



**BHP Mitsubishi Alliance**

# **Progressive Rehabilitation and Closure Plan**

## **Red Hill Mine**

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### **EA holder name**

BHP Coal Pty Ltd, Mitsubishi Development Pty Ltd, QCT MINING PTY. LTD., Umal Consolidated Pty Ltd, QCT INVESTMENT PTY. LTD., BHP Queensland Coal Investment Pty Ltd and QCT Resources Pty Limited

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## Glossary of terms and abbreviations

Key terms and abbreviations, and associated definitions used in this report are listed below.

| Term / Abbreviation     | Description                                                                                                                                                                                                                               |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3P grasses              | Perennial, productive and palatable (3P) grasses                                                                                                                                                                                          |
| Administering authority | Department of Environment, Tourism, Science and Innovation (Queensland)                                                                                                                                                                   |
| AEP                     | Annual exceedance probability                                                                                                                                                                                                             |
| AHD                     | Australian height datum                                                                                                                                                                                                                   |
| AQP                     | Appropriately qualified person                                                                                                                                                                                                            |
| ASC                     | Australian Soil Classification                                                                                                                                                                                                            |
| BBAC                    | Barada Barna Aboriginal Corporation                                                                                                                                                                                                       |
| BMA                     | BHP Mitsubishi Alliance                                                                                                                                                                                                                   |
| BOM                     | Bureau of Meteorology                                                                                                                                                                                                                     |
| BRM                     | Broadmeadow Mine                                                                                                                                                                                                                          |
| CEC                     | Cation exchange capacity                                                                                                                                                                                                                  |
| CHPP                    | Coal handling and preparation plant                                                                                                                                                                                                       |
| CSIRO                   | Commonwealth Scientific and Industrial Research Organisation (Australia)                                                                                                                                                                  |
| DES                     | Department of Environment and Science (Queensland)                                                                                                                                                                                        |
| DESI                    | Department of Environment, Science and Innovation (Queensland)                                                                                                                                                                            |
| DETSI                   | Department of the Environment, Tourism, Science and Innovation (Queensland) (the administering authority) (previously referred to as the Department of Environment, Science and Innovation and the Department of Environment and Science) |
| DLGP                    | Department of Local Government and Planning (Queensland)                                                                                                                                                                                  |
| DM                      | Dry matter (with reference to vegetation)                                                                                                                                                                                                 |
| DNRMMRRD                | Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (Queensland) (previously referred to as the Department of Resources)                                                                          |
| DoR                     | Department of Resources (Queensland)                                                                                                                                                                                                      |
| EA                      | Environmental Authority ( <i>Environmental Protection Act 1994</i> , Queensland)                                                                                                                                                          |
| EC                      | Electrical conductivity                                                                                                                                                                                                                   |
| EIS                     | Environmental Impact Statement                                                                                                                                                                                                            |



| Term / Abbreviation                  | Description                                                                                                                                         |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| EP Act                               | <i>Environmental Protection Act 1994</i> (Queensland)                                                                                               |
| EPP (Water and Wetland Biodiversity) | <i>Environmental Protection (Water and Wetland Biodiversity) Policy 2019</i> (Queensland)                                                           |
| ERA                                  | Environmentally relevant activities                                                                                                                 |
| ESA                                  | Environmentally sensitive areas                                                                                                                     |
| ESP                                  | Exchangeable sodium percentage                                                                                                                      |
| FCCM                                 | Fort Cooper Coal Measures                                                                                                                           |
| GDE                                  | Groundwater dependent ecosystem                                                                                                                     |
| GLS                                  | Goonyella lower seam                                                                                                                                |
| GMS                                  | Goonyella middle seam                                                                                                                               |
| GRM                                  | Goonyella Riverside Mine                                                                                                                            |
| GUS                                  | Goonyella upper seam                                                                                                                                |
| IA                                   | Improvement area<br>“...for a NUMA, means an area of land in the NUMA to which a management milestone for the NUMA relates” (PRCP Guideline, 2024)  |
| IDC                                  | Index of diversion condition                                                                                                                        |
| Interburden                          | Mineral (mining) waste located between mined coal seams                                                                                             |
| IRC                                  | Isaac Regional Council                                                                                                                              |
| LOD                                  | Land outcome document                                                                                                                               |
| LSA                                  | Land suitability assessment                                                                                                                         |
| MCM                                  | Moranbah Coal Measures                                                                                                                              |
| MERFP Act                            | <i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i> (Queensland)                                                                  |
| MIA                                  | Mine industrial area                                                                                                                                |
| Milestone criteria                   | “...for a management milestone or a rehabilitation milestone, means a requirement that must be met to achieve the milestone” (PRCP Guideline, 2024) |
| Mineral waste                        | Material comprising spoil, ± rejects, ± waste coal. Sometimes called ‘mine waste’ or ‘mining waste’                                                 |
| ML                                   | Mining lease                                                                                                                                        |
| NC Act                               | <i>Nature Conservation Act 1992</i> (Queensland)                                                                                                    |

| Term / Abbreviation | Description                                                                                                                                                                                                                                                                                    |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NUMA                | Non-use management area                                                                                                                                                                                                                                                                        |
| Overburden          | Mineral (mining) waste located above the top coal seams                                                                                                                                                                                                                                        |
| PMF                 | Probable maximum flood                                                                                                                                                                                                                                                                         |
| PMLU                | Post-mining land use<br><i>"...for land, means the purpose for which the land will be used after all environmentally relevant activities carried out on the land have ended" (section 112 of the Environmental Protection Act 1994) (PRCP Guideline, 2024)</i>                                 |
| PRCP                | Progressive rehabilitation and closure plan                                                                                                                                                                                                                                                    |
| PRCP Guideline      | Progressive rehabilitation and closure plan Guideline (September 2024) (DESI, Queensland)                                                                                                                                                                                                      |
| QA/QC               | Quality assurance and quality control                                                                                                                                                                                                                                                          |
| RA                  | Rehabilitation area<br><i>"... for a post-mine land use, means an area of land in the post-mine land use to which rehabilitation milestone for the post-mining use relates" (PRCP Guideline, 2023)</i>                                                                                         |
| RCM                 | Rangal Coal Measures                                                                                                                                                                                                                                                                           |
| RE                  | Regional ecosystem                                                                                                                                                                                                                                                                             |
| RHM                 | Red Hill Mine                                                                                                                                                                                                                                                                                  |
| Rejects             | Waste material produced during coal processing                                                                                                                                                                                                                                                 |
| Residual void       | An open pit resulting from the removal of ore and/or waste rock that will remain following the cessation of all mining activities and completion of rehabilitation processes, may include ramp voids                                                                                           |
| RM                  | Rehabilitation milestone<br><i>"...for the rehabilitated land, means each significant event or step necessary to rehabilitate the land to a stable condition (section 112 of the EP Act)" (PRCP Guideline, 2024)</i>                                                                           |
| RRR                 | Residual risk rating (with reference to the risk assessment)                                                                                                                                                                                                                                   |
| Spoil               | Rock material overlying and between 'target' coal seams, which is mined and placed in the spoil dumps (i.e. overburden and interburden)                                                                                                                                                        |
| SQP                 | Suitably qualified person (for performing a regulatory function)                                                                                                                                                                                                                               |
| Stable condition    | <i>"...defined in section 111A of the EP Act:<br/>Land is in a stable condition if -</i> <ul style="list-style-type: none"> <li><i>the land is safe and structurally stable, and</i></li> <li><i>there is no environmental harm being caused by anything on or in the land, and</i></li> </ul> |

| Term / Abbreviation | Description                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <ul style="list-style-type: none"> <li><i>the land can sustain a PMLU.</i>" (PRCP Guideline, 2024)</li> </ul>                                                                  |
| STAC                | Smart Transformation Advisory Council                                                                                                                                          |
| Transitional PRCP   | <i>"...the holder of an existing EA for an ineligible mining activity relating to a mining lease that is transitioning into the new PRCP framework"</i> (PRCP Guideline, 2024) |
| Underburden         | Mineral (mining) waste located beneath the GLS                                                                                                                                 |
| VM Act              | <i>Vegetation Management Act 1999</i> (Queensland)                                                                                                                             |
| WBNM                | Watershed Bounded Network Model                                                                                                                                                |

## INTRODUCTION

Red Hill Mine (RHM), owned by BHP Mitsubishi Alliance (BMA), is an approved underground metallurgical coal mine located in the Bowen Basin, Queensland.

This transitional Progressive Rehabilitation and Closure Plan (PRCP) has been prepared for RHM in accordance with the requirements of the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act). This PRCP has been developed to meet the requirements of the *Environmental Protection Act 1994* (EP Act) and the Progressive Rehabilitation and Closure Plan Guideline (PRCP Guideline) (DESI, 2024a).

Environmentally relevant activities (ERAs) at RHM include Schedule 3 13: Mining black coal, Ancillary 62 - Resource recovery and transfer facility operation, Ancillary 08 - Chemical storage 1 and Ancillary 63 - Sewage treatment 1. These are undertaken under the conditions of the site Environment Authority (EA) EPML03337715, provided in Appendix A.

**Environmental Authority Holder:** Umal Consolidated Pty Ltd, BHP COAL PTY LTD, QCT INVESTMENT PTY. LTD., MITSUBISHI DEVELOPMENT PTY LTD, QCT MINING PTY. LTD., QCT RESOURCES PTY LIMITED, BHP Queensland Coal Investments Pty Ltd

**Environmental Authority Number:** EPML03337715 (04 April 2025)

**Tenements:** ML1763 (part) and ML70421 (part)

As detailed in the PRCP Guideline, the main purposes of the PRCP are to (subject to transitional provisions):

- Require the holder of an EA to plan for how, where and when activities will be carried out on land in a way that maximises the progressive rehabilitation of the land to a stable condition (defined in section 111A of the EP Act)
- Provide for the condition to which the holder must rehabilitate the land before the EA may be surrendered

This PRCP comprises two parts:

- Section A: Rehabilitation planning part - provides information about the site, details the rehabilitation methodologies and techniques, and includes evidence and justification to support the development of the proposed PRCP schedule; and
- Section B: PRCP schedule - includes maps of rehabilitation and closure outcomes for the site, and tables of time-based rehabilitation milestones.

This PRCP also includes Section C: Appendices, providing specialist studies and technical assessments used to support the development of the PRCP.

## TRANSITIONAL PROVISIONS

Part 27, Chapter 13 of the EP Act sets out the transitional provisions following the commencement of the MERFP Act. In particular, BMA is a 'mining EA holder' for the purposes of the transitional provisions on the basis that, on commencement of the MERFP Act, BMA was "the holder of an environmental authority (EPML03337715) for a mining activity relating to a mining lease authorising operations" at RHM (section 750, EP Act).

The transitional provisions provide how an EA holder was to 'transition' into the PRCP regime. This was summarised, and additional guidance provided, within Section 6 of the PRCP Guideline, which states it applies to "existing EA holders who must transition into the new PRC Plan framework".

In accordance with the transitional provisions and requirements of Section 6 of the PRCP Guideline, BMA adhered to the following process to transition rehabilitation and closure outcomes from the RHM EA into the draft PRCP schedule:

1. Identifying rehabilitation and closure outcomes in the land outcome document (LOD) (EPML03337715)
2. Identifying post-mining land uses (PMLUs)

3. Identifying non-use management areas (NUMAs)
4. Defining rehabilitation areas (RAs) within the PMLU, or improvement areas (IAs) within the NUMA
5. Identifying milestones
6. Identifying milestone criteria
7. Identifying when the first rehabilitation milestone (RM) and management milestone (MM) must commence and completion dates for the milestones.

In accordance with transitional provisions (section 750, EP Act), the RHM EA (EPML03337715) is an approved LOD.

Acceptance criteria for rehabilitation requirements were included consistently across all BMA site EAs in 2018. Per BMA's understanding of the legislative intent, BMA has transitioned the relevant EA rehabilitation requirements and acceptance criteria into the RHM PRCP.

## Transitional timeline

The timeline of the key steps in the assessment process for this transitional PRCP includes:

- A Transition Notice for RHM was issued to BMA by the administering authority, dated 13 December 2021 (Appendix B). This Transition Notice required submission of the RHM PRCP by 13 December 2024.
- The Transition Notice was issued following a pre-notification meeting held between the administering authority and BMA, on 29 November 2021. This PRCP is based on the key aspects agreed on by the administering authority during this meeting, as documented in the memorandum *Progressive Rehabilitation and Closure Plan - Red Hill Mine (v2)*, provided in Appendix C.
- Prior to the PRCP submission, a pre-lodgement meeting between the administering authority and BMA was held on 25 November 2024. This was arranged to discuss the key content of the site's draft PRCP, aimed at identifying any notable gaps or refinements needing to be addressed prior to the final submission.
- The PRCP was submitted to the administering authority on 13 December 2024.
- An Information Request Notice was issued to BMA by the administering authority, dated 24 February 2025.
- The response to the Information Request Notice and revised PRCP (plan, schedule and appendices) were provided to the administering authority on 25 August 2025, and included the relevant PRCP schedule conditions and milestone criteria agreed during Saraji South Mine negotiations (August 2025).
- BMA received a Decision Notice on the PRCP schedule from the administering authority on 19 September 2025, approving the proposed PRCP schedule with conditions or amendments - the administering authority enforced additional erosion milestone criteria and the requirement to submit to the administering authority the design requirements for drainage structures.
- A final version of the transitional RHM PRC plan was submitted to the administering authority on 15 October 2025 to align with the approved PRCP schedule.

## KNOWLEDGE BASE REFINEMENT

Compilation of this PRCP has been supported by the rehabilitation and closure-related knowledge base for RHM at the time of submission of this PRCP (original submission 13 December 2024 with an update relating to the administering authority Information Request Notice submitted on 25 August 2025). Relevant studies contributing to this knowledge base have been referenced throughout this PRCP, with key resources provided in Section C: Appendices.

As highlighted by the International Council of Mining and Metals in the Integrated Mine Closure Good Practice Guide, 3rd Edition (ICMM, 2025), *"the collection, updating, use and review of the knowledge base is an ongoing and iterative process over the mine life, used to inform the closure planning process"*. ICMM also indicate *"gaps and uncertainties will be identified over the mining life cycle, with studies, research and trials undertaken as*

*needed to close knowledge gaps” and “the plans to address gaps and uncertainties over the life of the mine should be incorporated into the closure execution plan and used to inform closure planning and implementation.”*

The Australian Government state in their Leading Practice Sustainable Development Program for the Mining Industry Mine Rehabilitation handbook that *“at worst, initiating closure operations when the site has not developed the skills, equipment and necessary technical knowledge to successfully carry out a large rehabilitation program can result in very poor outcomes requiring very costly remediation, and with greatly reduced probability of successful closure”* (DIIS, 2016).

Internal BHP guidance states that the knowledge base is the foundation for all other steps in the closure management process and review of the knowledge base should enable gaps and uncertainties to be identified for defining forward work plans. Without a robust, relevant and fit for purpose knowledge base, decisions may be made without the right level of detail or erroneous information, resulting in sub-optimal closure outcomes, increased closure risk and destruction of asset value through increased cost and/or time for closure implementation.

As the rehabilitation and closure knowledge base for RHM develops, it will be used to inform ongoing refinement of the plans for rehabilitation and closure, as well as this PRCP as required.

# A: REHABILITATION PLANNING

## 1 PROJECT PLANNING

### **Legislative Requirement**

*In accordance with Section 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part of the PRC Plan must include a description of:*

- *each resource tenure, including the area of each tenure*
- *the relevant activities to which the application relates*
- *the likely duration of the relevant activities*
- *how and where the relevant activities are to be carried out, including maps.*

### **PRCP Guideline**

- *The following spatial information must be submitted as part of the PRC Plan:*
- *the location and maximum extent of disturbance footprint for the mine life*
- *the PMLUs and NUMAs for the area within the resource tenures*

*any sensitive receptors.*

*In addition to the list above, the PRC Plan must include spatial information outlining the rehabilitation and improvement areas that correspond to the proposed PRCP Schedule. The spatial information must show the locations of the rehabilitation and improvement areas for a 10-year period (minimum).*

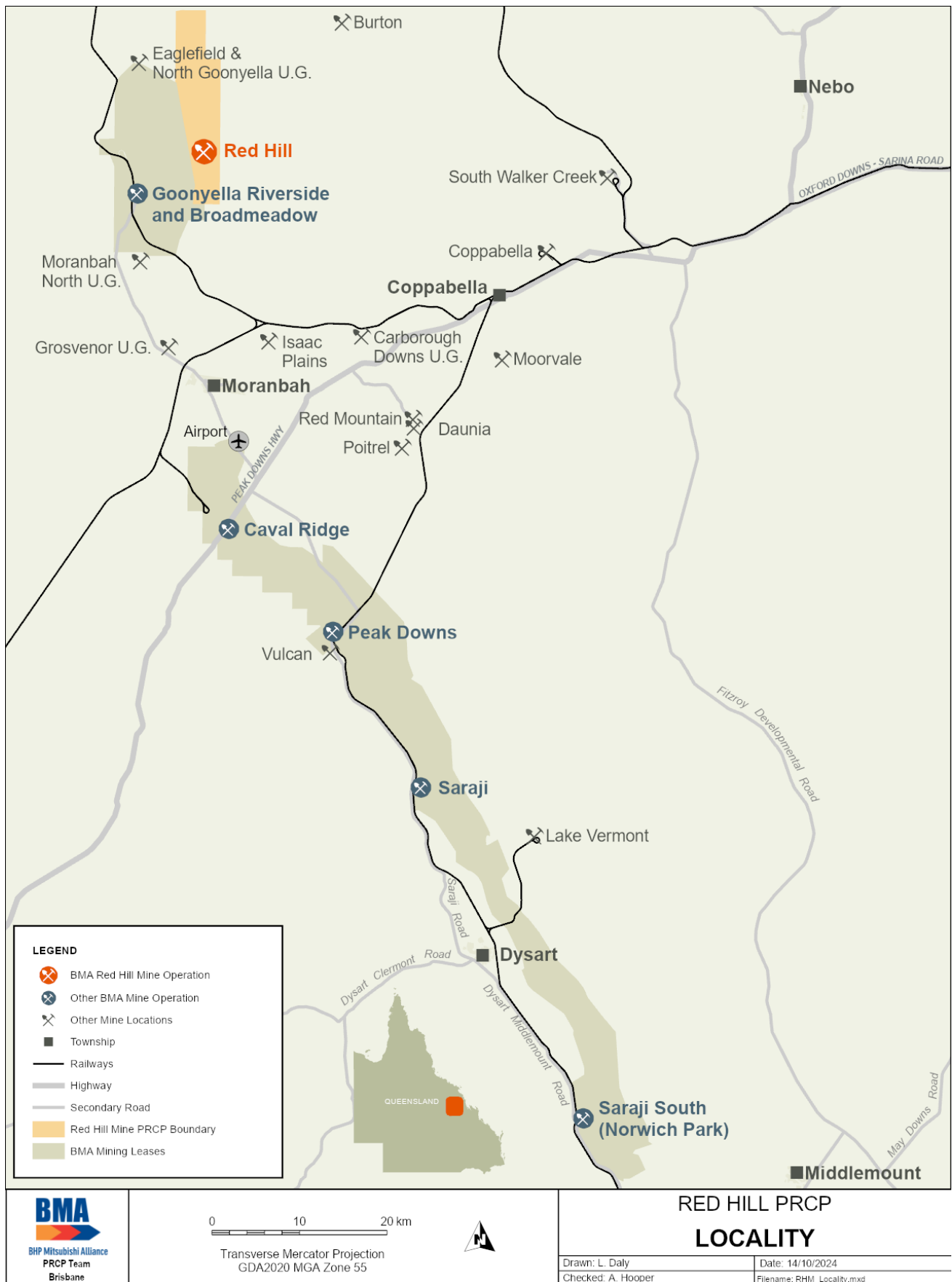
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*All spatial information must be prepared and submitted in accordance with the guideline 'Spatial Information Submission' (ESR/2018/4337).*

## 1.1 Project description

### 1.1.1 Geographic location

RHM is located approximately 20km north of the town of Moranbah in the Bowen Basin and approximately 135km south-west of Mackay (Queensland) (Figure 1). RHM is located adjacent and to the east of the existing open cut Goonyella Riverside Mine (GRM) and north of the underground Broadmeadow Mine (BRM).



**Figure 1: RHM location map**



### 1.1.2 Mining tenements

RHM EA includes the mining leases (MLs) listed in Table 1 and illustrated in Figure 2. The mining tenements associated with the RHM EA area cover 9,701 hectares (ha).

**Table 1: RHM mining tenements**

| Lease number   | Name      | Date granted      |
|----------------|-----------|-------------------|
| ML1763 (part)  | Goonyella | 30 September 1971 |
| ML70421 (part) | Red Hill  | 22 September 2016 |

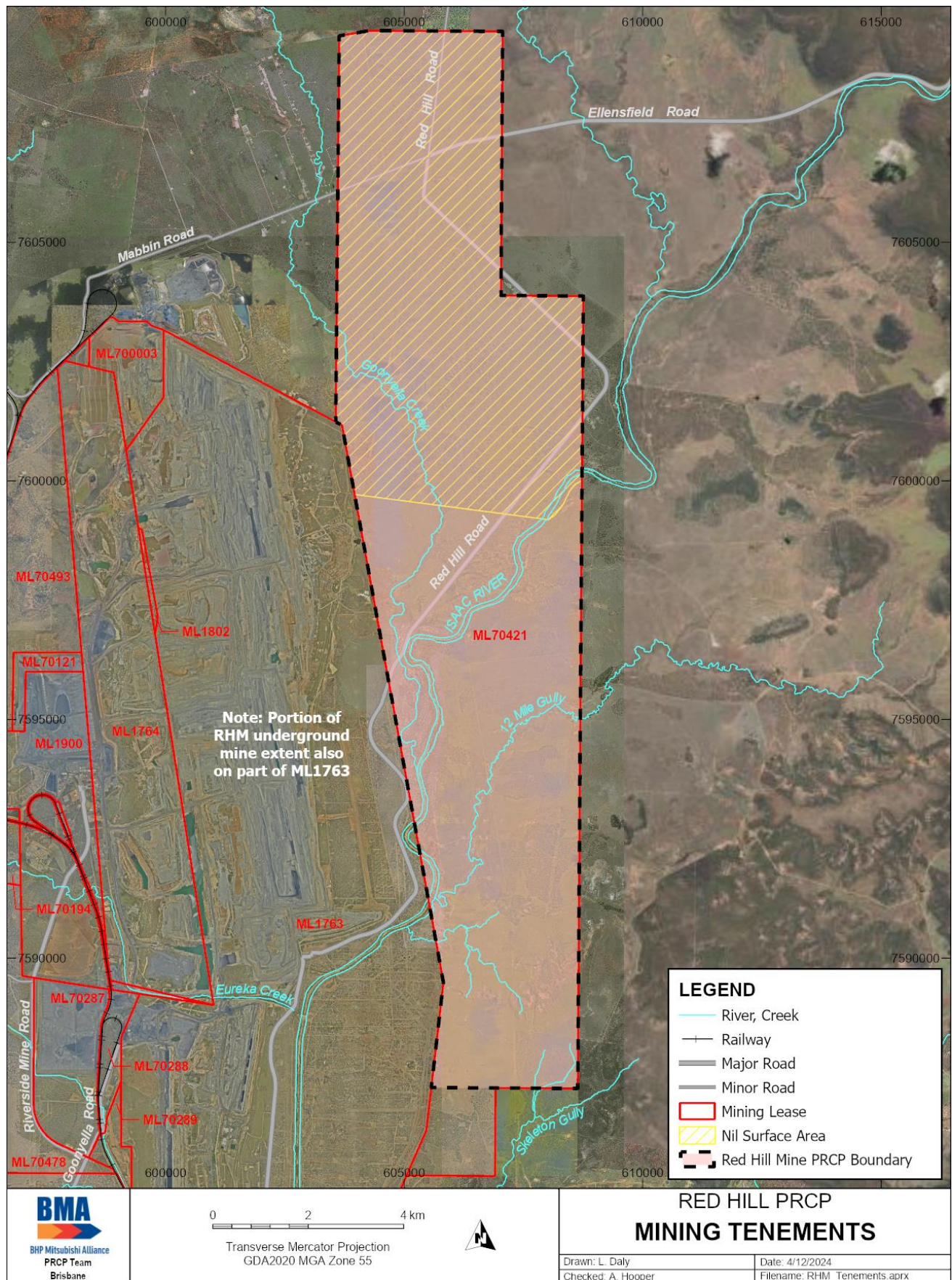
The RHM EA area overlaps with the GRM and BRM EA area. The EA overlap areas are detailed in the Red Hill Mining Lease environmental impact statement (EIS) (BMA, 2013a).

BMA is authorised to carry out activities under the RHM EA, including underground mining on both ML70421 and part of ML1763. Additional infrastructure to service RHM will be constructed on GRM and BRM. An extension to the BRM underground operation was also approved within the Red Hill EIS.

In respect of the correlation between the two PRCPs to prevent any overlap:

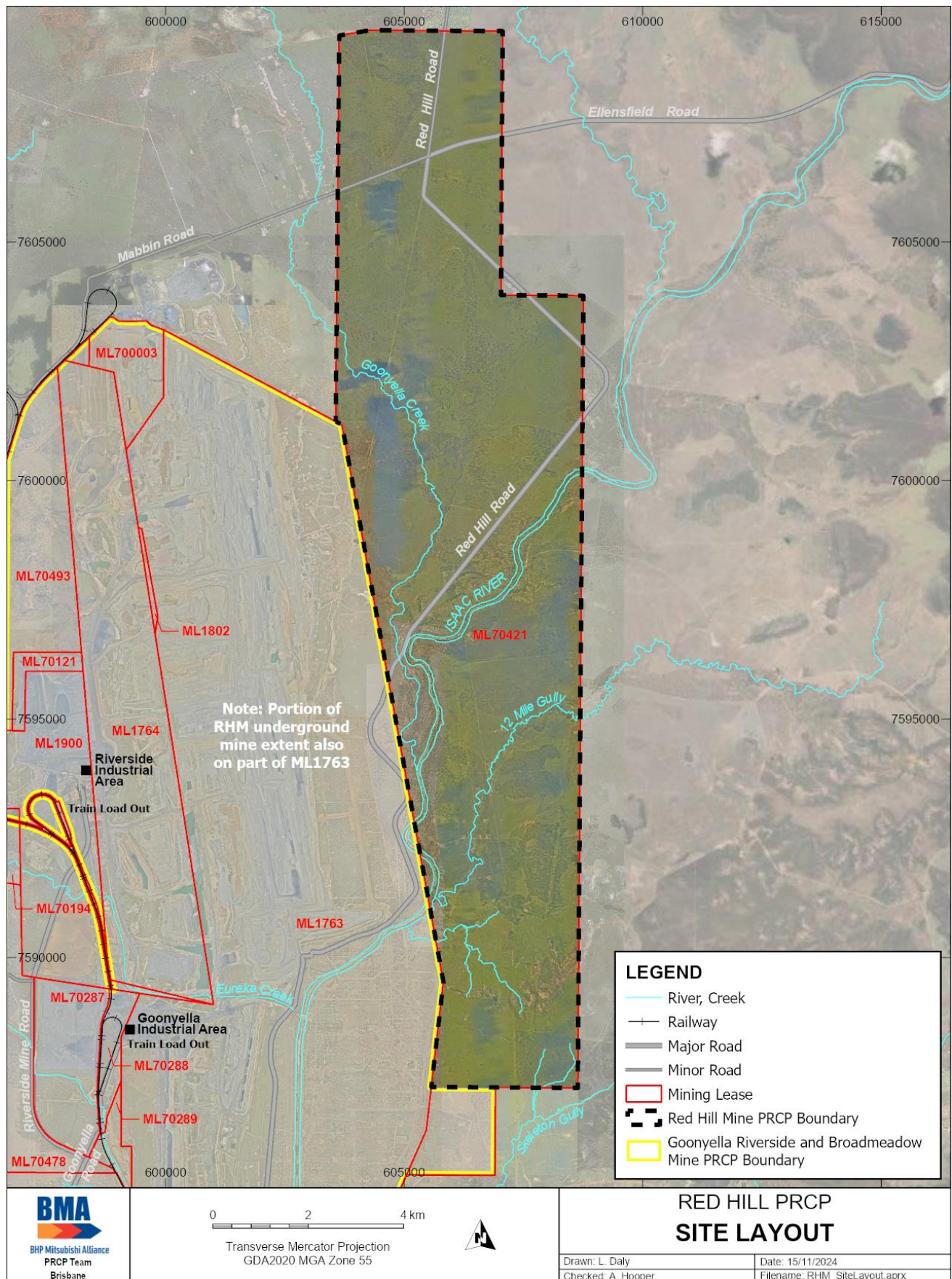
- The RHM PRCP covers the rehabilitation and closure of the area outlined as the 'Red Hill Mine PRCP Boundary', in Figure 3
- The GRM and BRM PRCP (submitted 29 November 2024) covers the rehabilitation and closure of the area outlined as the 'Goonyella Riverside and Broadmeadow Mine PRCP Boundary', in Figure 3

The RHM EA authorises exploration activities (seismic and drilling programs) in areas within the nil disturbance area shown in the EA and the nil surface area shown in Figure 2.



**Figure 2: RHM mining tenements**





**Figure 3: RHM site map**

### 1.1.3 Primary mine features and infrastructure on-site

RHM has not yet commenced development or operation. As detailed in the RHM EIS (BMA, 2013a), approved operations at RHM include:

- Underground longwall mining to the east of GRM
- An expansion of GRM to provide key infrastructure for RHM
- An extension of the adjacent BRM underground longwall panels

RHM will utilise existing infrastructure at GRM and BRM plus additional infrastructure will be installed on the GRM and BRM MLs to service RHM, including an additional coal handling and preparation plant (CHPP) and other associated processing infrastructure, conveyors, mine industrial area (MIA) and coal stockpiles. All water and waste will be transferred to GRM and BRM for management and tailings and rejects will be disposed of at GRM and BRM.

The RHM underground operation shown in the PRCP within ML1763, is reduced from the proposed layout in the EIS due to the GRM open cut operation extending further down-dip than planned at the time of the EIS. If the mine plan for the GRM open cut operation changes from the landform presented in the GRM and BRM PRCP, up to the full extent of the EIS approved footprint of the RHM underground operation may be mined. It is acknowledged that an amendment to either or both the RHM PRCP and GRM and BRM PRCP may be required to facilitate change in respect of planned operations.

The primary mine features and infrastructure approved within the RHM PRCP area are summarised in Table 2.

**Table 2: Primary mine features and infrastructure at RHM**

| Mine domain                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Underground mining and infrastructure | <ul style="list-style-type: none"> <li>• Subsidence areas</li> <li>• Ventilation shafts</li> <li>• Gas drainage bores and associated infrastructure</li> <li>• Longwall mining equipment</li> <li>• Service infrastructure</li> </ul>                                                                                                                                                                                                                                                                                      |
| Surface infrastructure                | <ul style="list-style-type: none"> <li>• Bridge across Isaac River</li> <li>• Accommodation village</li> <li>• MIA: <ul style="list-style-type: none"> <li>- Various buildings</li> <li>- Workshops</li> <li>- Fuel, oil, chemical, explosive and water storage</li> <li>- Fuel and wash bays</li> <li>- Sewage treatment plant</li> </ul> </li> <li>• Conveyors and transfer stations</li> <li>• Pipes and pumps</li> <li>• Power lines</li> <li>• Communications towers and lighting towers</li> <li>• Fences</li> </ul> |
| Stockpiles                            | <ul style="list-style-type: none"> <li>• Coal stockpiles</li> <li>• Topsoil stockpiles</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Mine domain                                    | Description                                                                                                                                                                                                                                                   |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dams                                           | <ul style="list-style-type: none"> <li>Mine dams</li> </ul>                                                                                                                                                                                                   |
| General disturbance                            | <ul style="list-style-type: none"> <li>Laydown areas</li> <li>Roads</li> <li>Drains and culverts</li> <li>Exploration</li> </ul>                                                                                                                              |
| Regional infrastructure (to remain at closure) | <ul style="list-style-type: none"> <li>Red Hill Road</li> <li>Mabbin Road</li> <li>Ellensfield Road</li> <li>Stock route U831</li> <li>Eungella water pipeline</li> <li>Middlemount water pipeline</li> <li>Third party powerlines and substations</li> </ul> |

#### 1.1.4 Type of mining operation

RHM is planned as an underground longwall mine using a thick seam mining technique, the same as BRM. The longwall panels will be accessed from the existing GRM voids or via drift access.

Prior to mining the longwall panels at RHM, a network of bores and associated surface infrastructure will be progressively installed over the underground mine footprint as mining advances for mine gas pre-drainage and management to enable the safe extraction of coal.

The longwall panels are accessed from the mine access via the main headings, which run roughly west-east. The main headings are a series of roadway tunnels for access, ventilation, machinery, electrical supply, communication systems, water, and compressed air lines. The longwall panels are orientated roughly north-south off the main headings. The EIS indicated further optimisation of the mine layout may occur (BMA, 2013a).

Mining of each longwall panel commences from the far extent of the longwall block, working back towards the main headings. The roof of the mined-out area collapses as mining progresses, which may result in subsidence on the surface.

The longwall continuous mining equipment includes:

- Self-advancing hydraulic powered roof supports which move with the shearer to support the roof
- Mechanised shearers to cut and remove the coal at the coal face
- Armoured face conveyors to remove the coal from the face and transfer it to the roadway to the surface

As the coal seam is up to 10m thick, it is too thick to be extracted using conventional longwall mining. The thick seam mining technique is therefore proposed for RHM to enable more coal to be extracted. The hydraulic roof support system can be raised and lowered, allowing coal above the area cut by the shearers to fracture and cave in behind the mining face as the hydraulic support is lowered, falling onto a rear armoured face conveyor to be extracted from the mine.

The coal is conveyed from the longwall face along the headings and then to the surface utilising a system of conveyors to raw coal stockpiles and then to the CHPP. RHM coal will predominately be processed at the proposed Red Hill CHPP located on GRM and BRM, but may also be processed at the existing GRM and BRM CHPPs.

Vertical shafts connect the mine workings to the surface to provide ventilation and emergency access to the surface if required.



### 1.1.5 Proposed duration of the operation

Current life-of-mine planning commences development of the RHM underground access in 2060, once open cut mining at GRM is complete. Mining of coal is planned to commence in 2063 and continues until 2091. Exploration activities are ongoing and will continue throughout the life of the operation.

Changes to GRM mine plans may bring forward the start of RHM. Variations to the planned mining rates due to business or market conditions, changes to technology, or refined resource information may also change the proposed duration or footprint of the operation. It is acknowledged that an amendment to either or both the RHM PRCP and GRM and BRM PRCP may be required to facilitate change in respect of planned operations.

## 1.2 Baseline information

### **PRCP Guideline (Section 3.1)**

*In addition to the legislative requirements, the following information about the site, where relevant, is considered necessary by the administering authority (as per section 126C(1)(j) of the EP Act) to decide whether to approve the PRCP Schedule:*

- site topography (locally and regionally)
- climate (general and specific (rain, evaporation, temperatures)) including long-term projections
- geological setting
- site hydrology and fluvial networks
- groundwater levels and properties
- soil types, properties, and productivity
- land stability (pre-existing land degradation/erosion and predisposition to ongoing stability issues)
- vegetation communities and ecological data (including existing regional ecosystem mapping)
- fauna presence and populations
- pre-mining land use
- identification of underlying landholders

*Transitional PRC Plans must include any baseline information collected as part of an EIS process or original EA application. If this information is unavailable, the reasons should be explained in this section of the rehabilitation planning part. Transitional PRC Plans are not required to demonstrate how aspects of the mine site have been designed for closure for existing or approved disturbance. However, any expansion to an existing site must demonstrate how it has been designed for closure. The rehabilitation/improvement planning must include data from when mining first commenced up until planned surrender. The transitional provisions of the EP Act include an exceptional circumstance for when land is available for rehabilitation.*

### 1.2.1 Site topography

The topography at RHM is relatively flat. The mine is located within a broad valley through which the Isaac River flows. The valley is defined to the west by the Denham Range and to the east by the Carborough Range. The southern end of the valley broadens out on to a wide flood plain. A low broad ridge to the north defines the northern part of the Isaac River catchment.

The topography of the Isaac River valley near RHM varies from approximately 250m Australian Height Datum (AHD) along the Isaac River to the east to approximately 450m AHD elevation along portions of the Denham Range that define the western edge of the valley. The relatively steep slopes associated with the Denham Range contrast with the extensive flat areas across the base of the river corridor, where gradients are generally less than 1:100.

### 1.2.2 Climate

RHM is located in a semi-arid climatic zone, which is characterised by high summer temperatures, warm dry winters and a distinct wet and dry season. Weather data was collected at the Moranbah Water Treatment Plant (Station No. 034038) between 1972 and 2012; and since 2012 it has been collected at the Moranbah Airport (Station No. 034035) (BOM, 2024).

### 1.2.2.1 Temperature

Maximum average temperatures range from 24°C in June/July to 35°C in December/January, with minimum average temperatures ranging from 9°C in July to 21°C in January.

### 1.2.2.2 Rainfall

Although rainfall occurs throughout the year, it is more prevalent in the summer months (Table 3).

**Table 3: Moranbah monthly average rainfall for station no. 034038 and station no. 034035**

| Month         | Station no. 034038 (mm) | Station no. 034035 (mm) |
|---------------|-------------------------|-------------------------|
| January       | 103.8                   | 103.1                   |
| February      | 100.7                   | 82.6                    |
| March         | 55.4                    | 76.8                    |
| April         | 36.4                    | 25.7                    |
| May           | 34.5                    | 30.6                    |
| June          | 22.1                    | 23.1                    |
| July          | 18.0                    | 35.9                    |
| August        | 25.0                    | 13.9                    |
| September     | 9.1                     | 13.3                    |
| October       | 35.7                    | 22.8                    |
| November      | 69.3                    | 66.3                    |
| December      | 103.9                   | 64.3                    |
| <b>Annual</b> | <b>614.2</b>            | <b>560.8</b>            |

### 1.2.2.3 Evaporation

The evaporation rate is highest in the summer months - mean daily rate of 8.5mm in December; and lowest in the cooler months - mean daily rate of 3.5mm in June. The annual average rate of potential evaporation is approximately 2,300mm, which greatly exceeds the annual rainfall, a characteristic of semi-arid environments.

### 1.2.2.4 Wind

Wind records for Moranbah for January - April show an easterly predominance of moderate strength (1 - 20km/h), with easterlies dominating in May - July with some south-easterly influence. Easterly winds predominate for August - December which tends north to north-easterly from October to December.

### 1.2.2.5 Long-term climate projections

To account for potential future climate uncertainties within hydrologic designs and mine water planning, this PRCP and supporting technical studies have utilised the *BMA Climate Change Adaptation in Mine Water Planning and Hydrologic Assessments Guideline* (BMA, 2023). This guideline was developed specifically for the locations of the BMA assets to provide a consistent approach to the adoption of future climate variables.

The approach and baseline data, on which the guideline was based, has been derived from Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology (BOM), Department of Environment, Tourism, Science and Innovation (DETSI) and other published sources and is aligned with the published projection database and methods including Consistent Climate Scenarios Projection Data and High-Resolution Projection Data.

### **1.2.3 Geological setting**

RHM is situated on the north-western margin of the Bowen Basin, on the Collinsville Shelf. The Bowen Basin in the area is characterised by a relatively thin accumulation of sediments, gentle easterly dips and minor deformation.

Locally, the Permo-Triassic sequence comprises, in ascending stratigraphic order: the upper part of the late Permian German Creek Formation of the marine influenced Back Creek Group; and the Moranbah Coal Measures (MCM), Fort Cooper Coal Measures (FCCM) and Rangal Coal Measures (RCM) of the late Permian Blackwater Group. All units of the Permo-Triassic sequence dip from west to east at between three and five degrees.

The RCM outcrop in the far eastern corner of ML70421. The FCCM contain thick, stone banded, poor quality coal seams which are not considered economic under current circumstances. These in turn overlie the MCM which include the target coal seam for mining at RHM. The MCM were deposited in a predominantly fluvial flood plain environment.

The lithology of the MCM is generally characterised by interbedded fine-grained lithic sandstone, siltstone, mudstone, claystone, and coal, which is uniform across the site. The MCM show regular grading of lithological sequences from sandstone to siltstone and mudstone to coal, then tending back to sandstone, typical of depositional flood plain/river systems.

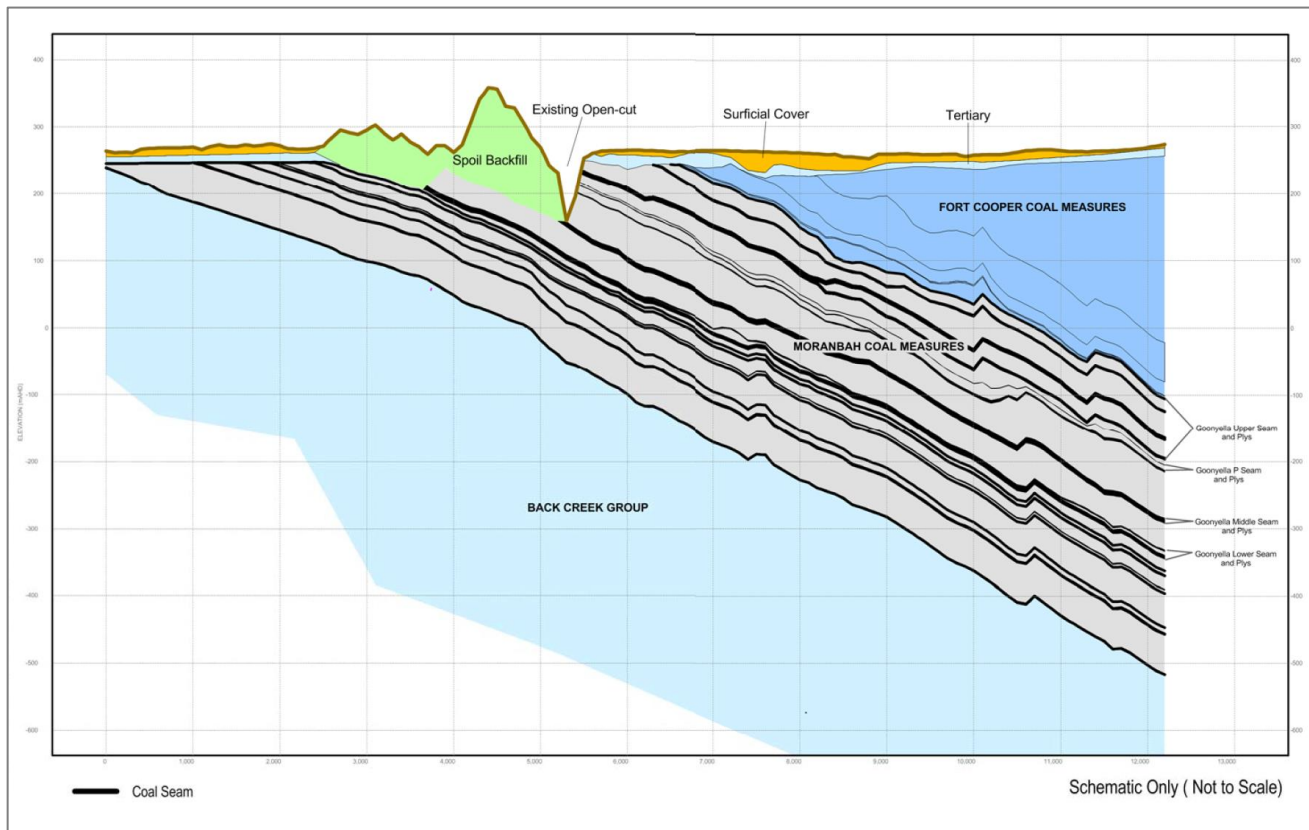
The MCM are characterised by several laterally persistent thick coal seams interspersed with several thin minor seams, which split and coalesce along strike and down-dip.

Coal occurs in four distinct horizons within RHM as shown in Figure 4:

- Goonyella upper seam (GUS)
- Goonyella P seam (GP1 and GP2 plies)
- Goonyella middle seam (GMS)
- Goonyella lower seam (GLS)

The GUS, GMS and GLS are mined at GRM to the west of RHM and BRM mines the GMS and GLS to the south. RHM will only target the GMS which yields high quality coking coal. The GMS is between 5 and 10.5m thick within the target mining.





**Figure 4: Geological cross section (BMA, 2013b)**

#### 1.2.4 Site hydrology and fluvial networks

RHM is located within the Isaac Connors Sub-basin which forms part of the Fitzroy Basin. The RHM EA area, lies across the Isaac Western Uplands Tributaries, Isaac and Lower Connors River Main Channel and Isaac Northern Tributaries Sub-catchments within the Upper Isaac River Catchment. The surface water environmental values for these sub-catchments are detailed in the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP (Water and Wetland Biodiversity)) Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all water of the Isaac River Sub-basin (including Connors River) (DEHP, 2011) and summarised in Table 4.

**Table 4: Surface water environmental values**

| Sub-catchment                              | Aquatic ecosystems | Irrigation | Farm supply/ use | Stock water | Aquaculture | Human consumer | Primary recreation | Visual recreation | Drinking water | Industrial use | Cultural and |
|--------------------------------------------|--------------------|------------|------------------|-------------|-------------|----------------|--------------------|-------------------|----------------|----------------|--------------|
| Isaac Western Upland Tributaries           | ✓                  | ✓          | ✓                | ✓           | ✓           | ✓              | ✓                  | ✓                 | ✓              | ✓              | ✓            |
| Isaac and Lower Connors River Main Channel | ✓                  | ✓          | ✓                | ✓           | -           | ✓              | ✓                  | ✓                 | ✓              | ✓              | ✓            |
| Isaac Northern Tributaries                 | ✓                  | ✓          | ✓                | ✓           | -           | ✓              | ✓                  | ✓                 | ✓              | ✓              | ✓            |

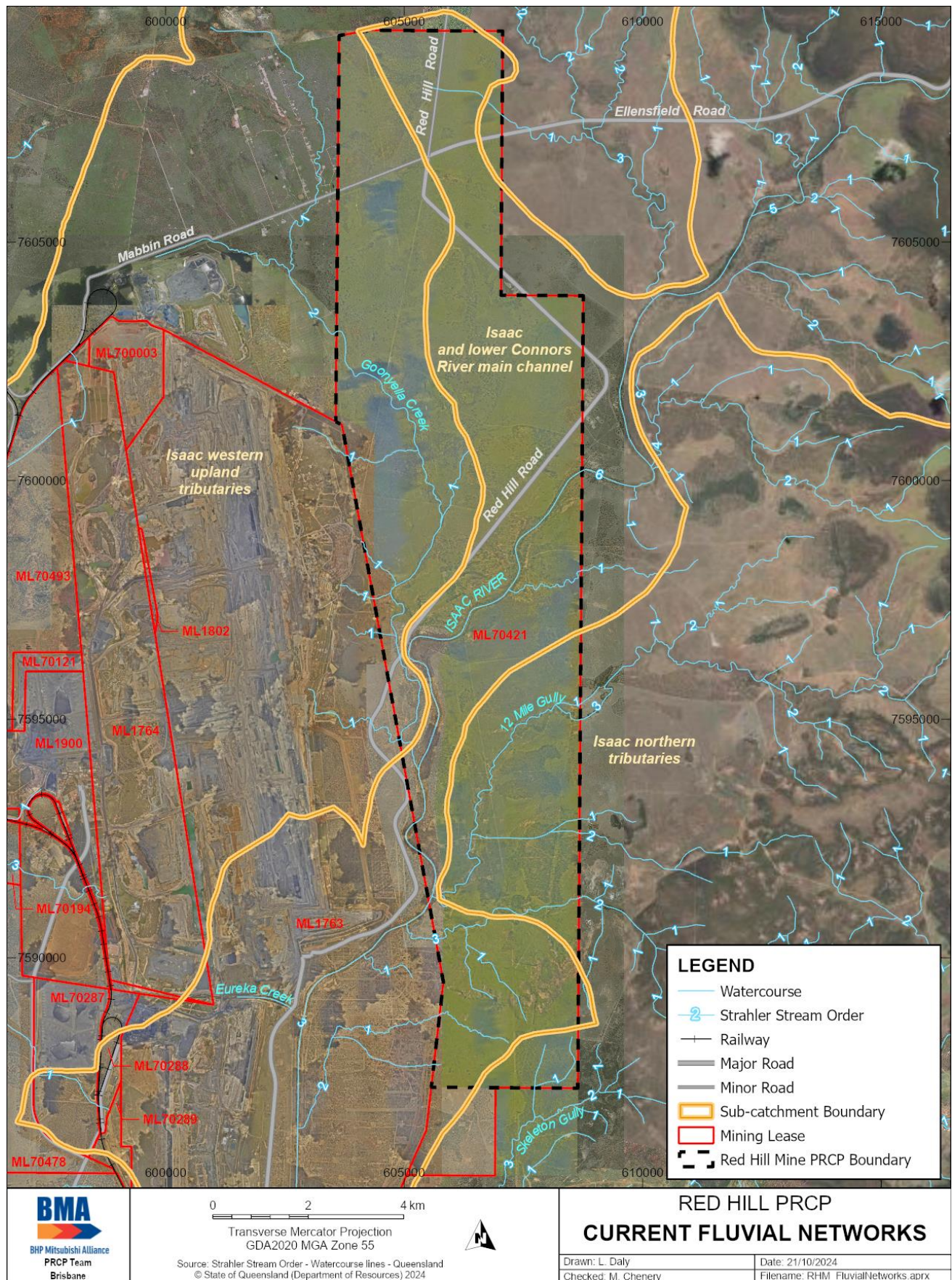
Several ephemeral watercourses, including Isaac River, Goonyella Creek and Twelve Mile Gully, and some minor unnamed surface water drainage lines are located within RHM. Minor agricultural type dams associated with the use of the property for grazing, not constructed by BMA, are located within the EA boundary. The watercourses within RHM are summarised in Table 5 and are shown in Figure 5.

There are currently no water licences within RHM for the taking of surface waters or diversion of watercourses.

**Table 5: Watercourses and key drainage lines within and immediately surrounding RHM**

| Watercourse                     | Perenniality | Hierarchy | Strahler stream order | Comment                                                                                                                                                                                                                           |
|---------------------------------|--------------|-----------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Isaac River                     | Intermittent | Major     | 6                     | The Isaac River is the dominant major watercourse in the catchment. The Isaac River flows through the site in a southerly direction and has its confluence with the Mackenzie River approximately 250km to the south of the mine. |
| Goonyella Creek and tributaries | Intermittent | Minor     | 1 - 2                 | The Goonyella Creek catchment includes the areas to the north and west of RHM, which includes disturbances from other mining operations. Confluence with the Isaac River is in the proximity of the planned underground workings. |
| Twelve Mile Gully               | Intermittent | Minor     | 1 – 3                 | Twelve Mile Gully runs in a south westerly direction across RHM draining into the Isaac River in the southern portion of ML70421.                                                                                                 |





**Figure 5: RHM fluvial network**

#### 1.2.4.1 Fluvial Water Quality

As operations at RHM have yet to commence, surface water monitoring data assessing upstream water quality specific to RHM is not available and the DETSI administered WaTERS database (August 2024) does not hold water quality data specific to RHM. Table 6 summaries the available water quality results for the sampling undertaken upstream of RHM for the EIS (URS, 2013).

**Table 6: Summary of upstream water quality results**

| Parameter                                      | Number of Samples | Average | Median | Q1 - 25th Percentile | Q3 - 75th Percentile | Minimum | Maximum |
|------------------------------------------------|-------------------|---------|--------|----------------------|----------------------|---------|---------|
| Aluminium (µg/L)                               | 45                | 11,334  | 8,500  | 3,900                | 15,000               | 100     | 46,000  |
| Ammonia as N (µg/L)                            | 44                | 55      | 20     | 5                    | 30                   | 5       | 1,460   |
| Arsenic (µg/L)                                 | 45                | 29.0    | 2.5    | 2.0                  | 2.5                  | 0.5     | 1200.0  |
| Beryllium (µg/L)                               | 1                 | 2.5     | 2.5    | 2.5                  | 2.5                  | 2.5     | 2.5     |
| Boron (µg/L)                                   | 45                | 54      | 50     | 30                   | 60                   | 25      | 125     |
| Cadmium (µg/L)                                 | 45                | 1.8     | 0.3    | 0.3                  | 0.3                  | 0.1     | 69.0    |
| Chromium (µg/L)                                | 45                | 165     | 15.0   | 11.0                 | 24.0                 | 0.3     | 6,600.0 |
| Copper (µg/L)                                  | 38                | 156     | 11     | 7                    | 13                   | 3       | 5,500   |
| Fluoride (µg/L)                                | 45                | 92      | 100    | 50                   | 100                  | 10      | 400     |
| Iron (µg/L)                                    | 45                | 13,358  | 11,000 | 6,500                | 16,000               | 90      | 59,000  |
| Lead (µg/L)                                    | 45                | 539.7   | 6.0    | 2.5                  | 8.0                  | 2.5     | 24,000  |
| Magnesium (µg/L)                               | 1                 | 407     | 407    | 407                  | 407                  | 407     | 407     |
| Manganese (µg/L)                               | 44                | 1,678   | 261    | 183                  | 359                  | 72      | 60,000  |
| Mercury (µg/L)                                 | 45                | 0.1     | 0.1    | 0.1                  | 0.1                  | 0.1     | 0.2     |
| Molybdenum (µg/L)                              | 45                | 7.4     | 2.5    | 2.5                  | 2.5                  | 2.5     | 210.0   |
| Nickel (µg/L)                                  | 45                | 199     | 15     | 10                   | 26                   | 3       | 8,100   |
| Nitrate as NO <sub>3</sub> (µg/L)              | 45                | 46      | 20     | 10                   | 40                   | 5       | 590     |
| Nitrite as NO <sub>2</sub> <sup>-</sup> (µg/L) | 4                 | 18      | 8      | 5                    | 20                   | 5       | 50      |
| pH (units)                                     | 45                | -       | -      | -                    | -                    | 5.4     | 9.1     |
| Selenium (µg/L)                                | 45                | 2.6     | 2.5    | 1.0                  | 2.5                  | 0.5     | 8.0     |
| Sulfate (mg/L)                                 | 45                | 3,091   | 2      | 1                    | 4                    | 1       | 55,000  |
| Zinc (µg/L)                                    | 45                | 472     | 24     | 18                   | 35                   | 3       | 20,000  |



| Parameter                                  | Number of Samples | Average | Median | Q1 - 25th Percentile | Q3 - 75th Percentile | Minimum | Maximum |
|--------------------------------------------|-------------------|---------|--------|----------------------|----------------------|---------|---------|
| Filterable Reactive Phosphate (FRP) (µg/L) | 7                 | 306.7   | 294.0  | 206.0                | 395.5                | 185.0   | 465.0   |
| Electrical Conductivity (µS/cm)            | 38                | 195     | 170    | 146                  | 210                  | 110     | 510     |
| Total Dissolved Solids (mg/L)              | 45                | 203     | 200    | 120                  | 260                  | 18      | 411     |
| Total Suspended Solids (mg/L)              | 45                | 446     | 340    | 250                  | 480                  | 31      | 1,800   |
| Turbidity (NTU)                            | 45                | 660     | 450    | 300                  | 770                  | 120     | 2,400   |
| Cobalt (µg/L)                              | 45                | 45      | 6      | 3                    | 8                    | 3       | 1,700   |
| Dissolved Aluminium (µg/L)                 | 38                | 1,714   | 405    | 163                  | 3,075                | 20      | 9,300   |
| Dissolved Arsenic (µg/L)                   | 38                | 0.6     | 0.5    | 0.5                  | 0.5                  | 0.5     | 1.0     |
| Dissolved Beryllium (µg/L)                 | 1                 | 2.5     | 2.5    | 2.5                  | 2.5                  | 2.5     | 2.5     |
| Dissolved Boron (µg/L)                     | 45                | 44      | 40     | 30                   | 50                   | 25      | 100     |
| Dissolved Cadmium (µg/L)                   | 38                | 0.1     | 0.1    | 0.1                  | 0.1                  | 0.1     | 0.1     |
| Dissolved Chromium (µg/L)                  | 45                | 1.2     | 0.5    | 0.5                  | 1.0                  | 0.5     | 8.0     |
| Dissolved Copper (µg/L)                    | 45                | 2.9     | 2.0    | 2.0                  | 3.0                  | 1.0     | 8.0     |
| Dissolved Iron (µg/L)                      | 45                | 788     | 260    | 100                  | 800                  | 25      | 5,300   |
| Dissolved Lead (µg/L)                      | 45                | 0.5     | 0.5    | 0.5                  | 0.5                  | 0.5     | 2.0     |
| Dissolved Manganese (µg/L)                 | 45                | 3.0     | 2.5    | 1.0                  | 5.0                  | 0.5     | 12.0    |
| Dissolved Mercury (µg/L)                   | 45                | 0.1     | 0.1    | 0.1                  | 0.1                  | 0.1     | 0.1     |
| Dissolved Molybdenum (µg/L)                | 45                | 1.4     | 0.5    | 0.5                  | 2.5                  | 0.5     | 7.0     |
| Dissolved Nickel (µg/L)                    | 45                | 2.2     | 2.0    | 2.0                  | 2.0                  | 0.5     | 7.0     |
| Dissolved Selenium (µg/L)                  | 45                | 2.0     | 2.5    | 1.0                  | 2.5                  | 0.5     | 5.0     |
| Dissolved Zinc (µg/L)                      | 45                | 3.3     | 2.5    | 2.5                  | 5.0                  | 0.5     | 6.0     |
| Chemical Oxygen Demand (mg/L)              | 38                | 34      | 32     | 26                   | 35                   | 3       | 100     |
| C6-C9 (µg/L)                               | 38                | 23      | 25     | 25                   | 25                   | 10      | 25      |
| C10-C14 (µg/L)                             | 38                | 109     | 25     | 25                   | 25                   | 25      | 3,200   |
| C15-C28 (µg/L)                             | 38                | 315     | 100    | 100                  | 100                  | 50      | 5,800   |

| Parameter                                | Number of Samples | Average | Median | Q1 - 25th Percentile | Q3 - 75th Percentile | Minimum | Maximum |
|------------------------------------------|-------------------|---------|--------|----------------------|----------------------|---------|---------|
| C29-C36 (µg/L)                           | 38                | 202     | 25     | 25                   | 60                   | 25      | 6,100   |
| BOD (lab) (mg/L)                         | 38                | 2       | 1      | 1                    | 2                    | 1       | 3       |
| C10 - C36 Fraction (sum) (µg/L)          | 31                | 656     | 100    | 70                   | 100                  | 50      | 15,000  |
| NO <sub>2</sub> + NO <sub>3</sub> (µg/L) | 2                 | 85      | 85     | 68                   | 103                  | 50      | 120     |
| Dissolved Cobalt (ug/L)                  | 38                | 0.5     | 0.5    | 0.5                  | 0.5                  | 0.5     | 0.5     |
| Total Silver (ug/L)                      | 38                | 3.4     | 0.3    | 0.3                  | 2.5                  | 0.3     | 75.0    |
| Dissolved Silver (ug/L)                  | 37                | 0.8     | 0.1    | 0.1                  | 2.5                  | 0.1     | 2.5     |
| Dissolved Uranium (ug/L)                 | 38                | 1.5     | 0.2    | 0.1                  | 0.2                  | 0.1     | 50.0    |
| Total Uranium (ug/L)                     | 38                | 2.0     | 0.5    | 0.3                  | 0.7                  | 0.3     | 50.0    |
| Dissolved Vanadium (ug/L)                | 38                | 3.7     | 2.5    | 2.5                  | 2.5                  | 2.5     | 12.0    |
| Total Vanadium (ug/L)                    | 38                | 294     | 27     | 19                   | 40                   | 5       | 10,000  |

The data collected to date has been collected as part of the RHM EIS and is summarised in the EIS's supporting technical documentation. Additional work is required to collect data that would support the development of site-specific values in line with the *Assessing and managing water quality in temporary waters - Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Smith, et al., 2020).

## 1.2.5 Hydrogeology

A hydrogeological assessment, including conceptual and numerical modelling, has been undertaken to support the development of this PRCP. The detailed report – *Transitional Progressive Rehabilitation and Closure Plan – Red Hill Mine - Hydrogeology Assessment* (AECOM, 2024) is provided in Appendix D. The groundwater numerical model domain for RHM includes the MLs forming RHM, GRM and BRM, in addition to surrounding areas where the operations could influence groundwater conditions. As the operations at GRM and BRM have an influence on groundwater conditions at RHM, the interpretation of the hydrogeological conditions presented within this PRCP collectively considers these neighbouring mining operations.

### 1.2.5.1 Groundwater environmental values

RHM is located within the Isaac Connors groundwater management area Zone 34 of the Fitzroy Basin. Within the groundwater management area, alluvial groundwater is managed as Groundwater Unit 1 and water within the hard rock aquifers as Groundwater Unit 2 (sub-artesian aquifers). The site is in the groundwater chemistry zone of 'sodic sequence', which is saline, sodium and chloride dominated (DEHP, 2011). Volumetric limits apply to extraction of groundwater within the groundwater management area for non-stock and domestic purposes.

Groundwater resources are also scheduled under the EPP (Water and Wetland Biodiversity) as Isaac Groundwaters of the Isaac River Sub-basin of the Fitzroy Basin water plan (WQ1310). Table 7 summarises the groundwater environmental values.



**Table 7: RHM groundwater environmental values**

| Groundwater zone   | Aquatic ecosystems | Irrigation | Farm supply/use | Stock water | Aquaculture | Human consumer | Primary recreation | Secondary Recreation | Visual recreation | Drinking water | Industrial use | Cultural and spiritual value |
|--------------------|--------------------|------------|-----------------|-------------|-------------|----------------|--------------------|----------------------|-------------------|----------------|----------------|------------------------------|
| Isaac Groundwaters | ✓                  | ✓          | ✓               | ✓           | -           | -              | ✓                  | -                    | -                 | ✓              | -              | ✓                            |

### 1.2.5.2 Hydrogeological units

Groundwater at RHM comprises the following key hydrogeological units:

- Quaternary alluvium – unconfined aquifer (sporadic discontinuous water-bearing strata of permeable unconsolidated irregular sequences of clay, silt, sand and/or gravel) localised along Eureka Creek, Goonyella Creek and regionally along the Isaac River where it is well developed
- Tertiary – including the Suttor Formation, Basalt and Duaringa Formation, which form an unconfined aquifer overlying Triassic and Permian units regionally
- Late Permian age coal measures – including the RCM, FCCM and MCM (Blackwater Group) consisting of:
  - Low permeability interburden units with aquitard properties
  - Coal seams that exhibit water bearing properties primarily associated with secondary porosity through cleats and fracturing
- Mid Permian – consisting of the Back Creek Group, which outcrops to the west of the site and underlies the Blackwater Group

The coal seams within the MCM are the primary aquifer at RHM. The coal seams can be characterised as semi-confined aquifers, with the upper, middle and lower coal seams forming the main hydrostratigraphic units locally. The MCM overburden and interburden act as aquitards and are typically dry, or very low yielding.

#### Quaternary alluvium

The Quaternary alluvial deposits unconformably overlie the Suttor Formation, Tertiary Basalt, and Rewan Formation. In the proximity of GRM and BRM the alluvial deposits predominantly occur in close proximity of the Isaac River (typically between 1 and 3km total width) and immediately surrounding floodplains. Along the Isaac River these deposits consist of clay, sandy clay, and sands and gravels with varying proportions of clay, to depths of up to 37m and typically between 15 and 35m. Investigations in the Isaac River alluvial deposits immediately to the south of the site indicated the thickness of bed sands in the Isaac River was 2 to 3m.

Hydrogeological investigations within the region indicated the permeability of the Isaac River alluvium ranged from 8.9 to 45.4m/day. The Quaternary flood deposits (riverbank sediments) are generally finer grained than the bed sands, with permeability values between 0.01 and 10m/day.

The Isaac River alluvium has limited effective storage, provides only limited volumes of baseflow, and does not contain permanent groundwater. More permanent groundwater resources may however occur in the deeper and relatively narrow parts of the Isaac River channel.

Due to the generally shallow saturated thickness and the lack of continuity of the more permeable gravel and sand sections, the Quaternary alluvium is not considered a significant aquifer in the proximity of RHM as it has limited sustainable yield. However, during periods of creek or river flow, the alluvium may become fully saturated and discharge to sub-cropping coal seams or other underlying aquifers. Drilling and monitoring on-site indicates that, where groundwater does occur, depth to groundwater in the Quaternary alluvium is approximately 3 to 13m below ground level. There is a marked separation between the measured alluvium groundwater levels and the piezometric levels associated with the deeper coal seam aquifers and thus it is unlikely that changes in groundwater levels in the coal would significantly impact on the alluvium hosted groundwater.

Regionally, groundwater flow within the alluvial aquifer is expected to follow topography and local drainage patterns.

Recharge of the alluvial aquifer, which is a porous media aquifer, is from surface water flow or flooding (losing streams), surface infiltration of direct rainfall and overland flow, where no substantial clay barriers occur in the shallow sub-surface. Available hydrologic data suggests that water infiltrates/drains to the base of the alluvium relatively quickly after rainfall events. This saturation is generally sporadic, producing semi-permanent, localised, relatively thin aquifers.

Groundwater discharge from the alluvium occurs through evapotranspiration from vegetation, short duration baseflow, and infiltration and recharge to the underlying older formations.

### **Tertiary Sutor Formation and Tertiary sediments**

The undifferentiated Tertiary sediments and Sutor Formation occurs extensively throughout the area, though outcrop is not always continuous; it is eroded in areas to expose the underlying Permian rocks, with parts of the Tertiary sequence concealed by younger alluvium and colluvium. The Tertiary sediments generally consist of lenses of paleochannel gravels and sands separated by sandy silts, sandy clays and clays. A review of the borehole logs showed the Tertiary sediments vary in thickness up to approximately 80m with a typical thickness of 15m.

Groundwater level in the Tertiary deposits has been found to be between 4 and 17m below ground level and exists within the more permeable sand and gravel Tertiary sediments. Depending on the location, the Tertiary aquifer is either unconfined to confined, with the degree of confinement determined by weathering, overlying alluvium and clay content. There is a distinction between the Tertiary and the coal measure groundwater levels, indicating a separation between the hydrostratigraphic units.

Recharge of the Tertiary aquifers primarily occurs through direct infiltration of rainfall and overland flow and through overlying Quaternary alluvial aquifers. Primary discharge mechanisms in the Tertiary sediment aquifers are through flow into adjacent or underlying aquifers; evapotranspiration; and groundwater extraction.

A review of bore logs within the RHM, GRM and BRM footprint showed that the Tertiary sediments are dominated by low permeability clays and sandy clays with isolated areas of loose more permeable sand. Within the proximity of the GRM Airstrip Pit, a hydraulic conductivity of  $6.6 \times 10^{-4}$  m/day was identified within the Tertiary sediments, indicating a predominantly clay lithology. Hydraulic conductivity within the sandstone/siltstone, sands and clays of the Tertiary Formation range between  $2 \times 10^{-7}$  to 24.6m/day (noting that 24.6m/day was significantly higher than other results for the unit).

Groundwater flow within the Tertiary sediments is limited due to the compartmentalisation associated with the variable clay contents and the discontinuous nature of the formation. Where groundwater flows occur, they are expected to be a subdued reflection of topography.

### **Permian Coal Measures**

Groundwater occurrence within the Permian coal measures is largely restricted to the low to moderately permeable coal seams that exhibit both primary porosity and the more dominant secondary porosity through fractures and cleats. The GLS, GMS and GUS coal seams represent the most extensive Permian aquifers at RHM.

Permian overburden and interburden are characterised by low vertical hydraulic conductivity and confine the coal seam aquifers both above and below. The confining units also have very low (leakance), limiting water flows into the aquifer (recharge). Other sediments in the overburden and interburden are relatively impermeable (either due to high clay content or significant cementing) and form aquitards. The overburden and interburden is hydrogeologically 'tight' and hence very low yielding to essentially dry claystone, mudstone, sandstone, siltstone and shale.

Evidence from piezometric observations for the coal seam aquifers suggests the groundwater levels were slightly different for each seam, with the GUS seam being 1 to 2m higher than the GMS seam, and the GLS seam being up to 14m lower than the GMS seam at the same location. This variation in hydraulic heads between coal seams confirms the aquitard nature of the interburden and the limited potential for induced flow.

As operations at the neighbouring GRM have a significant influence on groundwater levels at RHM and mining at GRM commenced prior to the earliest available groundwater data, a data derived piezometric surface cannot be produced. Prior to mining operations, groundwater flow direction in the coal seam aquifers is expected to have been from the north and west to the south and east across the site. This flow direction is consistent with recharge to the coal seams occurring at the subcrops to the west. The current groundwater flow pattern has been altered locally with groundwater flow towards the existing mine pits and underground workings at GRM, BRM and other surrounding mining operations, which are dewatered and depressurised.

The occurrence of groundwater in the interburden is limited. Aquifers in the interburden are discontinuous with heterogeneous hydraulic properties creating isolated, lens-like aquifers. Due to the heterogeneity and discontinuity of the interburden aquifers within the Permian strata, the groundwater flow direction cannot be determined on a regional scale for these units.

Groundwater recharge in the Permian-Triassic strata aquifers occurs from:

- Infiltration of rainfall and overland flow in outcrop and sub-crop areas
- Downward seepage or through flow from overlying or adjacent alluvial or tertiary aquifers where no significant clay barriers exist
- Leakage between aquifers by faulting and other structural discontinuities in overburden and interburden sediments
- Water storage/placement within mining voids or other workings

Primary discharge mechanisms in the Permian-Triassic strata aquifers include:

- Dewatering for mine progression
- Downgradient Permian-Triassic strata outcrop areas
- Through flow into adjacent (outcropping or sub-cropping coal seams) or seepage into underlying aquifers (via structural discontinuities)

Interpreted hydraulic conductivity values for the MCM indicate that the cleats and joints in the coal are less open with depth, with a corresponding decrease in permeability. The following ranges of hydraulic conductivity at the site have been identified:

- GUS: 0.02m/day (limited data, no range available)
- GMS: 0.009 to 0.1m/day
- GLS:  $7 \times 10^{-7}$  to 3m/day
- Interburden:  $9 \times 10^{-7}$  to  $9 \times 10^{-5}$ m/day
- Overburden:  $6 \times 10^{-4}$  to  $5 \times 10^{-2}$ m/day

### **1.2.5.3 Groundwater quality**

An assessment of groundwater quality for each of the hydrogeological units, based on the existing data held, was undertaken as part of the Hydrogeological Assessment (Appendix D). A summary of the currently known groundwater quality characteristics within each of the aquifers is provided below.

The groundwater data collection for RHM historically has been sporadic and undertaken for specific projects with different sampling methodologies and data quality objectives applied. Recent bore installation (2020) and monitoring programs have commenced, however the data is considered insufficient to provide statistical interpretations suitable to allow the development of site-specific milestone criteria.

#### **Quaternary alluvium**

The groundwater from the Quaternary alluvium is dominated by sodium and bicarbonate ions. Available data, which is also limited by the temporal nature of saturation, and sporadic lateral extent of the aquifer, also indicates the aquifer has variable salinity relating to depth of the aquifer and distance/time from recharge. Monitoring results from 2020 to 2024 indicate the alluvium hosted groundwater ranges from fresh to highly saline. Generally, the alluvial groundwater has lower salinity than the Tertiary and Permian formations.

Alluvium major ions and nutrient results from the 1998 to 2011 monitoring data indicated variability over time and between locations. The EPP (Water and Wetland Biodiversity) 50th percentile water quality objectives for shallow (<30m depth) groundwater were exceeded by the median results for: sodium and chloride, and by the maximum results for: sodium; calcium; chloride; bicarbonate; sulphate; and fluoride.

#### **Tertiary and Permian**

The Tertiary and Permian age formations have variable salinity, ranging from brackish to saline. The MCM and Back Creek Group has moderate to high salinity principally due to elevated levels of sodium and chloride ions.

The Back Creek Group groundwater contains a relatively higher proportion of sulphate due to marine influence during deposition compared to the MCM.

Permian major ions and nutrients results from the available monitoring data indicated variability over time and between locations. The EPP (Water and Wetland Biodiversity) 50th percentile water quality objectives for deep groundwater (>30m depth) are exceeded by the median and maximum results for: sodium; calcium; magnesium, chloride; bicarbonate; sulphate; and fluoride.

#### **1.2.5.4 Groundwater use**

Groundwater use in the area within and surrounding RHM is limited with land users predominantly utilising surface water dams and water supplied through reticulated infrastructure. Groundwater use is generally limited by groundwater quality restricting its beneficial use without prior treatment.

A search of the Department of Regional Development, Manufacturing and Water Groundwater Bore Database was carried out for registered bores within 5km of the RHM MLs. The search indicated there are 224 registered bores for the following uses:

- Groundwater monitoring – 190 bores
- Exploration – 20 bores
- Water supply – 8 bores
- Unknown – 6 bores

The Queensland Water Entitlement Database did not list any of the registered bores as having a water licence. BMA holds a water licence covering the EA area for the taking of underground water from the MCM for the purpose of dewatering (water licence authorisation #: 621847, expiry: 30/9/2037).

The BOM National Atlas of groundwater dependent ecosystems (GDEs) (GDE Atlas) (BOM, 2017) indicates moderate potential and high potential aquatic GDEs and moderate potential and low potential terrestrial GDEs being present within the RHM ML. A review of the mapping indicates the mapped potential aquatic GDEs in the areas surrounding RHM, other than the Isaac River, Goonyella Creek and Twelve Mile Creek, are dominated by anthropogenic infrastructure within the MLs including the tailing storage facilities, mine dams, in pit water storages, constructed drains and diversions, and not natural ecosystems. The groundwater monitoring in the proximity of the site indicates the alluvial groundwaters are temporal in nature and therefore likely to only support aquatic ecosystems after recharge resulting from periods of flooding. Terrestrial ecosystems within the riparian zones of the Isaac River and its tributaries are potentially facultative GDEs with deeper rooted species accessing the temporal groundwaters within the alluvial and colluvial deposits.

#### **1.2.5.5 Conceptual site model – extent of mining**

A hydrogeological conceptual site model representing the conceptual closure landform, at the last day of mining at RHM, is illustrated in Figure 6. This conceptual site model indicates the mining operations result in the following:

- Groundwater drawdown within the MCM, associated with dewatering/depressurisation of the RHM underground workings and on-going passive dewatering into the GRM residual voids
- Inwards hydraulic flow gradients towards the underground workings prior to flooding
- Flooding of the underground workings contributes to the recovery of groundwater in the proximity of the RHM underground workings and development of hydraulic gradients towards the Goonyella Pit residual void located immediately to the west
- Drawdown in the MCM at the end of mining is at, or close to, the maximum expected to occur as a result of RHM
- Little to no impact on surficial aquifers/GDEs, which are intermittently saturated, including the Isaac River alluvium
- Little to no impact on environmental receptors
- No impact on anthropogenic receptors, i.e. the water supply bores

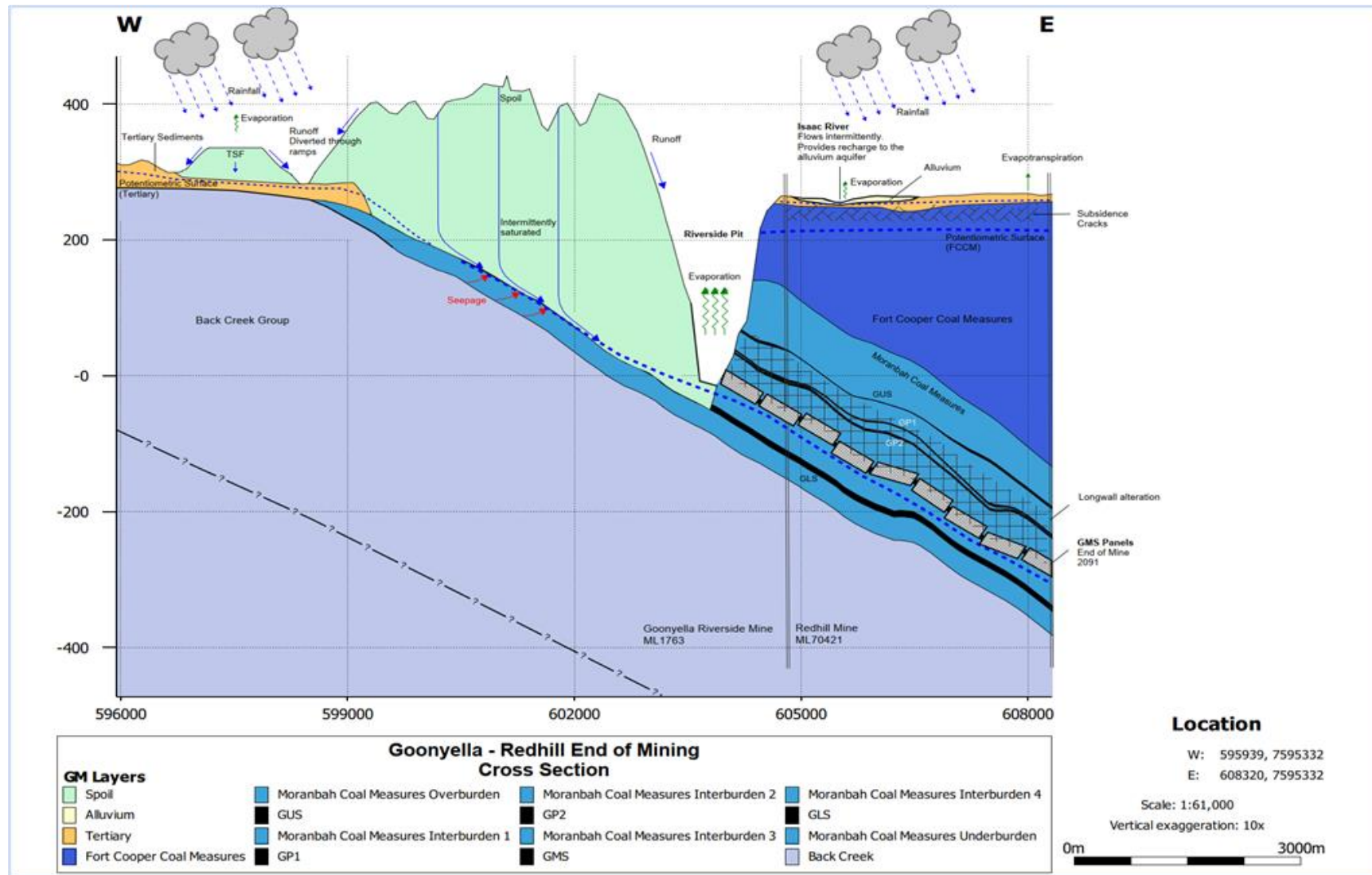


Figure 6: Conceptual site model of RHM at last day of mining (extent of mining) (AECOM, 2024)



### 1.2.6 Soil types, properties and productivity

A baseline soils assessment was completed by GSS Environmental as part of the RHM EIS. The detailed report – *Soil and Land Suitability Assessment, Red Hill Mining Lease, Environmental Impact Statement* (GSS Environmental, 2013) is provided in Appendix E. The key soils information from the report is summarised in this section.

A summary of the Australian Soil Classification (ASC), soil management group, description and grazing land suitability class for the soil types is provided in Table 8. Soil mapping, including area of each soil type according to the ASC, is shown in Figure 7.

The pre-mining grazing land suitability class of the soil types was assessed in the EIS. The assessment was in accordance with the *Guidelines for Agricultural Land Evaluation in Queensland* (DPI, 1990) classification system. This system allows for land to be allocated into five possible classes (with land suitability decreasing progressively from Class 1 to Class 5) which are derived from limitations that include soil type. The majority of site was assessed as grazing land suitability class 3, with the tenosol soils located within or on the immediate floodplains of the Isaac River assessed as class 4.

**Table 8: RHM baseline soil types**

| Soil Type # | ASC             | Soil management group | Description                                                                                                                                                                                                                                                                                                   | Grazing land suitability class |
|-------------|-----------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1           | Lithic Rudosol  | Clay topsoil          | Shallow rocky (skeletal) soils with a clay loam or clayey soil matrix associated with or underlain by shallow bedrock. Structurally stable with low potential for dispersion, and is generally of moderate salinity, strongly acidic                                                                          | 3                              |
| 2           | Tenosol         | Sand/loam topsoil     | Poor structure and loose sandy texture comprising deep (>1m) sand or silty sand grading to loamy or light clayey sand subsoils. Generally nondispersive, and has low levels of salinity, with a neutral pH. Located within Isaac River.                                                                       | 4                              |
| 3a          | Red Kandosol    | Sand/loam topsoil     | Sandy loam to loamy surface and medium to heavy clay subsoils. The topsoil is non-dispersive to moderately dispersive, mainly non-saline to slightly saline and varies from slightly acidic to mildly alkaline                                                                                                | 2                              |
| 3b          | Brown Kandosol  | Sand/loam topsoil     | Sandy loam to light clayey surface soils grading to light to medium or heavy clay subsoils. Slightly to moderately dispersive, non-saline and mainly neutral to slightly acidic                                                                                                                               | 2                              |
| 5           | Brown Chromosol | Sand/loam topsoil     | Sandy and loamy surface duplex soils, non-sodic to marginally sodic, non-saline sandy clay or medium to heavy clay subsoils. The topsoil is structurally stable with a low potential for dispersion. Most topsoil is non-saline although can be slightly saline and is slightly acidic to moderately alkaline | 2                              |

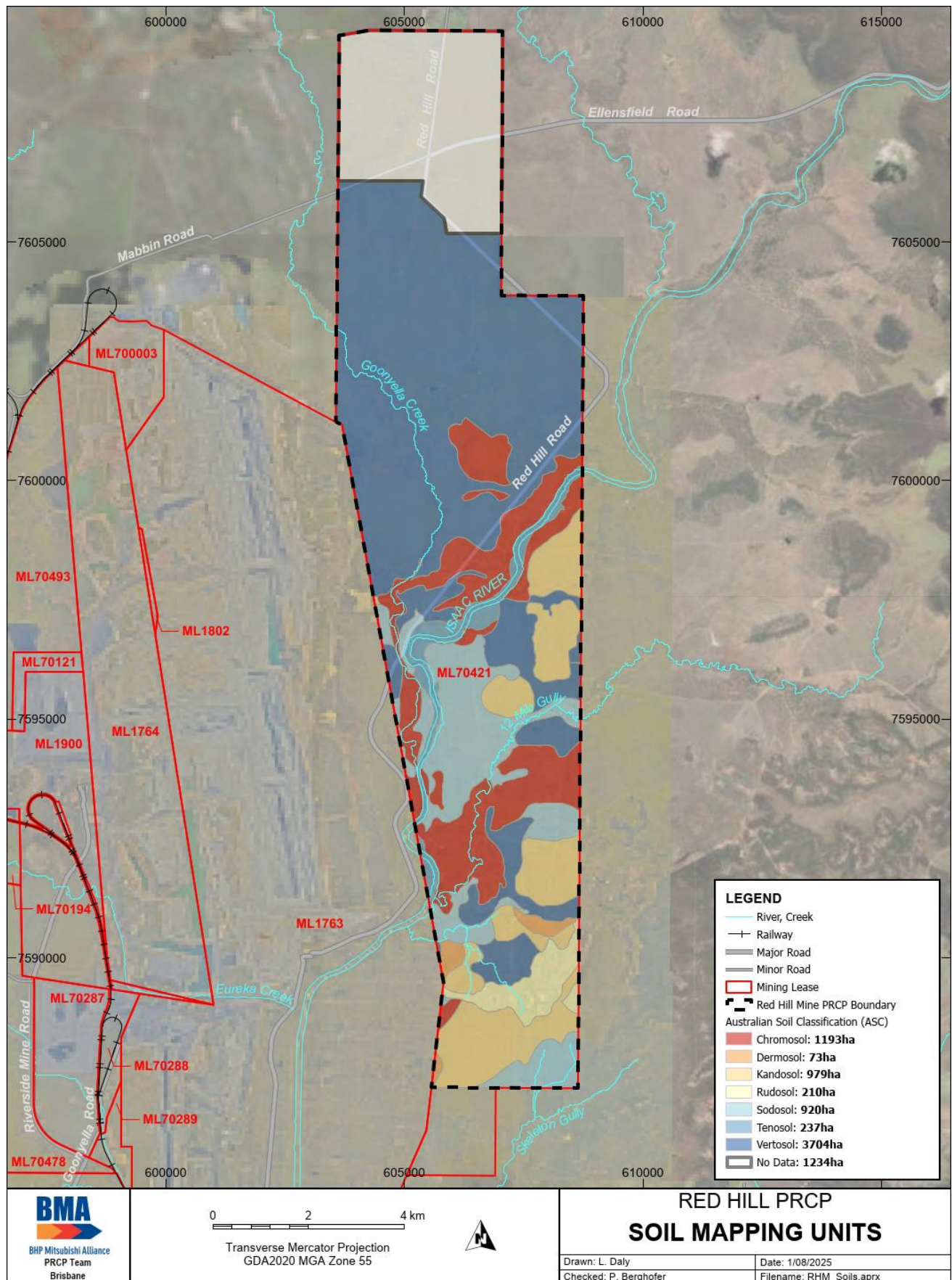
| Soil Type # | ASC                 | Soil management group | Description                                                                                                                                                                                                                                                                                                                                  | Grazing land suitability class |
|-------------|---------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 6           | Brown Sodosol       | Sand/loam topsoil     | Medium to deep hard-set thin loamy surface duplex soils, light medium to heavy clay deep subsoils. The topsoil is non-dispersive to moderately dispersive, is generally moderately saline, and the topsoil was generally neutral, or in some instances moderately acidic                                                                     | 3                              |
| 7           | Brown Dermosol      | Clay topsoil          | Hard-set or thin weak self-mulching clay loam to medium clay surface horizon. Non-dispersive to moderately dispersive, is non-saline and varied from slightly acidic to moderately alkaline, with occasionally high gravel content                                                                                                           | 3                              |
| 8a          | Shallow Vertosol    | Clay topsoil          | Cracking clay soils with a thin weak self-mulching surface soil over dark brown or brownish black sodic moderately saline heavy clay subsoils underlain by weathered rock. The topsoil is typically nondispersive, although occasionally has moderate dispersion ratings, is non-saline to slightly saline, and neutral to slightly alkaline | 3                              |
| 8b          | Deep Vertosol       | Clay topsoil          | Cracking clay soils with a thin weak self-mulching surface soil over dark brown or brown strongly structured mostly sodic heavy clay subsoils. The topsoil is mainly non-dispersive, occasionally moderately dispersive, varying from non-saline to moderately saline and is slightly acidic to slightly alkaline                            | 3                              |
| 8c          | Deep Salic Vertosol | Clay topsoil          | Cracking clay soils mostly with self-mulching surface soils, mainly non-dispersive, varies from non-saline to high saline and is moderately acidic to moderately alkaline. The subsoil is mainly non-dispersive                                                                                                                              | 3                              |

Table 9 summarises the chemical and physical parameters of the undisturbed soil management groups at RHM. Clay topsoils can be moderately alkaline in pH, have electrical conductivity (EC) which is non-saline and moderate cation exchange capacity (CEC). Sand/loam topsoils are slightly acidic to neutral in pH, have EC which is non-saline and a very low to moderate CEC.

Due to RHM being an underground mine there is minimal planned disturbance to soil. Topsoil stripping is only expected in the infrastructure areas (accommodation village, roads, gas drainage and general disturbance), or where required for exploration drilling, subsidence crack repairs and drainage works, as detailed in Section 6.1.4.

**Table 9: Summary of chemical and physical properties of undisturbed RHM soils**

| Analysis (unit)                          | Soil management group and ASC (and representative sites) |                                 |                          |                        |                                |                        |
|------------------------------------------|----------------------------------------------------------|---------------------------------|--------------------------|------------------------|--------------------------------|------------------------|
|                                          | Clay soils                                               | Sand/loam soils                 |                          |                        |                                |                        |
|                                          | Brown dermosol<br>(B21, C72)                             | Red kandosol<br>(B37, C68, C91) | Brown kandosol<br>(C104) | Brown kurosol<br>(A77) | Brown chromosol<br>(C82, C121) | Brown sodosol<br>(B40) |
| Depth (cm)                               | 0 - 10                                                   | 0 - 20                          | 0 – 15                   | 0 – 15                 | 0 – 15                         | 0 – 25                 |
| Soil pH                                  | 8.3                                                      | 6.3                             | 6.8                      | 7.2                    | 6.4                            | 7.0                    |
| Soil E <sub>ce</sub> (%)                 | 0.8                                                      | 0.3                             | 0.3 - 0.4                | 0.3                    | 0.5                            | 0.9                    |
| CEC (meq/100g)                           | 20.6                                                     | 4.5                             | 5.6 - 8.5                | 14.8                   | 1.8                            | 8.5                    |
| Exchangeable sodium percentage (ESP) (%) | 2                                                        | 4                               | 0                        | 9                      | 0                              | 0                      |
| Emerson Aggregate Test #                 | 2(3)                                                     | 3(2)                            | 3(1) - 5                 | 3(3)                   | 5                              | 5                      |



**Figure 7: RHM Soil Mapping Unit – ASC**

### 1.2.7 Land stability

The pre-mining topography at RHM is generally flat to undulating and is consistent with the regional landscape. RHM and non-mined land adjacent to GRM and BRM and within the Bowen Basin indicates surface erosion is common upon disturbance of soils and vegetation from cattle grazing and other land uses.

### 1.2.8 Vegetation communities and ecological data

Two main terrestrial ecological studies relating to vegetation communities and ecological values have been undertaken within the RHM site including:

- Red Hill Mining Lease Environmental Impact Statement – Section 09 Terrestrial Ecology (BMA, 2013e)
- Goonyella Riverside Mine, Broadmeadow Mine and Red Hill Mine Ecology Assessment (ELA, 2023)

The results of the ecological assessments and desktop searches of the following ecological databases have been used to determine the vegetation communities and ecological values of the RHM site, as well as the fauna presence and habitats as discussed in Section 1.2.9:

- Wildlife Online Database (DESI, 2024c)
- Regional ecosystem mapping (DESI, 2024d)
- Matters of State Environmental Significance mapping (MSES) (DESI, 2024e)
- Maps of environmentally sensitive areas (DESI, 2024f)

It is important to note that vegetation clearing and disturbance activities approved within the RHM site may have occurred since the ecological assessments.

#### 1.2.8.1 Regional ecosystems

Baseline regional ecosystem (RE) mapping for RHM is based on the results of ground-truthed vegetation surveys and mapping undertaken as part of the RHM EIS (BMA, 2013e), and results from the more recent ecology survey in the most northern part of RHM (ELA, 2023). Ground-truthed RE mapping for the site is shown in Figure 8 and listed in Table 10, along with their associated *Vegetation Management Act 1999* (VM Act) class and biodiversity status. The prevalent ground-truthed REs within RHM are RE 11.4.2, RE 11.4.9, RE 11.5.3, RE 11.5.9 and RE 11.8.11.

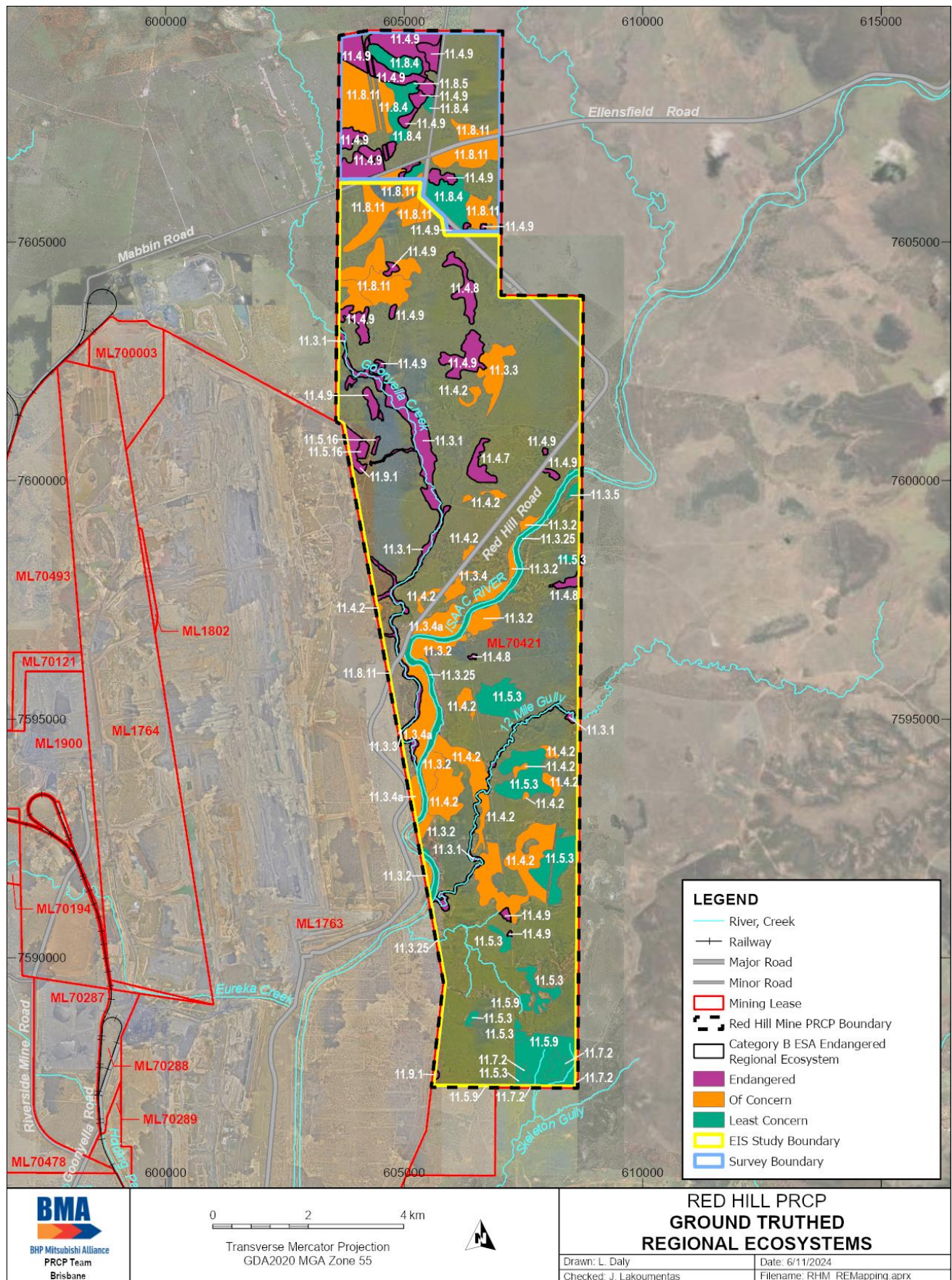
The majority of vegetation communities and REs within the RHM site have been disturbed or modified by grazing practices to some degree (BMA, 2013e). Despite historic clearing for cattle grazing, several remaining patches of remnant vegetation have been mapped across the RHM site.

**Table 10: Ground-truthed regional ecosystems within RHM**

| RE descriptions                                                                            | RE Code | VM Act class  | Biodiversity status |
|--------------------------------------------------------------------------------------------|---------|---------------|---------------------|
| <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains  | 11.3.1  | Endangered    | Endangered          |
| <i>Eucalyptus populnea</i> woodland on alluvial plains                                     | 11.3.2  | Of concern    | Of concern          |
| <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines | 11.3.25 | Least concern | Of concern          |
| <i>Eucalyptus coolabah</i> woodland on alluvial plains                                     | 11.3.3  | Of concern    | Of concern          |
| <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains   | 11.3.4  | Of concern    | Of concern          |



| RE descriptions                                                                                                                                        | RE Code | VM Act class  | Biodiversity status   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------|-----------------------|
| <i>Corymbia tessellaris</i> woodland                                                                                                                   | 11.3.4a | Of concern    | Of concern            |
| <i>Acacia cambagei</i> low woodland on alluvial plains                                                                                                 | 11.3.5  | Least concern | Of concern            |
| <i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. grassy or shrubby woodland on Cainozoic clay plains                                                 | 11.4.2  | Of concern    | Of concern            |
| <i>Eucalyptus populnea</i> with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on Cainozoic clay plains            | 11.4.7  | Endangered    | Endangered            |
| <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains                | 11.4.8  | Endangered    | Endangered            |
| <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains                                                   | 11.4.9  | Endangered    | Endangered            |
| <i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces | 11.5.3  | Least concern | No concern at present |
| <i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces           | 11.5.9  | Least concern | No concern at present |
| <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest in depressions on Cainozoic sand plains and remnant surfaces                    | 11.5.16 | Endangered    | Endangered            |
| <i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone                                                                       | 11.7.2  | Least concern | No concern at present |
| <i>Eucalyptus melanophloia</i> woodland to open woodland on Cainozoic igneous rocks                                                                    | 11.8.4  | Least concern | No concern at present |
| <i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks                                                                                 | 11.8.5  | Least concern | No concern at present |
| <i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks                                                                                       | 11.8.11 | Of concern    | Of concern            |
| <i>Acacia harpophylla</i> - <i>Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks                                     | 11.9.1  | Endangered    | Endangered            |



**Figure 8: RHM ground-truthed regional ecosystems**



### 1.2.8.2 Environmentally sensitive areas

Category B environmentally sensitive areas (ESAs) are defined under Schedule 19 of the *Environmental Protection Regulation 2019* to include Endangered REs based on the biodiversity status in the 'Regional ecosystem description database' (Queensland Herbarium, 2024).

The following REs with a current Endangered biodiversity status were ground-truthed on RHM site in association with Category B ESAs (BMA, 2013e; ELA, 2023) (Figure 8):

- RE 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains
- RE 11.4.7 *Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on Cainozoic clay plains
- RE 11.4.8 *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains
- RE 11.4.9 *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains
- RE 11.5.16 *Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains and remnant surfaces
- RE 11.9.1 *Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks.

### 1.2.8.3 State significant flora species

Two state significant flora species under the *Nature Conservation Act 1992* (NC Act) have been recorded and are known to occur on RHM based on the results of previous ecological surveys:

- *Cerbera dumicola* (Near threatened NC Act) (BMA, 2013e)
- King blue grass (*Dichanthium queenslandicum*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)

*Cerbera dumicola* was recorded at a single location in the east of the RHM site during the EIS, where it was identified within non-remnant vegetation (BMA, 2013e). King blue grass was recorded in the natural grassland vegetation community in north of the RHM site within RE 11.8.11 (BMA, 2013e; ELA, 2023) (Figure 8.)

## 1.2.9 Fauna presence and populations

### 1.2.9.1 State significant fauna species

The following threatened fauna species under the NC Act are known to occur on RHM based on the results of the previous ecological surveys:

- Koala (*Phascolarctos cinereus*) (Endangered NC Act) (BMA, 2013e; ELA, 2023)
- Ornamental snake (*Denisonia maculata*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)
- Squatter pigeon (*Geophaps scripta scripta*) (Vulnerable NC Act) (BMA, 2013e; ELA, 2023)
- Greater glider (*Petauroides volans*) (Endangered NC Act) (ELA, 2023)
- Australian painted snipe (*Rostratula australis*) (Endangered NC Act) (ELA, 2023)
- Short-beaked echidna (*Tachyglossus aculeatus*) (Special least concern NC Act) (BMA, 2013e; ELA, 2023)

Fauna habitat mapping of koala, ornamental snake (Figure 9) and squatter pigeon (Figure 10) is based on the RHM EIS data (where available) (BMA, 2013e), to align with the EA authorised impacts, and the ELA (2023) survey in the northern part of RHM. Habitat mapping of central greater glider and Australian painted snipe (Figure 11) is based on the ELA (2023) survey results.

The koala was recorded within poplar box (*Eucalyptus populnea*) woodland in the mid-west of the RHM site (BMA, 2013e). Suitable habitat associated with poplar box woodlands and red gum (*E. camaldulensis*) riparian woodlands exists for this species (BMA, 2013e). The Isaac River contains large tracts of eucalypt woodlands

(RE 11.3.25) providing habitat connectivity values for the koala. Habitat for the koala on RHM has been mapped in Figure 9.

The ornamental snake was recorded on the east of the RHM site during the EIS (BMA, 2013e). Habitat for the ornamental snake has been mapped in Figure 9 in association with areas with gilgai depressions and cracking clays (typically RE 11.4.8 and RE 11.4.9), as well as creek lines which provide habitat connectivity and species mobility between a highly fragmented landscape (BMA, 2013e).

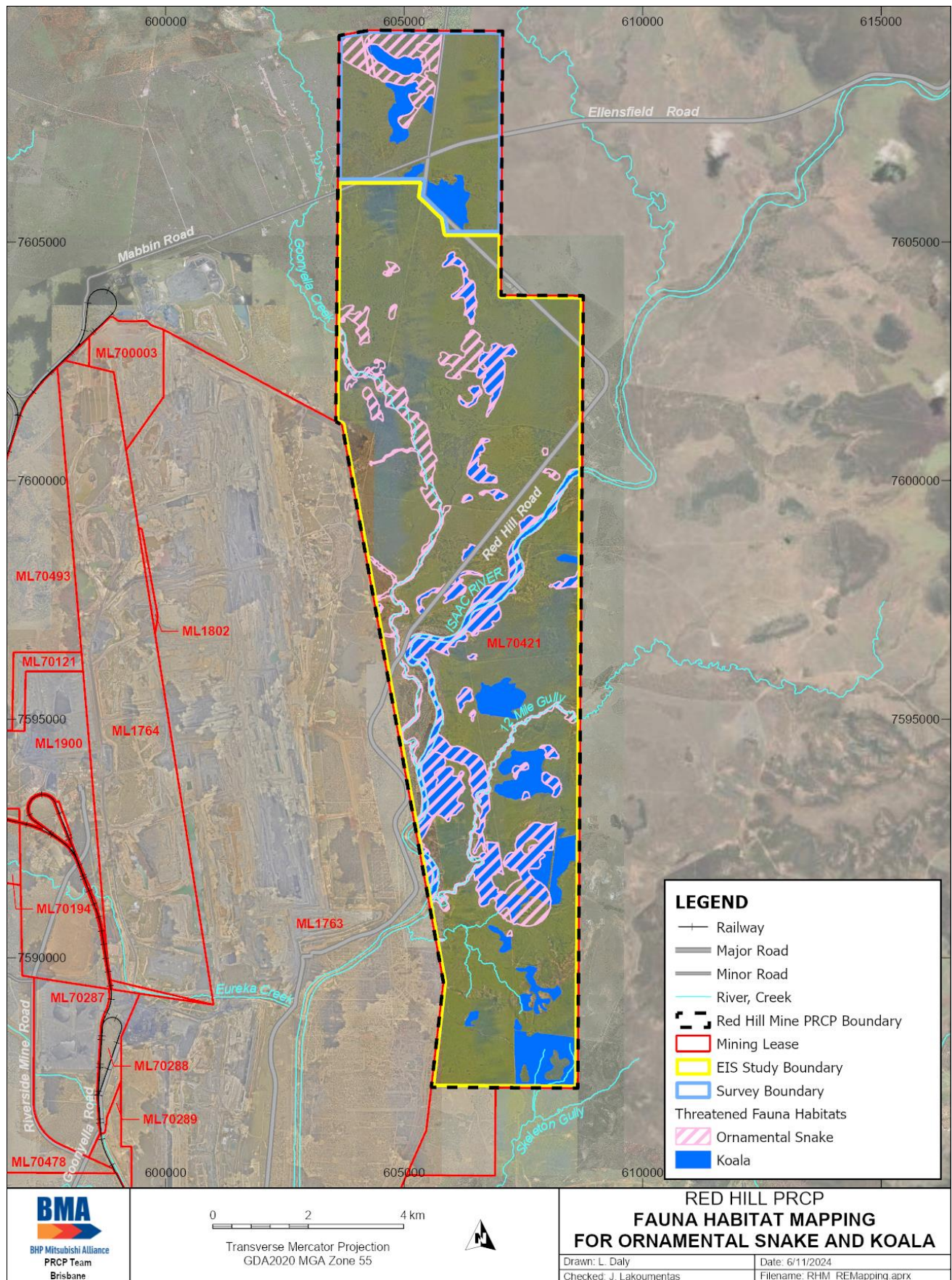
Multiple squatter pigeon have been observed on the RHM site during ecological surveys (BMA, 2013e; ELA, 2023). Squatter pigeon are ground-dwelling birds, predominantly foraging on seeds from grasses and tend to inhabit the grassy understorey of eucalypt woodlands and open grass areas including regrowth and modified areas, such as paddocks (ELA, 2023). The squatter pigeon requires access to permanent waterbodies for drinking, either natural or man-made, as long as there is bare ground at the water's edge. Squatter pigeon habitat has been mapped on RHM in association with remnant and regrowth eucalypt dominated REs within 1km of suitable water sources, including larger watercourses and waterbodies that hold pools of water for extended periods (ELA, 2023) (Figure 10).

The greater glider has been recorded within *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines associated with RE 11.3.25 (ELA, 2023). The greater glider habitat predominantly consists of *Eucalyptus* spp. forests and woodlands fringing riparian corridors and flood plains, with hollow bearing trees associated with the Isaac River (ELA, 2023) (Figure 11).

There have been no direct observations of the Australian painted snipe during surveys at RHM (ELA, 2023). However, the species was identified as known to occur as there have been several records within 50km of the site, including one undated historical record located within RHM on the floodplains of the Isaac River (ELA, 2023). This highly mobile species occurs within terrestrial shallow wetlands, ephemeral or permanent, with shallow muddy edges. This species may temporarily utilise habitat within the RHM site, which includes palustrine wetlands and flooded gulgais (under certain climatic conditions) (ELA, 2023) (Figure 11).

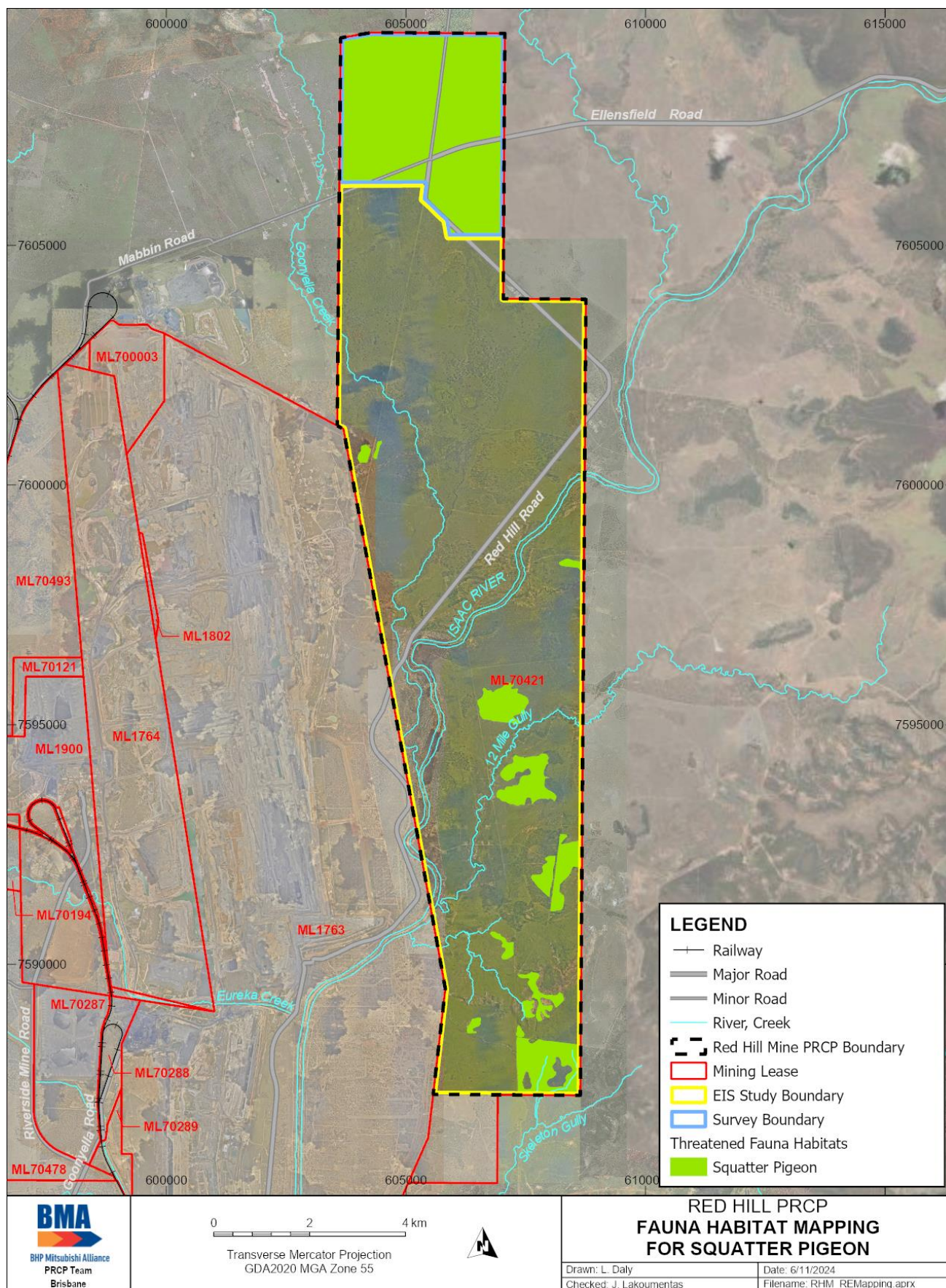
The short-beaked echidna has been recorded on RHM site during ecological surveys (BMA, 2013e; ELA, 2023). This species occurs in a wide range of habitats and is likely to occupy remnant and regrowth habitats within the site (BMA, 2013b) (Figure 8).





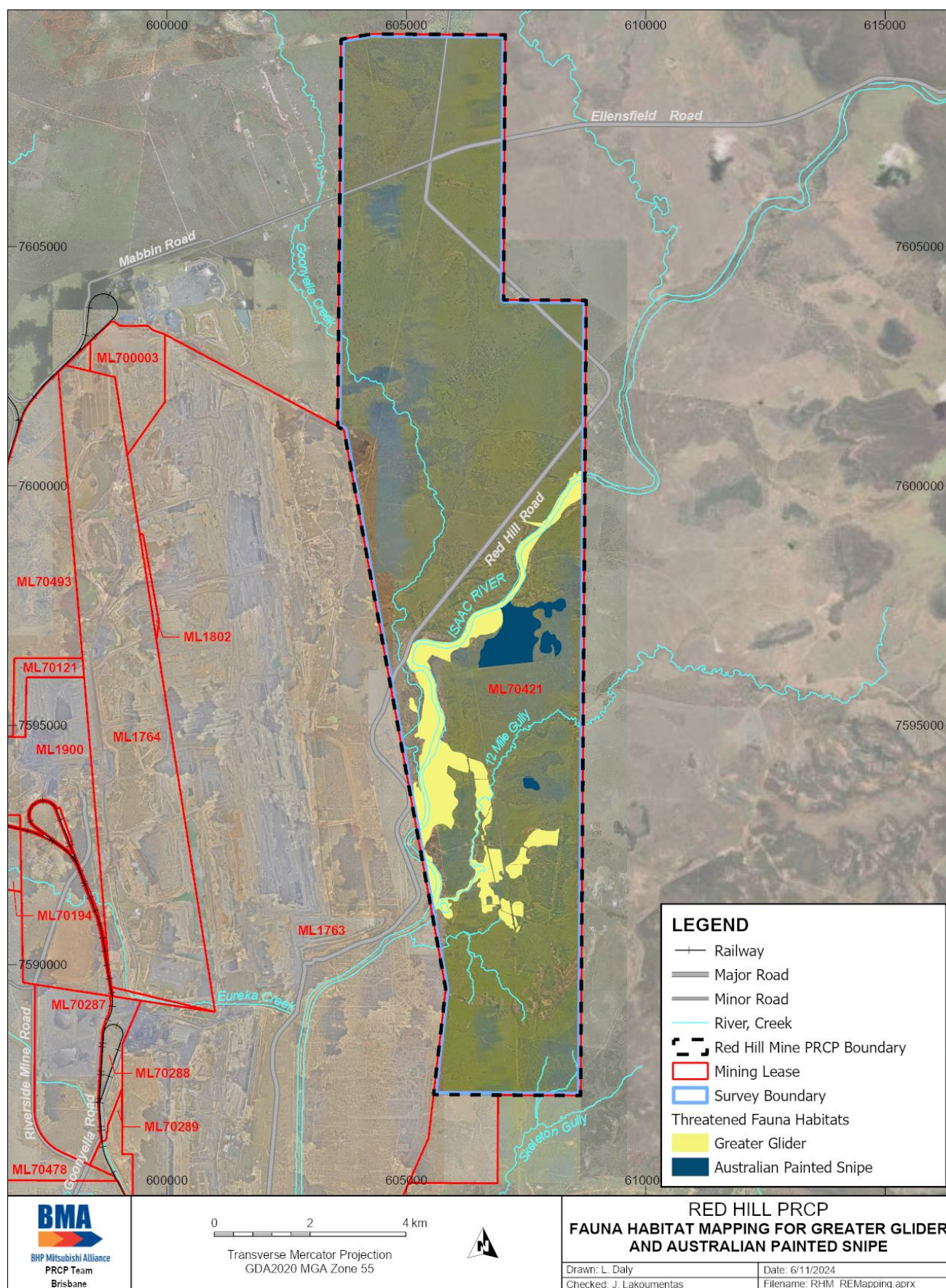
**Figure 9: RHM fauna habitat mapping for koala and ornamental snake**





**Figure 10: RHM fauna habitat mapping for squatter pigeon**





**Figure 11: RHM fauna habitat mapping for greater glider and Australian painted snipe**

### **1.2.10 Pre-mining land use**

Prior to exploration and mining activities, the RHM site has been used for cattle grazing, resulting in extensive tree clearing over most of the area.

A small area of strategic cropping land, approximately 120ha (1.2% of the site), is mapped in the north of ML70421, however there is no evidence of previous cropping activity within RHM site (BMA, 2013b).

### **1.2.11 Contaminated land**

The primary land uses within the RHM MLs have included:

- Rural cattle grazing
- Riverside Homestead, including cattle dip, hydrocarbon storage, workshops/storage sheds, septic systems, waste disposal/landfill areas, hardstand plant/material storage and other infrastructure associated with property maintenance
- Coal seam gas infrastructure including wells and pipelines
- Electrical transmission infrastructure including substations
- Red Hill Road

At the time of the contaminated land investigations, undertaken to support the RHM EIS, much of the area within RHM was contained on the Queensland Environmental Management Register. Underlying properties that have been utilised to undertake EP Act 'notifiable activities', have been listed on the Queensland Environmental Management Register. The Queensland Environmental Management Register listings are not associated with BMA RHM activities or infrastructure. None of the RHM underlying properties were listed on the Queensland Contaminated Land Register.

Planned BMA activities at RHM are predominantly associated with exploration, the extraction of coal through underground mining techniques and an accommodation village. Coal processing, heavy industrial support activities and waste disposal will be undertaken on the neighbouring GRM and BRM MLs. Therefore, the mining operations at RHM are unlikely to contribute to the existing Queensland Environmental Management Register listing or contribute further to the contamination of land.

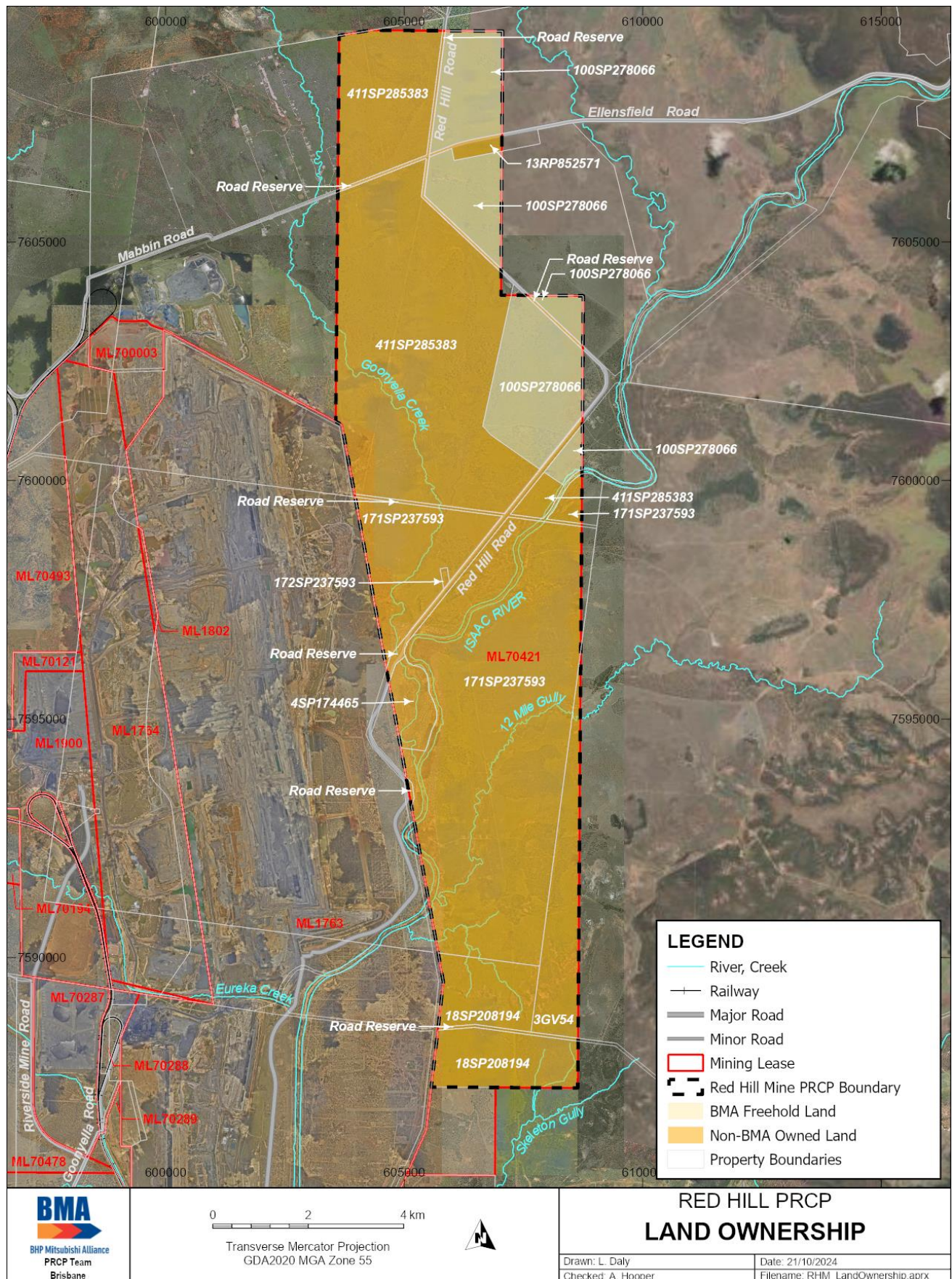
### **1.2.12 Underlying landholders**

The RHM site is a combination of freehold land owned by BMA (and/or related companies) and other freehold land holdings including:

- Private landowner
- Centurion Coal Mining Pty Ltd
- Red Hill Road and Mabbin Road reserves, owned by Isaac Regional Council (IRC)
- Q.E.C. Ltd

The underlying land ownership for RHM is shown in Figure 12. BMA has agreements with the underlying landholders in relation to the granted ML surface areas that enable mining activities to proceed within RHM.





**Figure 12: RHM land ownership**



### 1.2.13 Sensitive Receptors

The EP Act and PRCP Guideline do not define 'sensitive receptor'. BMA define a sensitive receptor post-mining as any of the following (within the EA boundary):

- Residential building, for example dwelling, residential premise, or homestead
- Sensitive place for humans: educational institution, childcare, medical centre/health care or hospital
- Conservation or protected area
- QLD Aboriginal and Torres Strait Islander Cultural Heritage Register location/area
- Groundwater bore with supply/stock water use
- Waterway ecosystem
- GDEs

Sensitive receptor locations within the RHM EA boundary include waterway ecosystems (i.e. Isaac River, Goonyella Creek, Twelve Mile Gully and drainage lines). Sensitive receptors were considered when planning the PMLUs, as well as the water management and revegetation rehabilitation and management methodologies.

## 1.3 Design for closure

As this PRCP for RHM is subject to transitional PRCP arrangements, it is not required to demonstrate how aspects of the mine site have been designed for closure for existing or approved disturbance (PRCP Guideline, Section 3.1).

However, this PRCP has been developed to manage progressive rehabilitation of the RHM site, aiming to minimise long-term management requirements as well as associated closure costs. Importantly, a focused design for closure underpins all sections of this plan, including:

- Engagement with relevant stakeholders presenting transitional PMLUs
- Defining and implementing rehabilitation practices based on identified risks that could influence achievement of milestone criteria
- Demonstrating a successful rehabilitation trajectory towards achievement of these milestone criteria by ongoing site monitoring and maintenance

## 1.4 Rehabilitation and improvement planning

### **Legislative Requirement**

*In accordance with sections 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part must include:*

- *identification of all relevant activities on the mine site*
- *the predicted duration of each of the relevant activities proposed for the mine site*
- *the size/extent of the relevant activities*
- *whether the different relevant activities can be progressively rehabilitated.*

### **PRCP Guideline (Section 3.1)**

*Under section 126C(1)(j) of the EP Act, transitional PRC Plans must also include the following details about any existing rehabilitation already completed at the time of submission of the proposed PRC Plan:*

- *a description of the rehabilitation works previously carried out*
- *when the rehabilitation works commenced and were completed*
- *whether the rehabilitation has been applied for or approved as progressively certified under the EP Act.*

### 1.4.1 Rehabilitation areas and relevant activities

The RAs included in the PRCP schedule for RHM are referred to throughout this PRCP. A RA is defined in the PRCP Guideline as “an area of land in the post-mine land use to which a rehabilitation milestone for the post-mining use relates”.

The RHM RAs, as well as the relevant activities associated with each RA, are detailed in Table 11 and shown in Figure 23. As required by the PRCP Guideline, only PMLU areas where disturbance has occurred or will occur, are mapped as a RA. The northern areas of ML70421 and undisturbed watercourse areas are expected to remain undisturbed from mining and are therefore not mapped as a RA.

To support ongoing operations, minor ancillary activities may be required in areas not mapped as a RA. Minor ancillary activities can occur without a PRCP amendment and may include roads, access tracks and culverts, fences, underground services, low-impact telecommunication facilities, electrical sub-stations and switch yards, transmission grid works and supply network works, storage depots, pipelines and pumps, groundwater bores, gas drainage bores, monitoring and investigation works and exploration activities (authorised under PRCP schedule condition PRCP19). Disturbance must be rehabilitated within six months of the completion of the activity, and the land must be rehabilitated to a stable condition and achieve the proposed PMLU. Exploration activities can also occur in areas not within a RA, however activities must comply with the relevant conditions of the PRCP schedule.

The predicted duration of the relevant activities, the size and availability for progressive rehabilitation, are also provided in Table 11. Any infrastructure that is beneficial to the PMLU may be retained if agreed with the landowner and will not be available for rehabilitation.

**Table 11: Relevant activities requiring rehabilitation at RHM**

| Relevant Activity                                                                                                                                | Predicted duration                                                                  | Size (ha) | Progressive rehabilitation availability                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RA3 – Cattle grazing PMLU</b>                                                                                                                 |                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>Accommodation village</li> <li>Roads</li> <li>General infrastructure and disturbance</li> </ul>           | <p>Development and mining: 2060 - 2091</p> <p>Final rehabilitation: 2092 - 2132</p> | 138       | <ul style="list-style-type: none"> <li>Dependent on the use and location, or unless deemed suitable to be retained for the PMLU: typically areas will be available for rehabilitation either at the end of mining or after the major rehabilitation activities are complete</li> <li>Dams are available for rehabilitation when no longer required for water management</li> </ul>                                                                                        |
| <b>RA11 – Watercourse PMLU</b>                                                                                                                   |                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>Watercourses impacted by underground mining/subsidence</li> <li>Watercourse crossings/culverts</li> </ul> | <p>Development and mining: 2060 - 2091</p> <p>Final rehabilitation: 2092 - 2120</p> | 388       | <ul style="list-style-type: none"> <li>Available for initial operational repair of cracks progressively during mining operations once the initial subsidence is complete</li> <li>Rehabilitation is scheduled once final subsidence is complete after flooding of underground workings at the end of mining</li> <li>Dependent on the location in relation to mining and rehabilitation activities and after subsidence: typically crossings will be available</li> </ul> |

| Relevant Activity                                                                                                                                                                                           | Predicted duration                                                                                   | Size (ha) | Progressive rehabilitation availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                             |                                                                                                      |           | for rehabilitation at the end of the major rehabilitation activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>RA21 – Woodland habitat PMLU</b>                                                                                                                                                                         |                                                                                                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Subsidence</li> <li>Underground mining infrastructure</li> <li>General infrastructure and disturbance within underground mining area</li> <li>Exploration</li> </ul> | Exploration: 2025 - 2091<br>Development and mining: 2060 - 2091<br>Final rehabilitation: 2092 - 2128 | 2,818     | <ul style="list-style-type: none"> <li>Exploration areas are available for initial rehabilitation once exploration activities are complete, as per EA Conditions L15-L21 (replicated as PRCP schedule conditions PRCP20 to PRCP26)</li> <li>Available for initial operational repair of subsidence cracks and drainage works progressively during mining operations once the initial subsidence is complete</li> <li>Subsidence rehabilitation is scheduled once final subsidence is complete after flooding of underground workings at the end of mining</li> <li>Infrastructure is available for removal once no longer required to support underground mining operations, when mining in the associated longwall panel/s is complete</li> </ul> |
| <b>Other areas</b>                                                                                                                                                                                          |                                                                                                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Minor ancillary activities</li> <li>Exploration</li> </ul>                                                                                                           | 2025 - 2091                                                                                          | 5,207*    | <ul style="list-style-type: none"> <li>Available for rehabilitation once activities are complete</li> <li>Exploration areas are available for initial rehabilitation once exploration activities are complete, as per EA Conditions L15-L21 (replicated as PRCP schedule conditions PRCP20 to PRCP26)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

\*Disturbance may occur within the area not mapped as RAs – area of actual disturbance within the area will be minimal.

Note: BMA uses a consistent set of RAs across their assets, and as such some RA numbers are not relevant at RHM

#### 1.4.1.1 EA progressive rehabilitation conditions

The RHM EA includes the following conditions regarding the commencement of progressive rehabilitation:

- F3: *“Rehabilitation must commence progressively when areas become available.”*

The rehabilitation of exploration activities is covered in EA Schedule L. These rehabilitation conditions were included when the EA was amended (4 April 2025) to approve the additional exploration activities. The relevant rehabilitation conditions have been replicated in the PRCP schedule conditions.

All areas are included in the PRCP schedule for rehabilitation as soon as practicable after land becomes available. For infrastructure and general disturbance areas, rehabilitation is scheduled the year after the land becomes available to allow for final planning. Subsidence areas are scheduled within a year of becoming

available for rehabilitation, once final subsidence is realised after flooding of the underground workings (completed five years after final mining) to allow for final settlement and cracking. Operational compliance activities, including initial crack repairs and drainage works of subsidence areas, will be undertaken progressively during operations as panels are mined.

### 1.4.2 Rehabilitation milestones

The RMs included in the PRCP schedule for RHM are referred to throughout this PRCP. A RM is defined in the PRCP Guideline as “*each significant event or step necessary to rehabilitate the land to a stable condition (section 112 of the EP Act)*”. The RMs are detailed in Table 12.

**Table 12: Rehabilitation milestones for RHM**

| RM   | RM name                                                                             |
|------|-------------------------------------------------------------------------------------|
| RM1  | Infrastructure decommissioning and removal                                          |
| RM2  | Remediation and/or management of contaminated land                                  |
| RM3  | Landform development and reshaping                                                  |
| RM4  | Surface preparation (cattle grazing)                                                |
| RM5  | Surface preparation (woodland habitat)                                              |
| RM6  | Surface preparation (watercourse)                                                   |
| RM7  | Revegetation (cattle grazing)                                                       |
| RM8  | Revegetation (woodland habitat)                                                     |
| RM9  | Revegetation (watercourse)                                                          |
| RM10 | Achievement of surface requirements (cattle grazing)                                |
| RM11 | Achievement of surface requirements (woodland habitat)                              |
| RM12 | Achievement of surface requirements (watercourse)                                   |
| RM13 | Achievement of post-mining land use to a stable condition (cattle grazing – RA3)    |
| RM14 | Achievement of post-mining land use to a stable condition (woodland habitat – RA21) |
| RM15 | Achievement of post-mining land use to a stable condition (watercourse – RA11)      |

### 1.4.3 Existing rehabilitation

Disturbance from exploration activities already undertaken at RHM have been progressively rehabilitated. However, no existing rehabilitation has been included in the PRCP as rehabilitated exploration areas may be subject to further impacts from subsidence.

No progressive certification applications under the EP Act have been applied for RHM rehabilitation areas.



## 2 COMMUNITY CONSULTATION

### **Legislative Requirement**

*In accordance with section 126C(1)(c)(iii) and (iv) of the EP Act, the rehabilitation planning part of the PRC Plan must include:*

- *details of the consultation undertaken by the applicant in developing the proposed PRC Plan, and*
- *details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.*

### **PRCP Guideline (Section 3.5)**

*In developing the proposed PRC Plan, the community should at least be engaged on the plan for the mine, PMLUs or NUMAs, areas of disturbance, rehabilitation and management methods, progressive rehabilitation, and closure timeframes. Ongoing community consultation should continue throughout the stages of the mine life so that progressive rehabilitation and the socio-economic and environmental impacts related to mine closure can be discussed with the community.*

*Community consultation carried out through different processes (such as an EIS) may be used to address the requirements in section 126C(1)(c) of the EP Act. The details of this consultation must be provided in the rehabilitation planning part of the proposed PRC Plan).*

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*Transitional PRC Plans are still required to meet the legislative requirements in section 126C(1)(c) of the EP Act. All proposed PRC Plans must contain a community consultation plan regardless of whether the site has an existing EA.*

To comply with section 126C(1)(c)(iii) of the EP Act, the PRCP must include details of the consultation undertaken by the applicant in developing the proposed PRCP (Section 2.4). This includes previous consultation undertaken as part of existing EA approvals or regular engagement processes (Section 2.2.1), and consultation undertaken as part of PRCP development (Section 2.2.2).

To comply with section 126C(1)(c)(iv) of the EP Act, and the PRCP Guideline, the PRCP must include a community consultation plan which details how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan (Section 2.3).

A community consultation register has been compiled to support the development of this PRCP – *Red Hill Mine PRCP Community Consultation Register* is provided in Appendix F.

### 2.1 Stakeholders

The PRCP Guideline requires that the applicant must attempt to consult all relevant members of the community, noting that the community may include, but are not limited to:

- Affected landholders (such as underlying and adjoining land holders, and holders of land necessary for access to the land to which the proposed PRCP relates)
- Traditional Owners
- Local government
- Local community groups

The Queensland Government Information sheet *Community consultation for Progressive Rehabilitation and Closure Plan* (last revised on 16 February 2024) (DESI, 2024b), states that community members to be included in consultation must have a genuine, demonstrable and legitimate interest in:

- The land where the activity will occur
- The land adjacent to where the activity will occur
- The land/amenities surrounding where the activity will occur that are likely to be impacted by the activity (e.g. groundwater/drinking water users within the surrounding area or community located upstream or downstream of the activity)

Genuine interest may include direct impact interest (e.g. underlying and adjacent land holders), cultural interest (e.g. Traditional Owners), land use interest (e.g. overlapping tenure holders, or local government), or heritage, environmental, recreational or health interests (e.g. state or local government, or relevant community groups).

The stakeholders identified as having a genuine, demonstrable and legitimate interest in the ongoing rehabilitation and closure planning at RHM are listed in Table 13, along with BMA's existing relationship and the stakeholders potential areas of interest with respect to the RHM PRCP. Stakeholder details such as names of Queensland Government departments, companies and community groups, are correct for the point in time that the consultation was completed and may change over time.

## **2.2 Consultation to date**

### **2.2.1 Pre-PRCP consultation**

Initial consultation and engagement relating to RHM was undertaken between 2008 and 2012 as part of EIS consultation. EIS consultation included engagement on rehabilitation and land uses. Since the EIS, the following rehabilitation and closure-related engagement has taken place prior to the development of the RHM transitional PRCP:

- Engagement with Barada Barna Aboriginal Corporation (BBAC) has been ongoing since 2021 on PRCP development and rehabilitation execution, specifically on provision of seed for rehabilitation and contracting opportunities for rehabilitation execution
- Engagement with affected (underlying) landowners has been undertaken to develop compensation, leasing and agistment agreements, as BMA must rehabilitate in accordance with the requirements of the EP Act which are satisfied through the PRCP
- During 2018 and 2019, BMA engaged with the administering authority to implement the current EA conditions in relation to PMLUs and acceptance criteria, which were included in the EA Table F1: Rehabilitation Requirements
- BMA engaged with the administering authority in relation to how the PRCP Guideline elements (particularly regarding transitional arrangements) and the current EA conditions related to rehabilitation and closure would transition to PRCPs
- Since 2021, information about the PRCP process, the schedule for development of PRCPs for BMA assets and PRCP progress briefings has been provided to IRC at routine meetings, noting the RHM PRCP would be submitted in December 2024
- BMA has engaged with nearby landholders on land management and lease/license conditions, and on operational, environmental management and/or water matters, as required

### **2.2.2 Transitional PRCP consultation**

Consultation as part of the development of the RHM transitional PRCP has included letters sent in 2024 via letter box drop, post or email to more than 6,500 premises in Moranbah and Dysart, including property owners, households, business and community groups. These stakeholders are listed in Table 13 and include:

- Barada Barna People, via BBAC
- Widi People of the Nebo Estate #1
- Widi People of the Nebo Estate #2
- Private owner of freehold land within and adjacent to the RHM EA area
- Other owners of land within the EA area including Q.E.C. Ltd (Powerlink) and Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)
- Moranbah residents, business owners and community organisations via a letter drop to all premises
- IRC
- Members of the Moranbah Smart Transformation Advisory Council (STAC)

- Isaac Business Chamber
- Owners and operators of utility assets within and adjacent to RHM
- Nearby mining tenement holders and petroleum (gas) tenement holders
- Queensland Government departments

In addition to the consultation letters, BMA distributed information about PRCPs to individuals, businesses and organisations via:

- BMA's Coal Connect, an online weekly newsletter to the BMA workforce and all internal coal personnel
- BMA's Community Connect, a bi-monthly newsletter distributed to more than 15,000 community members and BMA suppliers throughout the Bowen Basin

BMA's Community Hotline for the general public was also available during consultation for the community to request more information about PRCPs and continues to be available for any future queries.

## **2.3 Community consultation plan**

The PRCP Guideline requires the community consultation plan to include:

- Objectives of the community consultation
- Consultation process, including proposed frequency of consultation
- Information to be released for community consultation
- How community feedback will be considered in the PRCP

Whilst many stakeholders in the Isaac region are well-educated about mining operations, there is less understanding of planning for life-of-mine, rehabilitation and closure planning. The community consultation plan recognises the following social context:

- Talk of closure planning will lead to community concerns, requiring careful and consistent communication
- PRCP consultations by a range of companies for a variety of assets will represent considerable cumulative demands on stakeholders, and a coordinated, strategic approach will be required to manage consultation fatigue
- Community members are becoming increasingly aware of climate change and the impacts of resource activities and energy policies on the environment

Accordingly, community and stakeholder expectations with regards to mine rehabilitation are expected to increase over time and need to be continuously assessed.

### **2.3.1 Objectives**

The objectives of the community consultation include:

- To engage stakeholders in developing objectives and aspirations for PMLUs and landform, and social value opportunities to be considered in the PRCP
- To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah and Dysart communities, BMA suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes
- To engage with utility owners and operators and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests

### **2.3.2 Consultation process**

The consultation process to enable ongoing PRCP-related engagement is detailed in Table 14. The process includes the relevant stakeholders, engagement type and proposed consultation frequency to achieve the consultation objectives.

BMA continues to engage with neighbouring landholders on land management, lease/licence conditions, and operational matters, as required.

Stakeholder titles are correct as at the time consultation was undertaken. Some stakeholder titles (e.g. names of Queensland Government departments) may change over time and will be updated as necessary as part of future PRCP consultation and amendments.

### **2.3.3 Information to be provided**

#### **2.3.3.1 Consultation to date**

The transitional PRCP consultation letters provided information about RHM and rehabilitation and closure planning and encouraged the stakeholders (Section 2.2.2) to contact BMA if they would like to discuss the PRCP. The information provided to stakeholders through the transitional PRCP consultation letters included:

- Introduction of Queensland Government requirements for mine rehabilitation and closure planning
- EP Act requirements for rehabilitation
- PRCP requirements
- PRCP submission date
- Location of RHM
- EA details
- Approved activities at RHM
- MLs within RHM EA area
- Estimated mine life of RHM
- BMA's commitment to progressive rehabilitation
- Rehabilitation objective and methods
- EA approved PMLU options
- Commitment to future engagement in PRCPs
- An invitation to seek information or discussion about PRCPs
- Contact details for further information or discussion

The information provided to the community as part of the transitional PRCP consultation via Coal Connect and Community Connect included:

- Progressive rehabilitation as a key focus for BMA
- PRCP requirements and purpose
- Timing for the development of the RHM PRCP
- Life of BMA assets that are subject to transitional PRCPs
- Commitment to ongoing engagement
- Contact details for further information or discussion

Consultation and engagement conducted by BMA to date was to transition the PMLUs within the EA to the PRCP. The BMA Community Hotline was also available during consultation for the community to request more information about PRCPs and continues to be available for any future queries.

#### **2.3.3.2 Ongoing consultation**

Information to be released for community consultation, as part of future RHM PRCP implementation will include:

- The rationale and scope for PRCPs



- Approved mining activities and PMLUs for RHM
- On-site activities and areas of disturbance
- Proposed rehabilitation methods, schedule and milestones
- Progress against rehabilitation milestones
- Alignment with long-term transformation planning occurring through governments
- Opportunities for community consultation as part of the PRCP's implementation

Communication tools could include:

- Frequently asked questions and answers and a PRCP fact sheet available to support consultation activities
- Face to face and virtual meetings, forums or workshops
- Updates and fact sheets about the RHM PRCP

Additional information to be shared with specific stakeholders is detailed in Table 14.

#### **2.3.4 How feedback will be considered**

The PRCP community consultation register (Appendix F) will be updated to include the consideration of issues raised and the outcomes of engagement as part of the community consultation activities outlined in Table 14. All stakeholder feedback recorded in the community consultation register will be considered in framing and detailing future PRCP amendments for RHM.

This may include feedback on, for example:

- Planned PMLUs
- Alternative PMLUs
- Vegetation species most suitable to the approved PMLUs
- Rehabilitation methods to protect cultural heritage and achieve optimal use for the PMLUs
- PRCP schedule
- Water management (e.g. availability for beneficial use as part of the PMLUs, or adjacent uses)
- Development of business capacity programs to equip local and Indigenous businesses for rehabilitation works.

The PRCP will be evaluated to ensure PMLUs are consistent with the outcomes of consultation with the community.

## **2.4 Community consultation register**

The community consultation stakeholders, the consultation undertaken, and feedback received are documented in the community consultation register (Appendix F). The community consultation register is compliant with section 126C(1)(c)(iii) of the EP Act and includes:

- Identification of each community member/stakeholder
- Previous engagements with the community
- Consultation date(s)
- Description of consultation type
- Information provided to the community
- Issues raised/discussed by the community
- How issues have been considered

- Decisions/outcomes of engagement
- Commitments made by BMA

## **2.5 Feedback to date**

All feedback received to date as part of the consultation for the PRCP, is documented in the community consultation register (Appendix F) and summarised in Table 13. There were no enquiries or feedback received following the transitional PRCP consultation letters apart from an acknowledgement of receipt of the letter. There were also no responses or enquiries to letters to Moranbah premises or to the information provided via Community Connect and Coal Connect.

**Table 13: RHM identified stakeholders, current BMA relationships, potential PRCP areas of interest and consultation outcomes**

| Stakeholder                                                                                            | Existing BMA relationship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <b>Traditional Owners</b>                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li>Barada Barna People (QCD380/08), represented by BBAC</li> </ul> | <ul style="list-style-type: none"> <li>BMA has a constructive working relationship with Barada Barna People, who are the registered native title holders of land which includes RHM.</li> <li>BBAC and BMA meets regularly as part of the BBAC-BMA Relationship Committee.</li> <li>BMA holds a Native Title Project Agreement with BBAC on behalf of Barada Barna people. RHM falls within the Agreement area. The Agreement was signed on 31 July 2024. This Agreement sets a new way forward in the relationship between BMA and the Barada Barna People, providing intergenerational benefit. Under the Agreement, BMA will provide support towards priority community projects that enable Barada Barna People to live and work on-country, strengthening this important connection.</li> <li>From a rehabilitation and closure perspective, BMA is working with BBAC specifically on provision of seed for</li> </ul> | <ul style="list-style-type: none"> <li>Aspirations around rehabilitation and potential commercial opportunities as a PMLU</li> <li>How operational management and/or rehabilitation could contribute to future use of the areas</li> <li>Recognition and management of cultural heritage impacts</li> <li>Native Title and land acquisition interests</li> <li>PMLUs and landforms</li> <li>Future access to and ownership of land</li> <li>Environmental management/stewardship</li> <li>Employment and business opportunities in rehabilitation, environmental management and monitoring</li> </ul> | <ul style="list-style-type: none"> <li>Existing PMLUs were discussed with BBAC and they expressed their desire to be involved in seed supply and the activities required to support execution of the rehabilitation and management milestones for PMLUs</li> <li>The landform shown in the RHM PRCP reflects that approved under the EA. The PRC Plan and schedule shows this area mined and subsequently rehabilitated. It is however noted that there are a number of areas of cultural heritage significance within the ML boundary and further consultation with Barada Barna would be required before mining could take place in these areas.</li> </ul> |

| Stakeholder                                                                         | Existing BMA relationship                                                                                                                                                                                                                                                                                                                                                                         | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                         | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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|                                                                                     | rehabilitation and contracting opportunities for rehabilitation execution.                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Widi People of the Nebo Estate #1</li> </ul> | <ul style="list-style-type: none"> <li>BMA has a constructive relationship with Widi People of the Nebo Estate #1, meeting as needed. There are no agreements with Widi People with respect to RHM.</li> </ul>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |
| <ul style="list-style-type: none"> <li>Widi People of the Nebo Estate #2</li> </ul> | <ul style="list-style-type: none"> <li>BMA has a constructive relationship with Widi People of the Nebo Estate #2, meeting as needed. There are no agreements with Widi People with respect to RHM.</li> </ul>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |
| <b>Underlying landowners</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Private landowner</li> </ul>                 | <ul style="list-style-type: none"> <li>BMA has a longstanding relationship with the landowner of freehold land within and adjacent to the EA area. The landowner also holds an agistment licence within the EA area.</li> <li>BMA engages with the landowner through letters, emails and regular meetings, including on an as-needs basis with regard to licenses and land management.</li> </ul> | <ul style="list-style-type: none"> <li>Environmental management/stewardship</li> <li>PMLUs and landforms</li> <li>PRCP schedule</li> <li>Future access to and ownership of land when it is no longer required for mining</li> <li>Water usage, quality and access to groundwater and surface water (e.g. water allocations, water pipelines, etc.)</li> <li>Potential impacts on roads and road reserves</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |



| Stakeholder                                                                                                            | Existing BMA relationship                                                                                                                                                                                                                                                                                                                                                   | Potential areas of interest                                                                                                                                                                                                                                                                                                                                           | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes                                  |
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|                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Potential impacts on land, water, property and future business value relating to PMLUs, and timing of impacts</li> </ul>                                                                                                                                                                                                       |                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>Q.E.C. Ltd. (Powerlink)</li> </ul>                                              | <ul style="list-style-type: none"> <li>Powerlink has an easement for energy transmission within the EA area and owns a parcel of land within the EA area for a substation.</li> <li>Engagement with Powerlink is via routine correspondence on commercial and statutory issues, with meetings held as required on specific issues.</li> </ul>                               | <ul style="list-style-type: none"> <li>PRCP schedule</li> <li>Potential impacts on powerlines</li> <li>Potential impacts on land and future business value relating to PMLUs, and timing of impacts</li> </ul>                                                                                                                                                        | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                                                               |
| <ul style="list-style-type: none"> <li>Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)</li> </ul> | <ul style="list-style-type: none"> <li>Centurion Coal Mining Pty Ltd owns land within the EA area as well as the overlapping Middlemount Water Pipeline.</li> <li>Centurion Coal Mining Pty Ltd also holds an adjacent Petroleum Lease.</li> <li>Engagement with Centurion Coal Mining Pty Ltd is via routine correspondence on commercial and statutory issues.</li> </ul> | <ul style="list-style-type: none"> <li>PMLUs and landforms</li> <li>PRCP schedule</li> <li>Future access to and ownership of land when it is no longer required for mining</li> <li>Potential impacts on Middlemount Water Pipeline</li> <li>Potential impacts on land, water, property and future business value relating to PMLUs, and timing of impacts</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                                                               |
| <ul style="list-style-type: none"> <li>IRC</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>IRC owns land within the EA area for road reserves (Red Hill Road and Mabbin Road).</li> </ul>                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>PRCP schedule</li> <li>Potential impacts on Council services, road infrastructure and traffic conditions</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>The PRCP landform proposes a realignment of Red Hill Road. To effect realignment, BMA acknowledge it would need to</li> </ul> |

| Stakeholder                                           | Existing BMA relationship                                                                                                                                                                                                                                                                                             | Potential areas of interest                                                                                                                                                                                                      | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes                                                                                                                                                                                                                                                                                                                                |
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|                                                       | <ul style="list-style-type: none"> <li>BMA and IRC engage in commercial discussions regarding use of IRC land within the EA area, as required.</li> </ul>                                                                                                                                                             |                                                                                                                                                                                                                                  | <p>apply for and obtain, a Works On Road Corridor Permit from IRC. Engineering studies will need to be completed before the permit is applied for. Concerns raised by IRC in relation to any realignment proposal for Red Hill Road will be considered during the permitting process. If changes are made to the proposed realignment as a result of future planning or permitting processes that impact the PRCP schedule, a PRCP amendment will be required.</p> |
| <b>Local Government</b>                               |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>IRC</li> </ul> | <ul style="list-style-type: none"> <li>BMA has a long established and cooperative relationship with IRC.</li> <li>BMA provides regular updates on PRCPs to IRC, as part of biannual IRC-BMA meetings which discuss a range of topics, and as part of additional issue-specific meetings from time to time.</li> </ul> | <ul style="list-style-type: none"> <li>Local employment</li> <li>Impacts on Council services and infrastructure</li> <li>Stock routes</li> <li>Rehabilitation progress and PRCP schedule</li> <li>PMLUs and landforms</li> </ul> | <ul style="list-style-type: none"> <li>Transitional provisions for the PRCP were discussed. IRC understand the PMLUs as per the EA are being transitioned into the PRCP.</li> <li>IRC requested further information and engagement to understand how BMA and IRC could work together on potential innovative approaches to end of life mines</li> </ul>                                                                                                            |

| Stakeholder                                                                                             | Existing BMA relationship                                                                                                                                                                                                                                                                                                                                                                                                            | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes                                                                                                                                                                                               |
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|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Management of closure impacts on employment and businesses</li> <li>• Alignment of rehabilitation plans with local and regional planning goals</li> <li>• Economic transformation (towards post-mining) and community sustainability</li> <li>• Potential impacts on environmental qualities, amenity and traffic conditions during closure or rehabilitation activities</li> <li>• Potential cumulative impacts of closure of multiple mining assets in a similar timeframe (e.g. job and population losses)</li> </ul> | and long term futures of the local communities post mining. These innovative approaches would need to provide commercial viability as well as ecological and social functionality. IRC have been interested to understand the challenges to facilitate future changes. BMA has committed to engage with IRC on this going forward |
| <b>Residents, businesses and community groups</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• Moranbah residents, businesses and community groups</li> </ul> | <ul style="list-style-type: none"> <li>• BMA engages with Moranbah residents, businesses and community organisations through stakeholder meetings, media and social media, and Community Connect, a regular BMA newsletter</li> <li>• Engagement activities with community members ranges from one-off responses to enquiries, to community events and forums, and ongoing engagement processes such as partnerships with</li> </ul> | <ul style="list-style-type: none"> <li>• Timing of closure</li> <li>• Rehabilitation obligations and progress</li> <li>• Environmental management/stewardship</li> <li>• Employment continuity</li> <li>• PMLUs and landforms</li> <li>• Management of closure impacts on employment and businesses</li> <li>• Economic and community sustainability</li> </ul>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• No feedback was received in relation to PMLUs at RHM</li> </ul>                                                                                                                                                                                                                          |

| Stakeholder                                                                                                                                                                                          | Existing BMA relationship                                                                                                                                                                                                                                                                                              | Potential areas of interest                                                                                                                                                                                                                                                        | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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|                                                                                                                                                                                                      | community organisations and industry bodies                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Local employment and business opportunities in rehabilitation works</li> </ul>                                                                                                                                                              |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Moranbah STAC</li> </ul>                                                                                                                                      | <ul style="list-style-type: none"> <li>The Smart Transformation Project, including the Moranbah STAC was established by BMA in 2019. STAC members meet every two months to consider a range of issues and priorities related to the future and sustainability of the communities and economies of Moranbah.</li> </ul> | <ul style="list-style-type: none"> <li>As above, with a particular focus on community and economic development and transformation</li> </ul>                                                                                                                                       | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |
| <ul style="list-style-type: none"> <li>Isaac Business Chamber</li> </ul>                                                                                                                             | <ul style="list-style-type: none"> <li>The Isaac Business Chamber was established in early 2024 and represents businesses across the IRC local government area. BMA has engaged with Isaac Business Chamber through community forums.</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>As above, with a particular focus on business and economic development opportunities associated with mining and/or rehabilitation works</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |
| <b>Utility owners/easement holders with assets within the EA area</b>                                                                                                                                |                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                    |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Q.E.C. Ltd. (Powerlink)</li> <li>Ergon Energy</li> <li>Centurion Coal Mining Pty Ltd (Middlemount Water Pipeline Pty Ltd)</li> <li>Aurizon Network</li> </ul> | <ul style="list-style-type: none"> <li>BMA has constructive working relationships and engages with utility owners as required (issue-specific or transactional engagement) with respect to: <ul style="list-style-type: none"> <li>Powerlines and powerline easements (Powerlink)</li> </ul> </li> </ul>               | <ul style="list-style-type: none"> <li>Impact on assets/asset value</li> <li>Remediation of impacts on assets</li> <li>Any service disruptions and mitigations</li> <li>Crossing/interface agreements</li> <li>Timeframe for decommissioning utilities that service RHM</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |



| Stakeholder                                                                               | Existing BMA relationship                                                                                                                                                                                                                                                                        | Potential areas of interest                                                                                                                                                                                                                                                                                                                        | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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|                                                                                           | <ul style="list-style-type: none"> <li>- Powerlines overlapping the EA area (Ergon Energy)</li> <li>- Middlemount Water Pipeline</li> <li>- Rail lines (Aurizon)</li> </ul>                                                                                                                      | <ul style="list-style-type: none"> <li>• Cost of decommissioning utilities</li> </ul>                                                                                                                                                                                                                                                              |                                                                                                                                     |
| <b>BMA operations</b>                                                                     |                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>• RHM workforce (including contractors)</li> </ul> | <ul style="list-style-type: none"> <li>• RHM is not yet operational so there is no workforce</li> <li>• Engagement with the future workforce will be through the relevant channels when operations commence, which may include 'toolbox' talks, email communications and Coal Connect</li> </ul> | <ul style="list-style-type: none"> <li>• Timing of closure</li> <li>• Rehabilitation obligations</li> <li>• Employment continuity</li> <li>• Management of closure impacts on employment and businesses</li> <li>• Economic and community sustainability</li> <li>• Local employment and business opportunities in rehabilitation works</li> </ul> | <ul style="list-style-type: none"> <li>• Not applicable</li> </ul>                                                                  |
| <b>BMA suppliers</b>                                                                      |                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>• RHM suppliers</li> </ul>                         | <ul style="list-style-type: none"> <li>• RHM is not yet operational so there are no current suppliers</li> <li>• Engagement with the future suppliers will be via the relevant channels when operations commence, which may include the BMA community-related</li> </ul>                         | <ul style="list-style-type: none"> <li>• Loss of supply opportunities with closure</li> <li>• Opportunities to participate in supply chain for closure and/or rehabilitation works</li> <li>• Economic transformation (towards post-mining)</li> </ul>                                                                                             | <ul style="list-style-type: none"> <li>• Not applicable</li> </ul>                                                                  |

| Stakeholder                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Existing BMA relationship                                                                                                                                                                                                                                                                                                                                                                  | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                                                              | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Local Buying Program portal, and via Community Connect.                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Economic and community sustainability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                     |
| <b>Overlapping/adjoining/nearby resource interests</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)</li> <li>Anglo American Australia</li> <li>Fitzroy (CQ) Pty. Ltd.</li> <li>Stanmore SMC Pty Ltd</li> </ul> <p>Overlapping and nearby Authority to Prospect and Petroleum Commercial Area:</p> <ul style="list-style-type: none"> <li>Arrow Bowen Pipeline Pty Ltd (Arrow Energy Pty. Ltd.)</li> <li>QPM Energy Pty Ltd and QPM Energy (MGP Upstream) Pty Ltd</li> </ul> | <ul style="list-style-type: none"> <li>BMA liaises with overlapping, adjoining and nearby mining and resource interests on an as-needed basis</li> <li>BMA also engages with overlapping and nearby petroleum resource holders in accordance to <i>Mineral and Energy Resources (Common Provisions) Act 2014</i> (Qld) (MERC Act) requirements for petroleum overlap activities</li> </ul> | <ul style="list-style-type: none"> <li>Train load-out access</li> <li>Future land use and ownership</li> <li>Collaboration on good industry rehabilitation and closure practices</li> <li>Potential future use of land within the EA area for resource extraction purposes</li> <li>Potential for any disruption of resource activities due to closure or rehabilitation works</li> <li>Cumulative impacts and opportunities of mine closures</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |

| Stakeholder                                                                                                                              | Existing BMA relationship                                                                                                                                                                                 | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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| <ul style="list-style-type: none"> <li>CH4 Pty Ltd (Arrow Energy Pty. Ltd.)</li> </ul>                                                   |                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                     |
| <b>Queensland Government</b>                                                                                                             |                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                     |
| <p>Queensland Government departments:</p> <ul style="list-style-type: none"> <li>Department of Resources (DoR)</li> <li>DETSI</li> </ul> | <ul style="list-style-type: none"> <li>BMA has constructive working relationships with DoR and DETSI</li> <li>DoR's Deputy Director-General Georesources has asked to be kept informed on PRCP</li> </ul> | <ul style="list-style-type: none"> <li>Legislative compliance</li> <li>Resource development</li> <li>Employment and growth opportunities</li> <li>Public interest</li> <li>Environmental management</li> <li>Economic transformation (towards post-mining)</li> <li>Financial assurance</li> <li>Environmental risk management</li> <li>Future PMLUs and landform</li> <li>Company responses to stakeholder views</li> <li>Industry best practice, and innovative future-looking approaches</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |

| Stakeholder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Existing BMA relationship                                                                                                                                                                                                                                  | Potential areas of interest                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
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| <p>Offices of the Ministers for:</p> <ul style="list-style-type: none"> <li>Resources and Critical Minerals</li> <li>Environment, Science and Innovation, and the Great Barrier Reef</li> <li>Energy and Clean Economy Jobs</li> <li>Agricultural Industry Development and Fisheries; and Rural Communities</li> <li>Regional Development and Manufacturing, and Water</li> </ul> <p>Members of Parliament:</p> <ul style="list-style-type: none"> <li>Member for Burdekin</li> <li>Shadow Minister for Natural Resources and Mines</li> <li>Shadow Minister for Environment and the Great Barrier Reef</li> </ul> | <ul style="list-style-type: none"> <li>BMA conducts regular engagement with Ministers and Members of Parliament. Employment growth and sustainable community and economic development are key priorities for Queensland Government stakeholders</li> </ul> | <ul style="list-style-type: none"> <li>Legislative compliance</li> <li>Resource development</li> <li>Employment and growth opportunities</li> <li>Public interest</li> <li>Environmental management</li> <li>Economic transformation (towards post-mining)</li> <li>Financial assurance</li> <li>Environmental risk management</li> <li>Future PMLUs and landform</li> <li>Company responses to stakeholder views</li> <li>Industry best practice, and innovative future-looking approaches</li> </ul> | <ul style="list-style-type: none"> <li>No feedback was received in relation to PMLUs at RHM</li> </ul>                              |



| Stakeholder                                                                                                                                                                                                                                                                             | Existing BMA relationship | Potential areas of interest | Outcomes of community consultation during PRCP development and extent to which each proposed PMLU is consistent with those outcomes |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Shadow Minister for Science and Innovation</li> <li>Shadow Minister for Energy and Cost of Living</li> <li>Shadow Minister for Water and the Construction of Dams</li> <li>Shadow Minister for Regional Development and Manufacturing</li> </ul> |                           |                             |                                                                                                                                     |

**Table 14: Process to be followed for ongoing community consultation for RHM PRCP**

| Stakeholders                                                                                                                                                | Engagement type                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Proposed consultation frequency                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                                               | <b>1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP</b>                                                                                                                                                                                                                                                                                                         |                                                        |
| <ul style="list-style-type: none"> <li>Barada Barna People</li> <li>Widi People of the Nebo Estate #1</li> <li>Widi People of the Nebo Estate #2</li> </ul> | <p>Meet with Traditional Owners and landowners to provide an update on the PRCP and progress with rehabilitation, and invite their inputs and feedback on:</p> <ul style="list-style-type: none"> <li>PMLUs and post-mining landforms, including any particular values or opportunities in specific disturbed areas</li> <li>Rehabilitation methods which would optimise future woodland habitat and/or grazing opportunities, and potential land management requirements</li> </ul> | As required, to a schedule agreed with representatives |

| Stakeholders                                                                                                                                                                                                                                                               | Engagement type                                                                                                                                                                                                                                                                                                                                                                                                                                | Proposed consultation frequency                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                                                                                                                                                              | <b>1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP</b>                                                                                                                                                                                                                                                                   |                                                                                                       |
| <ul style="list-style-type: none"> <li>Private landowner of underlying land within EA area and adjacent land</li> <li>Other underlying landowners within EA area: Q.E.C. Ltd. (Powerlink), Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)</li> </ul> | <ul style="list-style-type: none"> <li>Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management, or research partnerships</li> <li>Rehabilitation methods, schedule and progress towards milestones</li> </ul>                                                                                                                                                                                     |                                                                                                       |
| <ul style="list-style-type: none"> <li>Landowners within EA area and adjacent land</li> </ul>                                                                                                                                                                              | Advise the landowners in writing regarding any proposed changes to the RHM PRCP that have potential to affect interests in freehold land within or adjacent to the EA area.                                                                                                                                                                                                                                                                    | As required, as part of the PRCP amendment process                                                    |
|                                                                                                                                                                                                                                                                            | Meet with landowners to discuss any proposed changes to the PRCP and progress with rehabilitation, and invite their inputs and feedback on: <ul style="list-style-type: none"> <li>Land use/management/rehabilitation issues as relevant to the private freehold land</li> <li>Access to water resources</li> <li>Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management, or research</li> </ul> | As required, as part of the PRCP amendment process                                                    |
|                                                                                                                                                                                                                                                                            | Correspond and if requested meet with landholders during the pre-closure, closure/decommissioning and rehabilitation periods, to reduce the potential for works to impact on their amenity, land use, property access or access to water                                                                                                                                                                                                       | Annually for at least five years prior to the forecast end of mining, or as agreed with the landowner |

| Stakeholders                                                                                                                                                | Engagement type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Proposed consultation frequency                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                                               | <b>1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                         |
| <ul style="list-style-type: none"> <li>Barada Barna People</li> <li>Widi People of the Nebo Estate #1</li> <li>Widi People of the Nebo Estate #2</li> </ul> | <p>Meet with Traditional Owners to provide an update on the PRCP and progress with rehabilitation, and invite inputs and feedback on:</p> <ul style="list-style-type: none"> <li>Involvement of businesses owned by Barada Barna People in rehabilitation works</li> <li>Pipeline of opportunities relating to rehabilitation work and land management</li> </ul>                                                                                                                                                                                                                                                     | As part of regular updates to a schedule agreed with Traditional Owners                                 |
| <ul style="list-style-type: none"> <li>IRC</li> </ul>                                                                                                       | <p>Meet with IRC as part of consultation on proposed amendments to the PRCP, to invite their inputs and feedback on:</p> <ul style="list-style-type: none"> <li>Impacts and opportunities pertaining to IRC assets within the EA area</li> <li>IRC's strategic analysis and planning for the area</li> <li>Challenges, opportunities and community aspirations of relevance to mine closure and rehabilitation</li> <li>IRC's intended economic and social transition approaches</li> <li>Shared value initiatives, e.g. infrastructure retention, capacity building, environmental management or research</li> </ul> | As required, to a schedule agreed with IRC                                                              |
|                                                                                                                                                             | Provide progressive rehabilitation information as part of regular meetings with IRC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | As required, to a schedule agreed with IRC                                                              |
|                                                                                                                                                             | <p>Engage with IRC to seek inputs on:</p> <ul style="list-style-type: none"> <li>Any impacts of RHM's closure and/or rehabilitation works on Council assets or services</li> <li>Any impacts of RHM's closure and/or rehabilitation works on community amenity</li> <li>Rehabilitation methods and potential land/water management requirements</li> </ul>                                                                                                                                                                                                                                                            | Annually for at least five years prior to the forecast end of mining, or as agreed with representatives |

| Stakeholders                                                                                                                  | Engagement type                                                                                                                                                                                                                                                                                                                                                    | Proposed consultation frequency                                      |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                 | <b>1. To engage stakeholders in developing objectives and aspirations for post-mining land use and landform, and social value opportunities to be considered in the PRCP</b>                                                                                                                                                                                       |                                                                      |
| <ul style="list-style-type: none"> <li>RHM personnel (future)</li> </ul>                                                      | Keep the RHM workforce updated via internal newsletters/emails or toolbox talks if there are substantive changes to the PRCP, e.g., significant changes in rehabilitation milestones or plans for the cessation of mining at RHM, and including a communication channel for personnel to ask questions or contribute to discussions about PRCPs and rehabilitation | Ongoing engagement process                                           |
|                                                                                                                               | Commencing five years prior to the forecast cessation of mining, provide regular updates to RHM personnel on the implementation of closure, and seek personnel's feedback on rehabilitation progress                                                                                                                                                               | Annually for at least five years prior to the forecast end of mining |
| <ul style="list-style-type: none"> <li>Moranbah residents, community members, business owners and community groups</li> </ul> | Via workshops or focus groups, seek involvement in articulating community aspirations for rehabilitation, and economic transformation opportunities related to PMLUs                                                                                                                                                                                               | As required, or as agreed with representatives                       |
|                                                                                                                               | Provide community updates if there are any substantive changes and associated PRCP amendments required, via mail-out letters                                                                                                                                                                                                                                       | As required, as part of the PRCP amendment process                   |
|                                                                                                                               | Provide updates and briefings on PRCPs to the Moranbah STAC                                                                                                                                                                                                                                                                                                        | On request                                                           |

| Stakeholders                                                                                                               | Engagement type                                                                                                                                                                                                                                                                  | Proposed consultation frequency                                                       |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                              | <b>2. To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah community, RHM suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes</b> |                                                                                       |
| <ul style="list-style-type: none"> <li>Moranbah residents, community members, business owners, community groups</li> </ul> | Using community forums such as interagency meetings, community meetings, supplier networks, partnership meetings and business network meetings, provide regular community updates on RHM PRCP and implementation                                                                 | As required, or as agreed with representatives                                        |
|                                                                                                                            | Invite input to final planning for closure, including management of closure impacts, via a workshop, community forum or other means                                                                                                                                              | Three years prior to the forecast end of mining                                       |
| <ul style="list-style-type: none"> <li>RHM suppliers (future)</li> </ul>                                                   | Provide regular updates about business supply opportunities resulting from progressive rehabilitation work packages, including through the Isaac Business Chamber                                                                                                                | As required                                                                           |
|                                                                                                                            | Participate in initiatives led by IRC, Isaac Business Chamber, industry or local communities which aim to harness social value from mine closure and rehabilitation planning, and/or work towards economic transformation                                                        | As required, or as agreed with representatives                                        |
|                                                                                                                            | Provide information about the pending closure of RHM and potential future supply opportunities as part of closure and rehabilitation to local businesses, Traditional Owner businesses and RHM suppliers                                                                         | Three years prior to the forecast end of mining, subsequent consultation to be agreed |



| Stakeholders                                                                                                 | Engagement type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Proposed consultation frequency                |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Consultation objective</b>                                                                                | <b>2. To support transparent access to information about the RHM PRCP and implementation, enabling opportunities for the Moranbah community, RHM suppliers and government agencies and representatives to provide inputs and feedback on rehabilitation and closure outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |
| <ul style="list-style-type: none"> <li>Elected representatives and Queensland Government agencies</li> </ul> | <p>Provide updates via letters and/or meetings on PRCPs to:</p> <ul style="list-style-type: none"> <li>Offices of the Ministers for: <ul style="list-style-type: none"> <li>Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRRD)</li> <li>Environment, Tourism, Science and Innovation</li> <li>Energy and Home Ownership</li> <li>Primary Industries</li> <li>Local Government and Water</li> </ul> </li> <li>Queensland Parliament Member for Burdekin</li> <li>Shadow Minister for Natural Resources and Mines</li> <li>Shadow Minister for Environment, Science, Innovation and Climate Change</li> <li>Shadow Minister for Energy</li> <li>Shadow Minister for Local Government and Water</li> <li>Shadow Minister for State Development, Infrastructure, Planning and Regional Development</li> <li>Director, Native Title Services and Coal Hub, DNRMMRRD</li> <li>Deputy Director-General Georesources, DNRMMRRD</li> </ul> | As required, or as agreed with representatives |

| Stakeholders                                                                                                                                                              | Engagement type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Proposed consultation frequency                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                                                             | <b>3. To engage with utility owners and operators, and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                     |
| Utility owners and operators: <ul style="list-style-type: none"> <li>• Powerlink</li> <li>• Ergon Energy</li> <li>• Middlemount Water Pipeline Pty Ltd Telstra</li> </ul> | Engage with utility owners and easement holders that have interests in land or infrastructure within the EA area to: <ul style="list-style-type: none"> <li>• Inform them of closure timelines and rehabilitation activities relevant to land or infrastructure in which they have an interest</li> <li>• Seek input about potential impacts on utility/transport assets and/or service capacity, and any specific management measures to avoid impacts on utility assets and services.</li> <li>• Develop agreements in relation to the use, rehabilitation and/or management of land owned by utility owner and operators within the EA</li> </ul> | <ul style="list-style-type: none"> <li>• Three years prior to the forecast end of mining</li> </ul> |
|                                                                                                                                                                           | Maintain engagement regarding progressive rehabilitation and undertake consultation regarding crossing/interface agreements, as required if rehabilitation will affect utilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Initiated three years prior to decommissioning</li> </ul>  |

| Stakeholders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Engagement type                                                                                                                                                                                                                             | Proposed consultation frequency                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Consultation objective</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>3. To engage with utility owners and operators, and adjacent mining and energy tenement holders, to provide information about RHM closure planning that supports them to manage their assets and interests</b>                           |                                                                                                      |
| <p>Nearby mining interests:</p> <ul style="list-style-type: none"> <li>Centurion Coal Mining Pty Ltd (previously Peabody (Bowen) Pty. Ltd.)</li> <li>Anglo American Australia</li> <li>Fitzroy (CQ) Pty. Ltd.</li> <li>Stanmore SMC Pty Ltd</li> </ul> <p>Overlapping and nearby Authority to Prospect and Petroleum Commercial Area:</p> <ul style="list-style-type: none"> <li>Arrow Bowen Pipeline Pty Ltd (Arrow Energy Pty. Ltd.)</li> <li>QPM Energy Pty Ltd and QPM Energy (MGP Upstream) Pty Ltd</li> <li>CH4 Pty Ltd (Arrow Energy Pty. Ltd.)</li> </ul> | <ul style="list-style-type: none"> <li>Write to advise overlapping, adjacent and nearby resource interests if there are any substantive changes to the closure and rehabilitation schedule in future iterations of the RHM PRCP.</li> </ul> | <ul style="list-style-type: none"> <li>As required, as part of the PRCP amendment process</li> </ul> |

| Relationship with PRCP schedule                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>RHM has transitional provisions and approved land outcomes identified in the EA. Specific community engagement on the proposed PMLUs within the EA being transitioned to the PRCP, and the proposed rehabilitation approach, has been undertaken prior to submission of the transitional RHM PRCP. Consultation will continue as per the process documented in the community consultation plan.</p> |

### 3 POST-MINING LAND USES

#### Legislative Requirement

*In accordance with section 126C(1)(d) of the EP Act, the rehabilitation planning part of the PRC Plan must state the extent to which each post-mining land use for land identified in the PRC PLAN schedule for the plan is consistent with:*

1. *the outcome of consultation with the community in developing the plan, and*
2. *any strategies or plans for the land of a local government, the State or the Commonwealth.*

#### PRCP Guideline (Section 3.2)

*A PMLU is defined under section 112 of the EP Act as the purpose for which the land will be used after all relevant activities for the PRC Plan carried out on the land have ended. Relevant activity for a PRC Plan is defined in the EP Act as the relevant activities to be carried out on land the subject of the plan. It is not the intention of this definition to include third-party activities or assets that continue to exist once mining activities have ceased, such as third-party pipeline easements, power easements or overlapping tenures for other EAs.*

*The rehabilitation planning part of the PRC Plan must include a detailed description of the nominated PMLU(s) for the site. The description must include (where relevant), but is not limited to:*

- *a description of the use of the land*
- *if applicable, the specific vegetation types (e.g. RE 13.2.9) or land suitability classification (e.g. Class 4)*
- *identification of any permanent or essential management infrastructure to be included as part of the PMLU*
- *completion criteria for measuring whether the PMLU has been successfully achieved*

*Where a PMLU has been previously addressed in a land outcome document and is able to be transitioned into the PRCP Schedule, the holder is not required to complete the information requirements under section 126C(1)(j) of the EP Act in this section for those PMLUs.*

*However, the legislative requirements under section 126C(1)(d) of the EP Act still apply. All PMLUs transitioned into the PRCP Schedule must still meet the requirements of a PMLU explained in this section, particularly that the PMLU can be rehabilitated to a stable condition.*

*Where PMLUs have not been pre-approved, the applicant must include all of the requirements stated in this section.*

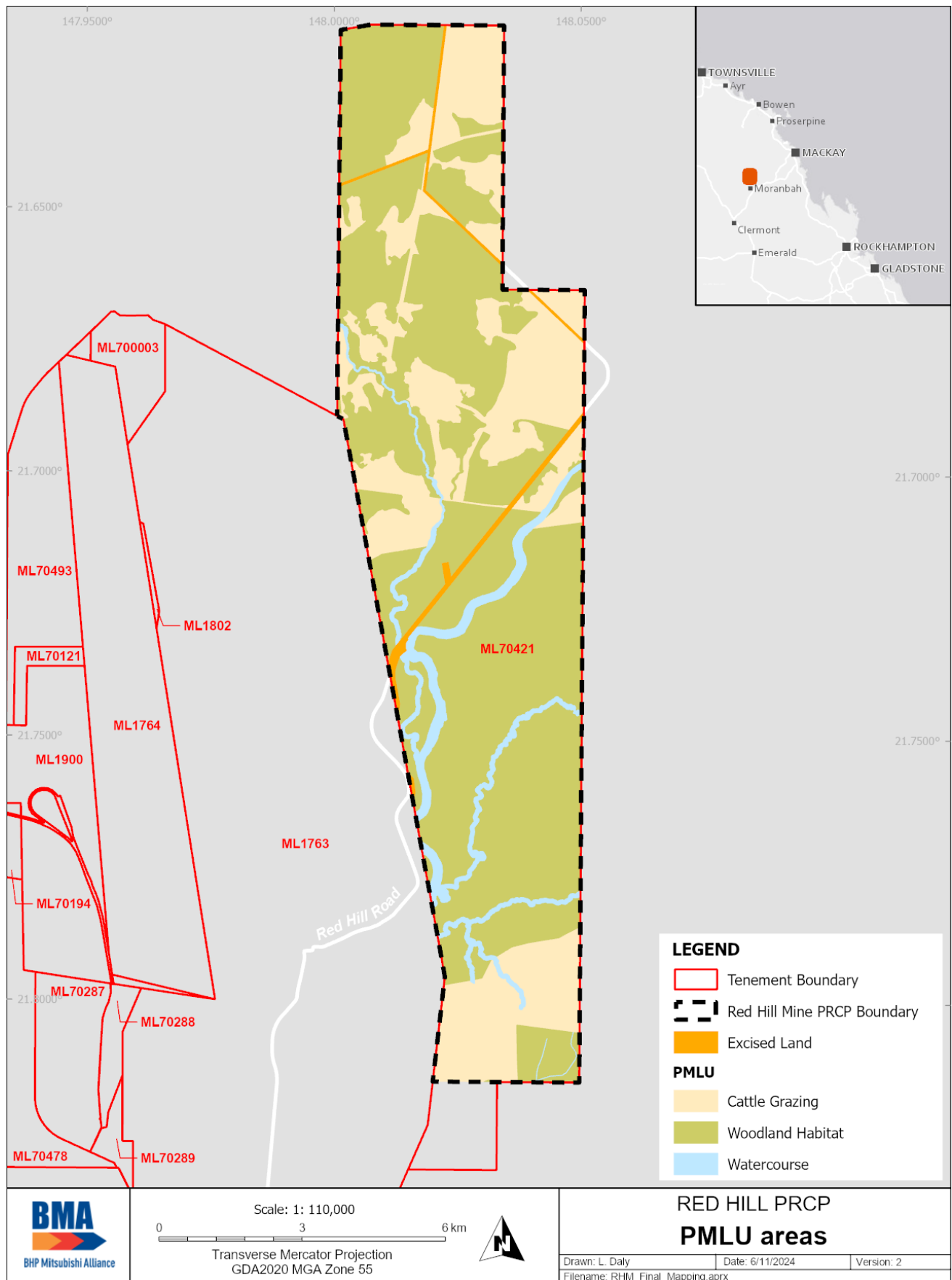
#### 3.1 Nominated PMLUs

A number of PMLUs are permitted for RHM under the EA (Table F1 in the RHM EA), of which the following three are proposed as PMLUs at RHM:

- Cattle grazing
- Woodland habitat
- Watercourse

The proposed PMLUs are illustrated in Figure 13 and have been recommended based on the closure landform, existing vegetation, ecological values, pre-mining land uses and the outcomes of the rehabilitation and closure studies supporting this PRCP.

There is minimal planned disturbance to soil and changes to the landform, and therefore the proposed PMLUs are expected to be substantially unchanged from pre-mining except for the effects of subsidence, which will alter the topography and surface drainage patterns. The proposed PMLUs are consistent with the RHM EIS, which proposed grazing within a mosaic of bushland, native and non-native grassland and ponded areas (BMA, 2013b).



**Figure 13: RHM PMLUs**



### 3.1.1 Cattle grazing

The EA objectives, indicators and acceptance criteria for cattle grazing PMLU are listed in Table 15. As the RHM EA is an approved LOD, BMA has transitioned the relevant EA acceptance criteria, as per the legislative intent of the transitional provisions, to the final milestone criteria of achievement of the PMLU to a stable condition of cattle grazing (RM13).

At RHM, cattle grazing PMLU is predominately planned for infrastructure areas where there was clearing for agricultural land uses prior to mining. For areas not planned to be disturbed by mining activities, cattle grazing is also planned where there has been extensive clearing, and the area is currently grazed.

**Table 15: RHM EA post-mine land use objectives, indicators and acceptance criteria: cattle grazing**

| Goal                            | Objective                                                                                                                       | Indicator                                            | Acceptance criteria                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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               | 1. Groundcover >50%<br>2. 70% of slopes ≤20%                                                                                                                                                                                                                                                                                                                                                                                       |
| Non-polluting                   | Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters                             | pH<br>EC<br>Turbidity                                | Not significantly different to upstream values                                                                                                                                                                                                                                                                                                                                                                                     |
|                                 | Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater                                    | EC                                                   | Not significantly different to:<br>a) The <i>Environmental Protection (Water) Policy 2009</i> schedule documents water quality objectives for relevant groundwater chemistry zones; or<br>b) Local water quality objectives developed in accordance with the Queensland Water Quality Guidelines.                                                                                                                                  |
| Able to sustain the agreed PMLU | Rehabilitation is suitable for sustainable cattle grazing                                                                       | Land suitability assessment (LSA) for cattle grazing | Land suitability class ≤3 or not different from pre-mining class if ≥4. Assessment completed in accordance with <i>LSA Framework for Open-Cut Coal Mine Rehabilitation 2018 (A rule-set for LSA sustainable beef cattle grazing on land rehabilitated after open cut coal mining in the Bowen Basin Queensland)</i> unless otherwise agreed in writing between the administering authority and the environmental authority holder. |

| Goal | Objective | Indicator             | Acceptance criteria                                                     |
|------|-----------|-----------------------|-------------------------------------------------------------------------|
|      |           | Leucaena stem density | <250 stems >2m height per ha (1 per 40m <sup>2</sup> ), mean total area |

### 3.1.1.1 Pre-mining cattle grazing land suitability class

The EA acceptance criteria refers to the pre-mining land suitability class. The pre-mining land suitability for cattle grazing was assessed as part of the RHM EIS (BMA, 2013b; BMA, 2013a) in accordance with the *Guidelines for Agricultural Land Evaluation in Queensland* (DPI, 1990) and is detailed in Section 1.2.6.1. Land suitability decreases progressively from Class 1 (suitable land with negligible limitations) to Class 5 (unsuitable land with extreme limitations).

The RHM EIS assessment of land suitability pre- and post-mining indicated that land suitability class would change in some areas from suitable grazing land (Classes 2 and 3) to unsuitable for agricultural activities (Class 5) due to the modelled impact of ponding (BMA, 2013b). However, for areas impacted by subsidence, the proposed PMLU in the PRCP is woodland habitat.

### 3.1.1.2 Post-mining cattle grazing land suitability class

The post-mining cattle grazing land suitability assessment referred to in the EA acceptance criteria was *A rule-set for land suitability assessment of sustainable beef cattle grazing on land rehabilitated after open-cut coal mining in the Bowen Basin Queensland*, developed by Short (2018).

The PRCP milestone criteria for achieving the PMLU to a stable condition for cattle grazing (RM13) will be assessed according to the land suitability framework presented in the *Rehabilitated mined land suitability for beef cattle grazing in the Bowen Basin: Technical Paper* (Short, 2025) from the Office of the Queensland Mine Rehabilitation Commissioner (Table 16). This land suitability framework has minor changes from the rule-set referred to in the EA (Table 15) and will be adopted for the PRCP to align with the leading practice paper.

Rehabilitation activities will aim to achieve a land suitability class of 3 or better. However, monitoring of cattle grazing reference sites has shown that land within RHM and in the broader area often decreases to class 4 and class 5 due to various limitations. Therefore, cattle grazing rehabilitation at RHM can be class  $\geq 4$ , if not different to pre-mining (as per the EA acceptance criteria).

Reference sites (Section 8.4) will also be assessed according to the land suitability framework (Table 16) to enable a comparison between the performance of cattle grazing rehabilitation and the representative cattle grazing land suitability class of the broader area.

**Table 16: Regional land suitability framework for beef cattle grazing PMLU rehabilitation in the Bowen Basin (Short, 2025)**

| Limitation                         | Indicator                                                      | Suitable          |                     |               | Unsuitable        |         |
|------------------------------------|----------------------------------------------------------------|-------------------|---------------------|---------------|-------------------|---------|
|                                    |                                                                | Class 1           | Class 2             | Class 3       | Class 4           | Class 5 |
| Water availability                 | Soil water storage (mm)                                        | >75               | 75 - 60             | <60 - 40      | <40 - 30          | <30     |
| Nutrient deficiency                | Available-P (mg/kg) in 0-0.1m depth increment                  | >20               | 20 - 14             | <14 - 8       | <8 - 4            | <4      |
| Nutrient availability and toxicity | pH in 0-0.1m depth increment                                   | 7.3 - 6.6         | < 6.6 - 6.0         | <6.0 - 5.6    | <5.6 - 5.0        | <5.0    |
|                                    |                                                                |                   | >7.3 - 7.9          | >7.9 - 8.4    | >8.4 - 9.0        | >9.0    |
| Surface condition                  | Surface condition                                              | Fine (peds <10mm) | Coarse (peds >10mm) | Surface crust | Very hard setting | Massive |
| Salinity                           | ECe (dS/m) in Effective rooting depth (0-0.6m depth increment) | <2                | 2 - 4               | >4 - 10       | >10 - 16          | >16     |
| Rockiness                          | Gravel, 20 - 60mm (%)                                          | <20               | 20 - 50             | >50 - 70      | >70 - 85          | >85     |
|                                    | Cobble, 60 - 200mm (%)                                         | <10               | 10 - 20             | >20 - 50      | >50 - 75          | >75     |
|                                    | Stone, 200 - 600mm (%)                                         | <2                | 2 - 10              | >10 - 20      | >20 - 50          | >50     |
|                                    | Boulders, >600mm (%)                                           | 0                 | <2                  | 2 - 10        | >10 - 20          | >20     |
| Slope gradient                     | Slope gradient (%)                                             | <5                | 5 - 10              | >10 - 15      | >15 - 20          | >20     |
| Microrelief                        | Vertical (m)                                                   | 0                 | <0.2                | 0.2 - 0.4     | >0.4 - 0.6        | >0.6    |
| Water erosion                      | Slope (%), ESP <6 (%) in 0-0.1m soil depth increment           | <5                | 5 - 8               | >8 - 12       | >12 - 18          | >18     |
|                                    | Slope (%), ESP >6-14 (%) in 0-0.1m soil depth increment        | <3                | 3 - 6               | >6 - 10       | >10 - 12          | >12     |
|                                    | Slope (%), ESP >14 (%) in 0-0.1m soil depth increment          | <1                | 1 - 2               | >2 - 4        | >4 - 6            | >6      |
| Sub-soil erosion                   | ESP (%) at 0.5m depth                                          | <6                | 6 - 14              | >14 - 23      | >23 - 34          | >34     |
| Potentially acid forming materials | Strongly acid conditions (pH < 4.5) within (x) m depth         | >3                | 3 - 2               | <2 - 0.9      | <0.9 - 0.6        | <0.6    |

### 3.1.2 Woodland habitat

The EA objectives, indicators and acceptance criteria for a woodland habitat PMLU are listed in Table 17. As the RHM EA is an approved LOD, BMA has transitioned the relevant EA acceptance criteria, as per the legislative intent of the transitional provisions, to the final milestone of achievement of the PMLU to a stable condition of woodland habitat (RM14).

At RHM, woodland habitat PMLU is planned for areas related to underground mining or subsidence, including remnant vegetation and some cleared areas. For undisturbed areas, woodland habitat has been proposed where remnant or regrowth REs were mapped in the recent ecology survey (ELA, 2023). Consistent with the RHM EIS, the proposed PMLUs are a mosaic of grazing, bushland, native and non-native grassland and potentially ponded areas, however the inclusion of regrowth REs has contributed to an increased amount of woodland habitat PMLU.

**Table 17: RHM EA PMLU, indicators and acceptance criteria: woodland habitat**

| Goal                        | Objective                                                                                                                       | Indicator                         | Acceptance criteria                                                                                                                                                                                                                                                                               |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 unless an alternative is justified by an appropriately qualified person                                                                                                                                                                                                                      |
|                             | 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<br>EC<br>Turbidity             | Not significantly different to upstream values                                                                                                                                                                                                                                                    |
|                             | Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater                                    | EC                                | Not significantly different to:<br>a) the <i>Environmental Protection (Water) Policy 2009</i> schedule documents water quality objectives for relevant groundwater chemistry zones; or<br>b) local water quality objectives developed in accordance with the Queensland Water Quality Guidelines. |
|                             | Native bushland characteristics                                                                                                 | Species richness:<br>Trees        | ≥2                                                                                                                                                                                                                                                                                                |

| Goal                                           | Objective | Indicator         | Acceptance criteria |
|------------------------------------------------|-----------|-------------------|---------------------|
| Able to sustain an agreed post-mining land use |           | Shrubs            | ≥3                  |
|                                                |           | Grasses           | ≥4                  |
|                                                |           | Tree canopy cover | ≥16 %               |

### 3.1.3 Watercourse

The EA objectives, indicators and acceptance criteria for a watercourse PMLU are listed in Table 18. These criteria were developed specifically for diversions, although they can be applied to watercourse rehabilitation. As the RHM EA is an approved LOD, BMA has transitioned the relevant EA acceptance criteria, as per the legislative intent of the transitional provisions, to the final milestone of achievement of the PMLU to a stable condition of watercourse (RM15).

The watercourses that transverse through RHM are assigned a watercourse PMLU. These include Isaac River, Goonyella Creek and Twelve Mile Gully, as well as small drainage lines (Section 1.2.4).

The lateral limits of the watercourse PMLU were defined based on the following considerations:

- Aerial imagery of the watercourses and associated riparian vegetation/REs (Section 1.2.8)
- Strahler stream orders (Section 1.2.4)
- Flood modelling (Section 6.1.2)

The disturbed areas within the watercourse PMLU include the subsidence impacted areas and various creek crossings.

**Table 18: RHM EA PMLU objectives, indicators and acceptance criteria: watercourse**

| Goal                                           | Objective                                                                                                                       | Indicator                                                    | Acceptance criteria                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|
| 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 erosionally stable                                                                                            | Geomorphic index (Index of Diversion Condition (IDC) method) | Greater or equal to upstream or downstream values |
| Non-polluting                                  | Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters                             | pH<br>EC<br>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 |

## 3.2 Community considerations

The PMLUs of cattle grazing, woodland habitat and watercourse as presented in the EA and this PRCP, is consistent with the outcomes of community consultation completed to date (Section 2). No concerns on these proposed PMLUs were raised during community consultation, including:



- Consultation with BBAC – the PMLUs have been discussed with the BBAC as part of ongoing consultation regarding the development of the PRCPs. This consultation included discussion on opportunity for BBAC's involvement in rehabilitation activities as it relates to the proposed PMLUs, specifically on the provision of seed and contracting opportunities for rehabilitation execution.
- Consultation with IRC – BMA has provided regular PRCP briefings to the IRC which have detailed that the proposed PMLUs as per the EA, are being transitioned into the PRCP. IRC and BMA have agreed to continue to engage on future opportunities, challenges and community aspirations, relevant to mine rehabilitation and closure as they develop.

### 3.3 Regional planning integration

The PMLUs at RHM consider pre-mining land uses, the final landform and already approved PMLUs in the RHM EA (Section 3.1).

Under the Isaac Regional Planning Scheme (Isaac Regional Council, 2021), RHM is located in a rural zone. This includes primary production uses (such as cropping, intensive horticulture, aquaculture, grazing, intensive animal industries, animal husbandry and animal keeping), renewable energy facilities and extractive industries, outdoor recreation and small-scale tourism facilities. The purpose of the rural zone includes providing *“for other uses and activities that are compatible with: (i) existing and future rural uses and activities; and (ii) the character and environmental features of the zone...”* (Isaac Regional Council, 2021).

Land use performance outcomes (PO11) for this rural zone include ensuring development:

- ‘(a) is consistent with the rural character of the locality;*
- (b) supports the primary rural function of the zone;*
- (c) protects rural, natural and scenic values of the locality; and*
- (d) includes boundary re-alignments where used to align with mining or petroleum tenements’.*

Concurrently, the Queensland Government, via its Mackay, Isaac and Whitsunday Regional Plan (DLGP, 2012), maps RHM in a regional landscape and rural production area, which includes land used for agriculture, natural economic resources (including extractive resources), water catchment, traditional uses, conservation areas and native forests.

The defined uses for both of these regional plans are consistent with the PMLUs proposed for RHM.

#### Relationship with PRCP schedule

The proposed PMLUs for RHM are consistent with pre-mining land uses, current adjacent land uses and PMLUs already approved as part of the RHM EA. These PMLUs can also be aligned to future land use development outcomes defined as part of State and regional plans.

The PMLU extents consider the closure landform, growth media, pre-mining land uses, existing vegetation, ecological values, watercourses and surrounding public infrastructure.

## 4 NON-USE MANAGEMENT AREAS

#### Legislative Requirement

*In accordance with sections 126C(1)(d), (g) and (h) of the EP Act, for each proposed non-use management area, the rehabilitation planning part of the PRC Plan must:*

- *state the reasons the applicant considers the area cannot be rehabilitated to a stable condition*
- *include copies of reports or other evidence relied on by the applicant for each proposed non-use management area*
- *state the extent to which the proposed non-use management area is consistent with the outcome of consultation with the community in developing the plan, and*
- *state the extent to which the non-use management area is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.*

#### **PRCP Guideline (Section 3.3)**

A NUMA is defined in the EP Act as an area of land the subject of a PRC Plan that cannot be rehabilitated to a stable condition after all relevant activities for the PRC Plan carried out on the land have ended. Proposed NUMAs must be justified under the criteria set out in section 126D(2) of the EP Act.

The rehabilitation planning part of the PRC Plan must also include:

- a) information demonstrating that the proposed footprint of each NUMA is as small as practicable
- b) an assessment of the NUMA location options, having regard to the constraint of the resource location, with an analysis of the potential environmental harm and sensitivity of the surrounding environment of each option
- c) a description of the proposed location of each NUMA and the environmental values of the surrounding environment
- d) evidence showing how the proposed location will prevent or minimise environmental harm.

In accordance with section 126D(1)(c) of the EP Act, the applicant must develop and implement management milestones within the PRCP Schedule which achieve best practice management and minimise environmental harm for any NUMAs contained in the proposed PRC Plan. As part of the development of management milestones, the applicant must conduct a NUMA specific risk assessment to identify and quantify risks and associated controls. The risk assessment should have an overarching goal of identifying and controlling any significant risks to the community and the environment.

Where a NUMA has already been identified in a land outcome document and is able to be transitioned into the PRCP Schedule, the applicant is not required to comply with sections 126C(1)(g) or (h) or 126D(2) or (3) of the EP Act. NUMAs transitioned into the PRCP Schedule are not required to complete the information requirements under section 126C(1)(j) of the EP Act in this section for those NUMAs. However, the legislative requirements under section 126C(1)(d) of the EP Act still apply.

Where a NUMA has not been pre-approved and is proposed as part of the transition into the PRC Plan, the applicant must include all of the requirements identified in this section.

No NUMA areas are proposed at RHM.

## **5 VOIDS IN FLOOD PLAINS**

#### **Legislative Requirement**

In accordance with section 126D(3) of the EP Act, if land the subject of the proposed PRCP Schedule will contain a void situated wholly or partly in a flood plain, the schedule must provide for the rehabilitation of the land to a stable condition.

#### **PRCP Guideline (Section 3.4)**

Section 41C of the EP Regulation states the decision considerations for a void situated wholly or partly in a flood plain. A void is considered to be located in a flood plain if the flood plain modelling shows that, when all relevant activities carried out on the land have ended, the land is the same height as, or lower than, the level modelled as the peak water level 0.1% AEP for a relevant watercourse under the guideline Australian Rainfall and Runoff (2019)(ARR).

Where a land outcome document has a pre-approved land outcome for a void with a location specified, flood plain modelling is not required. If a void has been identified as a NUMA in a land outcome document but the location is not identified, the applicant is required to carry out flood plain modelling in accordance with this section of the guideline. While the provision in the EP Act relating to voids located within a floodplain having to rehabilitate to a stable condition does not apply, the PRC Plan must include how the proposed location of the void minimises risks to the environment. Therefore, the flood plain modelling is required to support the assessment of the proposed location of the void.

If there are no land outcomes identified in a land outcome document, the applicant is required to carry out flood plain modelling in accordance with this section of the guideline.

No voids are planned at RHM, therefore a void in flood plain assessment has not been undertaken.

## 6 REHABILITATION AND MANAGEMENT METHODOLOGY

### Legislative Requirement

In accordance with section 126C(1)(e) and (i), the rehabilitation planning part of the PRC Plan must:

- For each proposed post-mining land use for land, state the proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP Schedule.
- For each proposed non-use management area, state the proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP Schedule for the area.

### PRCP Guideline (Section 3.6)

The proposed rehabilitation or management methodologies will underpin the development of the milestone criteria and support how the proposed PMLU will be achieved or the NUMA will be managed. As per section 126C(1)(j) of the EP Act, the administering authority requires information describing how the proposed rehabilitation or management methodologies have been developed and will be implemented.

This section identifies a number of studies or reports that must be provided in the proposed PRC Plan. If any of the required information outlined below is not relevant to the specific operation, the applicant must provide justification in the PRC Plan outlining why the information is not required.

### PRCP Guideline (Section 3.6.1)

This section outlines the range of information that the administering authority considers is necessary to underpin the development of the rehabilitation or management methodologies applicable to new and existing mines for most domains. The applicant must include the information as appendices to the rehabilitation planning part.

## 6.1 General rehabilitation practices

### 6.1.1 Hydrogeology

#### PRCP Guideline (Section 3.6.1)

Assess the hydrogeology of the site and all connected strata, and develop a conceptual model of the mine site's groundwater systems. This information must be integrated into the design of rehabilitation strategies and choice of PMLU or NUMA.

A hydrogeological assessment including conceptual and numerical modelling, has been undertaken to support the development of this PRCP. The detailed report – *Transitional Progressive Rehabilitation and Closure Plan – Red Hill Mine – Hydrogeology Assessment* (AECOM, 2024), is provided in Appendix D. The groundwater numerical model domain for RHM includes the MLs forming RHM, GRM and BRM, in addition to surrounding areas where the operations could influence groundwater conditions. As the operations at GRM and BRM have an influence on groundwater conditions at RHM, the interpretation of the hydrogeological conditions presented within this PRCP collectively considers these neighbouring mining operations.

The key hydrogeological units present within and immediately surrounding RHM are detailed in Section 1.2.5 and include:

- Quaternary alluvial - unconfined aquifer (sporadic discontinuous water-bearing strata of permeable unconsolidated sand or gravel) localised at and near to the Isaac River, Eureka Creek, and Goonyella Creek, and more regionally along the Isaac River
- Tertiary sediments - consisting of clay, silt, sand, gravel, colluvium, fluvial, and lacustrine deposits. Unconfined discontinuous aquifer with groundwater generally restricted to more porous media that overlies Permian units
- Permian coal measures - low permeability interburden/overburden units with aquitard properties and coal seams that exhibit water bearing properties primarily associated with secondary porosity through cleats and fracturing

### 6.1.1.1 Groundwater modelling

To support the assessment of potential groundwater impacts, numerical groundwater modelling was undertaken in accordance with the Australian Groundwater Modelling Guidelines (Barnett, et al., 2012), the Murray Darling Basin Commission Groundwater Flow Modelling Guideline (Aquaterra, 2001) and the Independent Expert Scientific Committee Explanatory Note for Uncertainty Analysis (IESC, 2018). The numerical groundwater model was adapted from the existing 2013 RHM groundwater model, which had been built using MODFLOW-SURFACT™ modelling package. The numerical groundwater model was updated to: reflect current available data; increase the model domain providing coverage for the area of interest; incorporate the PRCP closure landform/mining progression; and to achieve alignment with updates to the Australian Groundwater Modelling Guidelines.

The model update utilised MODHMS® (Hydrogeologic Inc., USA) that extends on the original MODFLOW-SURFACT™ modelling package to enhance the simulation capabilities and robustness. MODHMS® is based on the standard MODFLOW groundwater modelling code. The MODFLOW code was developed by the United States Geological Survey (McDonald and Harbaugh 1984) for three-dimensional, groundwater flow modelling. The MODFLOW code is the most widely used code for groundwater modelling and is considered an industry standard.

The objectives of the groundwater modelling, as required for input into the PRCP, were to:

- Assess the potential groundwater related impacts at completion of mining and until conditions stabilise post rehabilitation
- Assist in demonstrating the suitability of the closure landform for the PMLUs
- Demonstrate the closure landform is non-polluting with respect to potential poor-quality groundwater
- Demonstrate that groundwater receptors post-closure are not adversely impacted by the closure landform

The model layer elevations in the refined-grid area were generated based on the RHM, GRM and BRM geological model, and publicly available data outside of the BMA geological model domain. The groundwater numerical model layers utilised are summarised in Table 19.

**Table 19: Numerical groundwater model layers**

| Layer | Unit               |
|-------|--------------------|
| 1     | Tertiary, alluvium |
| 2     | FCCM               |
| 3     | Overburden         |
| 4     | GUS coal seam      |
| 5     | Interburden        |
| 6     | GP1 coal seam      |
| 7     | Interburden        |
| 8     | GP2 coal seam      |
| 9     | Interburden        |
| 10    | GMS coal seam      |
| 11    | Interburden        |

| Layer | Unit             |
|-------|------------------|
| 12    | GLS coal seam    |
| 13    | Underburden      |
| 14    | Back Creek Group |

Due to the influence that the neighbouring GRM residual void lakes have on post-mining groundwater conditions at RHM, the groundwater model and the GRM void water balance models were aligned through an iterative modelling approach. The iterative alignment approach included the inclusion of the water balance model void lake outputs within the groundwater model, the groundwater model was re-run to refine the groundwater inflows to the voids, which were then used to re-run the water balance model. This process was repeated until the variance between the iterations in the model outputs indicated an appropriate level of alignment had been achieved.

Further details on the model build, calibration and design are contained in Appendix D.

#### **6.1.1.2 Groundwater levels**

As mining operations commenced at the neighbouring GRM in 1971, prior to available data on groundwater levels for the area, a pre-mining groundwater potentiometric surface cannot be determined based on groundwater monitoring data. However, groundwater within the alluvial and Tertiary sediments are expected to have been a subdued reflection of topography and the Permian aquifers are expected to have flowed in a south easterly direction in line with the coal seam dip and the sub-crops on the western extent.

Groundwater model simulations of groundwater recovery in the post-mining environment have been undertaken and are detailed in Appendix D.

Groundwater within the alluvium and Tertiary sediments at RHM are recharged predominantly from precipitation and losing streams and are relatively disconnected from the underlying Permian hosted aquifers due to the low hydraulic conductivity of the Permian overburden. As a result, the groundwater numerical model predictions indicate there is limited to no change in post-mining groundwater levels compared to the current conditions within the alluvium and associated potential GDE locations. Drawdown of groundwater in the Tertiary sediments in the proximity of the GRM residual voids is expected to be maintained post-mining.

Modelling of the GMS groundwater levels (Plate 40 of Appendix D) indicated the following:

- Groundwater is drawn down during the RHM operations in the GMS because of mine dewatering activities. Subsequent flooding of the RHM underground workings increases the rate of post-mining groundwater recovery and results in hydraulic gradients that direct groundwater flows to the immediately adjacent GRM Goonyella Pit residual void
- The GMS groundwater levels are predicted to remain drawn down across RHM as a result of the GRM residual voids which maintain an inward hydraulic gradient centred on the Goonyella Pit residual void
- The lower groundwater levels in the GMS are not predicted to induce flows from the Back Creek Group and Tertiary materials

Modelling of the GLS groundwater levels (Plate 41 of Appendix D) indicated the following:

- The underground mining operations at RHM influence GLS groundwater levels at the GRM and BRM site. The dewatering and depressurisation at RHM, lower GLS groundwater levels surrounding the underground workings. Post-mining flooding of the RHM underground workings increases the rate of groundwater recovery in the GLS and forms inward hydraulic gradients to the GRM Goonyella Pit residual void
- The GRM Goonyella Pit residual void located immediately to the west of RHM, maintains a drawdown in the GLS through the RHM tenure and an inward hydraulic gradient upon stabilisation of groundwater levels post-mining



Groundwater levels at the registered supply bores within 20km of the RHM mining area (Figure 64 of Appendix D), identified one bore that will be adversely impacted post-mining. Groundwater bore RN182313 (Cleanskin Gully bore), which was drilled to 25.34 m and intersects FCCM, is located adjacent to the Goonyella Pit residual void high-wall in the proximity of the ML boundary between GRM and RHM. Groundwater at this location will be drawn down beyond the depth of the bore. Noting this bore is located within the BMA operational area and adjacent to the Goonyella high-wall, therefore the on-going use of this bore for supply purposes is considered implausible.

#### **6.1.1.3 Flow path simulation**

An assessment of the potential contaminant migration paths within groundwater were assessed through particle tracking simulation within the groundwater model, which is detailed in Section 15.6 of Appendix D.

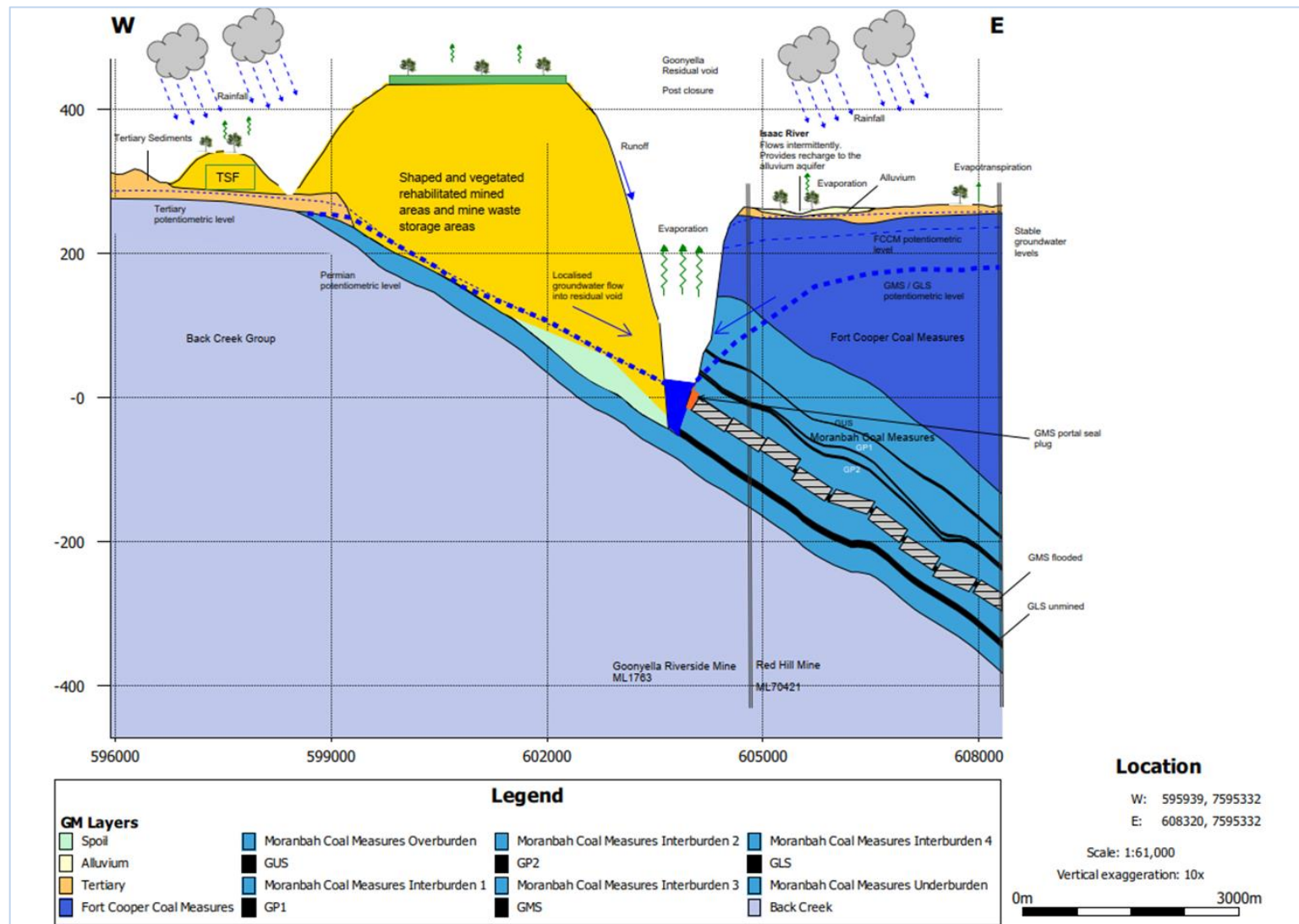
The particle tracking simulation indicates that particles located to the east of the GRM Goonyella Pit residual void and in the proximity of the RHM underground workings, migrate to the west towards the Goonyella Pit residual void in the post-mining environment. This confirms the GRM Goonyella Pit residual void maintains an inward hydraulic gradient and does not result in the migration of the water contained within the void's lake into RHM.

#### **6.1.1.4 Post-mining conceptual site model**

An evaluation of the source-pathway-receptor linkages based on the modelling results for the post-mining environment, where groundwater conditions have stabilised, has identified the following key features:

- The neighbouring GRM Goonyella Pit residual void lake height remains below the surrounding groundwater elevations for all RHM impacted hydrostratigraphic units creating an inward hydraulic gradient towards to the residual void
- Little to no additional impact on surficial aquifers, including the Isaac River alluvium, caused by the closure landform
- Little to no impact on environmental (GDEs) receptors caused by the closure landform
- A single groundwater supply bore located in the proximity of the Goonyella Pit residual void high-wall has been identified to become dry with time. No other anthropogenic receptors are identified to be impacted by the PRCP closure landform

A visual representation of the post-mining conceptual site model is provided in Figure 14.



**Figure 14: Post-mining conceptual site model (AECOM, 2024)**

### Relationship with PRCP schedule

Groundwater, once stabilised, will have an inward hydraulic gradient towards the immediately adjacent GRM Goonyella Pit residual void. The closure landform will have little to no additional impact to environmental or anthropogenic receptors. Groundwater is not anticipated to require any active management post-mining.

## 6.1.2 Flooding

### PRCP Guideline (Section 3.6.1)

*Section 3.4 of this guideline requires flood plain modelling for the purpose of voids located within a flood plain being rehabilitated to a stable condition. In addition to this, the applicant must also assess the flooding susceptibility and influence across the site. If flooding is a consideration, develop a hydrologic model of the catchment and a hydraulic model of the proposed mining area. Knowledge of flooding is integral to the rehabilitation planning process, including the placement and design of mine domains.*

A rehabilitation flood assessment, including hydrologic and hydraulic modelling for a range of design storm events and development of a flooding risk profile, has been undertaken to support the development of this PRCP. The detailed report – *Red Hill Mine Progressive Rehabilitation and Closure Plan Rehabilitation Flood Assessment* (SLR, 2024), is provided in Appendix G.

The flood modelling was undertaken on an iterative approach with the closure landform design development. Information from the initial round of rehabilitation flood modelling was used to design conceptual drainage and backfill in subsidence areas to reduce potential adverse impacts associated with the final closure landform. Upon finalising the landform design, the flood modelling was re-run and the flood risk profile and other interpretations amended to reflect the final closure landform design.

### 6.1.2.1 Flood modelling

A review of the watercourses in the vicinity of RHM was undertaken using hydrologic streamline data sourced from DoR. The following watercourses were identified as potentially having flood extents that could interact with RHM:

- Isaac River
- Twelve Mile Gully
- Goonyella Creek

#### Hydrologic model

A hydrologic model was developed for the RHM catchments using Watershed Bounded Network Model (WBNM) Version 2017. The rainfall-runoff routing program, Storm Injector Version 1.3.9.0 was utilised to assist in setup and analysis of Australian Rainfall and Runoff design storm ensembles and to review model results.

The hydrologic model covers a total area of 1,240km<sup>2</sup>. Catchment land use was adopted based on the final landform and aerial imagery, with a predominant land use assessed to be rural. Therefore, the majority of the catchment was modelled as fully pervious.

The WBNM model was simulated for the 39%, 2%, 1%, 0.1% Annual Exceedance Probability (AEP) and probable maximum flood (PMF) events with a range of storm durations between 1 hour to 48 hours and 10 temporal patterns for each duration in accordance with Australian Rainfall and Runoff.

Flood frequency analysis was undertaken for the gauge at Isaac River at Burton Gorge (130402A). Data for this gauge is available between 1964 and 1988 (24 years). A second gauging station was considered, Isaac River at Goonyella gauge (13414A), however due to the construction of the Burton Gorge Dam in 1992, the data from this stream gauging station was considered not suitable for flood frequency analysis.

Validation assessment of the WBNM model indicated the results were comparable to the peak flows from the flood frequency analysis, regional flood frequency estimation at the Burton Gorge and the previous WRM (2019) assessment, although the outcome suggests that the 0.1% AEP results may be conservative on the high side. It was therefore considered the WBNM model was suitable for the intended purpose.

### Hydraulic model

2-dimensional hydraulic modelling was undertaken as part of the assessment, including:

- Fluvial model to quantify flooding conditions within the Isaac River, for a range of design storm events. The results of the model were utilised to assess the risk of inundation of the GRM residual voids as a result of the RHM landform and stability of the final landform.
- Pluvial model to simulate local catchment rainfall runoff behaviour over the areas of the final landform where subsidence will potentially occur. A direct rainfall (Rain-on-Grid) approach was applied. The model results were utilised to investigate potential ponding in subsidence areas.

The hydrodynamic modelling software TUFLOW (Build 2023-03-AE) was used for the hydraulic modelling.

The fluvial model set up utilised the closure landform and a model grid size of 10m. Two hydraulic structures were included in the model, which were associated with culverts under Goonyella Road and the Coppabella to North Goonyella section of the Goonyella System rail alignment. The fluvial model was used to simulate a range of design storm events including 39%, 2%, 1%, 0.1% AEP and PMF. Three climate change scenarios (6%, 11% and 20% increase in rainfall intensities) were also run for the 0.1% AEP.

Pluvial hydraulic modelling was undertaken for the area potentially subject to subsidence from underground mining as part of the RHM operations (Section 6.4.1). The pluvial modelling was used to identify inundation areas and inform changes to the landform to minimise the potential for impacts from inundation within the underground subsidence areas. The pluvial modelling set up utilised evaporation data from the State government SILO database Long Paddock (Queensland Government, 2024) (average evaporation rate 5.52mm/day, or 0.23mm/h) and RHM soil types (Landloch, 2024). Soil types were converted to the corresponding United States Department of Agriculture soil types which are used in the TUFLOW software.

Within the RHM subsidence area, a combination of conceptual drains and partial backfill have been incorporated to limit potential depths of inundation and residual ponding. Where reasonably practical and outside of the watercourse alignments, the modelled depth of inundation was designed to target 1m or less in a 2% AEP event, which achieves a predominantly free draining landform. Free draining of the subsidence panels for the purpose of this assessment is where the landform sheds the majority of the surface water from the landform and towards the local drainage lines, and where any residual collection of water on the landform does not persist for more than one month under typical dry weather conditions.

Within the existing watercourse alignments, water depths may exceed 1m in a 2% AEP event and residual ponding was considered consistent with the PMLU of watercourse.

The conceptual design of the backfill and cutting of drains, where reasonably practical, limited surface disturbance, interference with endangered REs and limited disturbance of the banks of the Isaac River.

#### 6.1.2.2 Fluvial food levels and rehabilitation domains

The fluvial TUFLOW model results are included in Appendix G (Figures 5-6 to 5-8 and B-1-1 to B-8-3). The results indicate the RHM subsidence areas are located within the Isaac River floodplain with the tributaries Twelve Mile Creek and Goonyella Creek breaking their banks from the 39% AEP event. Inundation post-mining will be reflective of the subsidence landform with greater depth and lateral extent within the subsided panels.

Outside of the watercourse channels, the velocities of the floodwaters are generally low (<1m/s). The water velocities within the watercourses are consistent with velocities identified upstream and downstream of RHM and are considered reflective of natural conditions.

It is noted the Burton Dam located upstream of RHM does provide some flood mitigation and reduces natural flood heights in the proximity of the site.

#### 6.1.2.3 Pluvial pond in subsidence area

The pluvial model results, included in Appendix G (Figures 5-9 and C1-1-1 to C1-1-3), show the inundation depths in subsidence areas are equal to or less than 1m in the 2% AEP event, except for within the alignments of the watercourses and within one pre-existing farm dam. It is expected that natural sediment transport and deposition processes, that occur during flows within the watercourses, will result in the self-healing of

subsidence areas within the watercourses over time. The presence of ponding within the watercourse alignments is considered consistent with the PMLU of watercourse.

Outside of the watercourse alignments and the existing farm dam, the limiting of inundation within the subsidence areas was achieved through the inclusion of conceptual backfill and installation of drains to allow for drainage overland to the watercourses (Figure 5-3 of Appendix G). The conceptual design of the partial backfill and cutting of drains has limited the number of disturbance locations on the banks of the Isaac River and the level of surface disturbance required to achieve a reduction in inundation depth. The incorporation of the conceptual backfill and drains achieves a peak inundation depth of 1m in a 2% AEP event and provides a landform that is predominantly free draining back to the watercourses.

The subsidence modelling results (Section 6.4.1.1) are a conservative estimate, and actual depths will vary to that presented in the subsidence model. Therefore, the proposed backfill and drains cut in the subsidence landform can be considered as a proof of concept only, and further refinement and design based on actual depths of subsidence will be required.

#### 6.1.2.4 Alteration of flows

An assessment of the alteration of flows has been undertaken to gauge potential impacts of the closure landform to surrounding land users and environments. As the landform is predominantly free draining, the pre- and post-mining catchments are consistent and therefore there will not be a significant change to flows.

Upstream flows did not change between the pre- and post-mining landforms.

#### 6.1.2.5 Flood risk profile

A flood risk profile was developed based on the rehabilitation flood modelling results. Details of the flood risk profile are contained in Appendix G and the RHM PRCP risk assessment in Section 7.

Through the iterative closure landform design and flood modelling approach, the closure landform was developed to minimise the potential for environmental harm and to create a stable landform. As a result of this process, the flood risk profile identified low risk levels associated with flooding and the RHM closure landform. Therefore, no critical controls are required.

#### Relationship with PRCP schedule

The interaction between flooding and the proposed final closure landform presents low risk. Inundation depths within the subsidence areas are managed through drains and partial backfill to achieve 1m or less of inundation and a predominantly free draining landform.

#### 6.1.3 Waste characterisation

##### **PRCP Guideline (Section 3.6.1)**

*Characterise mine wastes in a report that describes the likely physical behaviour and chemical reactivity of the waste materials under the conditions in which they would be stored. The report must address the constituent elements present, and their likely future speciation and mobility.*

*All mined material should be classified on its propensity to be potentially acid or non-acid forming, to generate neutral metalliferous or saline drainage, and its susceptibility to weathering.*

No mine waste material is planned to be dumped or disposed at RHM. Coal will be processed at the CHPPs located on GRM and BRM and the tailings and rejects disposed at GRM and BRM. Due to the underground mining method and access via GRM and BRM, no spoil will be dumped at RHM. Therefore, no mine waste materials will be stored on-site at RHM and a material characterisation assessment is not required for RHM.



## 6.1.4 Soil and capping material

### **PRCP Guideline (Section 3.6.1)**

*The rehabilitation and management methodology should include that soil assessment activities are supplemented by additional surveys conducted at appropriate intervals to assess soil resources in planned disturbance areas. In addition to the assessment of soils, the proposed rehabilitation methodologies in the rehabilitation planning part must also address topsoil management. Topsoil management must ensure sufficient topsoil quantity and quality is available in those instances that waste rock or tailings cannot support the proposed PMLU. Integrated soil and waste rock characterisation and mapping should form the foundation of the rehabilitation strategies. The available soil resources and capping material should be assessed prior to the commencement of operations.*

A soil survey and assessment were undertaken as part of the RHM EIS (Section 1.2.6). The detailed report – *Soil and Land Suitability Assessment, Red Hill Mining Lease, Environmental Impact Statement* (GSS Environmental, 2013) is provided in Appendix E.

As detailed in Section 1.2.6, there is minimal planned disturbance to soil. Topsoil stripping will be required in some exploration and infrastructure areas. Topsoil is generally not planned to be stripped in subsidence areas unless larger crack repairs or drainage works are required (Section 6.4.4).

### 6.1.4.1 Quality of available resources

Underground mining and infrastructure activities occur on the southern area of RHM where the majority of soil types 1 – 7, as detailed in Section 1.2.6, are located (Table 20). The majority of the vertosols are concentrated at the north end of RHM (Figure 7) where minimal disturbance is expected.

### 6.1.4.2 Quantity of available resources

The recommended stripping depths for the soils assessed as suitable for re-use for rehabilitation within RHM are listed in Table 20, however only limited areas will require stripping. The EIS indicated the recommended stripping depths are subject to further investigation prior to commencement of disturbance in each location (BMA, 2013b).

The disturbance areas that will require topsoil to be stripped include the accommodation village, roads, gas drainage, exploration, drainage works, general disturbance and large crack repairs within the subsidence area. The potential disturbance within each soil type and the estimated areas to be stripped are shown in Table 20.

Topsoil will be respread a minimum depth of 100mm (woodland habitat PMLU) or 150mm (cattle grazing or watercourse PMLU). Based on the recommended stripping depths, the topsoil volume balance in Table 21 indicates there will be sufficient quantity of topsoil available on-site for rehabilitation of disturbed areas within RHM.

**Table 20: Recommended topsoil stripping depth**

| Soil type # | ASC            | Topsoil stripping depth (mm) | Potential disturbance (stripping/subsidence)                                                                                                                                          |
|-------------|----------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Lithic Rudosol | 0*                           | Stripping: accommodation village and roads (~80ha)                                                                                                                                    |
| 2           | Tenosol        | 400                          | Subsidence (~200ha)                                                                                                                                                                   |
| 3a          | Red Kandosol   | 300                          | Subsidence (~260ha)<br><br>Stripping: accommodation village (~80ha) and minor areas may be required for gas drainage, subsidence drainage works, road and general disturbance (~30ha) |
| 3b          | Brown Kandosol | 500                          | Subsidence (~340ha)                                                                                                                                                                   |

| Soil type # | ASC                 | Topsoil stripping depth (mm) | Potential disturbance (stripping/subsidence)                                                                                                     |
|-------------|---------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                     |                              | Stripping: minor areas may be required for gas drainage, subsidence drainage works, roads and general disturbance (~25ha)                        |
| 5           | Brown Chromosol     | 400                          | Subsidence (~880ha)<br>Stripping: minor areas may be required for gas drainage, subsidence drainage works, roads and general disturbance (~35ha) |
| 6           | Brown Sodosol       | 250                          | Subsidence (~770ha)<br>Stripping: minor areas may be required for gas drainage, subsidence drainage works, roads and general disturbance (~45ha) |
| 7           | Brown Dermosol      | 200                          | Subsidence (~60ha)<br>Stripping: minor areas may be required for gas drainage, roads and general disturbance (~5ha)                              |
| 8a          | Shallow Vertosol    | 0*                           | Subsidence (~70ha)<br>Stripping: minor areas may be required for gas drainage, roads and general disturbance (~5ha)                              |
| 8b          | Deep Vertosol       | 0*                           | Subsidence (~20ha)                                                                                                                               |
| 8c          | Deep Salic Vertosol | 0*                           | Subsidence (~580ha)<br>Stripping: minor areas may be required for gas drainage, subsidence drainage works, roads and general disturbance (~25ha) |

\* The EIS states these soils should be stripped as required and that material is replaced when rehabilitated (BMA, 2013b)

**Table 21: Topsoil volume balance**

| Soil type #                  | Estimated area to strip (ha) | Stripping depth (mm) | Volume stripped (m <sup>3</sup> ) | Replacement depth (mm) | Volume required (m <sup>3</sup> ) |
|------------------------------|------------------------------|----------------------|-----------------------------------|------------------------|-----------------------------------|
| <b>Cattle grazing PMLU</b>   |                              |                      |                                   |                        |                                   |
| 1                            | 80                           | 0*                   | 0                                 | 150                    | 120,000                           |
| 3a                           | 80                           | 300                  | 240,000                           | 150                    | 120,000                           |
| <b>Woodland habitat PMLU</b> |                              |                      |                                   |                        |                                   |
| 3a                           | 30                           | 300                  | 90,000                            | 100                    | 30,000                            |
| 3b                           | 25                           | 500                  | 125,000                           | 100                    | 25,000                            |
| 5                            | 35                           | 400                  | 140,000                           | 100                    | 35,000                            |

| Soil type #             | Estimated area to strip (ha) | Stripping depth (mm) | Volume stripped (m <sup>3</sup> ) | Replacement depth (mm) | Volume required (m <sup>3</sup> ) |
|-------------------------|------------------------------|----------------------|-----------------------------------|------------------------|-----------------------------------|
| 6                       | 45                           | 250                  | 112,500                           | 100                    | 45,000                            |
| 7                       | 5                            | 200                  | 10,000                            | 100                    | 5,000                             |
| 8a                      | 5                            | 0*                   | 0                                 | 100                    | 5,000                             |
| 8c                      | 25                           | 0*                   | 0                                 | 100                    | 25,000                            |
| <b>Watercourse PMLU</b> |                              |                      |                                   |                        |                                   |
| 2                       | 0                            | 400                  | 0                                 | 150                    | 0                                 |
| <b>Total</b>            | <b>330</b>                   |                      | <b>717,500</b>                    |                        | <b>410,000</b>                    |

Rock may be utilised to improve the erosion resistance of drainage structures, or to rock armour inlet points into watercourse/drainage lines to limit bank or head cut erosion. Rock may be sourced from mined fresh Permian overburden and interburden from GRM, or from imported quarry material. Permian spoil may also be ameliorated to develop an alternative growth media for native woodland species in subsidence areas, where suitable.

#### 6.1.4.3 Resource management

During mining operations, topsoil will be stripped from the infrastructure areas (accommodation village, access roads and gas drainage), and where required in the exploration areas, subsidence areas for larger crack repairs and drainage works. Topsoil will be stripped according to the recommended depths from the pre-mining soil surveys (Table 20). Topsoil will be stockpiled adjacent to the disturbance area and will be respread over the area during rehabilitation. Topsoil is stripped with caution to ensure as little contamination with subsoils occurs as possible. The spatial location of stockpiles will be recorded in a geographic information system and a volume inventory maintained.

An assessment of the growth media characteristics will be completed by an appropriately qualified person (AQP) prior to rehabilitation to determine the amelioration requirements and surface treatments. The assessment will consider the topsoil qualities, landform and revegetation plan for the proposed PMLU (Section 6.1.8), and the land suitability framework (Section 3.1.1.3) when planning cattle grazing rehabilitation.

For cattle grazing PMLU, the AQP will detail the amelioration and physical treatment requirements for the topsoil to be within the relevant land suitability class parameters as per the *Rehabilitated mined land suitability for beef cattle grazing in the Bowen Basin: Technical Paper* (Short, 2025) (Table 16).

The recommended amelioration and surface treatments will be undertaken as part of the rehabilitation execution activities. The growth media depth, potential amelioration options and the surface treatments to support the establishment of vegetation for each PMLU, are shown in Table 22. Opportunities to use other amelioration and surface treatment methods may be investigated.

The relationship between soils and vegetation ecosystems for the PMLUs is detailed in Section 6.1.8.

**Table 22: Topsoil ameliorant options and surface treatments for the RHM PMLUs**

| PMLU           | Topsoil                                                                                                     | Ameliorant options                                                                                                               | Surface treatments                                                                                                                          |
|----------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Cattle crazing | Minimum depth of 150mm is sufficient to store moisture and nutrients to initiate and sustain pasture growth | <ul style="list-style-type: none"> <li>Elemental Sulphur</li> <li>Manures</li> <li>Urea</li> <li>Diammonium phosphate</li> </ul> | <ul style="list-style-type: none"> <li>Ameliorate growth media as recommended by an AQP (if required)</li> <li>Rip along contour</li> </ul> |

| PMLU             | Topsoil                                                                                                                                                                                         | Ameliorant options                                                                                                                                                                                                                             | Surface treatments                                                                                                                                                                                                                                            |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Superphosphate</li> <li>• Fertiliser</li> <li>• Gypsum</li> <li>• Incorporated organic matter</li> <li>• Surface mulching (e.g. hay mulch)</li> </ul>                                                 | <ul style="list-style-type: none"> <li>• Direct seed as per seed mixes and rates for cattle grazing revegetation (Section 6.1.8.5)</li> </ul>                                                                                                                 |
| Woodland habitat | Minimum depth of 100mm to support establishment of woodland species and to limit the effects of competition from exotic pasture species<br><br>Or<br><br>Permian spoil – minimum depth of 300mm | <ul style="list-style-type: none"> <li>• Elemental Sulphur</li> <li>• Manures</li> <li>• Superphosphate</li> <li>• Fertiliser</li> <li>• Gypsum</li> <li>• Incorporated organic matter</li> <li>• Surface mulching (e.g. hay mulch)</li> </ul> | <ul style="list-style-type: none"> <li>• Ameliorate growth media as recommended by an AQP (if required)</li> <li>• Rip along contour</li> <li>• Direct seed as per seed mixes and rates for woodland habitat revegetation (Section 6.1.8.7)</li> </ul>        |
| Watercourse      | Minimum depth of 150mm to encourage a vegetative cover to provide erosion resistance                                                                                                            | <ul style="list-style-type: none"> <li>• Elemental Sulphur</li> <li>• Manures</li> <li>• Superphosphate</li> <li>• Gypsum</li> <li>• Incorporated organic matter</li> <li>• Surface mulching (e.g. hay mulch)</li> </ul>                       | <ul style="list-style-type: none"> <li>• Ameliorate growth media as recommended by an AQP (if required)</li> <li>• Rip along contour as required</li> <li>• Direct seed as per seed mixes and rates for watercourse revegetation (Section 6.1.8.9)</li> </ul> |

#### Relationship with PRCP schedule

There is minimal planned disturbance to soil, with topsoil stripping only expected in some exploration and infrastructure areas, and where required in the subsidence areas for larger crack repairs or drainage works. Therefore, there is sufficient quantity of suitable quality topsoil available on-site for rehabilitation of disturbed areas to cattle grazing, woodland habitat and watercourse PMLUs.

An assessment of the growth media characteristics will be completed by an AQP prior to rehabilitation, to determine the amelioration and surface treatments required to achieve the planned PMLU.

### 6.1.5 Landform design

**PRCP Guideline (Section 3.6.1)**

*The final landform design must be based on the proposed PMLUs and NUMAs and demonstrate that the land will be safe and structurally stable.*

Landform design considers the reshape of all relevant activity areas after the removal of infrastructure, and prior to placement of topsoil and seed.

Due to the underground mining method and the relevant activities on-site, the final landform will not result in significant variations to the pre-mining topography or significant reshaping. The major landform change is due to subsidence (Section 6.4).

#### 6.1.5.1 3D design

The conceptual 3D closure landform for RHM prior to backfill and drainage of the subsidence areas, is reflected in the modelled subsidence, provided in Figure 17. The landform detail with the conceptual subsidence backfill and drains is shown in Appendix G Figure 5-3.

#### 6.1.5.2 Method of determining landform design

There are no significant constructed landforms at RHM. The relevant activities (Section 1.4.1) considered when determining the RHM landform design are detailed in Table 23.

Removal of infrastructure (Section 6.5) and contaminated land requirements (Section 6.5.3) will be completed where required, prior to any required backfill and/or drainage works (Sections 6.1.2.3, 6.4.3, 6.4.4) or reshaping of the final landform. Topsoil and ameliorants are applied, where required, to support the PMLU (Section 6.1.4), the area is seeded (Section 6.1.8), and monitoring and maintenance completed to ensure rehabilitation is tracking to a stable condition (Section 8).

**Table 23: Landforms at RHM and proposed designs**

| Landform                                          | Landform design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subsidence areas (RA21)                           | <ul style="list-style-type: none"> <li>Areas to be partially backfilled and/or drainage installed to limit inundation to maximum 1m depth in a 2% AEP rainfall event (Sections 6.1.2.3, 6.4.3, 6.4.4) where practical</li> <li>Subsidence results in slopes along the edges of the subsidence troughs. Modelling shows these slopes will be short (maximum vertical subsidence is 5.8m) with an average slope of 6 - 7% and maximum slopes of 10% (Section 6.4.1.1)</li> <li>As slopes are within the acceptable maximum for the PMLU, no reshaping of subsidence slopes is expected</li> </ul> |
| Infrastructure, mine dams and general areas (RA3) | <ul style="list-style-type: none"> <li>Majority of areas will be relatively flat pads created by levelling the natural ground (minimal change to pre-mining topography)</li> <li>Landforms will be reshaped to maintain pre-mining contours <math>\pm 8\text{m}</math>, and to be free draining where required for cattle grazing PMLU</li> </ul>                                                                                                                                                                                                                                               |

**Materials available for landform rehabilitation**

Topsoil details to support revegetation are included in Section 6.1.4.

**Hydrological and hydrogeological assessments**

Flooding and hydrogeology details are included in Section 6.1.2 and 6.1.1 respectively.



### 6.1.5.3 Long-term landform stability

As there are no spoil dumps at RHM, no landform evolution modelling is required. The main area of erosion risk will be associated with the slopes along the edge of the subsidence troughs. These areas have a modelled vertical depth of less than 6m with an average slope of 6 - 7%, and a maximum slope of 10% (Section 6.4.1.1). Groundcover will be used to manage the erosion risk.

To establish the vegetation cover as soon as possible and limit the window of erosion risk, the following measures are planned:

- Ripping along the contour to key the growth media with the underlying subsoil, reduce compaction, improve water infiltration and create surface roughness to slow water flow (Section 6.1.4.3)
- Application of seed at the optimal time when there is sufficient soil moisture in the profile to assist germination and sustain establishment (Sections 6.1.8.5, 6.1.8.7 and 6.1.8.9)
- Inclusion of a sterile cover crop in the seed mix, which establishes quickly on the exposed surfaces and works to provide a root system that will stabilise the surface (Sections 6.1.8.5 and 6.1.8.9)
- Surface mulching where appropriate, to provide instant groundcover (e.g. hay mulch) (Section 6.1.4.3)
- Monitoring as scheduled and maintenance as required (Section 8)

### 6.1.5.4 Quality assurance / quality control

The proposed actions referenced in Table 23 are the key controls that will be put in place to manage the landform risks associated with achieving the PMLUs. Quality assurance and quality control (QA/QC) activities are built into all necessary execution and verification activities of these controls. Monitoring and reporting processes verify controls and ensure that controls are executed effectively (Section 8).

### 6.1.5.5 Trial methodology

No trials are proposed at RHM. Monitoring will verify if the landforms are on a trajectory towards achievement of the milestone criteria and eventual certification, or whether corrective actions, maintenance or changes to the rehabilitation methodology is required.

### 6.1.5.6 Limitations and assumptions

The limitations and assumptions of the final closure landform design include:

- The subsidence modelling (Section 6.4) has been completed based on the best available inputs at this time, plus a maximum extraction thickness, which may over-estimate the subsidence
- The conceptual backfill and drainage works to manage the subsidence inundation (Sections 6.1.2.3, 6.4.3, 6.4.4) are based on the modelled subsidence, however the design of the final backfill and drainage works will be completed when final subsidence is realised, after flooding of the underground workings. This ensures that the design is based on the actual subsidence and achieves the required outcomes.

#### Relationship with PRCP schedule

Due to the underground mining method and the relevant activities on-site, the final landform will not result in significant variations to the pre-mining topography or require significant reshaping. The major landform change is due to subsidence, however partial backfill and drainage works will limit potential depths of inundation and minimise the potential for adverse impacts to the PMLU. The closure landform design achieves a safe and stable landform.

### 6.1.6 Cover design

#### **PRCP Guideline (Section 3.6.1)**

*A cover design is required for the surface treatment of a mine landform or other waste material. Hence, the cover system design must be appropriate for the type(s) of waste the project will generate and reflect a risk-based approach. Where waste has the potential for AMD, neutral mine drainage or saline mine drainage, an appropriate cover system must be designed.*

*The cover design should include:*

- *identification and specification of the objectives of the cover system*
- *a detailed description of the design including the thickness of each layer*
- *a detailed description of construction methodology including any proposed staging of the cover system*
- *a quantitative assessment that identifies the location and quantity of proposed capping material available on-site*
- *proposed QA/QC for the construction of the cover system including the timely implementation of corrective actions where deviations from the design are identified.*

A cover system is required where there is potential for stored materials to cause acid and metalliferous drainage, neutral and metalliferous drainage or saline drainage, to ensure contaminants are not released to the receiving environment. There will be no rejects, tailings or spoil disposed at RHM, therefore there are no materials stored on-site which may require a cover design.

### 6.1.7 Water management

#### **PRCP Guideline (Section 3.6.1)**

*The rehabilitation planning part must include a description of the following:*

- *a description of the contaminants that pose a risk to environmental values of the receiving environment*
- *source, pathway and fate of contaminants that have the potential to impact environmental values*
- *infiltration and seepage intervention and collection controls*
- *surface water diversions and long-term management requirements*
- *dewatering requirements*
- *ongoing water management and reduction requirements (i.e. treatment).*

Due to the underground mining method, the changes to the landform are predominantly associated with subsidence. All shafts and bore holes will be decommissioned in line with safety standards at the time of decommissioning and all other BMA infrastructure will be decommissioned and removed to 0.5m below ground surface or covered to a minimum depth of 0.5m to enable establishment of the PMLUs. The operations at RHM do not include any spoil dumps or waste disposal areas.

The reach of the Isaac River that runs through RHM follows the natural alignment and no diversions are present.

Subsidence modelling, which is considered a conservative prediction, indicates that subsidence will occur above the underground mining panels to a maximum depth below natural ground surface in the order of 6m (Section 6.4.1). Rehabilitation of the subsidence areas includes the repair of surface cracks, sealing of shafts, decommissioning of bore holes, select partial backfill and cutting of drains, and revegetation (Section 6.4.4). Pluvial modelling within the modelled subsidence landform indicates that, outside of the watercourse alignments and within one pre-existing farm dam, inundation can be kept to less than or equal to 1m in a 2% AEP event and the area maintained as predominantly free draining (Section 6.1.2.3). Ponding in the watercourse alignments is considered consistent with the PMLU of watercourse.

#### 6.1.7.1 Contaminants and sources

BMA's surface disturbances, other than subsidence, is limited to ventilation shafts, exploration, degassing infrastructure, rehabilitation works, workforce accommodation village and other auxiliary type disturbances. No significant hazardous materials storage, waste disposal, processing facilities or industrial support facilities, that are potential sources of contamination, are proposed as part of the RHM operations. Therefore, no additional significant contamination sources from the RHM operations have been identified. Any minor spills from mobile

plant, sewage treatment and from the activities that are undertaken as part of RHM operations will be rectified as part of operations.

The area covered by RHM has been subject to anthropogenic activities prior to the commencement of mining activities by BMA, which may have contributed to contamination of the area (Section 1.2.11). Activities that could contribute to contamination include: operation of cattle dips; petroleum product or oil storage; crushing/quarry; homestead waste disposal; chemical storage; and stockyards.

Contaminated land investigations (RM2) will be undertaken to assess areas being rehabilitated by BMA. These investigations will assess for the range of identified potential contaminants and will provide an assessment of the risk presented to achievement of the PMLUs and the receiving environment.

Underground workings at the completion of operations are proposed to be flooded to assist with stabilising further subsidence (Section 6.4.1.4). As the coal seam will have been largely removed, and the overburden/interburden is non-acid forming and has acid neutralising capacity, limited potential for acid and metalliferous drainage risks is present (BMA, 2013c).

#### **6.1.7.2 Pathway of contaminants**

Contaminated land investigations will be undertaken as part of rehabilitation activities to confirm sources, pathways and receptors within the post-mining environment. These contaminated land investigations will inform any required remediation works and allow for the management of identified unacceptable risks associated with potential contaminant pathways.

The closure landform surface will drain directly to the surrounding watercourses and will not require on-going surface water management beyond that required under normal operations of the PMLU. Potential contaminant pathways for the closure landform surface include surface water runoff, generation of airborne particulate and through direct contact with the PMLUs. Through landform designs, remediation works and other engineering controls, the closure landform surface is intended to be suitable for the direct discharge of surface water runoff to the surrounding watercourses and for use of the area for the nominated PMLU.

Numerical groundwater predictive modelling and particle tracking (Appendix D) indicate that, upon stabilisation of the groundwater, inward hydraulic gradients are maintained by the immediately adjacent GRM Goonyella Pit residual void with the area of influence including RHM. This gradient is driven and maintained by evaporative losses from the residual void lake. This inward hydraulic gradient provides for the long-term collection of groundwater from the RHM workings.

#### **6.1.7.3 Fate of contaminants**

The contaminated land investigations undertaken as part of RM2, where required, will include fate and transport modelling for identified contaminant plumes to understand the mobilisation, evolution and risks of contaminants.

The inward groundwater hydraulic gradients created by the adjacent GRM Goonyella Pit residual void will minimise the potential migration of contaminants beyond the mining disturbance areas within the Permian hosted groundwater units. The groundwater modelling undertaken indicated contaminant migration would terminate within the GRM Goonyella Pit residual void.

#### **6.1.7.4 Ongoing water management**

On completion of rehabilitation works, ongoing water management or dewatering is not envisaged to be required. Subsidence areas will be rehabilitated, and surface water managed through a combination of partial backfill and cutting of drains where required to achieve 1m or less of inundation depth in a 2% AEP event and a predominantly free draining landform (Sections 6.1.2.3, 6.4.3, 6.4.4). Groundwater gradients within the mined seams will be towards the adjacent GRM Goonyella Pit residual void which will act as a terminal groundwater sink (Section 6.1.1).

#### **Relationship with PRCP schedule**

The closure landform will provide a landscape that does not require any ongoing active water management. Subsidence areas outside of the watercourses will be predominantly free draining and be limited to 1m or less of inundation in a 2% AEP event.

## 6.1.8 Revegetation

### *PRCP Guideline (Section 3.6.1)*

*The revegetation plan must propose activities that will establish self-sustaining vegetation communities that are appropriate for the intended PMLU (e.g. natural ecosystems, grazing, forestry and some agricultural and other land uses). Revegetation should, therefore, not only establish a ground cover, but also, in some domains, establish associated fauna habitat and other ecological services.*

*The rehabilitation planning part must include details of the site preparation required for rehabilitation activities.*

### 6.1.8.1 Revegetation objectives

The revegetation objectives of the planned PMLUs of cattle grazing, woodland habitat and watercourse are consistent with the rehabilitation requirements of the RHM EIS (BMA, 2013b) and EA as follows:

- Cattle grazing:
  - Achieve >50% vegetation groundcover
  - Establishment of cattle grazing pasture with land suitability class ≤3
- Woodland habitat:
  - Achieve groundcover ≥50%
  - Establishment of vegetation with BioCondition site-based attributes, or
  - Establishment of vegetation from substitute REs (RE 11.3.2b and RE 11.3.27f) suited to ponding (applicable if ponded areas remain)
- Watercourse:
  - Achieve riparian vegetation index ≥ upstream or downstream values

The above revegetation objectives for groundcover consider groundcover to be anything in contact with the soil surface, for example live cover, standing dry cover, organic litter (including leaves, hay, woody debris) or rocks.

No infrastructure is proposed to support the revegetation plan.

### 6.1.8.2 Species of conservation significance

RHM has no obligations under the EA requiring specific inclusion of species of conservation significance in the revegetation planning. Nonetheless, areas adjoining undisturbed Endangered or Of Concern REs (Section 1.2.8) or threatened species habitats (Section 1.2.9) will be rehabilitated to a woodland habitat PMLU wherever possible. This approach will provide connectivity between rehabilitated areas and existing vegetation and habitat values. Similarly, areas rehabilitated to a watercourse PMLU will connect existing riparian habitat values for several conservation significant species.

### 6.1.8.3 Fauna habitat and use requirements

There are no obligations under the EA to establish fauna habitat and/or fauna use in the rehabilitation areas for RHM. However, areas adjoining undisturbed threatened fauna species habitats (Section 1.2.9) will be rehabilitated to a woodland habitat PMLU wherever possible, and disturbed areas of watercourses will be rehabilitated to a watercourse PMLU, including the Isaac River riparian zone.

Woodland habitat and watercourse revegetation will include a combination of *Eucalyptus*, *Corymbia* and non-Eucalyptus framework tree species and woody understorey species that will provide broad habitat values for highly mobile fauna taxa including birds and mobile mammals (e.g. kangaroos and wallabies), as well as longer term foraging and shelter opportunities for common fauna species and several species of conservation significance (e.g. koala, greater glider and echidna).

#### 6.1.8.4 Revegetation seed provenance

The provenance (where the seed comes from) is a consideration for all species. Although the local provenance boundary locations may differ between species, as a preference seed should be sourced from the Brigalow Belt North bioregion.

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

#### 6.1.8.5 Cattle grazing revegetation species and seeding rates

Areas of cattle grazing are predominately planned for infrastructure areas that have been partly cleared for cattle grazing pre-mining (RA3).

The recommended revegetation species mix for cattle grazing PMLU is based on seeding native and naturalised exotic species that are preferred, palatable and productive (3P) grasses and legumes, cognisant of grazing best management practice (DES, 2022a; Future Beef, 2024). Preferred pasture species have been recommended based on species known to occur on RHM, as well as a selection of pasture species suitable for the soil management groups described in Section 6.1.4.

The recommended species list and seeding rates are detailed in Table 24. A seeding rate of 16kg/ha of coated pasture seed and 4kg/ha of uncoated legume seed is recommended for a cattle grazing PMLU. All seed mixes will also include 5kg/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.

Species availability may vary, however at least four preferred pasture grass species including at least two native species and two legumes listed in Table 24 are required. The cattle grazing seed mix composition and seeding rates may be adjusted by an AQP based on the results of ongoing rehabilitation monitoring (Section 8).

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.

No seeding of *Leucaena* (*Leucaena leucocephala*) is planned at RHM.

**Table 24: Recommended species list and seeding rates for cattle grazing PMLU**

| Scientific name                                                        | Common name                             | Clay topsoil | Sand/loam topsoil | Seeding rate (kg/ha)         |
|------------------------------------------------------------------------|-----------------------------------------|--------------|-------------------|------------------------------|
| <b>Grass species</b>                                                   |                                         |              |                   |                              |
| <i>Astrebla lappulacea</i> , <i>A. squarrosa</i> , <i>A. elymoides</i> | Mitchell grasses (curly, bull and hoop) | ✓            | -                 | 2 <sup>c</sup> (per species) |
| <i>Bothriochloa bladhii</i>                                            | forest blue grass                       | -            | ✓                 | 4 <sup>c</sup>               |
| <i>Bothriochloa insculpta</i> cvv. Bisset*                             | Bisset creeping blue grass              | ✓            | ✓                 | 4 <sup>c</sup>               |
| <i>Bothriochloa ewartiana</i>                                          | desert bluegrass                        | ✓            | ✓                 | 2 <sup>c</sup>               |
| <i>Chloris gayana</i> cvv. Callide*                                    | Callide Rhodes grass                    | ✓            | ✓                 | 4 <sup>c</sup>               |
| <i>Chloris gayana</i> cvv. Katambora*                                  | Katambora Rhodes grass                  | ✓            | ✓                 | 4 <sup>c</sup>               |
| <i>Dichanthium sericeum</i> subsp. <i>sericeum</i>                     | Queensland blue grass                   | ✓            | -                 | 4 <sup>c</sup>               |
| <i>Dichanthium aristatum</i>                                           | Angleton grass                          | ✓            | -                 | 2 <sup>c</sup>               |
| <i>Heteropogon contortus</i>                                           | black spear grass                       | ✓            | ✓                 | 2 <sup>c</sup>               |



| Scientific name                                       | Common name         | Clay topsoil | Sand/loam topsoil | Seeding rate (kg/ha)  |
|-------------------------------------------------------|---------------------|--------------|-------------------|-----------------------|
| <i>Leersia hexandra</i>                               | swamp rice grass    | ✓            | ✓                 | 4 <sup>c</sup>        |
| <i>Leptochloa digitata</i>                            | umbrella cane grass | ✓            | ✓                 | 4 <sup>c</sup>        |
| <i>Megathyrsus maximus</i> var. <i>pubiglumis</i> *   | green panic         | -            | ✓                 | 4 <sup>c</sup>        |
| <i>Panicum coloratum</i> var. <i>makarikariense</i> * | bambatsi Panic      | ✓            | -                 | 4 <sup>c</sup>        |
| <i>Panicum decompositum</i>                           | native millet       | ✓            | ✓                 | 4 <sup>c</sup>        |
| <i>Setaria incrassata</i> *                           | purple pigeon       | ✓            | -                 | 4 <sup>c</sup>        |
| <i>Urochloa mosambicensis</i> *                       | Sabi grass          | -            | ✓                 | 4 <sup>c</sup>        |
| <b>Grass species - Total seed weight (coated)</b>     |                     |              |                   | <b>16<sup>c</sup></b> |
| <b>Legume species</b>                                 |                     |              |                   |                       |
| <i>Macroptilium bracteatum</i> *                      | burgundy bean       | ✓            | -                 | 2                     |
| <i>Rhynchosia minima</i> var. <i>australis</i>        | rhynchosia          | ✓            | ✓                 | 2                     |
| <i>Rhynchosia minima</i> var. <i>minima</i>           | rhynchosia          | ✓            | ✓                 | 2                     |
| <i>Stylosanthes seabrana</i> *                        | stylo               | ✓            | -                 | 2                     |
| <b>Legume species - Total seed weight (uncoated)</b>  |                     |              |                   | <b>4</b>              |
| <b>Cover Crop</b>                                     |                     |              |                   |                       |
| <i>Echinochloa esculenta</i>                          | Japanese millet     | ✓            | ✓                 | 5                     |

<sup>c</sup> Seeding rate for coated seed. If not coated, use half the prescribed rate; \* Naturalised exotic pasture species

#### 6.1.8.6 Woodland habitat revegetation

The species selection for the woodland habitat revegetation areas considers the ecological functional groupings according to the role or function they perform in both rehabilitation and non-mined environments (Table 25) (Emmerton, et al, 2016a; Emmerton, et al, 2016b). Short lived wattles (*Acacia* spp.) should be excluded from the species mix as they are unlikely to provide the necessary structure and longer-term ecological function. Intermediate lifespan wattles should be limited in the seed mix with framework tree species and shrubby understorey species are maximised to provide longer-term ecosystem resilience, structure and function. Competitive pasture species will be excluded from the woodland habitat seed mix and only non-aggressive grass species are recommended (Emmerton, et al, 2016b).

**Table 25: Life form and functional groups assigned to species based on their structural form or ecological function**

| Life form and functional group         | Code  | Explanatory notes                                                                                                                                                                                                                                                                     |
|----------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Framework trees</b>                 |       |                                                                                                                                                                                                                                                                                       |
| Eucalypt/ Bloodwood (Corymbia) species | E/C   | <i>Eucalyptus</i> , <i>Corymbia</i> , occasionally <i>Angophora</i> species (of any height) which can form an upper storey and often form recognisable vegetation communities but may exist within other communities.                                                                 |
| Non-eucalypt, non-acacia species       | NE/NA | Non-eucalypt, non-wattle species (of any height) which can form recognisable communities, or which may exist in isolation and are capable of becoming part of the upper storey.                                                                                                       |
| Long lived acacias                     | LLA   | Wattle species which may form recognisable communities or exist as part of the upper storey in other communities                                                                                                                                                                      |
| <b>Woody understorey components</b>    |       |                                                                                                                                                                                                                                                                                       |
| Shrubby understorey                    | SU    | A shrub is defined as: a woody plant that is multi-stemmed from the base (or within 200mm from ground level) up to 8m in height or if single stemmed, less than 2m tall (Eyre, et al., 2015). It therefore may include species which are sometimes regarded as small to medium trees. |
| Groundcover shrubs                     | GCS   | Shrubs which form a groundcover.                                                                                                                                                                                                                                                      |
| Vines/creepers                         | V/C   | Vines or creepers that are perennial and have a woody component.                                                                                                                                                                                                                      |
| Intermediate lifespan acacias          | ILA   | Sub-dominant acacias which do not form a community in undisturbed natural ecosystems but can become dominant in rehabilitation areas.                                                                                                                                                 |
| Short lifespan wattles                 | SLA   | Wattles prevalent as an understorey in eucalypt communities with some level of disturbance and relatively short lived ( $\leq 10$ years).                                                                                                                                             |
| Introduced woody perennials            | IWP   | Introduced woody species potentially becoming weeds in some circumstances.                                                                                                                                                                                                            |
| <b>Groundcover components</b>          |       |                                                                                                                                                                                                                                                                                       |
| Competitive pasture grasses            | CPG   | Aggressive introduced pasture grass species (considered to detract from ecosystem values).                                                                                                                                                                                            |
| Introduced grasses                     | IG    | Less competitive naturalised species (less aggressive than the CPG group).                                                                                                                                                                                                            |
| Native grasses                         | NG    | Perennial and annual native grasses. Includes grass like plants (e.g. <i>Cyperus</i> , <i>Dianella</i> , <i>Lomandra</i> ).                                                                                                                                                           |

#### 6.1.8.7 Woodland habitat seed species and seeding rates

Woodland habitat PMLU is planned for areas impacted by underground mining, which includes remnant vegetation and some cleared areas (RA21).

Rehabilitation, including areas with minor surface cracks, will utilise the in-situ topsoil. For larger crack repairs that require infilling with material, drainage works and/or subsidence backfill areas, the topsoil stripped and stockpiled from the area prior to the works will be re-spread once works are complete. Although, an alternative growth media at a minimum depth of 300mm may also be used where suitable.

The areas to be revegetated will include where topsoil has been disturbed or replaced (such as crack repairs, drainage works or backfilled areas), or previously cleared areas where additional seeding is required to achieve the revegetation objectives. These areas will be seeded with the recommended species listed in Table 26, which includes species from the dominant REs within RA21, RE 11.4.2 and RE 11.5.3 (Section 1.2.8.1). Some areas within RA21 may have limited impacts from mining, therefore an AQP may recommend reduced seeding rates from those listed in Table 26, or recommend no seed application, based on an assessment of existing vegetation (such as species richness and cover). Revegetation species and rates for woodland habitat may be adjusted by an AQP to ensure continuous improvement of the rehabilitation outcomes, based on the results of ongoing monitoring (Section 8).

**Table 26: Recommended species list and seeding rates for woodland habitat PMLU**

| Species name*                                                               | Common name            | Life form and functional group code | Seed rates (kg/ha - uncoated weight) |
|-----------------------------------------------------------------------------|------------------------|-------------------------------------|--------------------------------------|
| <b>Framework tree species</b>                                               |                        |                                     |                                      |
| <i>Acacia rhodoxylon</i>                                                    | rosewood               | LLA                                 | 0.3 - 1                              |
| <i>Alphitonia excelsa</i>                                                   | red ash                | NE/NA                               | 0.3 - 0.5                            |
| <i>Angophora leiocarpa</i>                                                  | smooth barked apple    | E/C                                 | 0.3 - 0.5                            |
| <i>Atalaya hemiglauca</i>                                                   | whitewood              | NE/NA                               | 0.3 - 0.5                            |
| <i>Corymbia clarksoniana</i>                                                | Clarkson's bloodwood   | E/C                                 | 0.3 - 1                              |
| <i>Corymbia dallachiana</i>                                                 | Dallachy's gum         | E/C                                 | 0.3 - 0.5                            |
| <i>Corymbia erythrophloia</i>                                               | red bloodwood          | E/C                                 | 0.3 - 1                              |
| <i>Eucalyptus crebra</i>                                                    | narrow leafed ironbark | E/C                                 | 0.6 - 2                              |
| <i>Eucalyptus melanophloia</i>                                              | silver leafed ironbark | E/C                                 | 0.3 - 1                              |
| <i>Eucalyptus populnea</i>                                                  | poplar box             | E/C                                 | 0.3 - 0.5                            |
| <i>Lysiphyllum carronii</i>                                                 | red bauhinia           | NE/NA                               | 0.3 - 0.5                            |
| <i>Lysiphyllum hookeri</i>                                                  | white bauhinia         | NE/NA                               | 0.2 - 0.5                            |
| <i>Terminalia oblongata</i>                                                 | yellowwood             | NE/NA                               | 0.2 - 0.5                            |
| <b>Framework tree species - Total seed weight (uncoated)</b>                |                        |                                     | <b>6</b>                             |
| <b>Woody understory species</b>                                             |                        |                                     |                                      |
| <i>Acacia conferta</i>                                                      | crowded-leaf wattle    | ILA                                 | 0.3 - 0.5                            |
| <i>Acacia excelsa</i>                                                       | ironwood wattle        | LLA                                 | 0.3 - 0.5                            |
| <i>Acacia sericophylla</i>                                                  | desert oak             | ILA                                 | 0.3 - 0.5                            |
| <i>Alstonia constricta</i>                                                  | bitterbark             | SU                                  | 0.3 - 0.5                            |
| <i>Capparis lasiantha</i> , <i>C. canescens</i> , <i>C. loranthifolia</i> . | wait-a-while           | V/C                                 | 0.2 - 0.5                            |

| Species name*                                                                                                                                                                         | Common name             | Life form and functional group code | Seed rates (kg/ha - uncoated weight) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------|--------------------------------------|
| <i>Carissa ovata</i>                                                                                                                                                                  | currant bush            | GCS                                 | 0.3 - 1                              |
| <i>Cassia brewsteri</i> **                                                                                                                                                            | Leichhardt bean         | SU                                  | 0.3 - 0.5                            |
| <i>Dodonaea viscosa</i> **                                                                                                                                                            | sticky hop bush         | SU                                  | 0.3 - 0.5                            |
| <i>Eremophila mitchellii</i>                                                                                                                                                          | false sandalwood        | SU/NE/NA                            | 0.3 - 0.5                            |
| <i>Erythroxylon australe</i>                                                                                                                                                          | cocaine tree            | SU                                  | 0.2 - 0.5                            |
| <i>Geijera parvifolia</i>                                                                                                                                                             | wilga                   | SU                                  | 0.2 - 0.5                            |
| <i>Grevillea striata</i>                                                                                                                                                              | beefwood                | SU/NE/NA                            | 0.3 - 0.5                            |
| <i>Grewia latifolia</i>                                                                                                                                                               | dogs balls              | SU                                  | 0.3 - 0.5                            |
| <i>Hakea lorea</i>                                                                                                                                                                    | bootlace oak            | SU/NE/NA                            | 0.3 - 0.5                            |
| <i>Jasminum didymum</i>                                                                                                                                                               | native jasmine          | V/C                                 | 0.3 - 0.5                            |
| <i>Owenia acidula</i>                                                                                                                                                                 | emu apple               | SU                                  | 0.3 - 0.5                            |
| <i>Petalostigma pubescens</i>                                                                                                                                                         | quinine                 | SU/NE/NA                            | 0.3 - 0.5                            |
| <i>Senna artemisioides</i>                                                                                                                                                            | silver cassia           | SU                                  | 0.3 - 0.5                            |
| <b>Woody understory species - Total seed weight (uncoated)</b>                                                                                                                        |                         |                                     | <b>4</b>                             |
| <b>Grass species</b>                                                                                                                                                                  |                         |                                     |                                      |
| <i>Aristida</i> spp (i.e. <i>A. calycina</i> , <i>A. latifolia</i> , <i>A. ramosa</i> , <i>A. caput-medusae</i> , <i>A. jerichoensis</i> , <i>A. personata</i> , <i>A. calycina</i> ) | three awned spear grass | NG                                  | 1 - 2                                |
| <i>Bothriochloa decipiens</i> var. <i>decipiens</i>                                                                                                                                   | pitted blue grass       | NG                                  | 1 - 2                                |
| <i>Bothriochloa ewartiana</i>                                                                                                                                                         | desert bluegrass        | NG                                  | 1 - 2                                |
| <i>Chrysopogon fallax</i>                                                                                                                                                             | golden beard grass      | NG                                  | 1 - 2                                |
| <i>Cymbopogon refractus</i>                                                                                                                                                           | barbwire grass          | NG                                  | 1 - 2                                |
| <i>Cynodon dactylon</i> var. <i>dactylon</i> **                                                                                                                                       | couch                   | IG                                  | 2                                    |
| <i>Dichanthium sericeum</i>                                                                                                                                                           | Qld bluegrass           | NG                                  | 1 - 2                                |
| <i>Panicum effusum</i>                                                                                                                                                                | hairy panic             | NG                                  | 1 - 2                                |
| <i>Panicum queenslandicum</i>                                                                                                                                                         | Yabila grass            | NG                                  | 1 - 2                                |
| <i>Themeda triandra</i>                                                                                                                                                               | kangaroo grass          | NG                                  | 1 - 2                                |
| <b>Grass species - Total seed weight (uncoated)</b>                                                                                                                                   |                         |                                     | <b>10</b>                            |
| <b>Cover Crop</b>                                                                                                                                                                     |                         |                                     |                                      |
| <i>Echinochloa esculenta</i>                                                                                                                                                          | Japanese millet         | Cover crop                          | 5                                    |

\* If recommended species are not available, substitute species from RE 11.4.2 and 11.5.3

\*\*Species adapted to moderate to high salinity tolerance (DERM, 2011)

The preferred seeding timing for woodland habitat is either April/May or September/early October when there is sufficient soil moisture in the profile. Sowing in cooler months offers longer periods of surface moisture

resulting from rain events, as well as reduced grass competition. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

The conceptual surface water hydraulic design for subsidence areas provides for a predominantly free draining landform with a maximum of 1m depth of peak inundation within a 2% AEP rainfall event (Section 6.1.2.3). Should some ponded areas remain, the revegetation plan aims to achieve a fringing woodland habitat with tree, shrub, grass, and sedge species capable of persisting in the altered abiotic and biotic conditions. Revegetation will follow the 'substitute' approach as described by Spain, et al. (2023) and will be based on seeding with species from the following representative substitute REs:

- RE 11.3.2b - *Eucalyptus camaldulensis* (sometimes *E. populnea* and/or *E. tereticornis*) woodland in drainage depressions
- RE 11.3.27f - *Eucalyptus coolabah* and/or *E. tereticornis* open woodland to woodland fringing swamps

Revegetation of woodland habitat areas with ponding will utilise the in-situ topsoil and seed with the recommended species listed in Table 27. The revegetation plan includes 6kg/ha of framework tree species, 4kg/ha of woody understorey species and 8kg/ha of ground species. Seed availability may vary, however seed mixes should include at least four species from each of the main revegetation groups (i.e. framework tree, woody understorey and ground species) listed in Table 27, to achieve the required species richness. Revegetation species and rates for woodland habitat may be adjusted by an AQP, to ensure continuous improvement of the rehabilitation outcomes, based on the results of ongoing monitoring (Section 8).

**Table 27: Recommended species list and seeding rates for woodland habitat PMLU – ponded areas**

| Species name                                                    | Common name         | Life form | Seed rate (kg/ha - uncoated weight) |
|-----------------------------------------------------------------|---------------------|-----------|-------------------------------------|
| <b>Framework tree species</b>                                   |                     |           |                                     |
| <i>Casuarina cristata</i> *                                     | belah               | E/C       | 1 - 2                               |
| <i>Eucalyptus camaldulensis</i> *                               | river red gum       | E/C       | 1 - 2                               |
| <i>Eucalyptus coolabah</i>                                      | Coolabah            | E/C       | 1 - 2                               |
| <i>Eucalyptus populnea</i>                                      | poplar box          | E/C       | 0.5 - 1                             |
| <i>Eucalyptus tereticornis</i> *                                | Queensland blue gum | E/C       | 1 - 2                               |
| <i>Melaleuca bracteata</i> *                                    | black tea tree      | NE/NA     | 0.5 - 1                             |
| <i>Terminalia oblongata</i>                                     | yellowwood          | NE/NA     | 0.5 - 1                             |
| <b>Framework tree species - total seed weight (uncoated)</b>    |                     |           | <b>6</b>                            |
| <b>Woody understorey species</b>                                |                     |           |                                     |
| <i>Cassia brewsteri</i> *                                       | Leichardt bean      | SU        | 0.5 - 1                             |
| <i>Dodonaea viscosa</i>                                         | sticky hop bush     | SU        | 0.5 - 1                             |
| <i>Eremophila bignoniiflora</i>                                 | emu bush            | SU        | 0.5 - 1                             |
| <i>Eremophila mitchellii</i>                                    | false sandalwood    | SU        | 0.5 - 1                             |
| <i>Ficus opposita</i>                                           | sandpaper fig       | SU        | 0.5 - 1                             |
| <i>Geijera parvifolia</i>                                       | wilga               | SU        | 0.5 - 1                             |
| <i>Lysiphyllum carronii</i>                                     | red bauhinia        | NE/NA     | 0.5 - 1                             |
| <i>Psydrax oleifolia</i>                                        |                     | SU        | 0.5 - 1                             |
| <b>Woody understorey species - total seed weight (uncoated)</b> |                     |           | <b>4</b>                            |



| Species name                                                                                                     | Common name          | Life form    | Seed rate<br>(kg/ha -<br>uncoated<br>weight) |
|------------------------------------------------------------------------------------------------------------------|----------------------|--------------|----------------------------------------------|
| <b>Ground species</b>                                                                                            |                      |              |                                              |
| <i>Bothriochloa bladhii</i>                                                                                      | Forest blue grass    | NG           | 0.5 - 1                                      |
| <i>Bothriochloa decipiens</i> var. <i>decipiens</i>                                                              | pitted blue grass    | NG           | 0.5 - 1                                      |
| <i>Chrysopogon fallax</i>                                                                                        | golden beard grass   | NG           | 0.5 - 1                                      |
| <i>Cyperus</i> spp. ( <i>C. gracilis</i> , <i>C. polystachyos</i> ,<br><i>C. fulvus</i> , <i>C. exaltatus</i> )* | sedges               | Native other | 0.5 - 1                                      |
| <i>Eleocharis</i> spp. ( <i>E. sphacelata</i> , <i>E. pallens</i> ,<br><i>E. plana</i> )                         | spike like sedges    | Native other | 0.5 - 1                                      |
| <i>Iseilema</i> sp. ( <i>I. vaginiflorum</i> , <i>I. membranaceum</i> )                                          | Flinders grass       | NG           | 0.5 - 1                                      |
| <i>Leersia hexandra</i>                                                                                          | swamp rice grass     | NG           | 0.5 - 1                                      |
| <i>Leptochloa digitata</i>                                                                                       | umbrella cane grass  | NG           | 0.5 - 1                                      |
| <i>Panicum decompositum</i> var. <i>decompositum</i>                                                             | native millet        | NG           | 0.5 - 1                                      |
| <i>Paspalidium caespitosum</i>                                                                                   | brigalow grass       | NG           | 0.5 - 1                                      |
| <i>Paspalidium distans</i>                                                                                       | Shot grass           | NG           | 0.5 - 1                                      |
| <i>Paspalidium jubiflorum</i>                                                                                    | Warrego summer grass | NG           | 0.5 - 1                                      |
| <b>Ground species - total seed weight (uncoated)</b>                                                             |                      |              | <b>8</b>                                     |

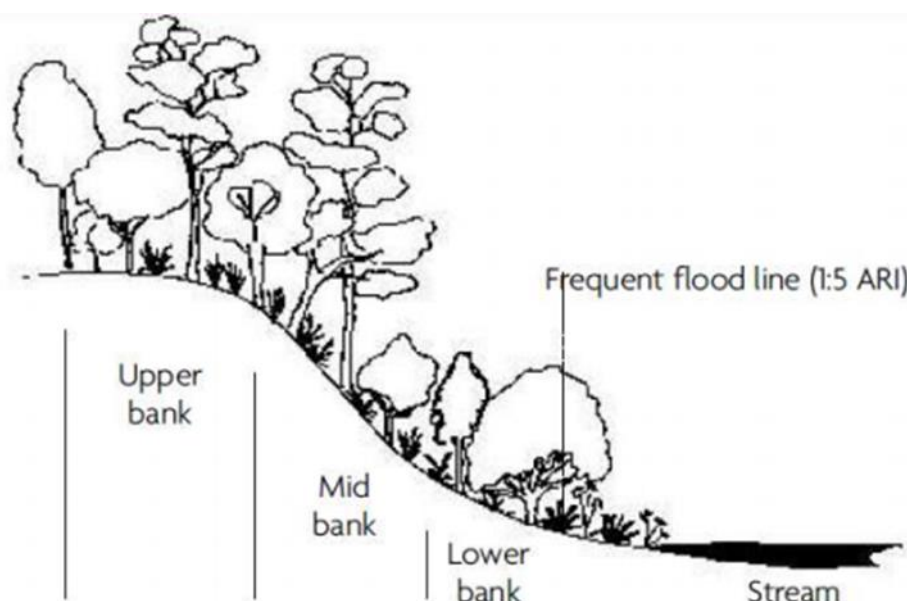
\* Medium salinity tolerance (DERM 2011)

#### 6.1.8.8 Watercourse revegetation

Watercourse revegetation activities will be implemented to establish riparian vegetation associated with watercourses which have been impacted by mining activities, such as crossings or subsidence cracks (RA11).

The revegetation zones for natural watercourses (Figure 15) are defined as follows:

- Upper bank: defines the lateral limits of both sides of the watercourse. It does not include the land adjacent. The upper bank generally extends down the riparian profile and is dominated by taller *Eucalyptus* spp, with a mixed woody and grassy understorey.
- Mid bank: occurs between the upper and lower banks and will vary in size depending on the watercourse geomorphology. The mid bank may include benches created from high flow events. The vegetation on the mid bank comprises a mix of species including scattered *Eucalyptus* spp., as well as species that are more adapted to periodic inundation of water and can withstand some disturbance from floods (i.e. *Melaleuca* spp).
- Lower bank (including bank toe): commences at the edge of the low flow channel or stream bed and extends up the bank to the area affected by more regular lower flows. The vegetation in the lower bank is dominated by scattered trees adapted to wetter environments (i.e. *Melaleuca* spp) and a high ground cover of grasses, reeds, sedges and rushes.



**Figure 15: Typical riparian revegetation plantings zone (Vegetation Matters, 2014)**

The growth media for watercourse PMLU will be pre-stripped topsoil, spread over the bank areas of the rehabilitated landforms at a depth  $\geq 150\text{mm}$ , and ameliorated if recommended by an AQP (Section 6.1.4).

#### 6.1.8.9 Watercourse revegetation species and seeding rates

The watercourse revegetation species are based on selecting framework trees, woody understorey and groundcover species associated with the predominant natural watercourse RE 11.3.25 occurring on RHM (Table 10).

The recommended watercourse revegetation species and seeding rates are listed in Table 28 and Table 29. The planned seeding rate for upper and mid banks is 20kg/ha (uncoated) comprised of 6kg/ha framework tree, 4kg/ha woody understorey species and 10kg/ha ground species.

The planned seeding rate for lower banks is 15kg/ha (uncoated) comprised of 5kg/ha framework tree and 10kg/ha ground species. The revegetation on the lower banks has been designed to establish a higher percentage of groundcover species, including grasses and rushes. Competitive pasture species have been excluded from the seed mix and only non-aggressive grass species are recommended. Short lived wattle species have also been excluded in the seed mix.

Planting in all revegetation zones will also include the addition of a sterile cover crop (e.g. Japanese millet or similar) seeded at 5kg/ha.

The preferred seeding timing for watercourse revegetation is August to October. There is low chance of frost and less likelihood of significant rainfall in this period allowing the best opportunity for vegetation to establish in a relatively non-erosive period. Seeding may be undertaken at other opportune times, such as for unseasonal climatic conditions.

**Table 28: Recommended species list and seeding rates for watercourse PMLU – upper and mid banks**

| Species name                  | Common name        | Life form and functional group code | Seed rate (kg/ha - uncoated weight) |
|-------------------------------|--------------------|-------------------------------------|-------------------------------------|
| <b>Framework tree species</b> |                    |                                     |                                     |
| <i>Acacia stenophylla</i> *   | river myall        | LLA                                 | 0.5 - 1                             |
| <i>Alphitonia excelsa</i>     | red ash            | NE/NA                               | 0.5 - 1                             |
| <i>Angophora floribunda</i>   | rough barked apple | E/C                                 | 0.5 - 1                             |

| Species name                                                    | Common name            | Life form and functional group code | Seed rate (kg/ha - uncoated weight) |
|-----------------------------------------------------------------|------------------------|-------------------------------------|-------------------------------------|
| <i>Angophora leiocarpa</i>                                      | smooth barked apple    | E/C                                 | 0.5 - 1                             |
| <i>Angophora subvelutina</i>                                    | broadleaf apple        | E/C                                 | 0.5 - 1                             |
| <i>Casuarina cristata</i> *                                     | belah                  | E/C                                 | 0.5 - 1                             |
| <i>Casuarina cunninghamiana</i> *                               | river she oak          | NE/NA                               | 0.5 - 1                             |
| <i>Corymbia tessellaris</i> *                                   | Moreton Bay ash        | NE/NA                               | 0.5 - 1                             |
| <i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> *          | river red gum          | E/C                                 | 1 - 2                               |
| <i>Eucalyptus coolabah</i> subsp. <i>coolabah</i>               | Coolabah               | E/C                                 | 1 - 2                               |
| <i>Eucalyptus melanophloia</i>                                  | silver leaved ironbark | E/C                                 | 0.5 - 1                             |
| <i>Eucalyptus populnea</i>                                      | poplar box             | E/C                                 | 0.5 - 1                             |
| <i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i> *     | Queensland blue gum    | E/C                                 | 0.5 - 1                             |
| <i>Lysiphyllum hookeri</i>                                      | white bauhinia         | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca bracteata</i> *                                    | black tea tree         | NE/NA                               | 0.5 - 1                             |
| <i>Terminalia oblongata</i>                                     | yellowwood             | NE/NA                               | 0.5 - 1                             |
| <b>Framework tree species - total seed weight (uncoated)</b>    |                        |                                     | <b>6</b>                            |
| <b>Woody understorey species</b>                                |                        |                                     |                                     |
| <i>Acacia excelsa</i>                                           | ironwood wattle        | ILA                                 | 0.5 - 1                             |
| <i>Acacia fasciculifera</i>                                     | scaly bark             | ILA                                 | 0.5 - 1                             |
| <i>Carissa ovata</i>                                            | current bush           | GCS                                 | 0.5 - 1                             |
| <i>Cassia brewsteri</i> *                                       | Leichardt bean         | SU                                  | 0.5 - 1                             |
| <i>Dodonaea viscosa</i>                                         | sticky hop bush        | SU                                  | 0.5 - 1                             |
| <i>Eremophila mitchellii</i>                                    | false sandalwood       | SU                                  | 0.5 - 1                             |
| <i>Erythroxylum australe</i>                                    | cocaine tree           | SU                                  | 0.5 - 1                             |
| <i>Ficus coronata</i>                                           | creek sandpaper fig    | SU                                  | 0.5 - 1                             |
| <i>Ficus fraseri</i>                                            | white sandpaper fig    | SU                                  | 0.5 - 1                             |
| <i>Ficus opposita</i>                                           | sandpaper fig          | SU                                  | 0.5 - 1                             |
| <i>Grevillea striata</i>                                        | beefwood               | SU                                  | 0.5 - 1                             |
| <i>Grewia latifolia</i>                                         | dogs balls             | SU                                  | 0.5 - 1                             |
| <i>Hakea lorea</i>                                              | bootlace oak           | SU                                  | 0.5 - 1                             |
| <i>Mallotus philippensis</i>                                    | red kamala             | SU                                  | 0.5 - 1                             |
| <i>Petalostigma pubescens</i>                                   | quinine                | SU                                  | 0.5 - 1                             |
| <b>Woody understorey species - total seed weight (uncoated)</b> |                        |                                     | <b>4</b>                            |

| Species name                                              | Common name          | Life form and functional group code | Seed rate (kg/ha - uncoated weight) |
|-----------------------------------------------------------|----------------------|-------------------------------------|-------------------------------------|
| <b>Ground species</b>                                     |                      |                                     |                                     |
| <i>Bothriochloa bladhii</i>                               | forest blue grass    | NG                                  | 1 - 2                               |
| <i>Capillipedium spicigerum</i>                           | scented top          | NG                                  | 1 - 2                               |
| <i>Cymbopogon refractus</i>                               | barbwire grass       | NG                                  | 1 - 2                               |
| <i>Cynodon dactylon</i> *                                 | couch                | IG                                  | 2                                   |
| <i>Dichanthium sericeum</i> subsp. <i>sericeum</i>        | Queensland bluegrass | NG                                  | 1 - 2                               |
| <i>Digitaria brownii</i>                                  | cotton panic         | NG                                  | 1 - 2                               |
| <i>Eulalia aurea</i>                                      | silky brown top      | NG                                  | 1 - 2                               |
| <i>Eustrephus latifolius</i>                              | wombat vine          | V/C                                 | 1 - 2                               |
| <i>Heteropogon contortus</i>                              | bunched speargrass   | NG                                  | 1 - 2                               |
| <i>Jasminum simplicifolium</i> subsp. <i>australiense</i> | stiff jasmine        | V/C                                 | 0.2 - 0.5                           |
| <i>Lomandra longifolia</i>                                | mat rush             | NG                                  | 0.2 - 0.5                           |
| <i>Panicum effusum</i>                                    | hairy panic          | NG                                  | 1 - 2                               |
| <i>Paspalidium distans</i>                                | shot grass           | NG                                  | 1 - 2                               |
| <i>Rhynchosia minima</i>                                  | Rhynchosia           | V/C                                 | 1 - 2                               |
| <i>Themeda triandra</i>                                   | kangaroo grass       | NG                                  | 1 - 2                               |
| <b>Ground species - total seed (uncoated)</b>             |                      |                                     | <b>10</b>                           |
| <b>Cover Crop</b>                                         |                      |                                     |                                     |
| <i>Echinochloa esculenta</i>                              | Japanese millet      | Cover crop                          | 5                                   |

\* Species adapted to moderate to high salinity tolerance (DERM, 2011)

**Table 29: Recommended species list and seeding rates for watercourse PMLU – lower banks**

| Species name                      | Common name           | Life form and functional group code | Seed rate (kg/ha - uncoated weight) |
|-----------------------------------|-----------------------|-------------------------------------|-------------------------------------|
| <b>Framework tree species</b>     |                       |                                     |                                     |
| <i>Casuarina cunninghamiana</i> * | river she oak         | NE/NA                               | 0.5 - 1                             |
| <i>Lophostemon suaveolens</i>     | swamp box             | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca bracteata</i> *      | black tea tree        | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca fluviatilis</i>      | weeping tea-tree      | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca leucadendra</i> *    | broad-leaved tea tree | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca linariifolia</i> *   | snow in summer        | NE/NA                               | 0.5 - 1                             |
| <i>Melaleuca trichostachya</i>    | flax-leaf paperbark   | NE/NA                               | 0.5 - 1                             |

| Species name                                                          | Common name          | Life form and functional group code | Seed rate (kg/ha - uncoated weight) |
|-----------------------------------------------------------------------|----------------------|-------------------------------------|-------------------------------------|
| <i>Melaleuca viminalis</i> *                                          | red bottlebrush      | NE/NA                               | 0.5 - 1                             |
| <b>Framework tree species - total seed weight (uncoated)</b>          |                      |                                     | <b>5</b>                            |
| <b>Ground species</b>                                                 |                      |                                     |                                     |
| <i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>                     | forest blue grass    | NG                                  | 1 - 2                               |
| <i>Cymbopogon refractus</i>                                           | barbwire grass       | NG                                  | 1 - 2                               |
| <i>Cynodon dactylon</i> *                                             | couch                | IG                                  | 2 - 3                               |
| <i>Cyperus</i> spp. ( <i>C. gracilis</i> , <i>C. polystachyos</i> )** | sedge                | NG                                  | 2 - 3                               |
| <i>Dichanthium sericeum</i> subsp. <i>sericeum</i>                    | Queensland bluegrass | NG                                  | 1 - 2                               |
| <i>Eleocharis</i> spp.                                                | spike-rush           | NG                                  | 0.5 - 1                             |
| <i>Eustrephus latifolius</i>                                          | wombat vine          | V/C                                 | 0.5 - 1                             |
| <i>Leptochloa digitata</i>                                            | Umbrella cane grass  | NG                                  | 0.5 - 1                             |
| <b>Ground species - total seed weight (uncoated)</b>                  |                      |                                     | <b>10</b>                           |
| <b>Cover Crop</b>                                                     |                      |                                     |                                     |
| <i>Echinochloa esculenta</i>                                          | Japanese millet      | Cover crop                          | 5                                   |

\* Species adapted to moderate to high salinity tolerance (DERM, 2011); \*\* Bank toe area only

#### 6.1.8.10 Reference sites

Details for the establishment of reference sites for cattle grazing, woodland habitat and watercourse PMLUs are outlined in Section 8.4.

| Relationship with PRCP schedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The revegetation approach for the PMLUs focuses on selection and establishment of suitable species based on the growth media and rehabilitated landforms. Woodland habitat and watercourse rehabilitation considers the inclusion of framework tree species, woody understorey and ground species from the REs of remnant vegetation occurring within RHM. Should some ponded areas remain, the revegetation plan aims to achieve a fringing woodland habitat with species capable of persisting in the altered abiotic and biotic conditions. The recommended species will best support achievement of the cattle grazing, woodland habitat and watercourse PMLUs.</p> |



## 6.2 Tailings storage facilities

### **PRCP Guideline (Section 3.6.2)**

*The tailings require characterisation to determine the geochemistry, rheology and geotechnical parameters that influence the rehabilitation or management strategies and the capacity of the site to support revegetation.*

*The design for a TSF must include relevant elements:*

- *lining of TSF (i.e. embankments and base of structure)*
- *leak detection systems*
- *cellular design of TSF*
- *seepage collection systems*
- *design storage allowance*
- *spillway location*
- *designing TSF for progressive rehabilitation.*

There are no tailings storage facilities at RHM. All RHM coal will be processed at CHPPs located on GRM and BRM and tailings will be disposed of at GRM and BRM.

## 6.3 Voids

### **PRCP Guideline (Section 3.6.3)**

*The information requirements of this domain are dependent on the nature of the proposed PMLU or NUMA for the void. For mine sites with voids, the rehabilitation planning part must include a void closure plan, which includes options for minimising final void area and volume; final void dimensions; pit wall geotechnical and geochemical stability, final slope angles, void hydrology, groundwater modelling, water balance and predicted long-term water quality.*

*A geotechnical report should focus on how the void will achieve post-closure slopes that will exhibit stability characteristics consistent with the planning and design of the post-closure mine void.*

*If floodwaters are likely to move over backfilled material, an assessment of the hydraulic properties must be conducted to assess whether instability may occur.*

*The rehabilitation and management strategies in the plan must include the supervision, verification and auditing of engineering works carried out to achieve the post-closure void landform, to ensure construction is consistent with the geotechnical design.*

*The rehabilitation and management strategy must also include confirmation that the post-closure landform demonstrates the level of stability as specified by the design.*

There are no voids planned at RHM.

## 6.4 Underground mining

### **PRCP Guideline (Section 3.6.4)**

*For underground mining operations, the rehabilitation planning part must include:*

- *a geotechnical study*
- *an assessment of groundwater interactions and potential lowering of groundwater levels*
- *the development of a hydrogeological conceptual model*
- *subsidence analysis and modelling and a subsidence vegetation/habitat impact assessment*
- *consideration of how potential entries to underground workings will be sealed (i.e. through some form of capping or back filling)*
- *how surface ponding and cracking will be mitigated*
- *identification of post-closure stabilisation of underground workings in order to manage the potential for unplanned surface subsidence and unplanned ground collapse such as sinkholes and pot holing.*

RHM is an underground longwall mining operation using top coal caving. The current life-of-mine plan for RHM proposes a total of 17 longwall panels in the GMS with a mining depth ranging from 250 to 650m from ground surface. The longwall panels are orientated roughly north-south and are typically 2 - 3km in length and approximately 320m in width.

The mine will be accessed via the GRM Goonyella Pit residual void with the first RHM longwall panels covered under the GRM and BRM PRCP area on ML1763. The RHM underground operation within ML1763 is reduced from the approved layout in the EIS due to the GRM open cut operation extending further than planned at the time of the EIS. Up to the full extent of the EIS approved footprint for RHM may be mined, if there are further changes to the GRM open cut operation. If changes occur to GRM and BRM or RHM mine plans, a PRCP amendment will be submitted to the administering authority, if required.

The underground mine layout is shown in Figure 16.

#### 6.4.1 Geotechnical study

An underground geotechnical study has been compiled to support the development of this PRCP. The detailed plan – *Geotechnical considerations for closure of Red Hill Mine* (Byrnes Geotechnical, 2024) is provided in Appendix H.

##### 6.4.1.1 Subsidence

For longwall mining, maximum subsidence depths occur along the centre of the mined-out panels, with the main pillars and main heading remaining at, or close to, pre-mining ground levels. Subsidence generally starts to occur shortly after mining, with most subsidence typically completed within about 12 months of mining. The time frame and depth of subsidence can vary depending on the type of rock overlaying the mined area, as well as the depth to the extracted coal. The final surface depends on pre-mining topography, geology, the seam thickness extracted, width of panels, and the depth of the longwall mining.

When coal is extracted from a longwall panel, the overburden load carried by the coal is redistributed onto the chain pillars on each side of the longwall panel. This increase in overburden load may result in the chain pillars failing over time, resulting in additional minor subsidence.

Full realisation of subsidence at the surface is only achieved once the underground mine has been flooded post-mining. Flooding can occur either naturally with the recovery of the groundwater or directly by active pumping post-mining. Upon flooding, the goaf undergoes additional softening and consolidation, and further subsidence occurs. RHM underground mine is planned to be purposely flooded at the end of mining.

The RHM subsidence modelling is shown in Figure 17. The modelling indicates that RHM is expected to have 29km<sup>2</sup> of subsided ground on the surface. The modelled maximum vertical subsidence is less than 6m with a maximum tilt of 4.6% and strains that range from -19mm/m to +21mm/m. The overall average slope on the surface, along the edge of the subsidence troughs, is 6 - 7%, with a maximum of 10%. The modelling predicts the maximum subsidence is through the centre of each panel, with minor subsidence above the chain pillars and no subsidence over the mains pillars.



**Figure 16: RHM underground layout**





**Figure 17: RHM modelled subsidence**

#### **6.4.1.2 Cracking**

For longwall operations, such as RHM, where larger panel 'width:cover' depth ratios occur, cracking is to be expected at the surface. Cracking may present in longitudinal (parallel to the panel edge) or arcuate (parallel to the mining face) fractures along each longwall panel. The relationship between the width of the cracking and the predicted tensile strain depends on the spacing of the cracks at the surface. Maximum cracking depth is expected to be no greater than 10m from the surface and is not directly connected to the goaf below.

Subsidence cracks will be managed according to the erosion and safety risks, and are likely to self-heal where the surface geology permits. At RHM, the surface is covered by a 0.5 to 30m thick layer of poorly consolidated Tertiary and Quaternary sediments, meaning surface cracks are expected to self-heal over time.

#### **6.4.1.3 Underground entries**

RHM underground workings are planned to be accessed via the high-wall in the Goonyella Pit residual void, therefore closure of the mine entrances are detailed in the GRM and BRM PRCP.

At the cessation of underground mining at RHM, an AQP will provide a plan for the closing of the mine entrances and shafts.

#### **6.4.1.4 Flooding of the underground**

As indicated in Section 6.4.1.1, flooding of the underground workings can occur either naturally with the recovery of the groundwater or directly by active pumping post-mining. RHM is planned to be purposely flooded at the end of mining. This will be undertaken with guidance from an AQP to ensure a safe, stable and non-polluting outcome.

Purposely flooding the workings will enable the full subsidence at the surface to be realised quicker and ensure geotechnical stabilisation of the closure landform. Final rehabilitation of subsidence areas (RA11 and RA21) is scheduled following flooding to ensure no further subsidence or surface cracking will impact the achievement of the PMLU.

### **6.4.2 Groundwater interaction**

Interaction with the groundwater at closure has been modelled in Section 6.1.1. The modelling includes the active flooding of the underground workings and used variations in the model to account for the hydrogeological changes associated with fractured overburden.

Post flooding and stabilisation of the groundwater, the groundwater hydraulic gradients within the goaf are towards the immediately adjacent GRM Goonyella Pit residual void. The Goonyella Pit residual void provides long-term groundwater management for RHM through the capture of any poor-quality groundwater within the mined-out coal seam.

### **6.4.3 Surface water interaction**

Where appropriate, subsided longwall panels will be partially backfilled and/or connected by drains that flow towards the Isaac River or its tributaries, to achieve a predominantly free draining landform. The backfilling and cutting of drains will aim to achieve a peak depth of inundation at or below 1m for a 2% AEP rainfall event (Section 6.1.2.3 and Appendix G) with the intention to maintain a landform that can support woodland habitat ecosystems of a similar composition to the existing REs.

To limit the impact associated with rehabilitation of subsidence areas, the conceptual design for the surface hydraulics where practical, limits disturbance of endangered REs, utilises existing drains and flow paths and minimises the number of disturbance points on the banks of the Isaac River.

The conceptual hydraulic design has been based on the predicted subsidence and is a proof of concept. Final design for the backfill and drainage network will need to be based on actual subsidence levels to achieve the nominated PMLU.



Ponding resulting from subsidence within the watercourses are expected to self-heal over time as a result of natural sediment transportation processes. Ponding within the watercourses is considered consistent with the PMLU of watercourse and will not be subject to active rehabilitation works to limit ponding.

## 6.4.4 Rehabilitation strategies

### 6.4.4.1 Surface infrastructure

Surface infrastructure related to the underground mining, including gas drainage infrastructure, ventilation infrastructure, water management and boreholes, will be decommissioned progressively as areas are no longer required to support mining. Decommissioning will be in accordance with Section 6.5 and will include:

- Removal of all above ground infrastructure
- Bore holes to be cut off below the ground, grouted and capped according to the *Coal Mine Safety and Health Act 1999* and the Code of Practice for construction and abandoning coal seam gas wells current at the time
- Ventilation shafts to be decommissioned as per the relevant standards in place at the time
- Pads around each bore, redundant access tracks and other infrastructure surface disturbance areas will be ripped, topsoiled and seeded
- Water and gas pipelines will be drained and removed to a depth of 0.5m below the surface

Regional infrastructure will be moved or repaired, in consultation with the relevant owners, if subsidence impacts the operation of the infrastructure or causes a safety risk.

### 6.4.4.2 Surface cracking

The surface geology at RHM indicates subsidence cracking is likely to self-heal. Mechanical repair of surface cracks should be limited to those cracks assessed as having a low probability to self-heal and likely to adversely impact achieving the PMLU. This will minimise unnecessary vegetation and soil disturbance and potential for additional erosion issues.

Where surface cracks are assessed as not self-healing and adversely impacting the PMLU, rehabilitation will include:

- Minor surface cracks:
  - Undertake minimal clearing of area around cracks
  - Disturbance of areas to infill minor cracks
  - Topsoil placement where required
  - Seed bare areas with appropriate species as recommended by an AQP to achieve the PMLU (Section 6.1.8)
- Larger surface cracks:
  - Undertake minimal clearing of areas around cracks
  - Strip topsoil from areas adjacent to the crack and stockpile
  - Infill cracks
  - Respread topsoil where topsoil has been removed
  - Seed disturbed areas with appropriate species as recommended by an AQP to achieve the PMLU (Section 6.1.8)

Repair of initial cracking will be undertaken progressively as part of mining operations. Final crack repairs will be scheduled after flooding of the underground workings, when realisation of final subsidence has occurred.

#### **6.4.4.3 Inundation areas**

The RHM EIS modelled subsidence ponding and proposed a final landform with ponded areas at depths of 2.0m to 2.5m (BMA, 2013b).

As part of the PRCP, subsidence areas will be managed to minimise the potential for adverse impacts to the PMLU through a combination of drains and partial backfill to limit potential depths of inundation. Where drainage and backfill can be achieved without significant disturbance to endangered REs, it will be designed and installed to enable water to flow to the Isaac River or its tributaries.

Based on the pluvial modelling (Section 6.1.2.3), the rehabilitation of subsided areas is proposed to include a combination of partial backfill and cutting of drains to achieve a predominantly free draining landform with a peak inundation depth of 1m outside of the watercourses in a 2% AEP event, where practical. This inundation depth balances the impacts of inundation with minimising impacts to endangered REs required for the installation of the drains and backfill.

The proposed backfill and drainage are a proof of concept based on the subsidence modelling (Section 6.4.1). The modelled subsidence is a conservative estimate and actual depths will vary.

Initial backfilling and drainage works is undertaken progressively as part of mining operations. Final drainage design and works will be scheduled after flooding of the underground workings when realisation of final subsidence has occurred, to ensure the drainage to the Isaac River is possible topographically.

#### **6.4.4.4 Vegetation/habitat**

The main PMLU planned for the underground mining and subsidence areas is woodland habitat (RA21). The revegetation plan for areas impacted by surface cracking, backfilling, drainage works, or ponding is outlined in Section 6.1.8.7. The revegetation species for the underground mining areas will be dependent on the final hydrology of the closure landform. The majority of the area will be revegetated with a woodland habitat seed mix that includes species from the dominate ground-truthed REs within RA21. Should some ponded areas remain, the revegetation plan aims to achieve a fringing woodland habitat capable of persisting in the altered abiotic and biotic conditions. These areas will be seeded with a species mix derived from substitute REs (RE 11.3.2b and RE 11.3.27f) suited to ponding.

Minimal vegetation disturbance is expected in most of the underground mining and subsidence impacted areas, therefore seed application may not be required in all areas. Where disturbance is required to undertake rehabilitation of the subsidence areas, impacts to existing vegetation will be minimised where possible.

The revegetation plan for watercourses impacted by subsidence (RA11) is outlined in Section 6.1.8.9. The revegetation species are based on selecting framework trees, woody understorey and groundcover species associated with the predominant natural watercourse RE 11.3.25.

#### **6.4.4.5 Watercourses**

The major watercourse within the RHM subsidence area is the Isaac River. Minor watercourses, Goonyella Creek and Twelve Mile Gully which drain to the Isaac River, are also present within the subsidence area.

Ponded areas within the watercourses are predicted to fill in naturally associated with natural sediment transportation. The time required for the natural healing of subsidence in the watercourses is dependent on the frequency and duration of rain and flow events and the volume of alluvial material mobilised (BMA, 2013b). The RHM EIS assessment of subsidence impacts on geomorphology concluded that the subsidence ponds in the Isaac River will have their storage capacity diminish over time and eventually fill with alluvial material. The subsidence created ponds within the watercourse channels will have a temporal and limited impact on the hydrological flows (BMA, 2013d).

Furthermore, BRM operational monitoring of the Isaac River has indicated that alluvial inputs from upstream have infilled some of the GMS subsidence panels (Alluvium, 2024). It is expected that self-healing and sediment transport processes will continue such that watercourse bank stability will not be adversely impacted by subsidence at achievement of the PMLU.

Operational watercourse subsidence impacts, including initial crack repairs, will be managed through compliance with the EA conditions (F10 – F18).

#### 6.4.4.6 Hydrogeological

Hydrogeological modelling has been undertaken for RHM (Section 6.1.1). Groundwater modelling within the subsidence areas indicates the following:

- Upon flooding of the underground workings and stabilisation of the groundwater levels, the adjacent GRM Goonyella Pit residual void establishes and maintains an inward hydraulic groundwater gradient across the RHM underground mining area through on-going evaporative losses from the void lake
- Although some increased vertical hydraulic conductivity is created by subsidence cracking, there is limited to no impact to the temporal groundwater hosted within the alluvial materials associated with the Isaac River or the GDEs associated with the alluvial materials
- One registered groundwater supply bore, located in the proximity of the underground workings and the Goonyella Pit residual void, becomes dry. However, this bore is in the operational areas of the mines and is not considered a viable supply bore location.

#### 6.4.5 Monitoring

Monitoring requirements for subsidence areas rehabilitated to a woodland habitat PMLU are outlined in Sections 8.1 and 8.2. Monitoring points for woodland habitat rehabilitation areas will be established as a part of the initial Year 1 monitoring, as detailed in Section 8.2.2.

Monitoring of watercourses impacted by subsidence will be undertaken, as per the frequency in Table 43, to assess the watercourse's geomorphic and riparian performance and to identify maintenance requirements. This will include identification and repair of active erosion and operational subsidence cracking. Monitoring points for watercourse rehabilitation areas will be established as a part of the initial Year 1 monitoring, as outlined in Section 8.3.

In addition, each subsided longwall panel will be inspected in compliance with EA conditions, which currently requires an annual inspection by an AQP. At each inspection, the condition of each subsided longwall panel will be assessed, including the structural, geotechnical and hydraulic adequacy of the subsided longwall panel.

Post-closure monitoring will continue after the achievement of the relevant PMLU to a stable condition.

#### Relationship with PRCP schedule

Areas impacted by RHM underground mining will be rehabilitated to woodland habitat or watercourse PMLU. Initial surface crack repairs and drainage works will occur progressively during operations and final scheduled rehabilitation will be undertaken post realisation of final subsidence. The subsidence areas outside of the watercourses will be predominantly free draining.

### 6.5 Built infrastructure

#### PRCP Guideline (Section 3.6.5)

*The administering authority's expectation of rehabilitation relating to built infrastructure is that it will be decommissioned, demolished, salvaged and/or disposed of unless it is being formally retained by the landholder to achieve an appropriate PMLU.*

*The rehabilitation planning part must include:*

- *Identification of infrastructure that will be decommissioned and the methods for decommissioning.*
- *A description of infrastructure that will remain post rehabilitation and the identification of ongoing maintenance requirements.*
- *Evidence of agreement for any infrastructure that will have ownership transferred.*

The infrastructure associated with the mining activities at RHM are summarised in Table 30. All BMA owned surface infrastructure with no beneficial use to the PMLU will be decommissioned and removed. Surface infrastructure that may be retained to support the PMLUs will have a demonstrable benefit and required agreements in place prior to rehabilitation, and may include selected: fencing; access tracks; services related infrastructure; sheds and buildings; bridges and water related infrastructure.

Infrastructure not constructed for the purpose of mining, such as dams used for grazing, gates, cattle gates, stock handling/watering areas, access tracks, fire breaks etc., will not be removed as part of rehabilitation works.

Priority will be to repurpose, salvage or recycle any infrastructure to be removed. Demolition and disposal within the underground drives, or the GRM and BRM 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 Queensland *Waste Reduction and Recycling Act 2011*.

**Table 30: Infrastructure associated with the approved RHM mining activities**

| Category                   |                                          | Infrastructure                                                                                                                                                                                                   |
|----------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Built infrastructure       | Steel, concrete and brick infrastructure | <ul style="list-style-type: none"> <li>• Bridge over Isaac River</li> <li>• Accommodation village</li> <li>• Sewerage treatment plant</li> <li>• Various buildings</li> <li>• Fences</li> </ul>                  |
|                            | Supporting services                      | <ul style="list-style-type: none"> <li>• Pipes and pumps</li> <li>• Power lines</li> <li>• Electrical equipment</li> <li>• Communication and lighting towers</li> <li>• Concrete pads and bitumen</li> </ul>     |
| Water infrastructure       |                                          | <ul style="list-style-type: none"> <li>• Mine dams</li> <li>• Drains</li> <li>• Culverts</li> </ul>                                                                                                              |
| Underground infrastructure |                                          | <ul style="list-style-type: none"> <li>• Longwall shearers and hydraulic roof supports</li> <li>• Conveyors</li> <li>• Gas drainage bores and associated infrastructure</li> <li>• Ventilation shafts</li> </ul> |

The timing of the decommissioning and removal of the infrastructure is based on the proposed timing of the RHM operation.

Any regional infrastructure associated with roads, power, water and communications supply to landowners or townships is not included in the PRCP schedule.

Further detail on the rehabilitation stages after decommissioning of the infrastructure, such as landform reshape, surface preparation, revegetation and monitoring, are covered in the relevant sections of this PRCP.

### 6.5.1 Built infrastructure

Decommissioning of the built and service infrastructure with no beneficial use to the PMLU will follow the resource management hierarchy and will include:

- Disconnecting services
- Removing surface built and service infrastructure through salvage or recycling activities, or demolishing and burying in the underground drives, or GRM and BRM mining voids or spoil dumps

- Removing below-ground built and service infrastructure to a depth of 0.5m below the surface and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps, or covering to a minimum depth of 0.5m to enable establishment of the PMLUs
- Removing concrete to a depth of 0.5m below the surface and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps, or covering to a minimum depth of 0.5m to enable establishment of the PMLUs
- Removing bitumen and recycling, or burying in the underground drives, or GRM and BRM mining voids or spoil dumps
- Disposing of demolition-related putrescible and hazardous wastes at an appropriately licenced facility

Ventilation shafts and other boreholes/shafts may remain at ground level and not be removed to a depth of 0.5m if the relevant standards and guidelines at the time of closure require the cap to be on the surface.

Below-ground infrastructure, services, waste and underground equipment deeper than 0.5m in relation to the final landform surface can be retained provided it can meet the following:

- Pipelines have been drained
- Below-ground infrastructure is mapped
- The intended PMLU is not compromised

### 6.5.2 Water infrastructure

Decommissioning of the water-related infrastructure constructed for mining activities with no beneficial use to the PMLU or the neighbouring GRM and BRM operation, will include:

- Removing any remaining water to the underground workings, or GRM and BRM, or in accordance with:
  - EA condition C3: *“Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the consent of the third party)”*.
- Disposing of mine dam sediment according to the results of an assessment by an AQP
- Removing any mine dam liners
- Breaching mine dam walls and reshaping of the area to make it free draining
- Removing culverts and drains constructed for mining activities and operations

### 6.5.3 Contaminated land assessment

In accordance with the EA conditions, contaminants must not be released in a manner that constitutes environmental harm, and spillage of any wastes, contaminants or other materials must be cleaned up as quickly as practicable, stored in accordance with relevant standards and handled in a way that prevents environmental harm.

At completion of mining operations and prior to landform reshaping, surface preparation and revegetation, a contaminated land investigation will be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (RM2). 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. A Contaminated Land Investigation Document will be completed in accordance with the EP Act, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan to allow the ML area to be safely utilised for the nominated PMLUs (Section 3).

Verification will be undertaken as part of the final rehabilitation milestone of achievement of PMLU to a stable condition to confirm there are no changes to the contaminated land status completed for RM2 and the requirements of any Site Management Plans have been met.



#### Relationship with PRCP schedule

Surface infrastructure owned by BMA and not beneficial to the PMLU will be decommissioned and removed. Below ground infrastructure will be removed if required to a depth of 0.5m or covered to enable establishment of the PMLU, provided there is no ongoing risk of environmental harm and the intended PMLU is not compromised. Ventilation shafts and other boreholes/shafts will be closed according to the relevant standards and guidelines at the time.

A contaminated land investigation will be undertaken at the completion of operations and prior to final landform development and shaping. Remediation and/or management of any identified contamination that has the potential to present unacceptable risks to the nominated PMLU or environmental values, will be undertaken.

## 6.6 Summary of key rehabilitation and management practices

The key rehabilitation activities and associated rehabilitation milestones are shown in Table 31.

Table 31: Key rehabilitation activities and rehabilitation milestones for RHM

| RA  | Relevant Activities                                                                                                     | Rehabilitation activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Commencement of rehabilitation timing                                                                                                                                                                                                  | RMs                                                                                                                                   |
|-----|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| RA3 | <ul style="list-style-type: none"> <li>Accommodation village</li> <li>General infrastructure and disturbance</li> </ul> | <ul style="list-style-type: none"> <li>Disconnect services</li> <li>Remove BMA owned surface built and service infrastructure where there is no beneficial use to the PMLU</li> <li>Remove BMA owned below ground built and service infrastructure within 0.5m of the surface or cover to a minimum depth of 0.5m, where there is no beneficial use to the PMLU</li> <li>Remove concrete and bitumen within 0.5m of the surface or cover to a minimum depth of 0.5m, where there is no beneficial use to the PMLU</li> <li>Remove waste not authorised under the EA waste schedule, including demolition waste</li> <li>Assess mine dam water and sediment and dispose appropriately</li> <li>Assessment of contaminated land risks</li> <li>Reshape the landform to maintain pre-mining contours <math>\pm 8\text{m}</math></li> <li>Install erosion and sediment control systems as required</li> <li>Spread topsoil a minimum thickness of 150mm, where topsoil has previously been removed</li> <li>Assess growth media characteristics to determine ameliorant and other treatment requirements</li> <li>Apply ameliorants and other treatments (if required)</li> <li>Rip along contour of slopes</li> <li>Seed with recommended seed mix and rates</li> </ul> | <ul style="list-style-type: none"> <li>Facilities will be required to support the rehabilitation activities, therefore area will be available for rehabilitation at the end of major rehabilitation activities for the site</li> </ul> | <ul style="list-style-type: none"> <li>RM1</li> <li>RM2</li> <li>RM3</li> <li>RM4</li> <li>RM7</li> <li>RM10</li> <li>RM13</li> </ul> |

| RA   | Relevant Activities                                                                                                                                            | Rehabilitation activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Commencement of rehabilitation timing                                                                                                                                                                                                                                                                                                       | RMs                                                                                                                      |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|      |                                                                                                                                                                | <ul style="list-style-type: none"> <li>Undertake monitoring and maintenance to demonstrate achievement of a cattle grazing PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                          |
| RA11 | <ul style="list-style-type: none"> <li>Watercourses impacted by underground mining/subsidence</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Rehabilitate surface cracks that do not self-heal and adversely impact achieving the PMLU</li> <li>Remove watercourse crossings and culverts</li> <li>Reshape watercourse crossings within natural watercourse bed and banks to a profile similar to the pre-disturbance condition</li> <li>Install erosion and sediment control systems as required</li> <li>Spread topsoil a minimum thickness of 150mm, where topsoil has previously been removed</li> <li>Assess growth media characteristics to determine ameliorant and other treatment requirements</li> <li>Apply ameliorants and other treatments (if required by the plan)</li> <li>Deep rip along contour of slopes as required</li> <li>Seed as per recommended seed mix and rates</li> <li>Undertake monitoring and maintenance to demonstrate achievement of a watercourse PMLU</li> </ul> | <ul style="list-style-type: none"> <li>Initial operational repair of subsidence cracks and drainage occurs progressively during mining operations once the initial subsidence is complete</li> <li>Rehabilitation is scheduled once final subsidence is complete after flooding of the underground workings at the end of mining</li> </ul> | <ul style="list-style-type: none"> <li>RM1</li> <li>RM3</li> <li>RM6</li> <li>RM9</li> <li>RM12</li> <li>RM15</li> </ul> |
| RA21 | <ul style="list-style-type: none"> <li>Subsidence</li> <li>Underground mining infrastructure</li> <li>General infrastructure and disturbance within</li> </ul> | <ul style="list-style-type: none"> <li>Remove BMA owned surface built and service infrastructure where there is no beneficial use to the PMLU</li> <li>Remove BMA owned below ground built and service infrastructure within 0.5m of the surface or cover to a minimum depth of 0.5m, where there is no beneficial use to the PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Initial operational repair of subsidence cracks and drainage occurs progressively during mining operations once the initial subsidence is complete</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>RM1</li> <li>RM2</li> <li>RM3</li> <li>RM5</li> <li>RM8</li> </ul>                |

| RA | Relevant Activities     | Rehabilitation activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Commencement of rehabilitation timing                                                                                                                                           | RMs                                                                  |
|----|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|    | underground mining area | <ul style="list-style-type: none"> <li>Seal shafts and gas drainage</li> <li>Assessment of contaminated land risks</li> <li>Backfill and/or install drainage to limit subsidence inundation to a maximum 1m depth for a 2% AEP rainfall event where practical to make the area predominantly free draining</li> <li>Rehabilitate surface cracks that do not self-heal and adversely impact achieving the PMLU</li> <li>Install erosion and sediment control systems as required</li> <li>Spread topsoil to a minimum thickness of 100mm or alternative growth media at minimum depth of 300mm, where topsoil has previously been removed</li> <li>Assess growth media characteristics to determine ameliorant and other treatment requirements</li> <li>Apply ameliorants and other treatments (if required by the plan)</li> <li>Rip along contour of slopes</li> <li>Seed with recommended seed mix and rate</li> <li>Undertake monitoring and maintenance to demonstrate achievement of a woodland habitat PMLU</li> </ul> | <ul style="list-style-type: none"> <li>Rehabilitation is scheduled once final subsidence is complete after flooding of the underground workings at the end of mining</li> </ul> | <ul style="list-style-type: none"> <li>RM11</li> <li>RM14</li> </ul> |

## 7 RISK ASSESSMENT

### Legislative Requirement

In accordance with section 126C(1)(f) of the EP Act, the rehabilitation planning part of the PRC Plan must identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the applicant intends to manage or minimise the risks.

### PRCP Guideline (Section 3.7)

As per section 126C(1)(j) of the EP Act, the administering authority considers it necessary for the proposed PRC plan to contain a risk assessment of all proposed NUMAs. The risk assessment must be carried out to identify the risks of the NUMA causing environmental harm and not being safe and structurally stable and detail how the applicant intends to manage and minimise the identified risks.

The AS ISO 31000:2018 Risk Management – Guidelines (Standards Australia, 2018) describes risk assessment as the overall process of risk identification, risk analysis, risk evaluation and risk treatment. Each of these aspects must be included in the risk assessment in the rehabilitation planning part.

Information requirements in this section apply to all applicants whether or not they are an existing EA holder. Existing holders may have the required information available from previously submitted plans/reports/applications that, if still valid, can be used in the PRC plan.

## 7.1 Identifying, assessing and treating risks

### 7.1.1 Risk methodology

A risk-based approach has been applied to the RHM PRCP, following the method described in Figure 18.

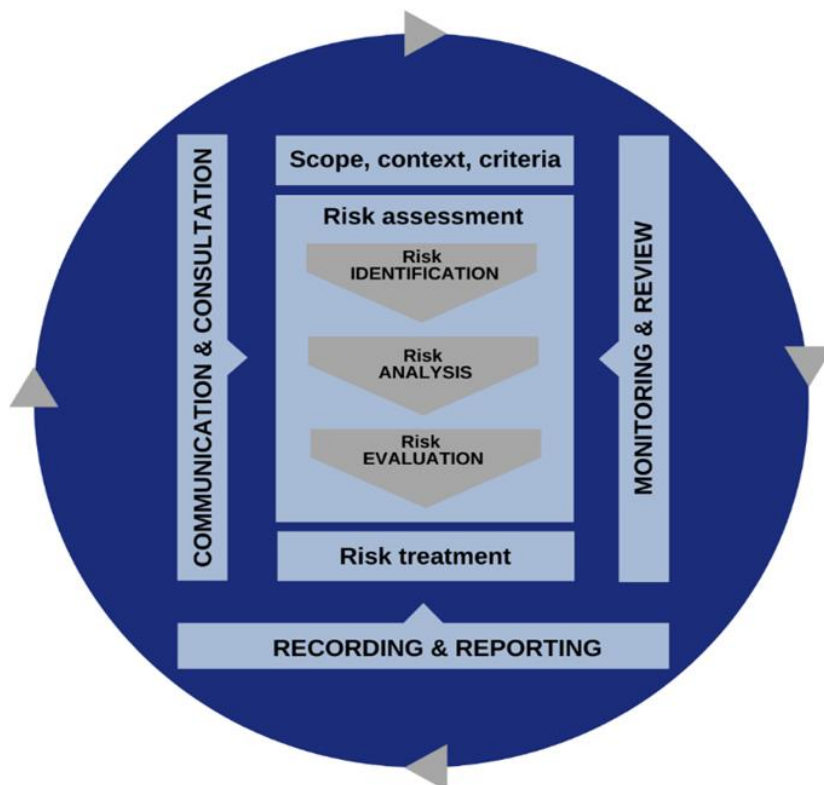


Figure 18: ISO 31000-compliant risk-based approach followed for the RHM PRCP



### 7.1.2 Risk identification

The risk event - a stable condition for land described as a PMLU not being achieved - was assessed in accordance with the ISO 31000 methodology described in Figure 18, where stable condition is defined as per section 111A of the EP Act.

For RHM, the PMLUs being assessed are cattle grazing, woodland habitat and watercourse (Section 3).

### 7.1.3 Risk analysis, evaluation and relevant treatments

The full risk assessment – *Red Hill Mine PRCP Risk Assessment* is included in Appendix I and provides the risk analysis, risk evaluation and risk treatments for each risk scenario.

Worst case outcomes were assessed for each scenario, preventative and mitigating controls identified and then a residual risk rating (RRR) was calculated. The BHP likelihood and impact tables, as well as the RRR heat map ratings matrix are provided in Table 32, Table 33 and Table 34, respectively.

**Table 32: BHP risk likelihood table**

| Likelihood      | Frequency <sup>1</sup>                       | Probability <sup>2</sup>              | Likelihood factor |
|-----------------|----------------------------------------------|---------------------------------------|-------------------|
| Highly Likely   | Likely to occur within a 1-year period       | ≥80% chance of the Risk occurring     | 3                 |
| Likely          | Likely to occur within a 1 – 5-year period   | 60 – 79% chance of the Risk occurring | 1                 |
| Possible        | Likely to occur within a 5 – 20-year period  | 30 – 59% chance of the Risk occurring | 0.3               |
| Unlikely        | Likely to occur within a 20 – 50-year period | 10 – 29% chance of the Risk occurring | 0.1               |
| Highly Unlikely | Risk likely to occur beyond a 50-year period | <10% chance of the Risk occurring     | 0.03              |

<sup>1</sup> Typically used when assessing ongoing or enduring Risks.

<sup>2</sup> Typically used when assessing project or one-off/discrete Risks

**Table 33: BHP risk impact table**

| Impact Level | Descriptors                                                                                         | Impact factor |
|--------------|-----------------------------------------------------------------------------------------------------|---------------|
| 5            | Significant and lasting impact to environment, climate, community or Indigenous peoples             | 1,000         |
| 4            | Significant impact to environment, climate, community or Indigenous peoples                         | 300           |
| 3            | Moderate impact to environment, climate, community or Indigenous peoples                            | 100           |
| 2            | Measurable but limited or temporary impact to environment, climate, community or Indigenous peoples | 30            |
| 1            | Minor, low level impact to the environment, climate, community or Indigenous peoples                | 10            |

**Table 34: BHP RRR heat map**

|            |                 |                   | Impact level       | 1                                                              | 2   | 3   | 4   | 5    |
|------------|-----------------|-------------------|--------------------|----------------------------------------------------------------|-----|-----|-----|------|
|            |                 |                   | Impact factor      | 10                                                             | 30  | 100 | 300 | 1000 |
|            | Likelihood      | Likelihood factor | Timeframe          | Residual risk rating<br>(with controls in place and effective) |     |     |     |      |
| Likelihood | Highly Likely   | 3                 | Within 1 year      | 30                                                             | 90  | 300 | 900 | 3000 |
|            | Likely          | 1                 | Within 1-5 years   | 10                                                             | 30  | 100 | 300 | 1000 |
|            | Possible        | 0.3               | Within 5-20 years  | 3                                                              | 9   | 30  | 90  | 300  |
|            | Unlikely        | 0.1               | Within 20-50 years | 1                                                              | 3   | 10  | 30  | 100  |
|            | Highly Unlikely | 0.03              | Beyond 50 years    | 0.3                                                            | 0.9 | 3   | 9   | 30   |

With controls in place and implemented effectively, the RRR for the identified risk scenarios of the risk event – a stable condition for land described as a PMLU not being achieved, is deemed to be low (RRR of 10).

The risk treatments for each scenario that are necessary for achieving a stable condition for the land described as the PMLUs are shown below in Table 35.

**Table 35: Necessary risk treatments identified to achieve a stable condition for the PMLUs**

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>PMLU Scenario 1: Landform failure</b>                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                             |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Technical services</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>Materials characterisation</li> <li>Growth media assessment to determine ameliorant and physical treatment requirements</li> <li>Application of ameliorants and physical treatments as per assessment</li> <li>PMLU selected based on most appropriate for landform and materials</li> <li>Groundcover of vegetation and rock (where appropriate on slopes/drainage channels) to provide erosion resistance</li> <li>Flooding of underground workings</li> </ul> |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                     | <ul style="list-style-type: none"> <li>Subsidence crack repairs and drainage to reduce inundation/ponding to acceptable limits</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Available material inventory</li> <li>Equipment capabilities</li> <li>Survey</li> <li>Rehabilitation monitoring</li> <li>Growth media assessment</li> <li>Stockpile materials if required</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Comparison against design</li> <li>Tracking against milestone criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Rehabilitation and subsidence monitoring and maintenance</li> <li>Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>From commencement of rehabilitation activities to final achievement of PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>PMLU Scenario 2: Alteration of hydrogeological conditions</b>                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Environment team</li> <li>Water team</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations</li> <li>Installation of relevant groundwater monitoring bores</li> <li>Collection and analysis of data to support the development of site-specific groundwater quality limits</li> <li>Revisiting and updating the groundwater models every five years (commencing from 2080)</li> <li>Contaminated land investigation to be undertaken at time of closure and implementation of remediation and/or site management plans as required</li> <li>Cumulative groundwater modelling to be undertaken at mine closure</li> </ul> |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Groundwater monitoring infrastructure</li> <li>Sample collection and laboratory analysis</li> <li>Development of site-specific groundwater quality limits</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Compliance with PRCP Condition/milestone criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Groundwater monitoring data analysis and implementation of any necessary remediation activities identified</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>From commencement of mining to final achievement of PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PMLU Scenario 3: Alteration of surface water systems</b>                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Environment team</li> <li>Water teams</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations</li> <li>Surface water monitoring to be undertaken in accordance with EA conditions</li> <li>Installation of monitoring equipment, where appropriate, at the relevant surface water monitoring locations</li> <li>Collection and analysis of data to support the development of site-specific surface water quality limits for relevant watercourses</li> <li>Mine dams to be decommissioned and areas rehabilitated</li> <li>Contaminated land investigations will be undertaken at the completion of operations and remediation works undertaken as appropriate</li> <li>Rehabilitation and monitoring of disturbed reaches of watercourse undertaken</li> <li>Subsidence landform to limit reduction in flows to Isaac River and reduce inundation to acceptable limits</li> </ul> |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Monitoring equipment installed in relevant watercourses</li> <li>Surface water sampling</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Development of site-specific surface water quality limits</li> <li>• Sampling equipment and infrastructure to allow collection of samples during runoff events</li> <li>• Flood and subsidence modelling</li> <li>• Subsidence monitoring</li> <li>• Suitably qualified person (SQP) to undertake contaminated land investigations and oversee on-going monitoring requirements</li> </ul>                                                                                                                                                                               |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>• Surface water PRCP Conditions/milestone criteria and water quality objective</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>• Monitoring when surface water flows are available</li> <li>• Monitoring of subsidence</li> <li>• Reporting under EA requirements</li> <li>• Implementation of any necessary remediation or maintenance activities identified through monitoring</li> </ul>                                                                                                                                                                                                                                                                                                               |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>• During runoff events suitable for the collection of surface water samples</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>PMLU Scenario 4: Contaminated land impacting on environmental receptors, rehabilitation and attainment of the PMLUs</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>• Studies and analysis to continue over the rehabilitation period to the end of the mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                                                                                                                                     |
| Responsibility for plan: <ul style="list-style-type: none"> <li>• Approval</li> <li>• Implementation</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Environment team</li> <li>• Water teams</li> <li>• Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>• Environmental monitoring and reporting as per the EP Act and existing EA requirements</li> <li>• All stored hazardous materials and infrastructure that have a reasonable potential to release contaminants, will be appropriately recycled or disposed</li> <li>• Contaminated land investigations to be undertaken at the completion of operations to identify contamination that has the potential to adversely impact PMLUs</li> <li>• Implementation of remediation and/or site management plans as required to reduce potential contaminated land risks</li> </ul> |



| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>SQP to undertake contaminated land investigations and oversee on-going monitoring requirements</li> <li>Sample collection, laboratory analyses and engineering controls</li> </ul>                                                                                                                                                                                                                                                                                                         |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Attainment of surface water and groundwater milestone criteria and a site suitability statement</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                 |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Contaminated land investigation report and reporting of water quality as per EA</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                 |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>Contaminated land Investigation at closure and water sampling as per PRCP monitoring program</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>PMLU Scenario 5: Flooding influences on rehabilitation and final landforms</b>                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                                                           |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Technical services</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>Removal of infrastructure from watercourse (e.g. culverts, etc), that could adversely impact flow</li> <li>Decommissioning of dams</li> <li>Design of landforms within flood extents that are safe and stable</li> <li>Establishment of vegetation suitable for the landform and reduces erosion risks</li> <li>Undertake monitoring for potential landform risks and undertake maintenance</li> <li>Subsidence drainage works to limit inundation/ponding to acceptable limits</li> </ul> |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Flood modelling</li> <li>Rehabilitation monitoring post flood events</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                            |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Inundation from a 2% AEP rainfall event not more than 1m</li> <li>Final landform to be predominantly free draining</li> </ul>                                                                                                                                                                                                                                                                                                                                                              |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                     | <ul style="list-style-type: none"> <li>Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                                                       |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>As per PRCP monitoring program</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>PMLU Scenario 6: Rehabilitated landforms result in alteration of flood hydrology upstream and downstream</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                    |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Technical services</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                              |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>Removal of infrastructure within watercourse alignments (e.g. culverts) that could adversely impact flows</li> <li>Decommissioning of dams</li> <li>Subsidence crack repairs and drainage works to limit inundation/ponding to acceptable limits</li> <li>Establishment of landforms that are stable</li> <li>Undertake modelling, monitoring and maintenance works where required to maintain landforms</li> </ul> |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Flood modelling</li> <li>Rehabilitation monitoring post flood events</li> </ul>                                                                                                                                                                                                                                                                                                                                     |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>No unacceptable damage to infrastructure or ecosystems as a result of changes to flood regime or change to flood extent</li> </ul>                                                                                                                                                                                                                                                                                  |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Rehabilitation monitoring</li> <li>Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                    |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>As per PRCP monitoring program</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>PMLU Scenario 7: Insufficient or inappropriate growth media required for rehabilitation</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                    |
| Responsibility for plan:                                                                                                                            | <ul style="list-style-type: none"> <li>Technical services</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>Environment team</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                    |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>Management of topsoil stockpiling</li> <li>Management of rehabilitation material application</li> <li>Review of the growth media material balance periodically during operations</li> <li>Growth media assessment to determine ameliorant requirements and physical treatments</li> <li>Application of ameliorants and physical treatments as per assessment</li> </ul> |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>Topsoil inventory</li> <li>Survey</li> <li>Equipment capabilities</li> <li>Rehabilitation monitoring data</li> <li>Growth media assessment</li> </ul>                                                                                                                                                                                                                   |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Tracking against milestone criteria</li> </ul>                                                                                                                                                                                                                                                                                                                          |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Rehabilitation monitoring and maintenance</li> <li>Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul>                                                                                                                                                                                        |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>From planning of soil stripping to final achievement of PMLU</li> </ul>                                                                                                                                                                                                                                                                                                 |
| <b>PMLU Scenario 8: Inadequate and/or inappropriate revegetation</b>                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                        |
| Responsibility for plan: <ul style="list-style-type: none"> <li>Approval</li> <li>Implementation</li> </ul>                                         | <ul style="list-style-type: none"> <li>Environment team</li> <li>Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                    |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>Growth media assessment to determine ameliorant and physical treatment requirements for the PMLU</li> <li>Application of ameliorants and physical treatments as per assessment</li> <li>Revegetation species and application rate aligned to growth media, landforms, subsidence impacts and PMLU</li> </ul>                                                            |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Management of seed selection, provenance and quality</li> <li>• Subsidence crack repairs and drainage works to limit inundation/ponding to acceptable limits</li> <li>• Rehabilitation and reference site monitoring</li> <li>• Rehabilitation maintenance</li> </ul>                                                                                                                                                                                                 |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>• Growth media assessment</li> <li>• Seed</li> <li>• Rehabilitation and reference site monitoring</li> </ul>                                                                                                                                                                                                                                                                                                                                                            |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>• Tracking against milestone criteria</li> <li>• Self-sustaining vegetation suited to PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>• Rehabilitation and reference site monitoring</li> <li>• Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                                                 |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>• From growth media planning to final achievement of PMLU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>PMLU Scenario 9: Deterioration of built infrastructure conditions</b>                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Reasons for selecting treatment option                                                                                                              | <ul style="list-style-type: none"> <li>• Studies and analysis to continue over the rehabilitation period to the end of mine life to demonstrate and confirm that these treatments achieve a stable condition for the proposed closure landform</li> </ul>                                                                                                                                                                                                                                                      |
| Responsibility for plan: <ul style="list-style-type: none"> <li>• Approval</li> <li>• Implementation</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Environment team</li> <li>• Site operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
| Proposed actions                                                                                                                                    | <ul style="list-style-type: none"> <li>• Surface infrastructure not being retained on-site to be decommissioned and removed, and underlying land rehabilitated</li> <li>• Undertake a preliminary contaminated land assessment prior to the completion of the approved activities, conduct a detailed site investigation and implement remediation and/or site management plan if required</li> <li>• Capping and sealing of surface infrastructure for underground operations (e.g. shafts, holes)</li> </ul> |
| Resource requirements                                                                                                                               | <ul style="list-style-type: none"> <li>• SQP to undertake contaminated land investigations and oversee on-going monitoring requirements</li> <li>• Rehabilitation monitoring</li> </ul>                                                                                                                                                                                                                                                                                                                        |

| Aspect                                                                                                                                              | Risk treatment                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk event: Stable condition for land described as a post-mining land use (cattle grazing, woodland habitat and watercourse) is not achieved</b> |                                                                                                                                                                                                                         |
| Performance measures and constraints                                                                                                                | <ul style="list-style-type: none"> <li>Tracking against milestone criteria</li> </ul>                                                                                                                                   |
| Reporting and monitoring                                                                                                                            | <ul style="list-style-type: none"> <li>Rehabilitation monitoring and maintenance</li> <li>Implementation of any necessary remediation or maintenance activities identified through rehabilitation monitoring</li> </ul> |
| Risk timing and scheduling                                                                                                                          | <ul style="list-style-type: none"> <li>Throughout operations to final achievement of PMLU</li> </ul>                                                                                                                    |

| Relationship with PRCP schedule                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A risk-based approach has been adopted to develop the milestones in the PRCP schedule. This is primarily driven by the RRR for the identified risk scenarios of the risk event. Should a risk event materialise, the additional proposed actions identified in this risk section will be implemented and, where necessary, adjusted accordingly (in line with the risk treatment identified in this section).</p> |

## 7.2 Rehabilitation trials

### **PRCP Guideline (Section 3.7.1)**

*In accordance with section 126C(1)(j) of the EP Act, if rehabilitation trials are planned, the rehabilitation planning part must state:*

- the objective of the trial(s)*
- the trial design including, but not limited to, the location, underlying land characteristics and potential issues*
- the details of how the trial(s) will be carried out*
- when the trial(s) will commence*
- the duration of the trial(s)*
- how the trial(s) will be assessed for success*
- how the results of the trial(s) will be incorporated into rehabilitation strategies and the development of milestones, and*
- where the trials have previously been carried out by the applicant.*

*The information requirements in this section will apply to all applicants, whether or not they are an existing EA holder, who have planned or commenced rehabilitation trials. Existing EA holders can provide details of any rehabilitation trials that have occurred prior to the submission of the proposed PRC plan.*

No rehabilitation trials are proposed at RHM. Current rehabilitation practices will be executed in line with the PRCP rehabilitation milestone criteria for each PMLU.



## 8 MONITORING AND MAINTENANCE

### PRCP Guideline (Section 3.8)

Under section 126C(1)(j) of the EP Act, the administering authority considers monitoring and maintenance necessary to decide if the PRC plan is consistent with the requirements of the legislation. The rehabilitation planning part must contain a monitoring and maintenance program that identifies and describes the monitoring systems that will be carried out in order to demonstrate a milestone and milestone criteria have been achieved. The program must include, where relevant to the milestone and milestone criteria (but is not limited to):

- schedule of monitoring, reporting and review for each milestone
- description of methodologies and standards, which could include field-based assessments and the application of new remote sensing, GIS and other relevant emerging technologies
- monitoring that enables the repeatable collection of relevant statistically valid data
- monitoring using appropriate quality assurance and data management processes and systems
- regular analysis of site data including multi-year comparison trends and bench-marking against analogue/reference sites
- contingency strategies if monitoring data indicates milestone criteria are not being met
- post-closure monitoring to ensure milestone criteria has been demonstrated
- intent of monitoring reports, such as provision of results and key findings

The information requirements in this section will apply to all applicants whether or not they are an existing EA holder. However, existing holders may already have the required information available from previously submitted plans/reports/applications that, if still valid, could be used in the PRC plan. If there has/is any monitoring or maintenance of areas already rehabilitated, details must be included in the PRC plan.

### 8.1 Rehabilitation monitoring

Rehabilitation milestone monitoring will be undertaken at RHM by an AQP to demonstrate achievement of the rehabilitation milestones, as they relate to achieving the PMLUs of cattle grazing, woodland habitat or watercourse. The RMs and associated milestone criteria for RHM are detailed in Section 1.4.2 and Section 10.4. A combination of monitoring, reporting and data analysis approaches will be used to demonstrate the achievement of the RMs as detailed in Table 36. Monitoring and maintenance activities will continue after rehabilitated areas achieve the final rehabilitation milestone (achievement of PMLU to a stable condition) and/or are certified.

**Table 36: Rehabilitation milestones with relevant reporting requirements**

| RM  | Rehabilitation milestone                           | Reporting requirements                                                                                                                                                                                                                                                                            |
|-----|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM1 | Infrastructure decommissioning and removal         | <ul style="list-style-type: none"> <li>• Document visual inspections</li> <li>• Map of retained below-ground infrastructure (installed after the approval date of this transitional PRCP)</li> <li>• Document regulated waste removal</li> <li>• Assessment report for mine water dams</li> </ul> |
| RM2 | Remediation and/or management of contaminated land | <ul style="list-style-type: none"> <li>• Contaminated Land Investigation Document, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan</li> </ul>                                                                                 |
| RM3 | Landform development and reshaping                 | <ul style="list-style-type: none"> <li>• Survey/LiDAR of landform</li> <li>• Analysis of final landform against design</li> </ul>                                                                                                                                                                 |

| RM   | Rehabilitation milestone                                                            | Reporting requirements                                                                                                                                                                                                    |
|------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM4  | Surface preparation (cattle grazing)                                                | <ul style="list-style-type: none"> <li>Document growth media depth</li> <li>Growth media assessment and amelioration and physical treatment plan</li> <li>Document ameliorants and physical treatments applied</li> </ul> |
| RM5  | Surface preparation (woodland habitat)                                              | <ul style="list-style-type: none"> <li>Document growth media depth</li> <li>Growth media assessment and amelioration and physical treatment plan</li> <li>Document ameliorants and physical treatments applied</li> </ul> |
| RM6  | Surface preparation (watercourse)                                                   | <ul style="list-style-type: none"> <li>Document growth media depth</li> <li>Growth media assessment and amelioration and physical treatment plan</li> <li>Document ameliorants and physical treatments applied</li> </ul> |
| RM7  | Revegetation (cattle grazing)                                                       | <ul style="list-style-type: none"> <li>Document seed mix, purity information, planting timing, seed application rates and areas</li> </ul>                                                                                |
| RM8  | Revegetation (woodland habitat)                                                     | <ul style="list-style-type: none"> <li>Document seed mix, purity information, planting timing, seed application rates and areas</li> </ul>                                                                                |
| RM9  | Revegetation (watercourse)                                                          | <ul style="list-style-type: none"> <li>Document seed mix, purity information, planting timing, seed application rates and areas</li> </ul>                                                                                |
| RM10 | Achievement of surface requirements (cattle grazing)                                | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5</li> </ul>                                                                                                              |
| RM11 | Achievement of surface requirements (woodland habitat)                              | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5</li> </ul>                                                                                                              |
| RM12 | Achievement of surface requirements (watercourse)                                   | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.3 and 8.5</li> </ul>                                                                                                              |
| RM13 | Achievement of post-mining land use to a stable condition (cattle grazing – RA3)    | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5</li> <li>Hazard assessment</li> <li>Built infrastructure survey</li> </ul>                                              |
| RM14 | Achievement of post-mining land use to a stable condition (woodland habitat – RA21) | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.2 and 8.5</li> <li>Hazard assessment</li> <li>Built infrastructure survey</li> </ul>                                              |

| RM   | Rehabilitation milestone                                                       | Reporting requirements                                                                                                                                                       |
|------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM15 | Achievement of post-mining land use to a stable condition (watercourse – RA11) | <ul style="list-style-type: none"> <li>Rehabilitation monitoring as per Sections 8.1, 8.3 and 8.5</li> <li>Hazard assessment</li> <li>Built infrastructure survey</li> </ul> |

### 8.1.1 Remote sensing and technology

The current rehabilitation monitoring program utilises 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.

### 8.1.2 Erosion monitoring

Erosion monitoring will be conducted for all PMLUs at the frequencies in Table 38 and Table 43, and will support achievement of surface requirements and the PMLU to a stable condition.

*“There is no consensus in Australia on a quantitative or precise definition of what constitutes minor, moderate and/or severe erosion”* (National Committee on Soil and Terrain, 2024). For this reason, the best approach to assess the type and severity of erosion is by an AQP during monitoring. Type of erosion and the associated severity according to the Australian soil and land survey field handbook (National Committee on Soil and Terrain, 2024), will be recorded as per Table 37. For gully erosion, gully depth will also be recorded as 0.3 – 1.5m, 1.5 – 3.0m, or >3m.

Sheet, rill or gully erosion classified as severe will be remediated (Table 37). All minor or moderate erosion, plus other erosion types, such as tunnel erosion, will be assessed by an AQP and will be remediated if assessed as requiring intervention to ensure the PMLU is achieved. This ensures the erosion is assessed holistically, such as to ensure repair will not cause more damage, instead of a purely quantitative assessment.

The rehabilitation milestones for the achievement of PMLU to a stable condition also require a safety hazard assessment to be completed, which also ensures any erosion that is a safety hazard is remediated.

**Table 37: Erosion type and severity**

| Erosion type*             | Erosion severity         |                                                                                                                                                                                                           |                                                                                                                              |                                                                                                                                                                                           |
|---------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | No erosion               | Minor                                                                                                                                                                                                     | Moderate                                                                                                                     | Severe                                                                                                                                                                                    |
| Sheet erosion             | No sheet erosion present | Indicators may include shallow soil deposits in downslope sediment traps (fencelines, farm dams). Often very difficult to assess as evidence may be lost with cultivation, pedoturbation or revegetation. | Indicators may include partial exposure of roots, moderate soil deposits in downslope sediment traps (fencelines, farm dams) | Indicators may include loss of surface horizons, exposure of subsoil horizons, pedestalling, root exposure, substantial soil deposits in downslope sediment traps (fencelines, farm dams) |
| Rill erosion (≤0.3m deep) | No rill erosion present  | Occasional rills                                                                                                                                                                                          | Common rills                                                                                                                 | Numerous rills forming corrugated ground surface                                                                                                                                          |

| Erosion type*              | Erosion severity         |                                                                                               |                                                                                   |                                                                                                                                                                                  |
|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | No erosion               | Minor                                                                                         | Moderate                                                                          | Severe                                                                                                                                                                           |
| Gully erosion (>0.3m deep) | No gully erosion present | Gullies are isolated, linear, discontinuous and restricted to primary or minor drainage lines | Gullies are linear, continuous and restricted to primary and minor drainage lines | Gullies are continuous or discontinuous and either tend to branch away from primary drainage lines and on to footslopes, or have multiple branches within primary drainage lines |

\*Erosion classification definitions (National Committee on Soil and Terrain, 2024)

### 8.1.3 Subsidence cracking

Subsidence areas will be assessed for surface cracking via LiDAR and/or on-ground inspections. Subsidence cracking will be monitored as scheduled in Table 38 and Table 43, but may be assessed more frequently based on risk. Subsidence cracking will be managed according to erosion risk and likelihood of self-healing (Section 6.4.4.2).

### 8.1.4 Drainage and ponding areas

Subsidence areas may have partial backfill and/or drainage constructed to reduce subsidence induced ponding and to manage the entry of surface flows into the Isaac River and its tributaries (Section 6.4.4). Drainage features will be monitored as scheduled in Section 8.2.1, but may be assessed more frequently based on risk. Monitoring of the drainage features will be undertaken to confirm they remain stable and function as intended and to identify maintenance requirements. Areas subject to potential ponding will be monitored for the standard PMLU rehabilitation parameters as detailed in Section 8.2.

## 8.2 Cattle grazing and woodland habitat monitoring

### 8.2.1 Monitoring schedule

The rehabilitation monitoring program follows a phased approach as detailed in Table 38. Initial monitoring is undertaken on an annual basis for the first three-years to primarily assess vegetation establishment. This approach allows a timely assessment of the performance 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 in the monitoring program in years three, five, 10 and five-yearly thereafter, to assess and track achievement of surface requirements (RM10 and RM11) and achievement of PMLU to a stable condition (RM13 and RM14). The phased approach of the monitoring program enables regular analysis of rehabilitation monitoring data, including multi-year comparison of trends.

Monitoring of cattle grazing and woodland habitat reference sites will be undertaken for the parameters listed in Table 38 and will be implemented as per the monitoring schedule from Year 3.

**Table 38: Cattle grazing and woodland habitat PMLUs monitoring schedule and measured rehabilitation parameters**

| Rehabilitation parameter                                                                   | Monitoring schedule |        |        |        |                                   |
|--------------------------------------------------------------------------------------------|---------------------|--------|--------|--------|-----------------------------------|
|                                                                                            | Year 1              | Year 2 | Year 3 | Year 5 | Year 10+<br>(5-yearly thereafter) |
| <b>Cattle grazing and woodland habitat PMLUs</b>                                           |                     |        |        |        |                                   |
| Landform and erosion                                                                       | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Soil                                                                                       | ✓                   | -      | ✓      | ✓      | ✓                                 |
| <b>Cattle grazing PMLU</b>                                                                 |                     |        |        |        |                                   |
| Groundcover                                                                                | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Species richness (3P grasses)                                                              | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Invasive plants                                                                            | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Grazing land suitability assessment                                                        | ✓                   | -      | ✓      | ✓      | ✓                                 |
| Land condition                                                                             | -                   | -      | ✓      | ✓      | ✓                                 |
| Pasture condition                                                                          | -                   | -      | ✓      | ✓      | ✓                                 |
| <b>Woodland habitat PMLU</b>                                                               |                     |        |        |        |                                   |
| Groundcover (including native perennial grass cover, little cover, non-native plant cover) | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Species richness (trees, shrubs, grass, forbs/other)                                       | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Tree height                                                                                | -                   | -      | ✓      | ✓      | ✓                                 |
| Tree canopy and shrub layer cover                                                          | -                   | -      | ✓      | ✓      | ✓                                 |
| Recruitment                                                                                | -                   | -      | ✓      | ✓      | ✓                                 |
| Invasive species                                                                           | ✓                   | ✓      | ✓      | ✓      | ✓                                 |
| Tree stem count/basal area                                                                 | -                   | -      | ✓      | ✓      | ✓                                 |
| Subsidence cracking                                                                        | ✓                   | ✓      | ✓      | ✓      | ✓                                 |



## 8.2.2 Rehabilitation monitoring sites

Permanent rehabilitation monitoring sites will be established as part of the initial rehabilitation monitoring and will be assessed during all phases of rehabilitation monitoring. The permanent field monitoring sites should be selected using the following criteria:

- Representative of rehabilitation slope or subsidence impacts
- Accessible (vehicle access preferred)

## 8.2.3 General rehabilitation monitoring parameters

### 8.2.3.1 Landform and erosion

Landform and erosion will be assessed as part of all monitoring phases (Table 38). Prior to commencing the field monitoring work, a desktop assessment using LiDAR data and aerial imagery will be completed to assess the rehabilitated slope against the landform design, and the ongoing monitoring of the landform and slopes.

The desktop analysis will identify potential areas of ponding due to subsidence, 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 the 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 50m tape perpendicular to the slope and across the erosional activity identified by the LiDAR analysis. Erosion will be assessed by an AQP based on the classifications in Section 8.1.2, including the requirement for repair.

### 8.2.3.2 Soil

The parameters detailed in Table 39 will be analysed during all monitoring events for soils. Soil profile pits or cores will be located within close proximity to the permanent rehabilitation monitoring sites. Surface sampling depth refers to the top 0 – 10cm; and sub-surface sampling depth refers to layers at 10 – 30cm, 30 – 60cm and 90 – 100cm.

**Table 39: 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 sodium ions on the soil's cation exchange complex. Sodicity in soils can lead to slaking and dispersion which impact soil structure and stability. | ✓       | ✓           |

| Category       | Analyte                                  | Purpose of analyte                                                                                                                                                  | Depth   |             |
|----------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|
|                |                                          |                                                                                                                                                                     | Surface | Sub-surface |
| 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.         | ✓       | -           |

## 8.2.4 Cattle grazing specific rehabilitation parameters

### 8.2.4.1 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 native and non-native species recorded), standing dry cover, organic litter (fine and coarse organic material, such as fallen leaves, twigs, branches and hay), rocks, or bare ground. The percentage of total groundcover (anything in contact with the soil surface) is calculated. The percentage of cover will be assessed within five 1m x 1m quadrats and averaged to give a value for the monitoring point.

### 8.2.4.2 Species richness

The number of 3P grasses will be recorded as part of all monitoring phases.

### 8.2.4.3 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. Prohibited invasive plants are currently not present or known to be present in Queensland and have therefore been excluded from any proposed criteria. A complete list of invasive plant species is listed in Schedule 2, Part 2 (Restricted matter – invasive biosecurity matter) of the *Queensland 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.

### 8.2.4.4 Grazing land suitability assessment

Land suitability (Section 3.1.1.2) will be assessed at Year 1 to determine the effectiveness of ameliorants or if further treatments are required. Ongoing grazing land suitability assessments will be undertaken at the

permanent rehabilitation monitoring sites as part of all monitoring events from Year 3. The land suitability will be classed 1 to 5 as per the limitations in Table 16.

#### 8.2.4.5 Land condition

Land condition, as described in the *Queensland Reef Protection Regulations Farming in Reef Catchments Grazing Guide* (DES, 2022a), 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 means “*the capacity of grazing land to respond to rain and produce useful forage*” (DES, 2022a). Indicators of land condition include “*the proportion of organic ground cover, density of desirable perennial pasture species (i.e. grasses that are perennial, productive and palatable (3P) for cattle), extent of erosion and presence of weeds*” (DES, 2022a). Land condition is classified into four broad categories under the Grazing Land Management ABCD land condition framework based on indicators associated with pasture and soil condition (Table 40).

**Table 40: Grazing Land Management ABCD Land Condition Framework (DES, 2022a)**

| Land Condition | Land Condition Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Good – A       | <p>A condition land has all of the following features:</p> <ul style="list-style-type: none"> <li>• most land types in good condition will typically have at least 50% and often above 70% ground cover at the end of the dry season</li> <li>• good density of perennial grasses dominated by those species considered to be 3P grasses for that land type, little bare ground (less than 30 % in most years)</li> <li>• few weeds and no significant infestations</li> <li>• good soil condition: no erosion, good surface condition</li> </ul>                                                       |
| Fair – B       | <p>B condition land has at least one or more of the following features, but otherwise is similar to A condition land:</p> <ul style="list-style-type: none"> <li>• land types will typically have at least 50% ground cover and less than 70% in most years at the end of the dry season</li> <li>• some decline of grasses that are 3P grasses, increase in other species (less favoured grasses, weeds) and/or bare ground (more than 30% but less than 50% in most years)</li> <li>• some decline in soil condition, some signs of previous erosion and current susceptibility to erosion</li> </ul> |
| Poor – C       | <p>C condition land has one or more of the following features, but otherwise is similar to B condition land:</p> <ul style="list-style-type: none"> <li>• land with poor or degraded condition will typically have less than 50% ground cover at the end of the dry season</li> <li>• general decline of grasses that are 3P grasses, large amounts of less favoured species and/or bare ground (greater than 50% in most years)</li> <li>• obvious signs of past erosion and/or current susceptibility to erosion is high</li> </ul>                                                                   |
| Degraded – D   | <p>D condition land has one or more of the following features:</p> <ul style="list-style-type: none"> <li>• generally less than 20% ground cover</li> <li>• general lack of any perennial grasses or forbs</li> <li>• severe erosion or scalding, resulting in hostile environment for plant growth</li> <li>• often no long-term ability to carry stock</li> </ul>                                                                                                                                                                                                                                     |

#### 8.2.4.6 Pasture condition

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

The density and coverage of 3P grasses 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 of dry matter (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 41.

**Table 41: Pasture condition assessment table**

| Condition rating | Condition indicators      |                                                    |                            |                                                         |
|------------------|---------------------------|----------------------------------------------------|----------------------------|---------------------------------------------------------|
|                  | Preferred pasture species |                                                    | Annual grass<br>% DM yield | Undesirable<br>grasses and<br>other weeds<br>% 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                                                     |

#### 8.2.5 Woodland habitat specific rehabilitation parameters

##### 8.2.5.1 BioCondition

The monitoring method for woodland habitat rehabilitation will be a modified *BioCondition – A condition assessment framework for terrestrial biodiversity in Queensland assessment manual – version 2.2*) (Eyre, et al., 2015). The applicable site-based attributes detailed in the sub-sections below will be assessed and recorded. The modified BioCondition Assessment Manual method will involve reducing the length of the transect when assessing some parameters (e.g. tree canopy and shrub layer cover).

The BioCondition Assessment Manual scoring tables will be used to determine the site-based attribute scores, whereby the 'benchmarks' to be used for the scoring will be the average of the combined representative RE benchmarks as detailed in Table 42. The representative REs are based on the dominate REs within RA21 (Section 1.2.8.1) and the REs used to derive the recommended species in the seed mix (Table 26). Therefore, the BioCondition score will only be applicable to woodland habitat areas that are free draining. The applicable site-based attributes have a maximum possible site score of 60.

**Table 42: BioCondition benchmarks and scoring of site-based attributes for representative regional ecosystems**

| Site-based attributes                           | Maximum score for attributes | Benchmarks* for representative REs |           | Averaged benchmarks |
|-------------------------------------------------|------------------------------|------------------------------------|-----------|---------------------|
|                                                 |                              | RE 11.4.2                          | RE 11.5.3 | Combined REs        |
| Recruitment of dominate canopy species          | 5                            | 100                                | 100       | 100                 |
| Native plant species richness - trees (#)       | 5                            | 4                                  | 6         | 5                   |
| Native plant species richness - shrubs (#)      | 5                            | 5                                  | 6         | 6                   |
| Native plant species richness - grasses (#)     | 5                            | 8                                  | 6         | 7                   |
| Native plant species richness – forbs/other (#) | 5                            | 7                                  | 10        | 9                   |
| Tree canopy height (m)                          | 5                            | 20                                 | 16        | 18                  |
| Tree canopy cover (%)                           | 5                            | 25                                 | 20        | 20**                |
| Shrub layer cover (%)                           | 5                            | 13                                 | 3         | 8                   |
| Native perennial grass cover (%)                | 5                            | 16                                 | 19        | 18                  |
| Litter cover (%)                                | 5                            | 30                                 | 20        | 25                  |
| Non-native plant cover (%)                      | 10                           | 0                                  | 0         | 0                   |
| <b>Maximum Site Score</b>                       | <b>60</b>                    |                                    |           |                     |

\* Benchmarks for each applicable site-based attribute for the representative REs (State of Queensland, 2024)

\*\* Tree canopy cover reduced to 20% as agreed with the administering authority.

For the limited RA21 woodland habitat areas where ponding remains, and the area is revegetated with species as per Table 27, the site-based attributes listed in Table 42 will be monitored, however rehabilitation performance will be measured by species richness and tree canopy cover attributes.

### 8.2.5.2 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 native and non-native species recorded), standing dry cover, organic litter (fine and coarse organic material, such as fallen leaves, twigs, branches and hay), rocks, or bare ground. The percentage of total groundcover (anything in contact with the soil surface) is calculated. The percentage of cover will be assessed within five 1m x 1m quadrats and averaged to give a value for the monitoring point.

### 8.2.5.3 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 trees, shrubs, grasses (native and exotic), and forbs and other ground species at each site.

#### **8.2.5.4 Tree height**

Tree height and height range will be assessed at the permanent rehabilitation monitoring sites from Year 3. Tree 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).

#### **8.2.5.5 Tree canopy and shrub layer cover**

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

#### **8.2.5.6 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 (<5cm diameter at breast height) at each monitoring site.

#### **8.2.5.7 Invasive plants**

'Restricted' invasive plants will be assessed at the permanent rehabilitation monitoring 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.

#### **8.2.5.8 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 30cm 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.

### **8.3 Watercourse monitoring**

Watercourse monitoring will be conducted at RHM to assess the performance of the rehabilitated watercourses disturbed by mining activities. The purpose of the monitoring is to assess the performance of the rehabilitated watercourses in achieving watercourse surface requirements (RM12) and the final PMLU milestone criteria (RM15).

Watercourse monitoring will be undertaken in accordance with the 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 watercourse diversions; however, it can also be utilised for rehabilitated reaches of watercourses. Within each impacted/rehabilitated reach (RA11), a minimum of four equally spaced apart transects (approximately 50m long) will be set up as monitoring locations. More monitoring locations may be required, depending on the number of subsided panels impacting the watercourse. For rehabilitated watercourses reaches where crossings/culverts are removed, a modified IDC method with a reduced number of monitoring points within each reach is required due to the reduced impact area.

The RHM watercourse monitoring schedule is detailed in Table 43. The monitoring schedule indicates the IDC parameters are measured in Year 1, Year 2, Year 5 and then 5-yearly thereafter. However, monitoring may be conducted more frequently if required to assess the effectiveness, success and appropriateness of implemented preventative/mitigation controls for subsided panels.



The IDC methodology and monitoring consists of:

- Visual inspection of the rehabilitated watercourse, upstream and downstream reaches (i.e. reference sites)
- Assessment of geomorphic index and riparian vegetation index at nominated monitoring points within the rehabilitated watercourse, upstream and downstream reaches
- Determination of reach-averaged geomorphic index and riparian vegetation index and overall IDC scores for the rehabilitated watercourse, upstream and downstream reaches
- Comparison of the geomorphic index and riparian vegetation index and overall IDC scores for the rehabilitated watercourse reach to the relative upstream and downstream reaches

In addition to the IDC index parameters, several other parameters will also be monitored as listed in Table 43.

**Table 43: Watercourse PMLU monitoring schedule and measured rehabilitation parameters**

| Monitoring parameters                       |                                                                                                | Monitoring schedule |        |        |                                   |
|---------------------------------------------|------------------------------------------------------------------------------------------------|---------------------|--------|--------|-----------------------------------|
| Parameter                                   | Monitoring detail                                                                              | Year 1              | Year 2 | Year 5 | Year 10+<br>(5-yearly thereafter) |
| <b>Geomorphic index parameters</b>          |                                                                                                |                     |        |        |                                   |
| Stream width                                | Width of high flow channel (m)<br>Width of active channel (m)<br>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                                                | ✓                   | ✓      | ✓      | ✓                                 |
| <b>Riparian vegetation index parameters</b> |                                                                                                |                     |        |        |                                   |
| 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                            | ✓                   | ✓      | ✓      | ✓                                 |

| Monitoring parameters                  |                                                                                        | Monitoring schedule |        |        |                                |
|----------------------------------------|----------------------------------------------------------------------------------------|---------------------|--------|--------|--------------------------------|
| Parameter                              | Monitoring detail                                                                      | Year 1              | Year 2 | Year 5 | Year 10+ (5-yearly thereafter) |
| <b>Additional parameters</b>           |                                                                                        |                     |        |        |                                |
| Erosion                                | Assessment of erosion type (sheet, rill, gully, tunnel and mass movement) and severity | ✓                   | ✓      | ✓      | ✓                              |
| Groundcover                            | Groundcover (%)                                                                        | ✓                   | ✓      | ✓      | ✓                              |
| Species richness - trees and shrubs    | Native plant species richness for life-forms trees and shrubs                          | ✓                   | ✓      | ✓      | ✓                              |
| Tree canopy cover                      | Native tree canopy cover (%)                                                           | -                   | -      | ✓      | ✓                              |
| Tree canopy height                     | Tree median canopy height (m) for ecologically dominant layer or canopy layer          | -                   | -      | ✓      | ✓                              |
| Recruitment of woody perennial species | Recruitment of woody perennial species in ecological dominant layer                    | -                   | -      | ✓      | ✓                              |
| Subsidence cracking                    | Assessment of subsidence cracks (where applicable)                                     | ✓                   | ✓      | ✓      | ✓                              |

## 8.4 Reference sites

Representative cattle grazing reference sites will be established when rehabilitation at RHM commences. A minimum of two cattle grazing reference sites will be established in areas cleared for agriculture and will be assessed against the land suitability framework (Short, 2025).

A minimum of two representative woodland habitat reference sites will be established within RA21 and monitored prior to impacts to determine the baseline BioCondition of the existing vegetation.

Watercourse reference sites will be established in the Isaac River, Goonyella Creek and Twelve Mile Gully, prior to impacts from subsidence, to establish baseline data sets of watercourse conditions. In line with the IDC methodology (ID&A, 2001), and where applicable, each watercourse will have a control reach 1km upstream of mining impacts/subsidence and a downstream reach 1km downstream from mining impacts. Within each reach, ideally four equally spaced apart transects (approximately 50m long) will be set up as reference sites. However, there will be no downstream reach reference sites for Goonyella Creek and Twelve Mile Gully, as they flow into the Isaac River. Reference sites will be monitored in accordance with the watercourse monitoring requirements outlined in Section 8.3.

Where revegetation is required to rehabilitate a watercourse crossing, a reduced number of reference sites (compared to the IDC method (ID&A, 2001)) will be established due to the reduced impact area.

## 8.5 Surface water monitoring

Surface water runoff monitoring will be undertaken for watercourse locations listed in Table 44, following installation of monitoring equipment (installation is required no later than 20 years post commencement of mining activities).

### **8.5.1 Surface water quality**

The surface water monitoring data currently held for the site was collected as part of the RHM EIS and is not suitable for the development of site-specific quality criteria. Also, as per ANZG (2018), the default guideline values are for generic applications and may not be representative of local conditions, and therefore are not suitable for use as water quality limits for a specific mine site.

Water quality limits should be site-specific and developed through appropriate sampling analytical and quality plans that include data quality objective processes aligned with the intended use of the data. BMA have requested the transitional PRCPs be conditioned to allow the appropriate development of site-specific water quality limits. As the watercourses at RHM are highly ephemeral and do not support baseflows, the establishment of the site-specific water quality limits will be based on the ANZECC guidance for temporary waters (Smith, 2020).

Due to the variability and availability of the stream flows in the target ephemeral watercourses, there is some uncertainty around the timing for completing the establishment of site-specific water quality limits. However, the surface water quality limits will be derived prior to 2055.

Water quality monitoring will be undertaken in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009* (DES, 2018).

### **8.5.2 Rehabilitation area surface water monitoring**

Run-off from representative areas of rehabilitation will be tested for pH, electrical conductivity and turbidity. The assessment of closure surface water quality will be undertaken through the receiving environment surface water monitoring detailed in Section 8.5.2.

### **8.5.3 Receiving environment surface water monitoring**

The collection and analysis of surface water samples from watercourses will commence following installation of monitoring equipment (installation required no later than 20 years post commencement of mining activities). The objective of the watercourse samples is to facilitate relinquishment of the site through confirming the rehabilitated site is not causing environmental harm through surface water discharges and has generated a stable landform suitable to support the PMLUs.

Surface water quality will be monitored at the locations in Table 44, at least once per month when flows at the downstream gauging station record  $\geq 5\text{m}^3/\text{second}$  within the Isaac River and  $\geq 1\text{m}^3/\text{second}$  for other monitored watercourses (when safe to collect samples). Due to the ephemeral nature of the watercourses that cross RHM, there are no baseflows to allow for collection of samples on a predetermined schedule, and therefore sampling will be undertaken following rainfall events that generate the target flows at the downstream gauging stations.

The water quality within the watercourses, within the five-year period immediately prior to surrender, will be assessed via the following process:

1. Downstream monitoring results will be compared to the site-specific surface water quality limits (once developed). Where downstream monitoring results are below the surface quality limits, no further actions will be required.
2. Where exceedances of the surface water quality limits are identified at the downstream sample locations, the downstream results will be compared to the upstream results for that monitoring round. Where downstream results are equal to or less than the upstream results, no further actions will be required.
3. Where downstream results are above both the specified water quality limits and the upstream results, an AQP will be engaged to assess the risk to achieving a stable condition:
  - a. Where risks are determined to be low, no further action will be taken.
  - b. Where a risk greater than low is identified by the AQP, an assessment of potential environmental harm and any changes or rectification actions to rehabilitation activities will be assessed and implemented.
  - c. Where (b) is triggered more than three times over five consecutive years prior to surrender, the five-year monitoring period is reset. Where environmental harm is identified and/or rectification actions to

rehabilitation activities are required, at least five years of further surface water monitoring will be undertaken.

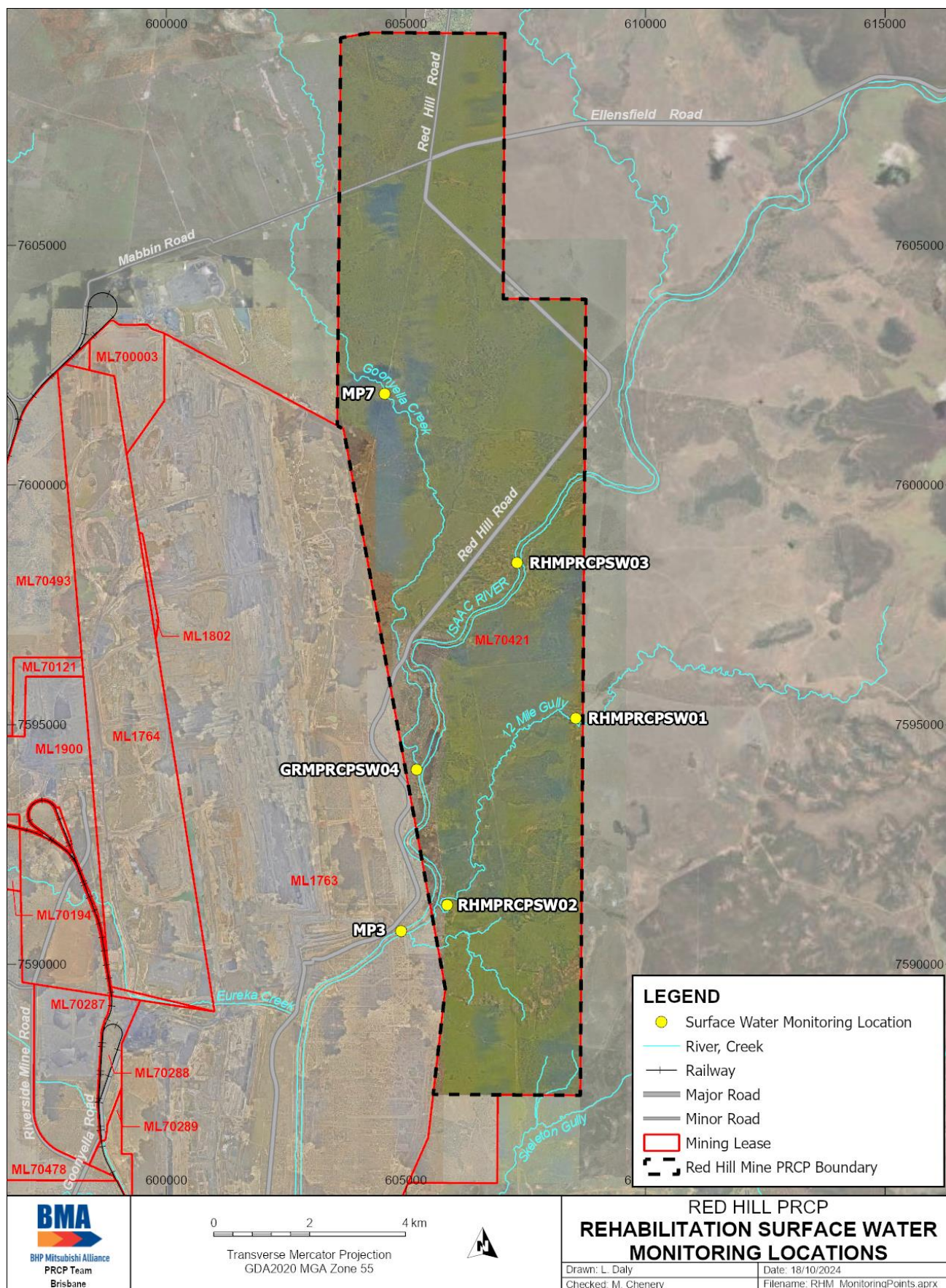
The results of assessments completed by the AQP will be provided to the administering authority within six months of receiving the sampling results.

The surface water monitoring locations are listed in Table 44 and shown in Figure 19. The monitoring locations may be amended as required to account for changes to upstream land uses/stream dynamics or to improve the effectiveness of the monitoring program.

**Table 44: Surface water sample locations**

| Sample location ID | Approximate location<br>(MGA2020 Zone 55) |          | Description                        |
|--------------------|-------------------------------------------|----------|------------------------------------|
|                    | Easting                                   | Northing |                                    |
| RHMPRCPSW03        | 607316                                    | 7598375  | Isaac River Upstream               |
| MP3                | 604899                                    | 7590686  | Isaac River Downstream             |
| MP7                | 604556                                    | 7601907  | Goonyella Creek Upstream           |
| GRMPRCPSW04        | 605222                                    | 7594064  | Goonyella Creek Downstream         |
| RHMPRCPSW01        | 608544                                    | 7595135  | Twelve Mile Gully Creek Upstream   |
| RHMPRCPSW02        | 605855                                    | 7591235  | Twelve Mile Gully Creek Downstream |





**Figure 19: RHM surface water monitoring locations**

## **8.6 Groundwater monitoring**

In line with the Guideline for Progressive Certification for Resource Activities (DES, 2022b), deep drainage water quality will be “*addressed holistically for a site at surrender*”. The objective and acceptance criteria for groundwater is not considered relevant to progressive rehabilitation of discrete packages of rehabilitated land due to the scale and nature of groundwater aquifers. Therefore, groundwater monitoring will commence following installation of monitoring bores (installation required no later than 20 years post commencement of mining activities) and provide more than a decade of water monitoring data prior to the scheduled completion of mining.

### **8.6.1 Groundwater quality**

As operations at RHM have not commenced, there is limited groundwater monitoring data. The groundwater data set held was collected sporadically for specific projects, for which different sampling methodologies and data quality objectives were applied. Therefore, this data was not collected with the intent of using it to develop site-specific criteria. Also, as per ANZG (2018), the default guideline values are for generic applications and may not be representative of local conditions, and therefore are also not suitable for use as water quality limits. The execution of scopes for the installation of monitoring infrastructure and collection of appropriate data sets to support the development of site-specific criteria, could not be completed within the transitional PRCP notice timeframes.

Water quality limits should be site-specific and developed through appropriate sampling analytical and quality plans that include data quality objective processes aligned with the intended use of the data. BMA have requested the transitional PRCPs are conditioned to allow the appropriate development of site-specific water quality limits.

To allow sufficient time to install required monitoring infrastructure, and collect a reasonable data set of the required quality to support the development of the required site-specific criteria, the development groundwater quality limits will be derived prior to 2055.

Water quality monitoring will be undertaken in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009* (DES, 2018).

### **8.6.2 Groundwater levels**

Monitoring of groundwater levels will focus on the relationship between the Permian groundwater level recovery and the GRM Goonyella Pit residual void's lake level. Groundwater level/gradient trends over time will be assessed against the more dynamic pit lake levels to demonstrate the groundwater within the Permian is progressing to where it will develop a hydraulic gradient towards the GRM Goonyella Pit residual void and thus minimising the potential for an unacceptable risk of environmental harm.

Due to the timeframes involved post-dewatering to achieve stabilisation of the groundwater levels (~100 years), the intention of the groundwater level monitoring is to obtain suitable data to support predictive groundwater numerical modelling. The predictive modelling will be used to confirm progress towards development of the inward hydraulic gradient towards the Goonyella Pit residual void, which will act as a long-term groundwater sink for the mined Permian lithology. Demonstrating the progress towards development of inward hydraulic gradients is to be done through predictive numerical modelling completed by AQPs.

### **8.6.3 Groundwater monitoring schedule**

During operations, groundwater monitoring will continue as per the applicable EA conditions.

Groundwater monitoring to assess the rehabilitated site will commence following installation of monitoring bores (installation required no later than 20 years post commencement of mining activities). Groundwater at the nominated locations will be monitored six monthly and compared against the site-specific groundwater quality limits.



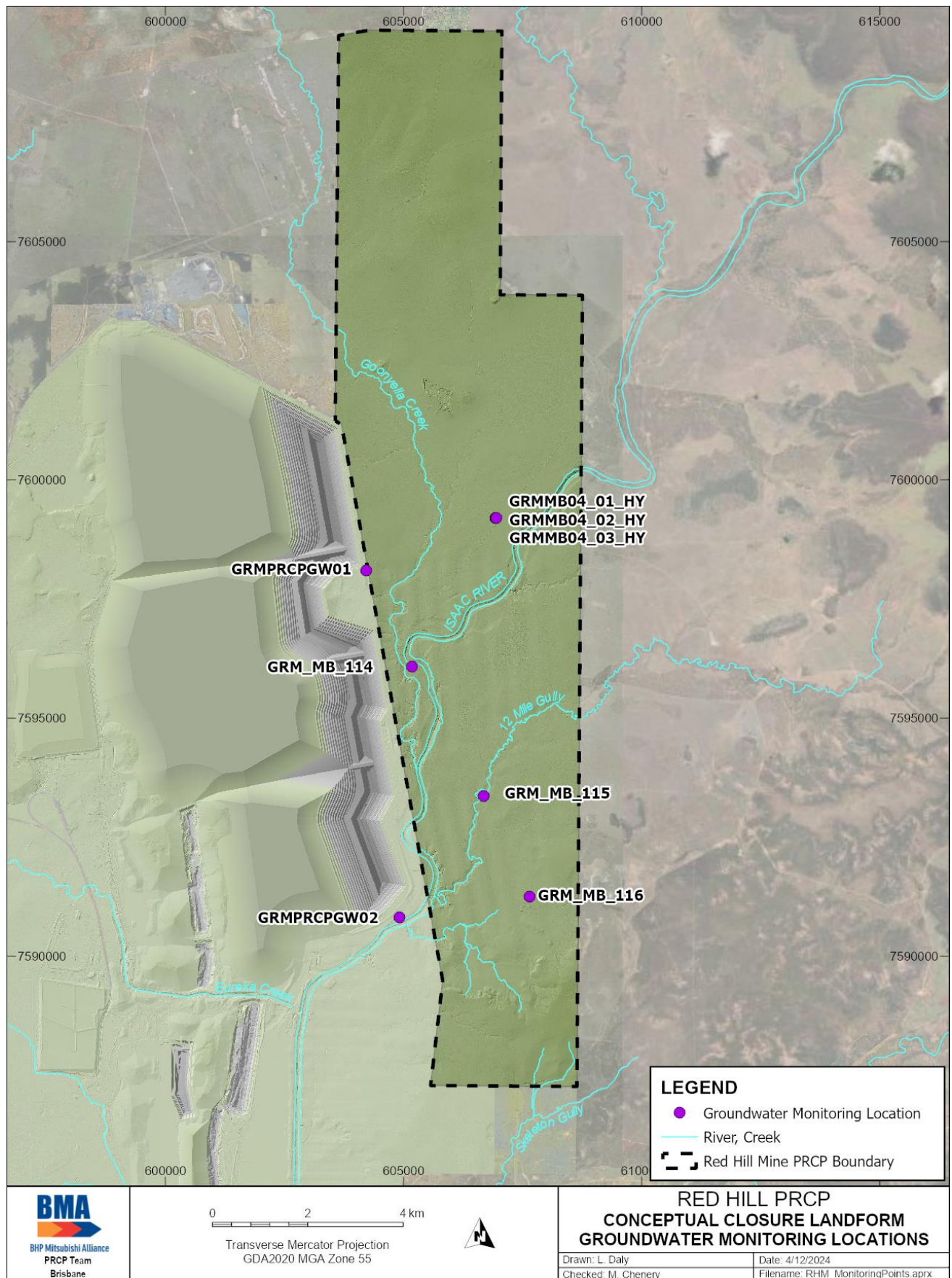
#### 8.6.4 Groundwater monitoring locations

Groundwater monitoring to support the assessment of closure conditions will be undertaken on bores that provide a reasonable assessment of aquifers that could form complete exposure pathways. The groundwater monitoring bore network to assess closure conditions will include selected bore locations that are appropriate and accessible in the closure landform, bores shared with neighbouring GRM and BRM, bores installed specifically to close data gaps and replacement bores. The groundwater monitoring locations to be utilised for assessment of rehabilitation are provided in Table 45 and illustrated in Figure 20.

The closure groundwater monitoring program may be amended to include additional bores to better assess hydrogeological conditions, or to replace lost or damaged bores, as required. Planned new bores to be installed as part of the rehabilitation monitoring program will be dependent on safe access and the presence of the target hydrogeological unit (e.g. alluvium) and groundwater at the selected locations.

**Table 45: RHM closure groundwater monitoring locations**

| Sample location ID | Approximate location (MGA2020 Zone 55) |          | Description                                                                                 | Hydro-geologic unit              |
|--------------------|----------------------------------------|----------|---------------------------------------------------------------------------------------------|----------------------------------|
|                    | Easting                                | Northing |                                                                                             |                                  |
| GRM_MB_114         | 605172                                 | 7596072  | Adjacent to Isaac River and Goonyella Creek on easter side of lease                         | Alluvial/Tertiary                |
| GRMMB04_01_HY      | 606953                                 | 7599206  | Central portion of tenement. Planned new bore                                               | Alluvial/Tertiary                |
| GRMMB04_02_HY      | 606946                                 | 7599201  | Central portion of tenement. Planned new bore                                               | Alluvial/Tertiary                |
| GRMMB04_03_HY      | 606938                                 | 7599195  | Central portion of tenement. Planned new bore                                               | Fort Cooper Measures - Coal Seam |
| GRMPRCPGW01        | 604217                                 | 7598105  | Western tenement boundary adjacent to the Goonyella Pit residual void. New bore.            | GLS                              |
| GRMPRCPGW02        | 604906                                 | 7590821  | West of tenement boundary immediately to the south of Goonyella Pit residual void. New bore | GLS                              |
| GRM_MB_115         | 606690                                 | 7593368  | Adjacent to Twelve Mile Gully. Planned new bore                                             | Alluvial/Tertiary                |
| GRM_MB_116         | 607639                                 | 7591258  | Southern end of subsidence area. Planned new bore                                           | Tertiary                         |



**Figure 20: RHM closure groundwater monitoring bores**

## 8.7 Achievement schedule

The timing of the rehabilitation milestones specific to achievement of surface requirements and achievement of cattle grazing, woodland habitat and watercourse PMLUs are listed in Table 46. These timeframes have regard to the risks presented in Section 7.

Achievement of surface requirements for cattle grazing (RM10) is proposed within a 10-year timeframe from revegetation and a further five-years for achievement of PMLU to a stable condition for cattle grazing (RM13). There are a number of factors which can influence the successful establishment of pastures on post-mined land including landform, soil management and amelioration, species selection, seeding rates and seeding timing, plus rainfall. This will allow for sufficient time to demonstrate the ongoing sustainability of the PMLU for cattle grazing through rehabilitation monitoring data associated with land condition and pastures.

Achievement of surface requirements for woodland habitat (RM11) and watercourse (RM12) are proposed within a 10-year timeframe from revegetation. A further 10-years is allowed for initial establishment and successional processes and natural recruitment to occur, prior to achievement of the PMLUs to a stable condition (RM14 and RM15).

**Table 46: Time for achievement of surface requirements and PMLUs rehabilitation milestones**

| RM   | Rehabilitation milestone                                                     | Milestone achievement time after revegetation (in PRCP schedule) |
|------|------------------------------------------------------------------------------|------------------------------------------------------------------|
| RM10 | Achievement of surface requirements (cattle grazing)                         | 10-years                                                         |
| RM11 | Achievement of surface requirements (woodland habitat)                       | 10-years                                                         |
| RM12 | Achievement of surface requirements (watercourse)                            | 10-years                                                         |
| RM13 | Achievement of post-mining land use to a stable condition (cattle grazing)   | Up to 15-years                                                   |
| RM14 | Achievement of post-mining land use to a stable condition (woodland habitat) | Up to 20-years                                                   |
| RM15 | Achievement of post-mining land use to a stable condition (watercourse)      | Up to 20-years                                                   |

## 8.8 Data analysis and reporting

Rehabilitation monitoring data will be collected and analysed by an AQP and assessed against the milestone criteria. The data will be analysed to identify changes and trends, as well as map the trajectory of rehabilitation to identify whether it is on track to achieve the milestone criteria or requires corrective actions or maintenance.

The rehabilitation data will be stored and processed within internal geospatial and document management systems.

## 8.9 Maintenance

Maintenance will be implemented when monitoring identifies issues with the rehabilitation, or when milestone criteria are not being met. In order 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 included in rehabilitation budgets for completion. Records of maintenance activities will be retained by BMA.

To support ongoing operations, exploration and minor ancillary activities may be required in areas not within a RA in some circumstances (Section 1.4.2). Rehabilitation of these activities will be managed as part of maintenance works and executed as soon as practicable and within six months of the completion of the

exploration or minor disturbance activity. Maintenance works may include removing infrastructure, reshaping the area, re-spreading stripped topsoil, applying seed mix aligned to the PMLU, weed control or managing erosion

## 8.10 Quality assurance and quality control

The QA/QC process to be followed as part of RHM ongoing rehabilitation monitoring is illustrated in Figure 21. The process provides for initial execution of the rehabilitation in accordance with the rehabilitation plan developed for each area prior to execution, followed by verification of the execution against the rehabilitation plan. Based on the verification outcomes, allowance is made for implementation of corrective actions, as needed. All rehabilitated areas then undergo rehabilitation monitoring; and subsequent execution of maintenance actions identified through the monitoring (Section 8) and improvements to the rehabilitation methodology. This process allows for a repetitive execution-verification-corrective action-monitoring QA/QC approach, to ensure rehabilitation areas progress on a trajectory towards achievement of milestone criteria and eventual certification.



**Figure 21: Rehabilitation monitoring quality assurance / quality control process**



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## B: PRCP SCHEDULE

### 10 PRCP SCHEDULE

#### Legislative Requirement

In accordance with section 126D(1) of the EP Act, the PRCP Schedule in the PRC Plan must:

- a) describe the area of each resource tenure either a post-mining land use or non-use management area, and
- b) for each post-mining land use state:
  - i. each rehabilitation milestone required to achieve a stable condition, and
  - ii. when each rehabilitation milestone is to be achieved, and
- c) for each non-use management area state:
  - i. each management milestone, and
  - ii. when each management milestone is to be achieved, and
- d) include maps showing the land mentioned in (a), (b) and (c).

#### PRCP Guideline (Section 4)

The development and implementation of the PRCP schedule is an essential element of a PRC plan. The administering authority approves a PRCP schedule and applicants are required to comply with the conditions and milestones of the schedule. A PRCP schedule must include:

- either a PMLU or NUMA for all land within the relevant resource tenures, including undisturbed land
- identification of when land becomes available for rehabilitation or improvement
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes
- milestone criteria that demonstrate when each milestone has been completed
- completion dates for each milestone to be achieved
- any conditions considered necessary or desirable.

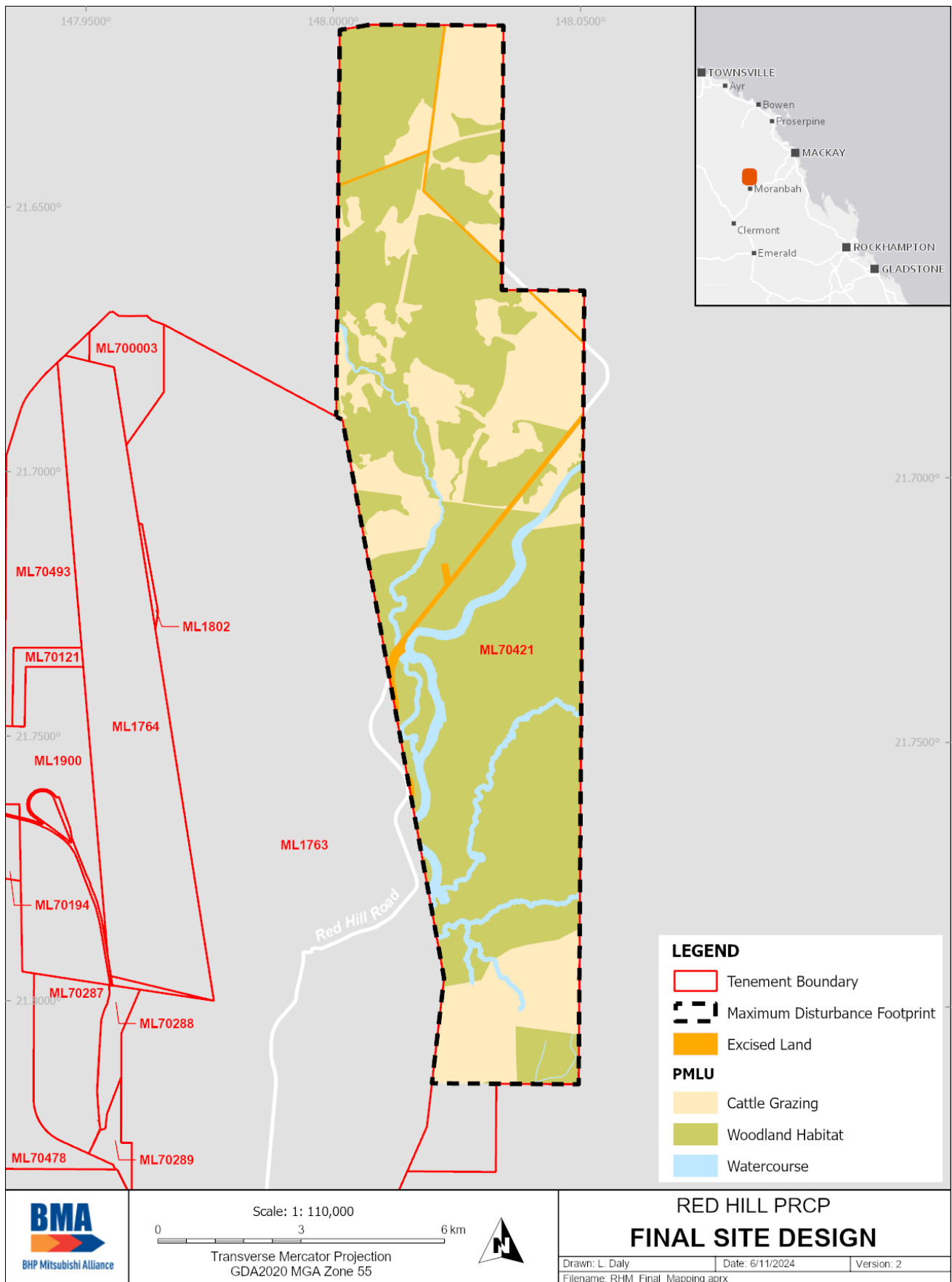
Applicants are required to develop and submit a proposed PRC plan when they make a site-specific application for an EA or receive a notice from the administering authority requiring the submission of a proposed PRC plan. The administering authority will assess the proposed PRCP schedule in conjunction with the rehabilitation planning part (see section 3 of this guideline) and decide whether to approve or refuse the PRCP schedule, amend the proposed PRCP schedule as necessary or impose milestones and conditions as necessary and impose conditions as necessary or desirable (see section 2.5 of this guideline). Once approved by the administering authority, the PRCP schedule becomes a legally binding and enforceable instrument with which the holder must comply.

### 10.1 Final site design

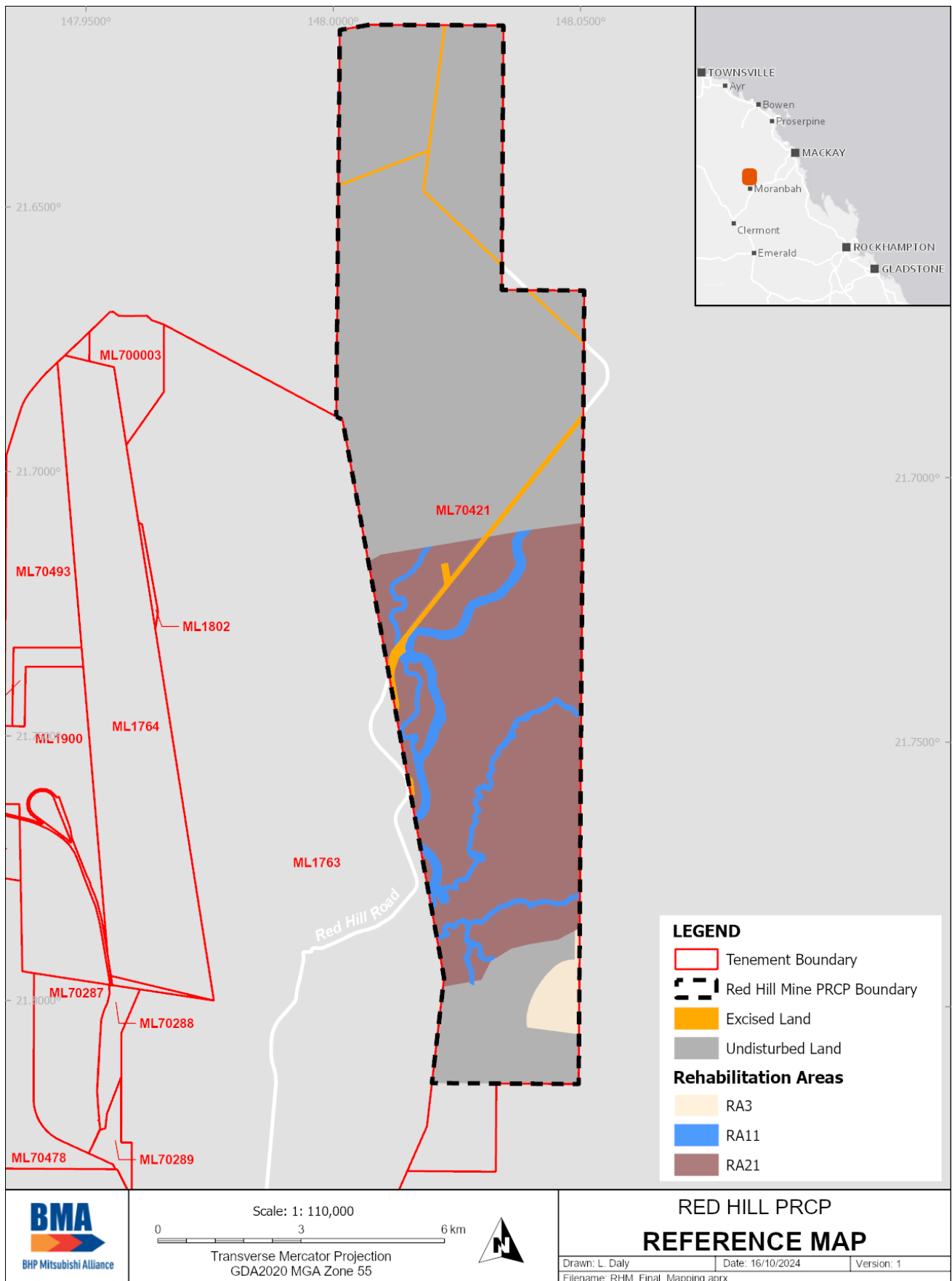
The RHM final site design is provided in Figure 22.

### 10.2 Reference map

The RHM reference map is provided in Figure 23.



**Figure 22: RHM Final site design**



**Figure 23: RHM Reference map**



### 10.3 Schedule Conditions

Refer to the approved RHM PRCP schedule for conditions (Section A - Conditions of PRCP schedule).

### 10.4 Rehabilitation milestones

The milestone criteria for RHM, as per the PRCP schedule approved by the administering authority with amendments (19 September 2025), are shown in Table 47. The PRC plan table number is referenced for the PRCP schedule Appendix tables that are directly sourced from the PRC plan, refer to the approved RHM PRCP schedule for the other Appendix tables.

The PRCP schedule includes additional erosion milestone criteria enforced by the administering authority, requiring tunnel erosion to be absent on all PMLUs. As communicated to the administering authority during the Information Stage, it remains BMA's position that:

- The BMA proposed erosion criteria, which utilises an AQP to enable a holistic assessment, will achieve a stable condition; and
- The criteria enforced by the administering authority, requiring tunnel erosion to be absent on all PMLUs, is not justified or achievable considering tunnel erosion is common throughout the Bowen Basin

**Table 47: RHM rehabilitation milestones and milestone criteria**

| Milestone reference | Rehabilitation milestone                   | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM1                 | Infrastructure decommissioning and removal | <p><b>1.1</b> All infrastructure to be retained onsite must be safe, stable and not cause environmental harm.</p> <p><b>1.2</b> All infrastructure and services to be retained onsite must have a signed landholder statement, declaring that they will accept responsibility for the infrastructure (except for those items in 1.3 and 1.4).</p> <p><b>1.3</b> Underground shafts are closed according to appropriately qualified person (AQP)<sup>1</sup> design (RA21).</p> <p><b>1.4</b> Except for 1.3, below-ground infrastructure, services and waste (as per the Environmental Authority (EPML03337715) waste schedule) deeper than 0.5m in relation to the final landform surface can be retained provided it can meet the following:</p> <ul style="list-style-type: none"> <li><b>a)</b> All pipelines have been drained; and</li> <li><b>b)</b> All below-ground infrastructure (installed after the approval date of this transitional PRCP) to be retained must be mapped; and</li> <li><b>c)</b> The intended PMLU is not compromised.</li> </ul> <p><b>1.5</b> With the exception of 1.2, 1.3 and 1.4 above, the following are complete:</p> <ul style="list-style-type: none"> <li><b>a)</b> All services disconnected, terminated and removed</li> <li><b>b)</b> All buildings and associated infrastructure dismantled and removed</li> <li><b>c)</b> All hardstand, concrete areas and roads (bitumen, blue metal, aggregate) removed</li> <li><b>d)</b> All pipelines drained and removed</li> </ul> |

| Milestone reference | Rehabilitation milestone                           | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                                                    | <p>e) All waste, not authorised under the Environmental Authority (EPML03337715) waste schedule, removed</p> <p>f) All surface water drainage infrastructure removed</p> <p>g) All drillholes, bores, sediment ponds and sumps decommissioned</p> <p>h) All machinery and equipment not required for rehabilitation works removed from site</p> <p>i) Mine water dams are decommissioned</p> <p>j) Watercourse crossings and culverts removed.</p> <p><b>1.6</b> Assessment of mine water dams to be retained post closure is completed by an AQP<sup>1</sup> and identified sediment and water management actions to ensure the dams are safe and stable for post mine use are completed.</p> <p><sup>1</sup><i><b>Appropriately qualified person (AQP)</b> means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.</i></p> |
| RM2                 | Remediation and/or management of contaminated land | <p><b>2.1</b> Contaminated Land Investigation Document completed in accordance with the <i>Environmental Protection Act 1994</i>, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan.</p> <p><b>2.2</b> The Contaminated Land Investigation Document confirms the area within the mining leases (ML1763, ML70421) does not present an unacceptable risk to the post-mining land use.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RM3                 | Landform development and reshaping                 | <p><b>All rehabilitation areas</b></p> <p><b>3.1</b> Erosion and sediment control systems are designed by an AQP<sup>1</sup>, installed, and fit for purpose.</p> <p><b>Cattle grazing (RA3)</b></p> <p><b>3.2</b> RA3 landforms maintain pre-mining contours <math>\pm 8\text{m}</math>.</p> <p><b>Watercourse (RA11)</b></p> <p><b>3.3</b> Reshape watercourse crossings to a profile similar to the pre-disturbance condition.</p> <p><b>Woodland Habitat (RA21)</b></p> <p><b>3.4</b> Backfill and/or install drainage to limit subsidence inundation:</p> <p>a) To maximum 1m depth in a 2% AEP rainfall event demonstrated by modelling completed by an AQP<sup>1</sup>, or</p> <p>b) Does not adversely impact achieving the PMLU as assessed by an AQP<sup>1</sup>.</p> <p><b>Retained water structure</b></p> <p><b>3.5</b> Water storages are safe for stock access and have vegetated banks.</p>                                                                                                                                                               |

| Milestone reference | Rehabilitation milestone               | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM4                 | Surface preparation (cattle grazing)   | <p><b>4.1</b> Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed.</p> <p><b>4.2</b> Assessment of growth media characteristics is completed by an AQP<sup>1</sup> to target land suitability class ≤3 as per PRCP Schedule Appendix 1 - Regional land suitability framework for beef cattle grazing PMLU rehabilitation in the Bowen Basin (Short, 2025) (Table 16).</p> <p><b>4.3</b> Ameliorant and physical treatments are applied as identified in criteria 4.2.</p> <p><b>4.4</b> Rip at least 300mm into soil/subsoil profile along contour of slopes.</p> |
| RM5                 | Surface preparation (woodland habitat) | <p><b>5.1</b> Topsoil placed at minimum depth of 100mm, or alternative growth media at minimum depth of 300mm, in areas where topsoil has previously been removed.</p> <p><b>5.2</b> Assessment of growth media characteristics is completed by an AQP<sup>1</sup> for target vegetation establishment suitable for designated PMLU.</p> <p><b>5.3</b> Ameliorant and physical treatments are applied as identified in criteria 5.2.</p> <p><b>5.4</b> Rip at least 300mm into soil/subsoil profile along contour of slopes.</p>                                                                          |
| RM6                 | Surface preparation (watercourse)      | <p><b>6.1</b> Topsoil placed at minimum depth of 150mm in areas where topsoil has previously been removed.</p> <p><b>6.2</b> Assessment of growth media characteristics is completed by an AQP<sup>1</sup> for target vegetation establishment suitable for designated PMLU.</p> <p><b>6.3</b> Ameliorant and physical treatments are applied as identified in criteria 6.2.</p> <p><b>6.4</b> Rip at least 300mm into soil/subsoil profile along contour of slopes.</p>                                                                                                                                  |
| RM7                 | Revegetation (cattle grazing)          | <p><b>7.1</b> Completed seeding in accordance with PRCP Schedule Appendix 2 - Recommended species list and seeding rates for cattle grazing PMLU (Table 24).</p> <p><b>7.2</b> At least four species of 3P grasses and two species of legumes from PRCP Schedule Appendix 2 - Recommended species list and seeding rates for cattle grazing PMLU (Table 24).</p>                                                                                                                                                                                                                                          |
| RM8                 | Revegetation (woodland habitat)        | <p><b>8.1</b> Completed seeding in accordance with PRCP Schedule Appendix 3 - Recommended species list and seeding rates for woodland habitat PMLU (Table 26)<sup>2</sup> or PRCP Schedule Appendix 4 - Recommended species list and seeding rates for woodland habitat PMLU – ponded areas (Table 27)<sup>2</sup>.</p> <p><sup>2</sup>Seed application may not be required in all areas.</p>                                                                                                                                                                                                             |
| RM9                 | Revegetation (watercourse)             | <p><b>9.1</b> Completed seeding in accordance with PRCP Schedule Appendix 5 - Recommended species list and seeding rates for watercourse PMLU – upper and mid banks (Table 28) and PRCP Schedule Appendix 6 - Recommended species list and seeding rates for watercourse PMLU – lower banks (Table 29).</p>                                                                                                                                                                                                                                                                                               |

| Milestone reference | Rehabilitation milestone                               | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RM10                | Achievement of surface requirements (cattle grazing)   | <p><b>10.1</b> &gt;50% vegetation groundcover, of which at least 50% of dry matter yield is 3P pasture species as listed in PRCP Schedule Appendix 2 - Recommended species list and seeding rates for cattle grazing PMLU (Table 24).</p> <p><b>10.2</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li><b>a)</b> All erosion as per PRCP schedule Appendix 7 – Erosion classification framework is assessed by an AQP<sup>1</sup> and repaired if assessed as requiring intervention to ensure a stable PMLU is achieved, and evidence that it is repaired as per AQP<sup>1</sup> advice; and</li> <li><b>b)</b> Mass movement and tunnel erosion are absent<sup>#</sup>.</li> </ul> <p><b>10.3</b> Surface water runoff has been collected across representative areas of rehabilitation when surface flows occur and it is safe to do so, and the results are not significantly different to upstream values for pH, EC, turbidity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| RM11                | Achievement of surface requirements (woodland habitat) | <p><b>11.1</b> Groundcover<sup>3</sup> must achieve ≥50% groundcover.</p> <p><b>11.2</b> Vegetation meets the following:</p> <ul style="list-style-type: none"> <li><b>a)</b> BioCondition score of ≥18/60 based on the benchmarks for the representative regional ecosystems as listed in PRCP Schedule Appendix 8 - BioCondition benchmarks and scoring of site-based attributes for representative regional ecosystems (Table 42) and as assessed by an AQP<sup>1</sup> using the modified 'BioCondition Assessment Manual' (version 2.2) methodology (RA21 - free draining areas), or</li> <li><b>b)</b> Species richness (RA21 - ponded areas): <ul style="list-style-type: none"> <li>i. ≥2 native trees;</li> <li>ii. ≥3 native shrubs; and</li> <li>iii. ≥4 ground species (native or exotic).</li> </ul> </li> </ul> <p><b>11.3</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li><b>a)</b> All erosion as per PRCP schedule Appendix 7 – Erosion classification framework is assessed by an AQP<sup>1</sup> and repaired if assessed as requiring intervention to ensure a stable PMLU is achieved, and evidence that it is repaired as per AQP<sup>1</sup> advice; and</li> <li><b>b)</b> Mass movement and tunnel erosion are absent<sup>#</sup>.</li> </ul> <p><b>11.4</b> Surface water runoff has been collected across representative areas of rehabilitation when surface flows occur and it is safe to do so, and the results are not significantly different to upstream values for pH, EC, turbidity.</p> <p><b>11.5</b> Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP<sup>1</sup>.</p> |

<sup>#</sup> The requirement for 'tunnel erosion' to be absent was enforced by the administering authority when approving the PRCP schedule.

| Milestone reference | Rehabilitation milestone                                                   | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                                                                            | <p><b>11.6</b> Bed and banks of subsidence drainage structures are geotechnically stable.</p> <p><sup>3</sup><b>Groundcover:</b> anything in contact with the soil surface, for example, live cover, standing dry cover, organic litter (including leaves, hay, woody debris) or rocks</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| RM12                | Achievement of surface requirements (watercourse)                          | <p><b>12.1</b> Groundcover<sup>3</sup> must achieve ≥50% groundcover.</p> <p><b>12.2</b> Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method<sup>4</sup>).</p> <p><b>12.3</b> Vegetation meets the following:</p> <ul style="list-style-type: none"> <li>a) Species richness: <ul style="list-style-type: none"> <li>i. ≥2 native trees;</li> <li>ii. ≥2 native shrubs representative of riparian vegetation RE 11.3.25; and</li> <li>iii. ≥2 grasses (exotic or native).</li> </ul> </li> </ul> <p><b>12.4</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li>a) All erosion as per PRCP schedule Appendix 7 – Erosion classification framework is assessed by an AQP<sup>1</sup> and repaired if assessed as requiring intervention to ensure a stable PMLU is achieved, and evidence that it is repaired as per AQP<sup>1</sup> advice; and</li> <li>b) Mass movement and tunnel erosion are absent<sup>#</sup>.</li> </ul> <p><b>12.5</b> Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP<sup>1</sup>.</p> <p><sup>4</sup>For watercourse rehabilitation (i.e. crossings/culverts), a modified IDC method with a reduced number of monitoring points within each reach will be used.</p> |
| RM13                | Achievement of post-mining land use to a stable condition (cattle grazing) | <p><b>13.1</b> Hazard assessment completed by an AQP<sup>1</sup> to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use.</p> <p><b>13.2</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li>a) No evidence of erosion classified as moderate or severe as defined by PRCP schedule Appendix 7 – Erosion classification framework ;</li> <li>b) Mass movement and tunnel erosion are absent<sup>#</sup>; and</li> <li>c) An AQP<sup>1</sup> determines that any erosion present will not compromise the achievement of a PMLU to a stable condition.</li> </ul> <p><b>13.3</b> Groundcover: &gt;50% vegetation groundcover, with ≥50% of pasture dry matter yield consisting of 3P grasses as listed in PRCP Schedule Appendix 2 - Recommended species list and seeding rates for cattle grazing PMLU (Table 24).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |

<sup>#</sup> The requirement for 'tunnel erosion' to be absent was enforced by the administering authority when approving the PRCP schedule.



| Milestone reference | Rehabilitation milestone                                                     | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                                                                              | <p><b>13.4</b> Surface water runoff has been collected across representative areas of rehabilitation when surface flows occur and it is safe to do so, and the results are not significantly different to upstream values for pH, EC, turbidity.</p> <p><b>13.5</b> Achievement of land suitability class <math>\leq 3</math> as per PRCP Schedule Appendix 1 - Regional land suitability framework for beef cattle grazing PMLU rehabilitation in the Bowen Basin (Short, 2025) (Table 16) or the pre-mining land suitability as per PRCP schedule Appendix 13 - Land suitability – Grazing or a more recent assessment as required under condition PRCP29.</p> <p><b>13.6</b> Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise <math>\leq 5\%</math> of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP<sup>1</sup> as appropriately managed.</p> <p><b>13.7</b> Final landform survey confirms no built infrastructure remains other than those that form part of landholder agreement and meets exception as per 1.4.</p> <p><b>Retained infrastructure/ Water storage</b></p> <p><b>13.8</b> Infrastructure to be transitioned to a future landholder is deemed fit for purpose, safe and stable by AQP<sup>1</sup> and accepted, by signed agreement with the future landholder.</p> <p><b>13.9</b> All retained dams are safe, stable for native animals and stock access and have vegetated banks.</p> <p><b>13.10</b> Water storages monitored for water quality annually must meet ANZECC 2000 stock water guideline values, for a minimum of 5 consecutive years.</p> |
| RM14                | Achievement of post-mining land use to a stable condition (woodland habitat) | <p><b>14.1</b> Hazard assessment completed by an AQP<sup>1</sup> to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use.</p> <p><b>14.2</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li>a) No evidence of erosion classified as moderate or severe as defined by PRCP schedule Appendix 7 – Erosion classification framework;</li> <li>b) Mass movement and tunnel erosion are absent<sup>#</sup>; and</li> <li>c) An AQP<sup>1</sup> determines that any erosion present, will not compromise the achievement of a PMLU to a stable condition.</li> </ul> <p><b>14.3</b> Groundcover must achieve <math>\geq 50\%</math> groundcover.</p> <p><b>14.4</b> Surface water runoff has been collected across representative areas of rehabilitation when surface flows occur and it is safe to do so, and the results are not significantly different to upstream values for pH, EC, turbidity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

<sup>#</sup> The requirement for 'tunnel erosion' to be absent was enforced by the administering authority when approving the PRCP schedule.

| Milestone reference | Rehabilitation milestone                                                | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                                                                         | <p><b>14.5</b> Vegetation meets the following:</p> <ul style="list-style-type: none"> <li>a) BioCondition score of <math>\geq 35/60</math> based on the benchmarks for the representative regional ecosystem as listed in PRCP Schedule Appendix 8 - BioCondition benchmarks and scoring of site-based attributes for representative regional ecosystems (Table 42) as assessed by an AQP<sup>1</sup> using the modified 'BioCondition Assessment Manual' (version 2.2) methodology (RA21 - free draining areas), or</li> <li>b) RA21 - ponded areas: <ul style="list-style-type: none"> <li>i. Species richness of <math>\geq 2</math> native trees, <math>\geq 3</math> native shrubs and <math>\geq 4</math> ground species (native or exotic)</li> <li>ii. Tree canopy cover: <math>\geq 16</math>.</li> </ul> </li> </ul> <p><b>14.6</b> Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise <math>\leq 5\%</math> of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP<sup>1</sup> as appropriately managed.</p> <p><b>14.7</b> Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP<sup>1</sup>.</p> <p><b>14.8</b> Final landform survey confirms no built infrastructure remains other than those that form part of landholder agreement and meets exception as per 1.4.</p> |
| RM15                | Achievement of post-mining land use to a stable condition (watercourse) | <p><b>15.1</b> Hazard assessment completed by an AQP<sup>1</sup> to confirm safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use.</p> <p><b>15.2</b> With respect to erosion in rehabilitated landforms:</p> <ul style="list-style-type: none"> <li>a) No evidence of erosion classified as moderate or severe as defined by PRCP schedule Appendix 7 – Erosion classification framework;</li> <li>b) Mass movement and tunnel erosion are absent<sup>#</sup>; and</li> <li>c) An AQP<sup>1</sup> determines that any erosion present, will not compromise the achievement of a PMLU to a stable condition.</li> </ul> <p><b>15.3</b> Geomorphic index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method<sup>4</sup>).</p> <p><b>15.4</b> Watercourse vegetation meets the following:</p> <ul style="list-style-type: none"> <li>a) Riparian vegetation index score: greater than or equal to upstream or downstream values (Index of Diversion Condition method<sup>4</sup>)</li> <li>b) Species richness: <ul style="list-style-type: none"> <li>i. <math>\geq 2</math> native trees;</li> <li>ii. <math>\geq 2</math> native shrubs; and</li> </ul> </li> </ul>                                                                                                                                                                                                          |

<sup>#</sup> The requirement for 'tunnel erosion' to be absent was enforced by the administering authority when approving the PRCP schedule.

| Milestone reference | Rehabilitation milestone | Milestone criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                          | <p>iii. ≥2 grass species (native or exotic)</p> <p>c) Tree canopy cover: ≥13%.</p> <p><b>15.5</b> Restricted invasive plants (as defined in the <i>Biosecurity Act 2014</i>) comprise ≤5% of vegetation groundcover, with the exception of <i>Parthenium hysterophorus</i> which must not exceed 10% vegetation groundcover and assessed by an AQP<sup>1</sup> as appropriately managed.</p> <p><b>15.6</b> Subsidence cracks are repaired if the cracks will not self-heal and they adversely impact achieving the PMLU as assessed by an AQP<sup>1</sup>.</p> <p><b>15.7</b> Watercourse bank stability is not adversely impacted by subsidence as assessed by an AQP<sup>1</sup>.</p> <p><b>15.8</b> Final landform survey confirms no built infrastructure remains other than those that form part of landholder agreement and meets exception as per 1.4.</p> |

## 10.5 Schedule

The RHM PRCP schedule is provided below.

| Post-mining land uses (PMLU)         |                                    |                                    |                                    |                                    |                                    |
|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Rehabilitation area                  | RA3                                |                                    |                                    |                                    |                                    |
| Relevant activities                  | Accommodation Area and Roads       |                                    |                                    |                                    |                                    |
| Total rehabilitation area size (ha)  | 138                                |                                    |                                    |                                    |                                    |
| Commencement of first milestone: RM1 | 10/12/XXXX <sup>1</sup> + 45 Years |                                    |                                    |                                    |                                    |
| PMLU                                 | Cattle Grazing                     |                                    |                                    |                                    |                                    |
| Date area is available               | 10/12/XXXX <sup>1</sup> + 45 Years |                                    |                                    |                                    |                                    |
| Cumulative area available (ha)       | 138                                |                                    |                                    |                                    |                                    |
| Milestone completed by               | 10/12/XXXX <sup>1</sup> + 47 Years | 10/12/XXXX <sup>1</sup> + 52 Years | 10/12/XXXX <sup>1</sup> + 54 Years | 10/12/XXXX <sup>1</sup> + 64 Years | 10/12/XXXX <sup>1</sup> + 69 Years |
| Milestone Reference                  | Cumulative area achieved (ha)      |                                    |                                    |                                    |                                    |
| RM1                                  | 138                                |                                    |                                    |                                    |                                    |
| RM2                                  |                                    | 138                                |                                    |                                    |                                    |
| RM3                                  |                                    |                                    | 138                                |                                    |                                    |
| RM4                                  |                                    |                                    | 138                                |                                    |                                    |
| RM7                                  |                                    |                                    | 138                                |                                    |                                    |
| RM10                                 |                                    |                                    |                                    | 138                                |                                    |
| RM13                                 |                                    |                                    |                                    |                                    | 138                                |

Note: <sup>1</sup> XXXX is the year of commencement of longwall mining as per conditions PRCP1 to PRCP3 inclusive.

| Post-mining land uses (PMLU)         |                                                                     |                                    |                                    |  |  |
|--------------------------------------|---------------------------------------------------------------------|------------------------------------|------------------------------------|--|--|
| Rehabilitation area                  | RA11                                                                |                                    |                                    |  |  |
| Relevant activities                  | Watercourses and crossing within underground mining/subsidence area |                                    |                                    |  |  |
| Total rehabilitation area size (ha)  | 388                                                                 |                                    |                                    |  |  |
| Commencement of first milestone: RM1 | 10/12/XXXX <sup>1</sup> + 34 Years                                  |                                    |                                    |  |  |
| PMLU                                 | Watercourse                                                         |                                    |                                    |  |  |
| Date area is available               | 10/12/XXXX <sup>1</sup> + 34 Years                                  |                                    |                                    |  |  |
| Cumulative area available (ha)       | 388                                                                 |                                    |                                    |  |  |
| Milestone completed by               | 10/12/XXXX <sup>1</sup> + 37 Years                                  | 10/12/XXXX <sup>1</sup> + 47 Years | 10/12/XXXX <sup>1</sup> + 57 Years |  |  |
| Milestone Reference                  | Cumulative area achieved (ha)                                       |                                    |                                    |  |  |
| RM1                                  | 388                                                                 |                                    |                                    |  |  |
| RM3                                  | 388                                                                 |                                    |                                    |  |  |
| RM6                                  | 388                                                                 |                                    |                                    |  |  |
| RM9                                  | 388                                                                 |                                    |                                    |  |  |
| RM12                                 |                                                                     | 388                                |                                    |  |  |
| RM15                                 |                                                                     |                                    | 388                                |  |  |

Note: <sup>1</sup> XXXX is the year of commencement of longwall mining as per conditions PRCP1 to PRCP3 inclusive.

| Post-mining land uses (PMLU)         |                                                                                                                      |                                    |                                    |                                    |                                    |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Rehabilitation area                  | RA21                                                                                                                 |                                    |                                    |                                    |                                    |
| Relevant activities                  | Subsidence, underground mining infrastructure, general infrastructure and disturbance within underground mining area |                                    |                                    |                                    |                                    |
| Total rehabilitation area size (ha)  | 2818                                                                                                                 |                                    |                                    |                                    |                                    |
| Commencement of first milestone: RM1 | 10/12/XXXX <sup>1</sup> + 34 Years                                                                                   |                                    |                                    |                                    |                                    |
| PMLU                                 | Woodland Habitat                                                                                                     |                                    |                                    |                                    |                                    |
| Date area is available               | 10/12/XXXX <sup>1</sup> + 34 Years                                                                                   |                                    |                                    |                                    |                                    |
| Cumulative area available (ha)       | 2818                                                                                                                 |                                    |                                    |                                    |                                    |
| Milestone completed by               | 10/12/XXXX <sup>1</sup> + 37 Years                                                                                   | 10/12/XXXX <sup>1</sup> + 42 Years | 10/12/XXXX <sup>1</sup> + 45 Years | 10/12/XXXX <sup>1</sup> + 55 Years | 10/12/XXXX <sup>1</sup> + 65 Years |
| Milestone Reference                  | Cumulative area achieved (ha)                                                                                        |                                    |                                    |                                    |                                    |
| RM1                                  | 2818                                                                                                                 |                                    |                                    |                                    |                                    |
| RM2                                  |                                                                                                                      | 2818                               |                                    |                                    |                                    |
| RM3                                  |                                                                                                                      |                                    | 2818                               |                                    |                                    |
| RM5                                  |                                                                                                                      |                                    | 2818                               |                                    |                                    |
| RM8                                  |                                                                                                                      |                                    | 2818                               |                                    |                                    |
| RM11                                 |                                                                                                                      |                                    |                                    | 2818                               |                                    |
| RM14                                 |                                                                                                                      |                                    |                                    |                                    | 2818                               |

Note: <sup>1</sup> XXXX is the year of commencement of longwall mining as per conditions PRCP1 to PRCP3 inclusive.

## **C: APPENDICES**

**Appendix A: Red Hill Mine Environment Authority (EPML03337715) (04 April 2025)**

**Appendix B: DES (13 December 2021) - Progressive Rehabilitation and Closure Plan Transition Notice. Ref EPML03337715**

**Appendix C: Progressive Rehabilitation and Closure Plan - Red Hill Mine - Pre-Notification Memo (29 November 2021)**

**Appendix D: AECOM (2024) - Transitional Progressive Rehabilitation and Closure Plan - Red Hill Mine - Hydrogeology Assessment**

**Appendix E: GSS Environmental (2013) - Soil and Land Suitability Assessment Red Hill Mining Lease Environmental Impact Statement**

**Appendix F: Red Hill Mine PRCP Community Consultation Register**

**Appendix G: SLR (2024) - Red Hill Mine Progressive Rehabilitation and Closure Plan Rehabilitation Flood Assessment**

**Appendix H: Byrnes Geotechnical (2024) - Geotechnical considerations for closure of Red Hill Mine**

**Appendix I: Red Hill Mine PRCP Risk Assessment**