
Year 1	130	130	Year 3-4
Year 2	180	50	Year 4-5
Year 5	300	120	Year 7-8
Year 10	580	280	Year 12-13
Year 20	1340	760	Year 22-23

[1]Noting 2 years of construction to occur prior to mining activity.

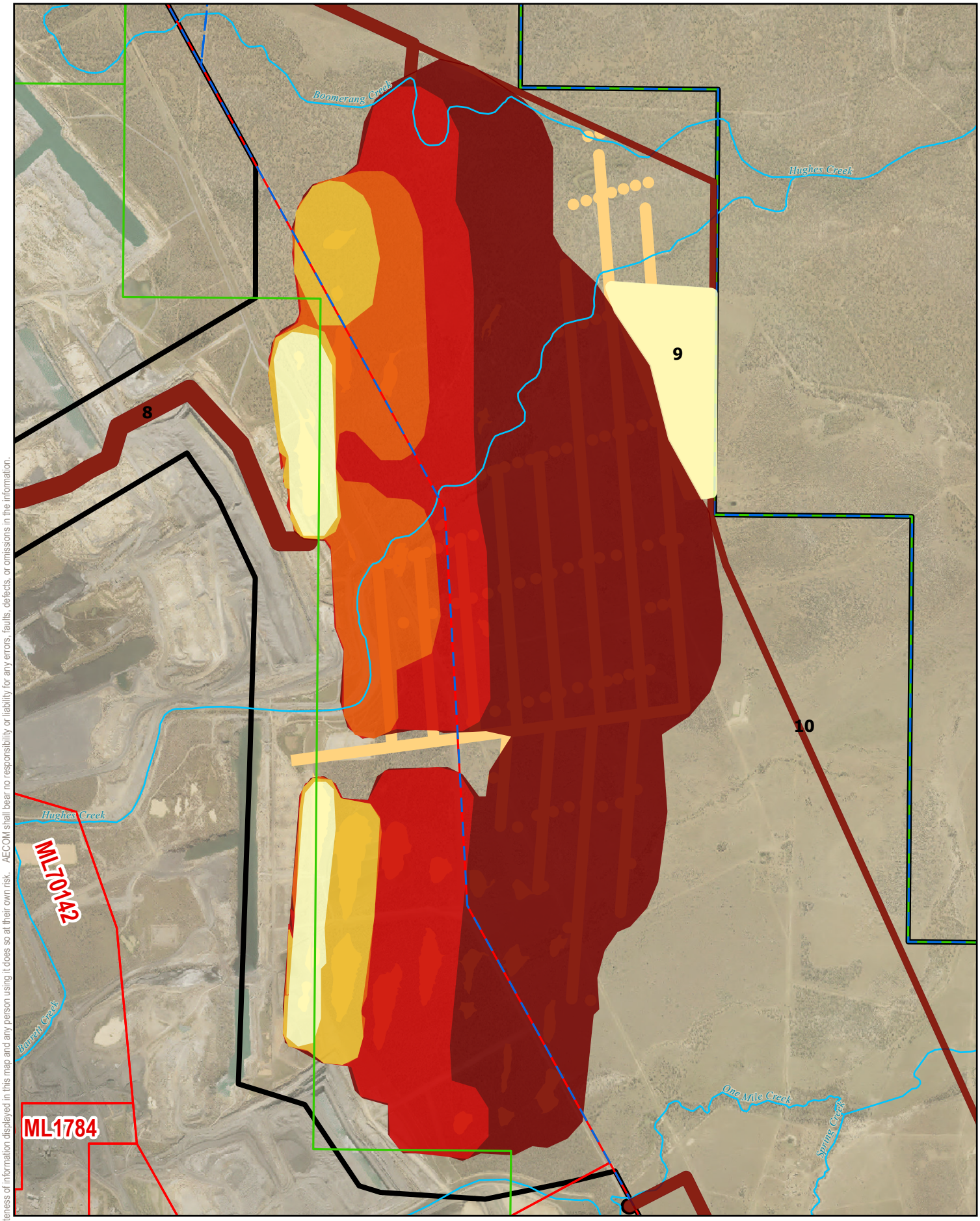
Indicative rehabilitation timeframes are shown in Table 7. This will be revised as part of the PRCP.

Table 7 Indicative rehabilitation schedule

Project phase	Activity	Years
Construction	Construction of the Project	1-2
	Decommission and removal of construction infrastructure no longer required and rehabilitation of the area (up to and including revegetation)	3-5*
	Ongoing monitoring and maintenance of construction infrastructure areas to demonstrate achievement of PMLU	6-20
Operational	Underground mining	3-22
	Longwall panel subsidence period (approx. 2 years from end of mining each panel) and management of subsidence under SMP	3-24
	Rehabilitation of subsidence areas and IMG network disturbance (up to and including revegetation)	5-24 (up to 2 years after panel subsides)
	Ongoing monitoring and maintenance of subsidence areas to demonstrate achievement of PMLU[#]	25-44
Closure	Decommission and removal of Project surface infrastructure not required by Saraji Mine or the PMLU and rehabilitation of the area (up to and including revegetation)	23-27*
	Ongoing monitoring and maintenance of surface infrastructure areas to demonstrate achievement of PMLU[#]	28-47

*Dependent on contamination land investigation outcomes

[#]Dependent on PMLU



LEGEND

- Project Site
- Project Footprint - Direct Impact
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)
- Watercourse

Subsidence Areas by Year

- 3
- 4
- 6
- 10
- 20

Surface Infrastructure

8 Conveyor
9 Construction Village
10 Transport and Infrastructure Corridor

N

Figure 11
Indicative progressions of subsided areas available for rehabilitation

Rehabilitation Management Plan
Saraji East Mining Lease Project

0 0.75 1.5 3
Kilometers
Scale: 1:42,682 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

BMA
BHP Mitsubishi Alliance

DATE: 20/06/2024 VERSION: 2

AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

Filename: L:\Secure\Projects\605X\605070314. Tech Work Area\4.98 GIS 2021\02_MXDs\01 Environmental Impact Statement\K-1 Subsidence and Rehab Plans\Rehab Management Plan\60507031_G449_RehabilitationTimeframe_v0.aprx Layout: F9_60507031_G449_v0_A4P_SubsidenceSequence

6.0 Rehabilitation method

All areas significantly disturbed by mining activities will be rehabilitated to a stable landform with a self-sustaining landcover or to a condition where maintenance requirements are consistent with an agreed PMLU. Rehabilitation will be undertaken progressively, primarily driven by the mine plan.

All rehabilitation methods will be conducted to:

- minimise the potential for erosion
- minimise surface water impacts including bedload sediment interruption, bank erosion, loss of flow and ponding
- revegetate previously vegetated areas to be self-sustaining vegetation communities
- ensure the vegetation within the rehabilitated area is not significantly different to surrounding landscapes of similar landform subject to the same land use.

Subsidence management will be required during the operational phase of the Project with management strategies to be assessed on a case-by-case basis in accordance with the SMP (BMA, 2024). The primary management strategies for subsidence areas (on the land and within the creeks) are surface crack repairs where required, watercourse management and in some cases, drainage establishment for ponding. Drainage will be permanently retained in the post-mining land use ensuring a free draining land form. The requirement for management will be identified as part of the routine subsidence monitoring during operations and incorporated into planning for progressive rehabilitation.

6.1 Infrastructure decommissioning and removal

General surface infrastructure

General surface infrastructure areas include the construction camp, buildings, powerlines, pipelines, monitoring equipment, bores, roads and hardstands. Surface infrastructure for the Project not required for Saraji Mine or beneficial for the PMLU will be removed and the area rehabilitated once underground mining is complete (unless infrastructure is not required after completion of the construction phase as described in Section 5.0). Shared infrastructure with Saraji Mine will be decommissioned and rehabilitated as per the rehabilitation schedule for Saraji Mine.

Built infrastructure will be decommissioned and removed. Priority will be to repurpose, salvage or recycle any infrastructure to be removed. Decommissioning of built infrastructure (with no beneficial use to the post mining land use) will include removing concrete to a depth of 0.5 m below the surface or covering to a minimum depth of 0.5 m to enable establishment of the PMLU. Demolition and disposal within the Saraji Mine mining voids or spoil dumps, will only be undertaken when repurpose, salvage or recycle alternatives are deemed by BMA not to be viable. This approach is in line with the waste and resource management hierarchy outlined in the Queensland Waste Management and Resource Recovery Strategy created under the *Waste Reduction and Recycling Act 2011* (Qld).

A contamination risk assessment will be conducted on areas that have been used for a notifiable activity(ies) under the *Environmental Protection Act 1994* (Qld) or are likely to be contaminated. A contaminated land assessment will be undertaken where required in accordance with the National Environment Protection (Assessment of Site Contamination) Measure. The contaminated land investigation will assess the site for the presence of contamination with the potential to adversely impact the nominated PMLUs and/or environmental values. Should land contamination be identified, the potential risks will be assessed and, where required, remediation will be undertaken and/or a Site Management Plan developed to allow the ML area to be safely utilised for the nominated PMLUs.

Once infrastructure is removed and contamination activities are complete, the remaining rehabilitation activities involving landform reshaping, topsoiling and seeding can commence.

IMG infrastructure

IMG infrastructure (for gas drainage) will be installed and then removed progressively as mining progresses across each panel. Following construction, interim rehabilitation measures will be undertaken including:

- removal of temporary facilities associated with drilling
- rehabilitation of the bulk of the drilling pad area, leaving only a small area immediately around the well
- rehabilitation over installed gas and water pipeline trenches
- reinstatement of vegetation along riparian corridors.

Once mining of each panel is complete, final decommissioning of IMG infrastructure will be undertaken progressively and include:

- removal of all facilities above ground surface level associated with wells
- cut off, grout and cap wells will below ground level to create a seal in accordance with guidelines on decommissioning of gas wells current at the time, and monitor during subsidence, repairing where standpipes have become exposed.
- rip pads around each well, topsoil, seed and fertilise disturbed areas as necessary to support the PMLU
- empty and make safe water and gas pipelines.

Vent shafts and boreholes

Decommissioning of ventilation shafts, service boreholes, dewatering and monitoring boreholes will be undertaken once they are no longer needed for the underground operations, this may be progressively during and at the end of underground operations. Decommissioning includes sealing, capping and grouting and will be completed in accordance with relevant standards and guidelines, in particular the relevant requirements of the Minimum Construction Requirements for Water Bores in Australia (Land and Water Biodiversity Committee, 2003) or other relevant guidelines in place at the time of decommissioning.

Underground access

Decommissioning of the underground access will be required after final mining. Any mining equipment or service supply lines and cables that are no longer required and are not readily recoverable for salvage or reuse will be left in the underground mine. Entrances to the underground workings will then be blocked off and sealed to prevent access.

A final safety inspection and certification against mine safety legislation in place at the time of closure will be required.

Raw and process water dams

Water storages created for the Project are unlikely to have any beneficial use for the future land use as they do not capture overland flow. The storages will have contained mine affected water and will need to be emptied.

The rehabilitation of water storages will include:

- treatment of water stored to meet water quality requirements if required
- contained sediments will be removed for disposal if required
- the walls will be breached so that the storage can no longer contain water
- the area will be graded and re-profiled to restore drainage
- the area is then topsoiled and seeded.

6.2 Topsoil management

Construction of surface infrastructure will require management of topsoil. Appropriate topsoil management is crucial to successful rehabilitation of disturbed areas.

Underground mining will result in subsidence of the land surface which will not significantly disturb the topsoil. Exceptions to this may occur in some instances post subsidence where re-contouring, drainage control or crack repair is required and, as such, topsoil salvage may be required prior to earthworks.

SCL areas to be re-established for dryland cropping PMLU, will be subject to the specific recommendations for restoration and management of topsoil and subsoil of each soil management unit identified in the approved Restoration Plan (RIDA ref: RPI121/001).

A general overview of the soil stripping, stockpiling and application process is detailed below.

Topsoil stripping

Topsoil is stripped according to the recommended depths from the pre-construction soil surveys. Deep ripping can help maximise soil recovery. Machinery used is to be weed free.

Topsoil is to be used progressively where possible to reduce topsoil stockpiles and storage time, but there is limited opportunity for direct use for underground operations as the majority of progressive rehabilitation areas i.e. subsidence, generally do not require topsoil replacement.

Topsoil stockpiling

Stockpile locations will aim to be close to disturbance areas within the Project footprint based on the following:

- not within proximity to overland water flow areas or drainage lines
- protected from wind prone areas
- areas that are not subject to stock grazing, machinery or vehicle movement
- areas that are not subject to drainage from higher areas to prevent erosion.

Stockpiles will be low mounds at a maximum height of 3 m, with a greater number of lower mounds preferable. Topsoil that will remain stockpiled for an extended period will be sown with species as needed.

Topsoil application process

A pre-mining land resources and soil investigation of the Project Site (Section 2.1) identified the land capabilities of the soil. This investigation identified that the soil classes were within the ranges suitable to create stable landforms compatible with the surrounding landscape and planned PMLUs.

There should be sufficient topsoil on site for rehabilitation, but if quantities are not sufficient, alternative options such as low intensity application of topsoil with additional ameliorants or development of an alternative growth media with sub soil or with the use of ameliorants to improve organic matter, will be utilised.

An assessment of the growth media characteristics will be completed by an appropriately qualified person to determine the amelioration requirements to suit the revegetation plan.

The indicative growth media depth, amelioration options and the surface treatment requirements to support the establishment of vegetation for each PMLU, are shown in Table 8.

Table 8 Indicative growth media ameliorant options and surface treatments for the PMLUs

PMLU	Growth media	Ameliorant options	Surface treatments
Cattle crazing	Topsoil – minimum depth of 150 millimetres (mm) is sufficient to store moisture and nutrients to initiate and sustain pasture growth.	• elemental sulphur • manures • urea • diammonium phosphate • superphosphate • fertiliser • gypsum • incorporated organic matter	• ameliorate growth media as recommended by an appropriately qualified person (if required) • rip on contour • direct seed as per seed mixes and rates for cattle grazing revegetation.

PMLU	Growth media	Ameliorant options	Surface treatments
		• surface mulching (e.g. hay mulch).	
Woodland habitat	Topsoil – depth of 100mm to 150 mm to limit the effects of competition on woodland species due to the potential loads of exotic pasture species.	• elemental sulphur • manures • superphosphate • fertiliser • gypsum • incorporated organic matter • surface mulching (e.g. hay mulch).	• ameliorate growth media as recommended by an appropriately qualified person (if required) • rip on contour or deep rip on contour to incorporate rock on steeper areas • direct seed as per seed mixes and rates for woodland habitat revegetation.
Dryland cropping	Topsoil – depth recommended by SMU. No soil to be transferred between nominated SMUs.	• fertiliser • gypsum • lime.	• ameliorate growth media as recommended by an appropriately qualified person (if required) for each SMU.

6.3 Erosion and sediment control

Potential hazards arise from exposed soil being subject to erosion during rehabilitation. Sediment and erosion controls that may be employed include:

- minimising erosion of exposed land by restricting clearing areas, minimising soil exposure, and diverting potential runoff from undisturbed areas
- preventing exposed subsoils through minimising length of time subsoils are exposed and using erosion control measures such as gravelling, mulching, sediment fencing, and erosion control blankets
- contour ripping.

Erosion control measures will be determined on a case-by-case basis and driven by outcomes of routine monitoring.

Sediment and erosion controls may be utilised within low lying SCL areas (in accordance with the Restoration Plan associated with RIDA ref: RPI121/001) to ensure that loss of soil resources is minimal, and product can be recovered.

6.4 Revegetation

Appropriate seed mix for revegetation will be selected based on the PMLU (and to be defined in the PRCP).

6.4.1 Cattle grazing

Areas proposed for pasture establishment will be seeded with an appropriate mix based on soil type, site erosion potential and PMLU objective. Ground broadcasting of pasture seed will be undertaken as the preferred sowing method. Fertiliser may be used if specified by an appropriately qualified person.

The recommended revegetation species mix for cattle grazing PMLU is based on seeding native and naturalised exotic species that are palatable, productive and perennial (3P) grasses and legumes.

Preferred pasture species will be recommended based on species known to occur on the Project site, as well as a selection of pasture species suitable for the soils. A seeding rate of 16 kg/ha of coated pasture seed and 4 kg/ha of uncoated legume seed is recommended for cattle grazing PMLU (Table 9).

All seed mixes will also include 5 kg/ha of Japanese millet (*Echinochloa esculenta*) or similar as a sterile cover crop to protect topsoil from erosion. The cover crop will establish quickly on the exposed surfaces and work to provide a root system that will stabilise the surface and prevent erosion until new seedlings have established.

The cattle grazing seed mix composition and seeding rates shown in Table 9 are indicative only and will be further developed with the PRCP. The seed mix and seeding rates may be adjusted based on the results of ongoing rehabilitation monitoring and learnings.

Pasture seed mixes are recommended to be sown in the warmer months of the year from September to March, when the probability of rainfall is highest. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

Table 9 Indicative species list and seeding rates for cattle grazing PMLU

Scientific name	Common name	Seeding rate (kg/ha)
Astrebla lappulacea, A, squarrosa, A. elymoides	Mitchell grasses (curly, bull and hoop)	2[c] (per species)
Bothriochloa bladhii	forest blue grass	4[c]
Bothriochloa insculpta cvv. Bisset*	Bisset creeping blue grass	4[c]
Chloris gayana cvv. Callide*	Callide Rhodes grass	4[c]
Chloris gayana cvv. Katambora*	Katambora Rhodes grass	4[c]
Dichanthium sericeum subsp. sericeum	Queensland blue grass	4[c]
Digitaria brownii	cotton panic	2[c]
Heteropogon contortus	black spear grass	2
Megathyrsus maximus var. *pubiglumis**	green panic	4[c]
*Panicum coloratum var. makarikariense**	bambatsi Panic	4[c]
*Setaria incrassata**	purple pigeon	4[c]
*Urochloa mosambicensis**	Sabi grass	4[c]
Grass species - Total seed weight coated (kg/ha)		16 [c]
*Stylosanthes seabrana**	stylo	2
*Macroptilium bracteatum**	burgundy bean	2
*Stylosanthes hamata**	shrubby stylo	2
Chamaecrista rotundifolia	Wynn cassia	2
Rhynchosia minima var. minima	rhynchosia	2
Rhynchosia minima var. australis	rhynchosia	2
Legume species - Total seed weight uncoated (kg/ha)		4
Echinochloa esculenta	Japanese millet	5 [c]

[c] Assumes seed is coated. If not coated, use half prescribed rate; [*] denotes a naturalised exotic pasture species

6.4.2 Woodland Habitat

Native vegetation outside of the surface infrastructure footprint will be retained to be compatible with the pre-existing land use for biodiversity values observed during the baseline ecological studies. Species selection for areas to be returned to woodland habitat will aim to achieve woodland habitat similar to the surrounding vegetation communities.

Seeding will be predominantly by direct broadcast.

A combination of native tree, shrub and grass species will be used for woodland habitat. The woodland habitat revegetation plan will include 6 kg/ha of framework tree species, 4 kg/ha of woody understory species and 7 kg/ha of grasses.

In areas of high erosion risk, planting will also include the addition of a sterile cover crop (e.g. Japanese millet or similar) seeded at 5 kg/ha to provide initial groundcover.

Riparian Areas

Riverine areas requiring rehabilitation such as riparian banks and floodplains (e.g. following diversion or subsidence) will be seeded or planted with the species that are commonly encountered in the riparian REs of the locality. As mentioned above, in areas of high erosion risk, other species will be used to rapidly establish a stabilising groundcover.

6.4.3 Dryland cropping

Disturbance to the area designated as dryland cropping PMLU is subject to the requirements of the RIDA (RIDA ref: RPI121/001) for the Project. The Restoration Plan to support RIDA Application: Saraji East Project (GT Environmental, 2021) defines the activities required to restore the cropping land to pre-disturbance condition, including definition of restoration criteria. The Restoration Plan determines the activities undertaken to revegetate this area.

The extent of dryland cropping PMLU that will require rehabilitation is limited to a small area in the southern end of the Project Site where the 66 kV powerline crosses.

6.4.4 Seed supply

The provenance (where the tube stock or seed comes from) is considered important for all species. Tube stock and seeds will be sourced as locally as possible from natural populations. Although the local provenance boundary locations may differ between species, tube stock and seed should ideally be obtained from the Brigalow Belt North bioregion.

Proof of provenance will be sought from the supplier(s) along with germination and viability certificates for all purchased tube stock and seeds.

7.0 Rehabilitation monitoring

Monitoring of rehabilitation provides a greater understanding of rehabilitation status, allows the identification of trends or areas that require maintenance, and identifies rehabilitation techniques that are more successful than others.

Rehabilitation monitoring will be undertaken in accordance with the PRCP at the time of rehabilitation. The monitoring program presented in this section may be modified as part of the development of the PRCP.

The purpose of rehabilitation monitoring is to track rehabilitation progress against milestone criteria and to demonstrate achievement of the PMLUs, as well as identify any issues affecting the rehabilitation that will require maintenance action.

A combination of monitoring, reporting and data analysis approaches will be used to demonstrate the achievement of the rehabilitation milestones as shown in Table 10.

Table 10 Rehabilitation milestones with relevant reporting requirements

Rehabilitation milestone	Reporting requirements
Infrastructure decommissioning and removal	Undertake and document visual inspections
Remediation and/or management of contaminated land	Contaminated Land Investigation Document including a site suitability statement completed by a Suitably Qualified Person confirming the land does not present an unacceptable risk to proposed future land uses or the environment
Landform development and reshaping	Survey/LiDAR of landform Analyse final landform against design
Surface preparation	Document growth media depth Document growth media assessment Document ameliorants and physical treatments applied
Revegetation	Document seed mix, purity information, planting timing, seed application rates and areas
Achievement of surface requirements	Undertake and report rehabilitation monitoring
Achievement of post-mining land use to a stable condition	Undertake and report rehabilitation monitoring

Monitoring of subsidence features and impacts will occur in accordance with the methodology outlined in the SMP. Reporting for subsidence impacts will occur in accordance with the SMP and where relevant to provide input to the overarching rehabilitation reporting.

The following sections relate to monitoring outside of subsidence areas.

7.1 Remote sensing and technology

The rehabilitation monitoring program is highly dependent on the capture and analysis of field data. Future advances in monitoring could include developments in remote sensing, technology and/or digital data capture which may be incorporated into the program, wherever practical.

7.2 Monitoring schedule

The monitoring program follows a phased approach as detailed in Table 11. Initial monitoring is undertaken on an annual basis for the first three-years of rehabilitation to primarily assess vegetation establishment and achieving initial surface requirements. This approach allows a timely assessment of rehabilitation post initial seeding and provides critical information to determine if rehabilitation is on track towards achieving surface requirements or if maintenance is required.

Additional rehabilitation parameters are included into the monitoring program in years three, five and five-yearly thereafter, to assess and track the performance of rehabilitation in relation to achievement of surface requirements and achievement of PMLU to a stable condition. The phased approach of the monitoring program enables regular analysis of rehabilitation monitoring data, including multi-year comparison of trends.

Table 11 Indicative PMLU monitoring schedule and measured rehabilitation parameters

Rehabilitation parameter	Monitoring schedule				
	Year 1	Year 2	Year 3	Year 5	Year 10+ (5-yearly thereafter)
Cattle grazing and woodland habitat PMLUs					
Landform and erosion	✓	✓	✓	✓	✓
Soil and spoil	✓	-	✓	✓	✓
Groundcover	✓	✓	✓	✓	✓
Invasive plants	✓	✓	✓	✓	✓
Cattle grazing PMLU					
Grazing Land Suitability Assessment	✓	-	✓	✓	✓
Land Condition	-	-	✓	✓	✓
Woodland habitat and Watercourse PMLU					
Species richness	✓	✓	✓	✓	✓
Tree stem count/basal area	-	-	✓	✓	✓
Tree height	-	-	✓	✓	✓
Tree canopy and shrub cover	-	-	✓	✓	✓
Recruitment	-	-	✓	✓	✓
Dryland cropping					
Refer to approved Restoration Plan (RIDA ref: RPI121/001)					

7.3 General rehabilitation monitoring parameters

7.3.1 Landform and erosion

Landform and erosion will be assessed as part of all monitoring phases. Prior to commencing the field monitoring work, a desktop assessment using LiDAR data and aerial imagery will be completed to develop a DEM to assess the rehabilitated slope against the landform design (Year 1), and the ongoing monitoring of the landform and slopes.

The desktop analysis will identify potential areas of major ponding, areas of deposition (where the ground level has increased over time), as well as the progression of erosion features such as developing gullies.

Field-based erosion monitoring will be conducted at permanent monitoring sites, as well as any new areas identified in the desktop assessment. If erosion is present, an erosion monitoring transect will be established by running a 50 m tape perpendicular to the slope and across the erosional activity identified by the LiDAR analysis.

Erosion severity, erosion type and state of erosion will be recorded for each erosion transect such that changes in severity can be detected and mitigation measures can be designed where required.

7.3.2 Soil

The parameters detailed in Table 12 will be analysed during all monitoring events for soils. Soil profile pits or cores will be located within proximity to the permanent rehabilitation monitoring sites. Surface sampling depth refers to the layer at 0-10 cm; and sub-surface sampling depth refers to layers at 10-30 cm, 30-60 cm and 90-100 cm.

Table 12 Soil analysis parameters for rehabilitation monitoring

Category	Analyte	Purpose of analyte	Depth	
			Surface	Sub-surface
Acidity / alkalinity	pH	Identify anomalies that may affect plant growth and sustainability.	✓	✓
Salinity	EC	Identify leaching profile. High salinity can lead to poor vegetation germination and establishment, reduced plant growth and vigour.	✓	✓
Exchangeable cations	CEC	Major factor in soil fertility. Controls soil stability, nutrient availability and buffers soil's chemical properties.	✓	✓
	ESP	ESP is a measure of the dominance of Na ions on the soil's cation exchange complex. Sodicity in soils can lead to slaking and dispersion which impact soil structure and stability.	✓	✓
Organic matter	Organic carbon	An indicator of soil nutrient stores and a contributor to improvements in soil structure. Increases in organic carbon is a key indicator of rehabilitation success.	✓	-
Major elements	Total Nitrogen	Indicator of soil nutrient store and is also a major plant nutrient.	✓	-
	Extractable Phosphorous (Colwell method)	Indicator of phosphorous readily available to plants.	✓	-
	Total Phosphorous	Indicator of total store of phosphorous, some of which is readily available. Key indicator of potential for long-term success or failure of rehabilitation.	✓	-

7.3.3 Groundcover

Groundcover will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring events. Groundcover type is recorded as either live cover (with species recorded), standing dry cover, organic litter (including leaves, hay and woody debris (i.e. logs or dead timber)), rocks, or bare ground. The percentage of total groundcover (anything in contact with the soil surface) is calculated.

7.3.4 Invasive plants

An invasive plant is a prohibited or restricted matter under the Queensland *Biosecurity Act 2014*, and is defined as a species that has, or is likely to have an adverse impact on a biosecurity consideration because of the introduction, spread or increase in population size of the species in an area. A complete list of invasive plant species is listed in Schedule 2, Part 2 (Restricted matter – invasive biosecurity matter) of the *Biosecurity Act 2014*.

'Restricted' invasive plants will be assessed at the permanent rehabilitation monitoring sites and reference sites as part of all monitoring phases. The presence and percent cover of invasive plants, calculated as a percentage of the total vegetation cover, will be recorded at each site.

7.4 Cattle grazing specific rehabilitation monitoring parameters

7.4.1 Grazing land suitability assessment

A land suitability assessment according to the Grazing rule-set will be undertaken at Year 1 to assess if ameliorants are working or if further treatments may be required. Ongoing grazing land suitability assessments will be undertaken as part of all monitoring events from Year 3. Based on the monitoring data, land suitability class will be rated 1 to 5 as per the soil limitations and land attributes in Table 13.

Table 13 Land suitability classes

Class	Definition
1	Suitable land with negligible limitations which is highly productive requiring only simple management practices to maintain economic production.
2	Suitable land with minor limitations which either reduce production or require more than the simple management practices of Class 1 land to maintain economic production.
3	Suitable land with moderate limitations which either further lower production or require more than those management practices of Class 2 land to maintain economic production.
4	Marginal land with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long term (presently considered unsuitable due to the uncertainty of the land to achieve sustained economic production).
5	Unsuitable land with extreme limitations that preclude its use for the proposed purpose.

7.4.2 Grazing land condition

Grazing 'land condition' will be assessed at the permanent cattle grazing rehabilitation monitoring sites from Year 3. This allows at least two seasons after seeding for pasture species to establish. Land condition will be assessed and rated Good (A), Fair (B), Poor (C) or Degraded (D) as described in the *Queensland Reef Protection Regulations Farming in Reef Catchments Grazing Guide* (DES, 2022) (Table 14).

Land condition requires monitoring the following aspects:

- groundcover – calculated as the percentage of soil surface covered by live cover, standing dry cover and organic litter (including leaves, hay and woody debris)
- pasture condition – including estimated percent dry matter (DM) yield of preferred pasture species, annual grasses, undesirable grasses and other weeds
- soil condition and erosion – assessed as per previous section.

7.4.3 Pasture condition

Pasture condition will be assessed at the permanent rehabilitation monitoring sites from Year 3.

The density and coverage of 3P grasses (perennial, productive, palatable) is a key indicator of pasture condition (DES, 2022a). Pasture condition monitoring will be undertaken in accordance with the Stocktake GLM method (Department of Agriculture and Fisheries, 2021). The assessment includes an estimate of the percentage DM yield in kg/ha comprised of 3P pasture species versus the percentage DM yield in kg/ha of annual and undesirable grasses. Based on the monitoring data, pasture condition will be rated per the condition indicators in Table 14.

Table 14 Pasture condition assessment table

Condition rating	Condition indicators			
	Preferred pasture species		Annual grass % DM yield	Undesirable grasses and other weeds % DM yield
	% DM yield	Crown cover		
Excellent (A=1)	> 80%	Dense and plants healthy	< 20%	< 20%
Good (B=2)	60 – 80%	High to moderate density and some plants unhealthy	20 – 39%	20 – 29%
Poor (C=3)	10 – 59%	Moderate to low density and some plants dead	40 – 70%	30 – 80%
Very poor (D=4)	< 10%	Sparse and many plants dead	> 70%	> 80%

7.5 Woodland habitat specific rehabilitation monitoring parameters

The woodland habitat rehabilitation monitoring parameters are consistent with the Queensland Biodiversity and Ecology Information System Tertiary level assessment in the 'Evaluating methods for assessing native ecosystem mine rehabilitation success – Technical Paper (Spain, Nuske, & Gagen, 2023)' released in March 2023 by the Office of the Queensland Mine Rehabilitation Commissioner. The following section details specific parameters monitored for woodland habitat rehabilitation and reference sites.

7.5.1 Species richness

All woody species are recorded for each survey plot. Species richness will be assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. Species richness includes a full floristic assessment and count of tree, shrub, grasses (native and exotic) and other ground species at each site.

7.5.2 Tree stem count/basal area

Tree stem count provides another measure of species' abundance which helps describe the vegetation community. The tree stem count records the number of individual trees in a 50m x 10m plot by species. A tree that branches into two or more stems 30 cm above the ground is counted as one individual (Neldner, 2022).

Basal area is recorded by species using a single sweep of a Bitterlich stick or similar with basal area factor of 1 (BAF1) from the centre of the plot (Neldner, 2022).

7.5.3 Tree canopy height

Tree canopy height and height range will be assessed at the permanent rehabilitation monitoring sites from Year 3. Tree canopy height (measured to the top of the highest leaves) refers to the median canopy height for trees in the canopy layer (Eyre, et al., 2015).

7.5.4 Tree and shrub canopy cover

Tree canopy cover will be assessed at the permanent rehabilitation monitoring sites from Year 3. Canopy cover is recorded using the line intercept method at each monitoring site. The crown of each tree (single-stemmed woody plant greater than 2 m tall) (Eyre, et al., 2015) is recorded and summed as a total canopy distance and converted to a percent cover.

Shrub cover will be assessed at the permanent rehabilitation monitoring sites from Year 3. The crown of each shrub (i.e. woody plant that is multi-stemmed from the base (or within 200 mm from ground level) or if single stemmed, less than 2 m tall) (Eyre, et al., 2015) is recorded using the line intercept method and summed as a total shrub distance and converted to a percent cover at each monitoring site.

7.5.5 Recruitment

Recruitment will be assessed at the permanent rehabilitation monitoring sites from Year 3. Recruitment of canopy species is assessed by observing the proportion of the dominant canopy species regenerating (<5 cm diameter at breast height) at each monitoring site.

7.6 Dryland cropping rehabilitation monitoring parameters

As described in the approved Restoration Plan to Support RIDA Application (RIDA ref: RPI121/001) for the Project (GT Environmental, 2021), restoration of dryland cropping areas will be assessed against the pre-disturbance land suitability and limitations in which the SMUs presented prior to disturbance (compared to pre-clear reference sites).

Ongoing monitoring and assessment of the restoration plan area will be conducted by a appropriately qualified person to demonstrate restoration success i.e.:

- soil resources in the disturbance area have been restored including available or submitted monitoring reports, photos, and associated laboratory results within six months of final restoration works
- monitoring notes and photos of native vegetation establishment and pre-disturbance land use in the project site, within three years of final restoration works
- independent review, land resource survey and report by a third-party consultant which demonstrates that the project site has been restored to pre-clear conditions including the status of SCL and Agricultural Land Class.

To monitor soil fertility and quality of pre-clear reference sites, samples will be collected to reassess key soil fertility indicators including but not limited to; pH, Electrical conductivity (EC), Chloride, Cation exchange capacity, Nitrogen, Phosphorus and Total organic matter. Texture (particle size analysis) may also be included on the final analysis. Prior to surface preparation and revegetation, soils will be visually inspected to confirm the appropriate moisture content.

Monitoring will occur every six months from commencement of restoration activities until disturbed areas are shown to be pre-activity condition and productive capacity for a period of one year. Monitoring of restoration works Annual Reports (per financial year) will be provided to the Department of Resources. Should the Project, or portions of the Project, are unable to demonstrate being restored to pre-clear conditions, then an acceptable mitigation strategy can be outlined and accepted by the Department of Resources.

7.7 Watercourse monitoring

Watercourse monitoring will be conducted to assess the performance of the creek reaches disturbed by mining activities. The purpose of the monitoring is to assess the performance of the rehabilitated watercourses in achieving watercourse surface requirements and the final PMLU milestone criteria.

Watercourse monitoring will be undertaken in accordance with the Index of Diversion Condition (IDC) methodology which is outlined in the Monitoring and Evaluation Program for Bowen Basin River Diversions (ID&A, 2001). The IDC is a quantitative monitoring method used to measure the geomorphic and riparian vegetation condition of creek diversions; however, it can be utilised for both diverted and rehabilitated reaches of watercourses. For small lengths of rehabilitated watercourses e.g. road crossings, a modified IDC method, with a reduced number of monitoring points within each reach, is required due to the reduced impact area.

The watercourse monitoring schedule is detailed in Table 15. The monitoring schedule indicates the IDC parameters are measured in Year 1 (of rehabilitation), Year 2, Year 5 and then 5-yearly thereafter.

The IDC methodology encompasses:

- visual inspection of the diversion/rehabilitated watercourse and upstream and downstream reaches (i.e. reference sites)
- assessment of geomorphic index and riparian vegetation index at nominated monitoring points within the diversion/rehabilitated watercourse, upstream and downstream reaches

- determination of reach-averaged geomorphic index and riparian vegetation index and overall IDC scores for the diversion/rehabilitated watercourse, upstream and downstream reaches
- comparison of the geomorphic index and riparian vegetation index and overall IDC scores for the diversion/rehabilitated watercourse reaches to the relative upstream and downstream reaches.

Table 15 Watercourse PMLU monitoring schedule and measured rehabilitation parameters

Monitoring parameters		Monitoring schedule			
Parameter	Monitoring detail	Year 1	Year 2	Year 5	Year 10+ (5-yearly thereafter)
Groundcover					
Groundcover	Groundcover (%)	✓	✓	✓	✓
Geomorphic index parameters					
Stream width	Width of high flow channel (m) Width of active channel (m) Width of low flow channel (m)	✓	✓	✓	✓
Bank condition	Presence of erosion	✓	✓	✓	✓
Piping of banks	Presence of piping on the banks	✓	✓	✓	✓
Bed condition	Presence of aggradation or degradation within the channel bed	✓	✓	✓	✓
Spoil piles	Proximity of spoil dumps in relation to the monitoring point	✓	✓	✓	✓
Recovery	Presence or absence of benches with/without vegetation	✓	✓	✓	✓
Instream structures	Stability of each identified instream structure	✓	✓	✓	✓
Riparian vegetation index parameters					
Riparian zone	Width of riparian zone (m)	✓	✓	✓	✓
Structural intactness	Over-storey, understorey and ground cover (% density)	✓	✓	✓	✓
Regeneration	Presence or absence of regeneration on banks	-	✓	✓	✓
Longitudinal continuity	Assess the gaps in the riparian vegetation corridor along the banks	✓	✓	✓	✓

7.8 Reference sites

Reference sites will be defined within the PRCP with representative locations selected for each PMLU. Reference sites will be preferentially selected from undisturbed areas within the ML to be representative of PMLU conditions. Data will also be collected at the reference sites during the rehabilitation program as required.

7.9 Maintenance

Maintenance will be implemented when monitoring identifies issues with the rehabilitation, or when milestone criteria are not being met. To select the most appropriate corrective actions, rehabilitation

monitoring data will be analysed to identify the likely cause(s). Required maintenance/corrective actions will be entered into the BMA work management system for actioning and record management.

7.9.1 Weed management

General weed control procedure

Weed management will occur in accordance with a site Weed and Feral Animal Management procedure. The most appropriate method of targeted herbicide will be chosen depending on the weed species present. Hardy species may require re-treatment after the initial treatment to ensure mortality of individual plants. Aggressive and targeted herbicide application regimes are most effective and economical when applied to species in the early phases of invasion. Chemical treatments will be coupled with regular weed monitoring to ensure early detection of new weed species. All herbicides must be registered chemical products with the Pesticides and Veterinary Medicines Authority (PVMA) and managed in accordance with site chemical management procedures and safety data sheets.

Weed wash-down procedure

A vehicle inspection will be completed before any vehicle is used for rehabilitation works or enters rehabilitation areas to mitigate weed invasion. This includes any light vehicles or plant, such as excavators, as well as any slashing equipment and other machinery used by contractors. Disposal of reproductive material must occur in accordance with the requirements of the *Biosecurity Act 2014* (Qld).

8.0 Risk assessment and trigger action response plan

A rehabilitation risk assessment and preliminary Trigger Action Response Plan (TARP), which demonstrate how potential rehabilitation risks will be avoided, mitigated and/or monitored, have been completed utilising the risk matrix presented in Table 16. Table 17 and Table 18 present the likelihood assessment and level of consequence ranking, respectively, which inform the risk matrix.

The rehabilitation risk assessment and TARP (refer to Table 19 and Table 20, respectively) should be read and implemented in conjunction with the risk assessment and TARP in the SMP, as well as the rehabilitation methods in Section 6.0 of the Plan.

As noted in the Project EA conditions, the PRCP will address risks, consequences and timeframes for rehabilitation.

Table 16 risk assessment will be revised and updated with a final TARP developed as part of the PRCP for the Project prior to commencement of construction.

Table 16 Risk Matrix

Likelihood	Low L1	Minor L2	Moderate L3	Major L4	Critical L5
Almost Certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

Table 17 Likelihood Assessment

Likelihood selected severity happens	Recurrence	Chance	Likelihood
Almost Certain	1-2 years	50%	3
Likely	5 years	20%	1
Possible	10 years	10%	0.3
Unlikely	50 years	2%	0.1
Rare	>50 years	1%	0.03
Assume reasonable effectiveness of preventative control. Likelihood based on improved controls (if event has happened)			

Note: Risk assessment severity and likelihood tables to be reconsidered for currency at time of any updates.

Table 18 Consequence Table

Severity level	Health and safety	Environment	Community	Reputation	Legal	Financial
5	2-20 fatalities. Permanent impairment to >30% of body to more than 10 persons.	Serious or extensive impact(s) (<20 years) to land, biodiversity, ecosystem services, water resources or air.	Serious community health, safety or security impacts (>50 households) or human rights violations; extended disruption to people's lives (>200 households), extensive damage to >200 houses or structures, objects or places of national cultural significance.	Serious national and international media attention. General public and non-government organisations (NGO) adverse reaction with interest from regulators (<3 months). Structured campaigning from employees, NGOs or communities having a major impact on the business or asset reputation.	Impairment of legal right to develop or operate an asset. Investigation for alleged high profile regulatory breach or criminal breach. An alleged breach of compliance-related laws will be a high profile regulatory breach. Defendant to high profile civil proceeding. Public inquiry into BHP or an issue critical for the resources industry.	Between US$250 million and US$1 billion
4	Single fatality. Permanent impairment >30% of body to one or more persons.	Major impact(s). (>5 years) to land, biodiversity, ecosystem services, water resources or air.	Serious community health, safety or security impacts (<50 households). Multiple allegations of human rights violations; extended disruption to people's lives (>50 households); extensive damage to >50 houses; moderate irreversible damage to structures, objects or places of national cultural significance.	Adverse national media attention. General public and NGO adverse reaction with interest from regulators with no material outcome. Structured campaigning from employees, NGOs or communities having a major impact on the business or asset reputation.	Investigation for alleged major regulatory breach. Defendant to major civil proceeding.	Between US$25 million and US$250 million
3	Permanent impairment <30% of body to one or more persons. Restricted or lost days due to injury or illness.	Moderate impact(s) (<1 year) to land, biodiversity, ecosystem services, water resources or air.	Moderate community health, safety or security impacts (<50 households). Single allegation of human rights violation; moderate disruption to people's lives (<50 households); extensive damage to <50 houses; moderate reversible damage to structures, objects or places of national cultural significance.	Attention from regional media or heightened concern by local community. Criticism by community, NGOs or activists. Asset reputation adversely affected.	Legal issue resolvable with moderate consequences. Losing or not getting the legal right to develop or operate (or approval for) a non-core activity.	Between US$2.5 million and US$25 million

Severity level	Health and safety	Environment	Community	Reputation	Legal	Financial
2	Objective but reversible impairment. Medical treatment injury or illness.	Minor impacts (<3 months) to land, biodiversity, ecosystem services, water resources or air.	Minor community health, safety or security impacts (<10 households) or human rights infringements; inconvenience to livelihoods <6 months; moderate damage to <50 houses or community infrastructure; minor, reversible damage to structures, objects or places of regional cultural significance.	Adverse local public or media attention and complaints. Heightened scrutiny from regulator. Asset reputation is adversely affected with a small number of people.	Legal issue resolvable with minor consequences.	Between US$250,000 and US$2.5 million
1	Low level short term subjective symptoms or inconvenience. No medical treatment.	Low level impacts to land, biodiversity, ecosystem services, water resources or air.	Single low level community health, safety or security impact; low level inconvenience <2 weeks; minor, reversible low-level disturbance or minor damage to a single house or structure, object or place of regional cultural significance.	Public concern restricted to local complaints. Low level interest from local media or regulator.	Low level legal issue resolvable without legal proceedings or substantive third-party engagement.	<US$250,000

Table 19 Risk assessment of key domains within the Project Site

Domain	Risk	Typical adaptive control measures	Severity level	Likelihood	Residual risk after measure
Surface infrastructure	**Infrastructure** – damage to infrastructure if subsidence is beneath / close to infrastructure	**Avoid** – avoid locating infrastructure at end of panel sequence and / or remove infrastructure from the predicted subsidence impact area at end of panel sequence. **Avoid** – where practical, remove surface infrastructure prior to subsidence.	Level 3	Unlikely	Moderate
		Mitigate – clean up and remediate contamination, undertake contaminated land assessment and remediation/management where required post-mining.			
		Mitigate – ripping concrete with cover material suitable for revegetation.			
Mining impacted areas	**Landform** – surface cracking and erosion	**Mitigate –** implement Subsidence Management Plan to monitor and manage erosion and crack repair until free-draining landform stabilised.	Level 2	Likely	Moderate
		Mitigate – rock armouring where appropriate and vegetation planting to support stabilisation.			
	Landform rehabilitation – soils do not contain the right attributes to promote growth of vegetation in rehabilitation areas	**Avoid** – topsoil stripped and applied; where necessary, or assessed by an Appropriately Qualified Person, soil ameliorants (e.g. gypsum, compost, mulch) added to improve the physical and chemical properties of topsoil growing medium and subsoil. Where practical, cleared vegetation will be mulched and stockpiled for future use as soil ameliorants.	Level 2	Unlikely	Low
	Landform rehabilitation / surface water – erosion and sediment generation in rehabilitation areas	**Avoid** – minimise cleared areas, minimise soil exposure, divert runoff around disturbed areas.	Level 2	Possible	Moderate
		Mitigate – implementation of erosion control measures such as rock, gravelling, mulching, sediment fencing and erosion control blankets, in conjunction with regular visual inspection of rehabilitation areas to ensure success of implemented erosion control measures. Repair erosion areas.			
	Surface water – changes to the sediment transport regime (i.e. increased sediment accretion within the ponding areas and reduction in the amount of sediment being transported to the	**Avoid** – minor remedial drainage earthworks will be permanently retained using natural overland flow paths, to achieve stable free-draining landform.	Level 2	Possible	Moderate
		Avoid – bed stabilisation works such as the installation of rock armouring and/or reprofiling and revegetation of banks. Instream works will be timed to coincide with the commencement of the dry season.			
		Mitigate – divert runoff around disturbed areas; monitor infilling; if required, instream grading, channel re-profiling to avoid propagation downstream;			

Domain	Risk	Typical adaptive control measures	Severity level	Likelihood	Residual risk after measure
	downstream reaches until the ponding areas are filled with sediment) causing stream widening and erosion downstream.	install pile fields upstream of the watercourse ponding areas. Instream works will be timed to coincide with the commencement of the dry season.			
		Mitigate – where monitoring identifies instability or persistent long term ponding in subsided panels, stabilisation and drainage will be permanently retained in the post mining land use ensuring a free draining landform. These remedial drainage works can include reprofiling/contouring, rock armouring and revegetation of banks.			
	Surface water – reduction in the total volume of water flowing through the Project area/downstream due to it being stored within the ponding areas.	**Mitigate** – where monitoring identifies persistent long term ponding in subsided panels, remedial drainage works such as reprofiling/contouring, rock armouring and revegetation of banks will gravity-feed ponded water via natural overland flow channels back into catchment. Drainage will be permanently retained in the post-mining land use ensuring a free draining land form. Temporary ponding of overland flow is unlikely to result in adverse impacts due to the very small percentage of the Isaac River and Fitzroy River catchments that the Project area makes up.	Level 1	Possible	Low
		Mitigate – the instream watercourse ponding will naturally infill with sediment after flow events over time to mitigate this risk.			
	Surface water – watercourse bank erosion, incision, stream widening.	**Mitigate** – embankment armouring, installation of contour banks, installation of erosion controls matting in high energy areas, riparian vegetation planting. Instream works will be timed to coincide with the commencement of the dry season. In many cases it is advised to control this risk post-subsidence to ensure controls are suitably selected and designed for post-subsidence topography.	Level 2	Possible	Moderate
		Mitigate – installation of drop structures and head cut erosion features, revegetation, repair and stabilise head cut erosion and inflow locations for watercourses (i.e. rock chutes), amelioration or capping of dispersive material, bank stabilisation (e.g. rock armour or revegetation).			
	Surface water – salts in water stored in the ponding areas evapo-concentrated to the point that it is not suitable for stock water, or	**Avoid** – temporary ponded areas will be drained by reconfiguring drainage of longwall panels towards overland flow paths back into catchment ensuring no long term water stored in panels. Drainage will be permanently retained in the post-mining land use ensuring a free draining land form Temporary ponding of overland flow is unlikely to result in adverse impacts	Level 2	Possible	Moderate

Domain	Risk	Typical adaptive control measures	Severity level	Likelihood	Residual risk after measure
	will reduce downstream water quality if it overflows, or will contribute to land degradation if it seeps into the surrounding soils.	due to the very small percentage of the Isaac River and Fitzroy River catchments that the Project area makes up.			
		Mitigate – create temporary stock exclusion zones around ponding areas that are not suitable for stock watering, pumping of water into internal mine water system as required.			
	Groundwater – groundwater drawdown or seepage from surface	**Mitigate –** monitor change in groundwater level, flows and quality to identify decline for investigation and mitigation by 'make good' arrangements or other measures proposed in a TARP.	Level 2	Possible	Moderate
	Ecology – vegetation dieback or changes to vegetation community structure if existing vegetation cannot tolerate inundation caused by ponding.	**Avoid** – early detection of change in vegetation communities to identify unforeseen decline of vegetation condition or extent of canopy dieback for investigation and mitigation by other measures proposed in a TARP.	Level 3	Possible	High
		Mitigate – seeding and/or planting to restore native riparian vegetation. Focus on restoration of vegetation providing connectivity on the habitat corridor for key species.			
	Landform rehabilitation / ecology – vegetation establishment in rehabilitation areas is unsuccessful due to poor seed quality, ineffective seeding techniques, inappropriate vegetation species chosen for the type of rehabilitation and/or seasonal influences impacting vegetation growth	**Avoid** – appropriate seed mix will be selected based on the post mining land use and the final landform.	Level 2	Possible	Moderate
		Avoid – seeding rates will be based on the number of species per gram, factoring in viability information about each species if known (e.g. 90% mortality/non-viability).			
		Avoid – seed treatment methods such as osmo-priming, coating or other methods to break dormancy may be used.			
		Avoid – appropriate seeding methods will be selected and may include direct drill air seeding after ripping, and hydro seeding using a custom slurry.			
		Avoid – sowing as part of Operational phase Year 5-24 (refer to Section 5.0) will be timed to coincide with the commencement of the wet season.			
	Ecology – impacts to Endangered, Vulnerable and Near Threatened (EVNT) species such as Ornamental	**Mitigate** – establish, enhance or promote threatened species habitat by retaining coarse woody debris and stags as well as rehabilitating with plant species consistent with the existing vegetation communities where possible.	Level 2	Unlikely	Low

Domain	Risk	Typical adaptive control measures	Severity level	Likelihood	Residual risk after measure
	snake, Australian painted snipe, Squatter pigeon (southern), Greater glider, Grey falcon, Koala, Caspian tern, Fork-tailed swift, Latham's snipe, White-throated needletail.				
	Ecology – Aquatic fauna become stranded in the ponding areas, i.e. subsidence ponding limiting fish passage (most likely during low flow conditions).	**Mitigate –** where stranded fish are observed, fish will be captured via sluicing or using nets to be released into adjacent watercourses with equivalent water quality and temperatures. Noxious or invasive fish species removed as part of salvage will not be returned into the water.	Level 2	Unlikely	Low
	Ecology – vegetation mortality due to grazing pressure.	**Avoid** – exclusion of grazing as a post-mining land use in high risk areas and fencing ecologically sensitive or significant areas.	Level 2	Unlikely	Low
		Minimise – adjust grazing pressure to match pasture availability and productivity.			
		Mitigate – de-stock where there is evidence of overgrazing.			
	Ecology – low pasture yields due to changed hydrogeology results in inability to support livestock.	**Avoid** – exclusion of grazing in high risk areas.	Level 1	Unlikely	Low
		Minimise – adjust grazing pressure to match pasture availability and productivity.			
		Mitigate – de-stock where there is evidence of overgrazing.			
		Minimise – conduct early post subsidence inspection and identification of high risk areas. Maintain adequate riparian vegetation cover.			
	Ecology – increasing the populations of restricted weeds and feral animals, or introductions of prohibited weeds during the	**Avoid** – weed and feral animal management will occur in accordance with a site Weed and Feral Animal Management procedure which will focus on watercourses, hardstand areas, drill sites, along either side of haul roads and drill sites, and the incidental mine gas network footprint.	Level 1	Likely	Moderate
		Avoid – tube stock and seed suppliers will be accredited and source supplied is free from declared weed seed.			

Domain	Risk	Typical adaptive control measures	Severity level	Likelihood	Residual risk after measure
	construction, operational and rehabilitation phases.	**Avoid** – a vehicle wash-down will be completed before and after any vehicle is used for rehabilitation works or enters rehabilitation areas to avoid weed invasion.			
		Mitigate – chemical/mechanical treatments coupled with regular weed monitoring to ensure early detection of new weed species.			
		Mitigate – controlled hazard reduction burns may be used to manage weed growth.			
		Mitigate – if necessary, feral animal controls such as baiting and shooting may be undertaken to control the population of pests as required.			

Table 20 Preliminary Rehabilitation TARP

Domain	Risk	Trigger	Possible Action/Responses (identified as mitigation measures in Table 19)
Subsided riverine (i.e. formation of ponding areas within watercourses)	Changes to the sediment transport regime	Monitoring under the RMP/SMP indicates a reduction in the amount of sediment being transported downstream that is causing deepening of the downstream reaches and consequent stream widening.	Bed stabilisation works such as the installation of rock armour, pile fields and/or reprofiling and revegetation.
	Watercourse bank erosion, incision, stream widening	Monitoring under the RMP/SMP indicates that watercourse bank erosion, incision and/or stream widening is occurring as a result of subsidence.	Repair and stabilise head cut erosion and inflow locations for watercourses (i.e. rock chutes), post-subsidence. Revegetation. Amelioration or capping of dispersive material. Bank stabilisation (e.g. rock armour or revegetation).
Subsided non-riverine (i.e. formation of ponding areas within the land)	Recurring surface cracking that is not self-healing	Monitoring under the RMP/SMP identifies that surface cracking has occurred post-subsidence and is not self-healing.	Crack repair strategy.
	Erosion and sediment generation in rehabilitation areas	Monitoring under the RMP identifies that erosion and sediment generation is occurring in rehabilitation areas.	Implement suitable erosion and sedimentation control measures such as gravelling, mulching, sediment fencing and erosion control blankets.
	Erosion due to subsidence (i.e. concentration of overland flow)	Monitoring under the RMP/SMP indicates that erosion is occurring as a result of subsidence.	Stabilise and revegetate. Stabilise newly formed inflow locations, post-subsidence. Amelioration or capping of dispersive material.
	Evapoconcentration of salts in water stored within the ponding areas resulting in highly saline water quality for extended periods	Water balance modelling of the ponding areas predicts higher frequencies of highly saline water (compared to naturally occurring pools/dams). Multiple years of monitoring under the RMP/SMP indicates that water stored within the ponding areas is not suitable for stock water and/or is consistently higher than non-subsided pools or farm dams.	Pumping of water to internal mine water system as required. Based on the case-by-case assessments, installation of drainage of ponds only if assessed as necessary and if determined to incur less impacts than the free-draining scenario. Drainage will be permanently retained in the post-mining land use ensuring a free draining land form
	Vegetation dieback or changes to vegetation community	Monitoring under the RMP/SMP indicates that vegetation dieback or changes to vegetation	Based on the case-by-case assessments, installation of drainage of ponds only if assessed as necessary and if

Domain	Risk	Trigger	Possible Action/Responses (identified as mitigation measures in Table 19)
	structure as a result of subsidence ponding	community structure is occurring due to subsidence ponding.	determined to incur less impacts than the free-draining scenario. Drainage will be permanently retained in the post-mining land use ensuring a free draining land form Revegetate the ponding areas with species that are tolerant of inundation (if this does not occur naturally).
	Increase in the populations of restricted weeds and feral animals, or introduction of prohibited weeds	Monitoring under the RMP and/or Weed and Feral Animal Management procedure identifies populations of restricted weeds and feral animals.	Chemical/mechanical weed treatments. Consider the need for controlled hazard reduction burns to manage weed growth. Consider the need for feral animal controls such as baiting and shooting to control populations of feral animals.
	Damage or impact to infrastructure due to subsidence beneath / in close proximity to infrastructure	Predicted interaction due to mine plan overlay and existing infrastructure. Monitoring under the SMP indicates that subsidence has damaged/impacted infrastructure.	Assess strategy for infrastructure that will be impacted by subsidence prior to subsidence occurring as part of routine monitoring. Repair and/or relocate damaged infrastructure.
Surface infrastructure	Vegetation dieback or changes to vegetation community structure	Monitoring under the RMP indicates that vegetation dieback or changes to vegetation community structure has occurred.	Based on the case-by-case assessments to identify potential causes of dieback and develop adaptive management approach. May require more intensive monitoring (e.g. to confirm if change is common to the region using reference/analogue sites) or if known specific remediation activities (such as replanting or consideration of alternative species to be planted, weed management, fertilisers or reprofiling the land).
	Rehabilitation does not progress toward PMLU	Monitoring under the RMP indicates lack of progress towards completion criteria.	

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