



APPENDIX AB - PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Progressive Rehabilitation and Closure Plan

Isaac Downs Extension Project



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Tenures: MLAs 700081, 700082, 700083 and 700084

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Definitions

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

Term	Definition
3P Grasses	Perennial, productive and palatable
ACARP	Australian Coal Association Research Program
AEP	Annual Exceedance Probability
AMD	Acid and Metalliferous Drainage (AMD). Includes acid/acidic drainage (AD), pH-neutral and metalliferous drainage (NMD) and sulphide-derived saline drainage (SD) – and/or any combination of these.
ANC	Acid Neutralising Capacity
AQP	Appropriately Qualified Person
BBAC	Barada Barna Aboriginal Corporation
CEC	Cation Exchange Capacity
CHPP	Coal Handling and Preparation Plant
CHM	Conceptual hydrogeological model
CSEP	Community and Stakeholder Engagement Plan
Coarse Reject	Waste material produced during coal washing, separated from the run-of-mine (ROM) coal in the coal handling and preparation plant (CHPP) can be separated and disposed as fine rejects (tailings) and coarse rejects, or co-disposed as mixed plant reject which is a mixture of coarse reject and 'dewatered' fine reject.
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
CWMP	Closure water management plan
DEM	Digital Elevation Model
DETSI	Department of Environment, Science, Tourism and Innovation (Queensland). (The Adminstrating Authority)
DM	Dry matter (with reference to vegetation)
DNRMMRRD	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development
DSITI	Department of Science, Information Technology and Innovation (Queensland)
EA	Environmental Authority (in terms of the Environmental Protection Act 1994, Queensland)
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMR	Environmental Management Register
EO Act	<i>Environmental Offsets Act 2014</i> (Queensland)
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERA	Environmentally Relevant Activities
ESP	Exchangeable Sodium Percentage
EV(s)	Environmental Value(s)
FoS	Factor of Safety
GMMP	Groundwater Monitoring and Management Plan
ha	Hectares

Term	Definition
t/ha/y	Tonnes/hectare/year
Interburden	Non-carbonaceous or carbonaceous mine waste located between coal seams. In this report the term 'overburden' shall be used to define overburden and interburden.
Project	Isaac Downs Extension Project (proposed Isaac Downs Extension Mine)
ID Extension	Stanmore ID Extension Pty Ltd
IDM	Isaac Downs Mine
IPC	Isaac Plains Complex
IPM	Isaac Plains Mine
km	Kilometre
LDWG	Livestock drinking water guidelines
LGA	Local Government Area
MAW	Mine-affected water
Mine Waste	Material comprising overburden and/or interburden, Sometimes, called 'mineral waste' or 'mining waste' or 'spoil'
ML	Mining Lease
MLA	Mining Lease Application
mm	Millimetres
MNES	Matter of National Environment Significance
MPA	Maximum Potential Acidity
MR Act	<i>Mineral Resources Act 1989</i> (Queensland)
MSES	Matter of State Environmental Significance
NAF	Non-Acid Forming
NC Act	<i>Nature Conservation Act 1992</i> (Queensland)
NUMA	Non-Use Management Area
Overburden	Non-carbonaceous or carbonaceous mineral waste located above (overburden proper) or between (interburden) coal seams. Carbonaceous overburden is generated during mining of non-ore material and may be represented by sedimentary units (non-coal) rich in organic carbon. Carbonaceous overburden does not include coarse reject, seam floor, seam roof or coal partings. Overburden reports to spoils dumps
PAF	Potentially Acid forming
PMLU	Post-mining Land Use 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.
PRCP	Progressive Rehabilitation and Closure Plan “... for land the subject of an ineligible mining activity, means a progressive rehabilitation and closure plan for the land that consists of two parts – • The rehabilitation planning part – PRCP, and • The approved part – PRCP Schedule that includes milestones and conditions” (PRCP Guidelines, 2023) (in terms of the Environmental Protection Act 1994 (Queensland))
PRCP Guideline	Progressive Rehabilitation and Closure Plan Guideline V3.01 (2023) (DESI, Queensland)

Term	Definition
QBEIS	Queensland Biodiversity and Ecology Information System
RA(s)	Rehabilitation Area(s) As defined in the PRCP Guideline: a rehabilitation area, 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.
RCM	Rangal Coal Measures
RE(s)	Regional Ecosystem(s)
ROM	Run-of-Mine
RM(s)	Rehabilitation Milestone(s) As defined in the PRCP Guideline: a rehabilitation milestone, for the rehabilitated land, means each significant event or step necessary to rehabilitate the land to a stable condition (section 115 of the EP Act).
SHMS	Safety and Health Management System
SMART	Specific, measurable, achievable, reasonable/relevant, time-specific
SMU(s)	Soil Mapping Unit(s)
SPR	Source-pathway-receptor
Spoil	Mine waste comprising non-ore (non-ROM) material such as overburden, interburden and waste coal.
SWMP	Surface water monitoring program
Tailings	Waste material produced during coal washing, separated from the run-of-mine (ROM) coal in the coal handling and preparation plant (CHPP) can be separated and disposed as fine rejects (tailings) and coarse rejects, or co-disposed as mixed plant reject which is a mixture of coarse reject and 'dewatered' fine reject.
TDS	Total Dissolved Solids
TEC	Threatened Ecological Communities
UQ	University of Queensland
VM Act	<i>Vegetation Management Act 1999</i> (Queensland)
Waste Coal	Sub-economical coal that reports to the spoil dumps as waste. Waste coal can be fresh or oxidised. All oxidised and coked (cindered) coal is waste.
WMS	Water Management System

1. INTRODUCTION

Stanmore ID Extension Pty Ltd (ID Extension), a wholly owned subsidiary of Stanmore Resources Ltd (Stanmore), has prepared an environmental impact statement (EIS) for the Isaac Downs Extension Project (the Project), under Chapter 3 of the *Environmental Protection Act 1994* (EP Act).

This Progressive Rehabilitation and Closure Plan (PRCP) and accompanying draft PRCP Schedule (**Appendix AC** to the EIS) were prepared as part of Project's EIS in accordance with the requirements of the Project's final terms of reference for the EIS (approved 11 December 2025), the *Environmental Protection Act 1994* (EP Act), and the Progressive Rehabilitation and Closure Plan Guideline (PRCP Guideline) (DES, 2023).

This PRCP is provided as **Appendix AB** to the EIS. A draft PRCP schedule is provided as **Appendix AC** to the EIS. Typically, a PRCP would include appendices with technical assessments; however where technical assessments are included as appendices to the EIS, they are referenced as such in this PRCP. This PRCP comprises the three following parts, which are integrated in the EIS.

- **Part A:** Rehabilitation Planning - providing information about the site, the rehabilitation plans, and evidence and justification to support the development of the proposed PRCP Schedule. References to appendices in Part A are to appendices to the EIS, unless otherwise stated.
- **Part B:** PRCP Schedule and associated spatial information - including maps of rehabilitation and closure outcomes for the site, and tables of time-based rehabilitation milestones, provided as **Appendix AC** to the EIS.
- **Part C:** Appendices - providing key information and technical studies used to support development of this plan. References to appendices in Part A are to appendices to the EIS, unless otherwise stated, noting that there are some appendices that are unique to the PRCP and not provided as separate appendices to the EIS.

2. REHABILITATION PLANNING PART

Legislative Requirement

In accordance with Section 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part of the PRCP 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 PRCP:

- the location and maximum extent of disturbance footprint for the mine life;
- the post-mining land uses (PMLUs) and none-use management areas (NUMAs) for the area within the resource tenures;
- any sensitive receptors; and
- extent of the flood plain as it relates to the final site design.

In addition to the list above, the PRCP 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).

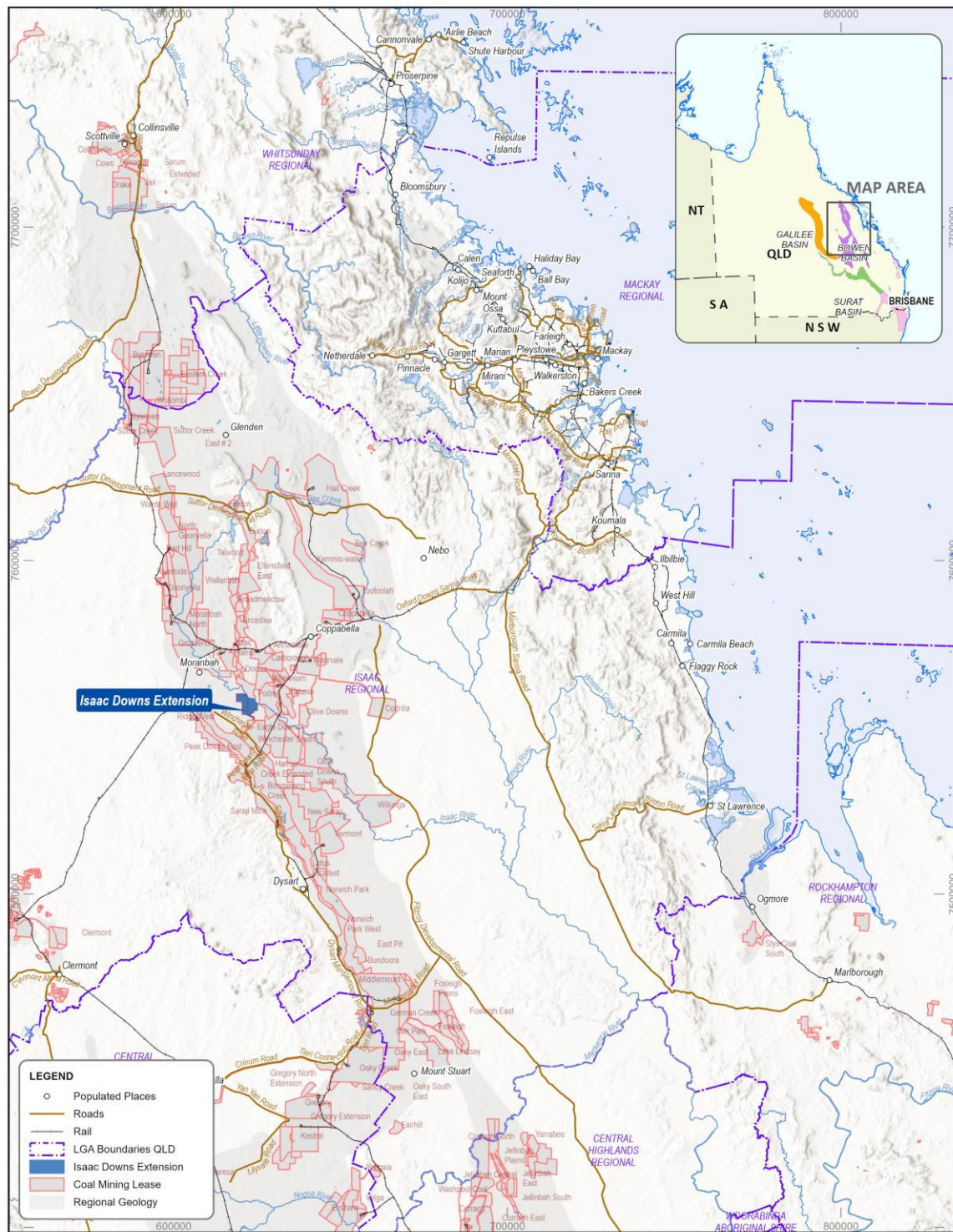
All spatial information must be prepared and submitted in accordance with the guideline 'Spatial Information Submission' (ESR/2018/4337).

2.1 Project Planning

2.1.1 Project Description

2.1.1.1 Geographic Location

The Project is located in the Bowen Basin of central Queensland approximately 15 km southeast of Moranbah and 150 km southwest of Mackay, and is within the Isaac Regional Council Area (Figure 1).



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Project Regional Location

Figure | 1

2.1.1.2 Mining Tenements

The proponent for the Project (ID Extension) applied for four mining leases (MLs) for the Project, with these ML applications (MLAs) described in Table 1 and displayed in Figure 2. The MLA boundaries have been selected to allow safe and efficient extraction of the coal reserves, allows sufficient areas for supporting infrastructure, minimise disturbance of environmentally sensitive areas, support the development of an appropriate post-mining landform, and meet the requirements of pre-existing background tenures and third-party access agreements.

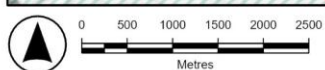
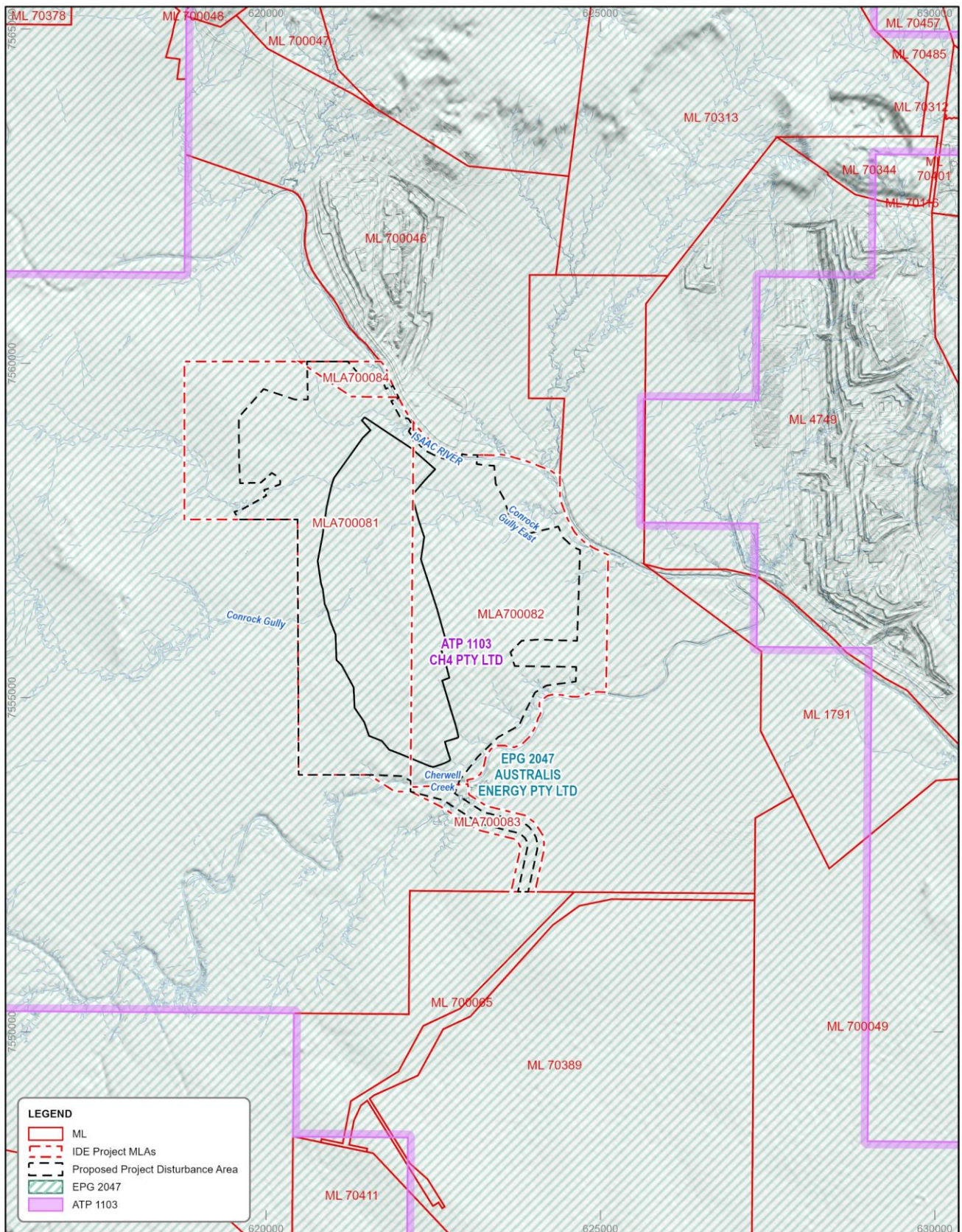
Table 1: Project – Planned Mining Tenements

Mining Application No.	Lease Name	Application Date	Area (ha)
MLA 700081	Isaac Downs Extension #1	24 June 2025	1393.26
MLA 700082	Isaac Downs Extension #2	24 June 2025	1166.46
MLA 700083	Isaac Downs Extension #3	24 June 2025	95.94
MLA 700084	Isaac Downs Extension #4	24 June 2025	51.44

The Project's MLAs 700081 to 700084 are overlapped by the following non-mineral exploration-only tenements (Figure 2).

- Authority to prospect (ATP 1103) – CH4 Pty Ltd (a subsidiary of Arrow Energy).
- Exploration permit geothermal application (EPGA 2047) – Australis Energy Pty Ltd.

There are no petroleum leases or other resource production tenures that overlap with the Project's MLA areas. ID Extension will engage with the overlapping tenement holders in accordance with the relevant requirements of Queensland's resource legislation.



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Mining and Overlapping Tenements

Figure | 2

2.1.1.3 Primary Mine and Infrastructure Features

The Project's main mining and infrastructure features are summarised in Table 2 and in Figure 3.

The Project will be integrated into Isaac Plains Complex (IPC), which comprises the Isaac Downs Mine (IDM) and Isaac Plains Mine (IPM). The Project will utilise some existing mining and infrastructure facilities at IPC. IDM and IPM are operated by the Stanmore subsidiaries, Stanmore IP South Pty Ltd and Stanmore IP Coal Pty Ltd, respectively.

Specifically, IDM's mine infrastructure area (MIA) will be used for workshop servicing of mining equipment, vehicle washdown requirements and consumables storage. IPM's coal handling and preparation plant (CHPP) will be utilised for processing the of the Project's run-of-mine (ROM) coal, and IPM's existing dumps and mined voids will be used for the disposal of the associated coarse rejects and tailings.

The Project's product coal from the IPM CHPP will be transport to the Dalrymple Bay Coal Terminal via the existing train loadout facility and Goonyella rail line for eventual shipping to market destinations.

A haul road connection with IDM will be constructed for haulage of ROM coal to the IPM's CHPP and general site access to the Peak Downs Highway via IDM, including a bridge across the Isaac River. IDM's dragline will be walked to the Project via a temporary crossing of the Isaac River prior to and at the cessation of mining.

A secondary site access will be established to Stanmore's Eagle Downs Project via a road, a bridge over Cherwell Creek and a bed-level crossing of JB Gully.

As a result of the continued use of the IDM's and IPM's existing mining and infrastructure facilities, the Project's operational requirements are reduced to a go-line (including heavy and light vehicle parking and a self-bunded fuel and lubricants storage), a crib area (including a potable water storage and supply, a small sewage storage facility, non-mining waste storage and a power supply connection), internal haul and access roads, RoM pads, a communication tower, site power supply infrastructure and general site fencing.

Water management structures will include mine-affected water dams, strategically located sediment control dams and drains (as per the erosion and sediment control plan), and pipes and pumps to facilitate the exchange of mine-affected water and raw water between the Project and IDM (i.e. as part of the water management strategy to minimise the need for controlled water releases during high rainfall events and to ensure an adequate water supply during extended periods of low rainfall).

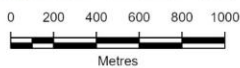
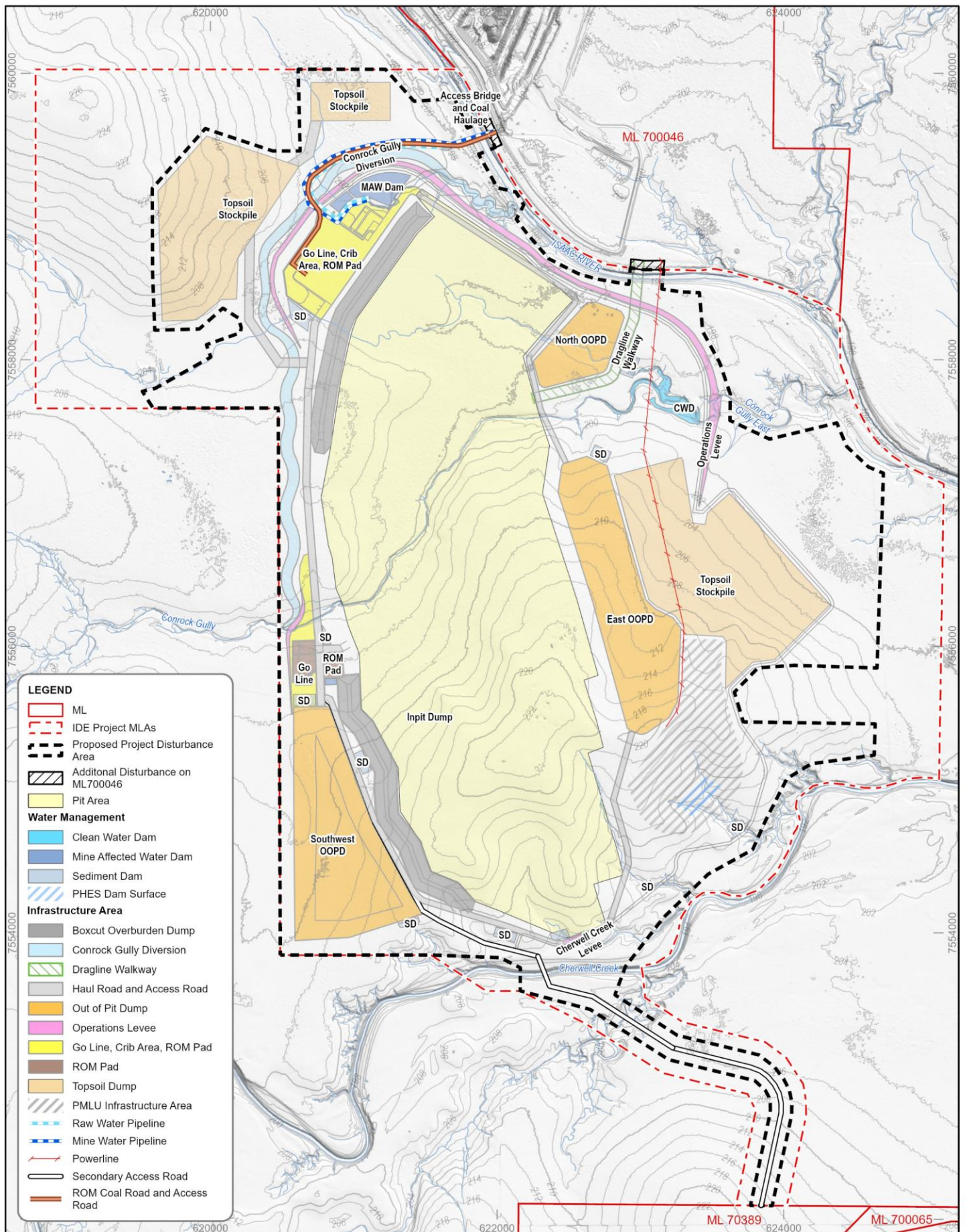
Prior to mining, the Isaac River levee and Cherwell Creek and Conrock Gully levee plugs will be established for flood control to prevent the inundation of the operational mining area from a 0.1% annual exceedance probability (AEP) flood event (i.e. 1:1,000 year flood event).

Conrock Gully will be diverted before mining in the area of the existing Gully commences to allow efficient, safe and maximal extraction of the Project's coal resource.

Table 2: Primary Mining and Infrastructure Features

Mine Domain	Mine Feature Name
Pit and Ramps / Final Void	• Mining pit area, including high wall, with residual void lake forming during closure
Spoil / Overburden Dumps	• In-pit and out-of-pit (box-cut and highwall) spoil dumps, comprising a main landform (in-pit), southwest landform (out-of-pit) and east landform (out-of-pit), with a temporary out of pit dump in the north prior to this dump material being used to backfill the northern pit area
Dams	• Mine affected water dams, sediment dams, clean water dam
Creek Diversions	• Conrock Gully diversion
Flood Protection	• Levee (Isaac River) and levee plugs (Cherwell Creek and Conrock Gully diversion)
General Infrastructure	• Isaac River and Cherwell Creek bridges, JB Gully bed-level crossing and Conrock Gully culvert crossing • Go-lines, including heavy and light vehicle parking • Fuel, oil, and lubricants storage (self-bunded)

Mine Domain	Mine Feature Name
	• Crib area, including a potable water storage and supply, a small sewage storage facility, and a remote power supply (generator) • Pipes and pumps • Power line • Communications infrastructure • Fences • General infrastructure areas in close proximity to the nominated footprints of particular infrastructure features (allows for some flexibility in location of infrastructure as well as potential disturbance associated with construction working areas)
General Disturbance	• Laydown areas • Access roads • Haul roads (RoM coal and overburden) • Drains • Topsoil stockpiles (prior to use of topsoil in rehabilitation of other areas) • Temporary dragline crossing of the Isaac River
Undisturbed Area	• Buffer land, within the nominated disturbance area, but which is likely to have minimal disturbance (e.g. exploration) • Land not impacted by mining operations – within the MLAs, but outside the nominated disturbance area
Post mining land use area	• Area within the Project's nominated disturbance area for future PMLUs such as pumped hydroelectric energy storage (PHES) ('pumped hydro') and / or an algae production facility



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Project Layout

Figure | 3

2.1.1.4 Type of Mining Operation

The Project comprises an open cut coal mine pit and associated infrastructure for the primary purpose of mining majority metallurgical (steel making) coal.

The Project will utilise a conventional open cut mining method, involving:

- clearing of vegetation, stripping and stockpiling of topsoil
- drilling and blasting of pre-strip overburden
- removing the pre-strip overburden using a dragline and/or truck and shovel fleets and/or dozers
- drilling and blasting of overburden
- drilling and blasting of pit floor for geotechnical stability to allow for in-pit dumping
- overburden removal using dragline and/or truck and shovel fleets
- coal mining using excavators
- RoM coal haulage to the RoM pad for eventual haulage to IPM CHPP
- formation of out-of-pit and in-pit overburden dumps as mining progresses
- progressive rehabilitation of dump areas as they become available.

This open cut mining method is the most efficient method for extraction of the Project's coal resource, and is similar to that employed at IDM and other open cut mines within the Bowen Basin. No new or alternative coal mining methods will be used for the Project. No underground mining is proposed for the Project. A schematic summary of this type of open cut mining operations is shown in Figure 4.

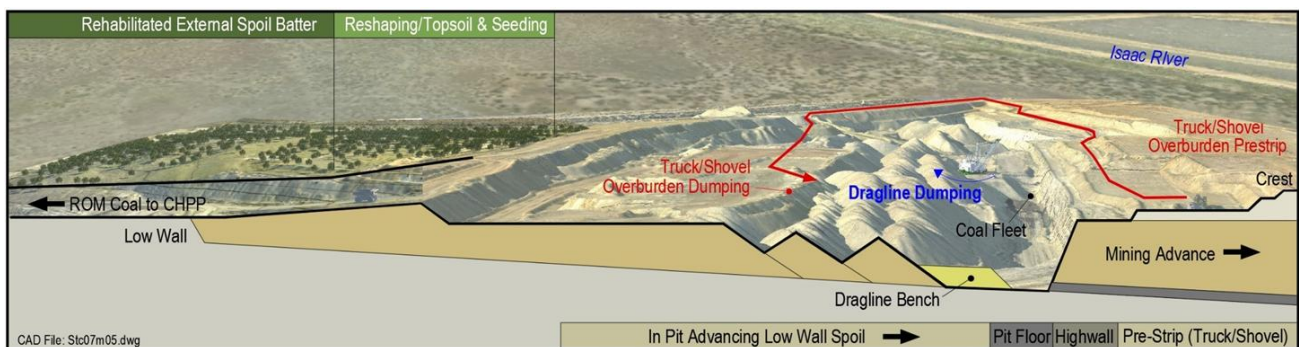


Figure 4: Open Cut Mining Schematic

2.1.1.5 Proposed Duration

The Project's construction is scheduled to commence in late 2027 / early 2028 with ROM coal extraction commencing in in 2029. For the purposes of describing the Project's operations, Year 1 refers to the initial construction year, and Year 2 is the first year of ROM coal extraction. Year 16 is the final year of ROM coal extraction. Following completion of mining during Year 16, decommissioning and rehabilitation of the Project is expected to take another 10 to 20 years depending on the planned final land use.

2.1.2 Baseline Information

2.1.2.1 Site Topography

Figure 5 shows the topography within and surrounding the Project area (the Project's MLA areas). Generally, the topography is relatively flat and falls towards the Isaac River and Cherwell Creek from the centre of the Project area. Elevation ranges between approximately 230 m AHD on a rise to the north of Cherwell Creek and 190 m AHD along the Isaac River.

Two dominant rises overlying residual Tertiary deposits are located within the Project area, which comprise the rise to the north of Cherwell Creek and a rise towards the northwest. Quaternary alluvial deposits form a flat plain along the eastern boundary of the Project area. The Isaac River forms the eastern boundary, and Cherwell Creek forms the majority of the southern boundary. South of Cherwell Creek the topography consists of a flat plain and a gentle rise of basalt colluvium.

2.1.2.2 Climate

Based on the average daily maximum air temperatures, the hottest daytime period ($>30.0^{\circ}\text{C}$) of the year is from September to April with a range of 30.1°C to 35.0°C . December has the highest average daily maximum air temperature at 35.0°C and July has the lowest average daily maximum air temperature at 24.3°C .

Based on the average daily minimum air temperature, the coolest nighttime period ($<15.0^{\circ}\text{C}$) of the year is from May to September with a range of 8.7°C to 12.7°C . July has the lowest average daily minimum air temperature of 8.7°C and January has the highest average daily minimum air temperature of 21.5°C .

The wettest period of the year is from November to March based on the average and median monthly rainfall. January is the wettest month with an average and median monthly rainfall of 104.1 mm and 100.2 mm, respectively.

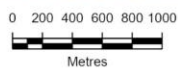
The driest period of the year is from April to October based on the average and median monthly rainfall. September is the driest month with an average and median monthly rainfall of 13.3 mm and 1.2 mm, respectively.

The average annual evaporation rate is 2,000-2,400 mm and seasonal pan evaporation rates for Summer, Autumn, Winter and Spring are 700-800 mm, 500-600 mm, 300-400 mm and 600-700, respectively. Summer and Winter possess the highest and lowest seasonal pan evaporation rates, respectively.

Winds across the region surrounding the Project area are predominantly light to moderate (up to around 5 m/s) and from the northeast through to southeast. Winds from the northwest and southwest sectors are much less frequent. The seasonal breakdown of winds shows that the predominant southeast winds present throughout the year, although Spring sees a slight shift in direction to greater easterlies.

Based on the average monthly relative humidity (%), February had the highest average humidity for 9am (74%) and 3pm (48%), October had the lowest average humidity for 9am (58%), and September had the lowest average humidity for 3pm (30%).

The yearly range of the average monthly relative humidity (%) for 9am and 3pm was 58-74% and 30-48%, respectively. The average monthly relative humidity (%) for 3pm is consistently lower than for 9am over the year. September to November (Spring) experiences the lowest average monthly relative humidity (%) for 9am (58-60%) and 3pm (30-34%).



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ISAAC DOWNS EXTENSION

Project Topography

2.1.2.3 Geology

The Project's coal deposit is located in the northern part of the Permo-Triassic Bowen Basin containing principally fluvial and some marine sediments. The Bowen Basin is part of a connected group of Permo-Triassic basins in eastern Australia, which includes the Sydney and Gunnedah Basins. The Basins axis orientation is NNW-SSE roughly parallel to the Paleozoic continental margin. Tectonically, the basin can be divided into NNW-SSE trending platforms or shelves separated by sedimentary troughs. The units from west to east are the Springsure Shelf, Denison Trough, Collinsville Shelf/Comet Platform, Taroom Trough, Connors and Auburn Arches (interrupted by the Gogango Overfolded Zone) and the Marlborough Trough.

Development of the basin in the Early Permian was in the form of half grabens which subsequently became areas of regional crustal sag. Variations in depositional patterns and deformation styles occur along strike suggest the possibility of NE trending deep seated crustal transfer faults referred to as a transfer corridor. The basin has suffered oriented NE-SW extensional and compressional events.

Structurally, the deposit lies on the western boundary of the deformed Nebo Synclinorium immediately west of a regional thrust fault system- the Isaac Thrust system. To the east and north (of the thrust) seams are repeated in the Winchester South deposit.

The economic seams are contained in the Late Permian Rangel Coal Measures which are approximately 100 m thick. The Rangel Coal Measures are underlain by the Fort Cooper Coal Measures and overlain by the Late Permian to Early Triassic Rewan Group.

The Rangel Coal Measures comprise light grey, cross-bedded, fine to medium grained labile sandstones, grey siltstones, mudstones and coal seams. Cemented sections are common in the sandstones. The transition from the Rangel Coal Measures to the Rewan Formation is generally difficult to define and is often based on the change from the green-grey colour of the Rewan sandstones to the blue-grey colour of the Rangel sandstones.

The Fort Cooper Coal Measures comprise typically tuffaceous sandstones, siltstones, mudstones and coal seams. The transition between the Rangel Coal Measures and the Fort Cooper Coal Measures is generally clearly marked by the Yarrabee Tuff.

2.1.2.4 Hydrology

The Project is located within the headwaters of the Isaac sub-catchment of the greater Fitzroy Basin. The Isaac River is the main watercourse in the vicinity of the Project area, and flows in the north-west to south-east direction to the east of the Project.

The catchment commences at the Denham Range located about 98 km to the north of the Project. The Isaac River flows in a southwesterly direction through the Carborough and Kerlong Ranges before turning in a southeasterly direction near the Goonyella Riverside Mine. The Connors River, which has a catchment area similar to the upstream Isaac River, flows into the Isaac River approximately 120 km downstream of the Project. The Isaac River finally converges with the Mackenzie River a further 53 km downstream.

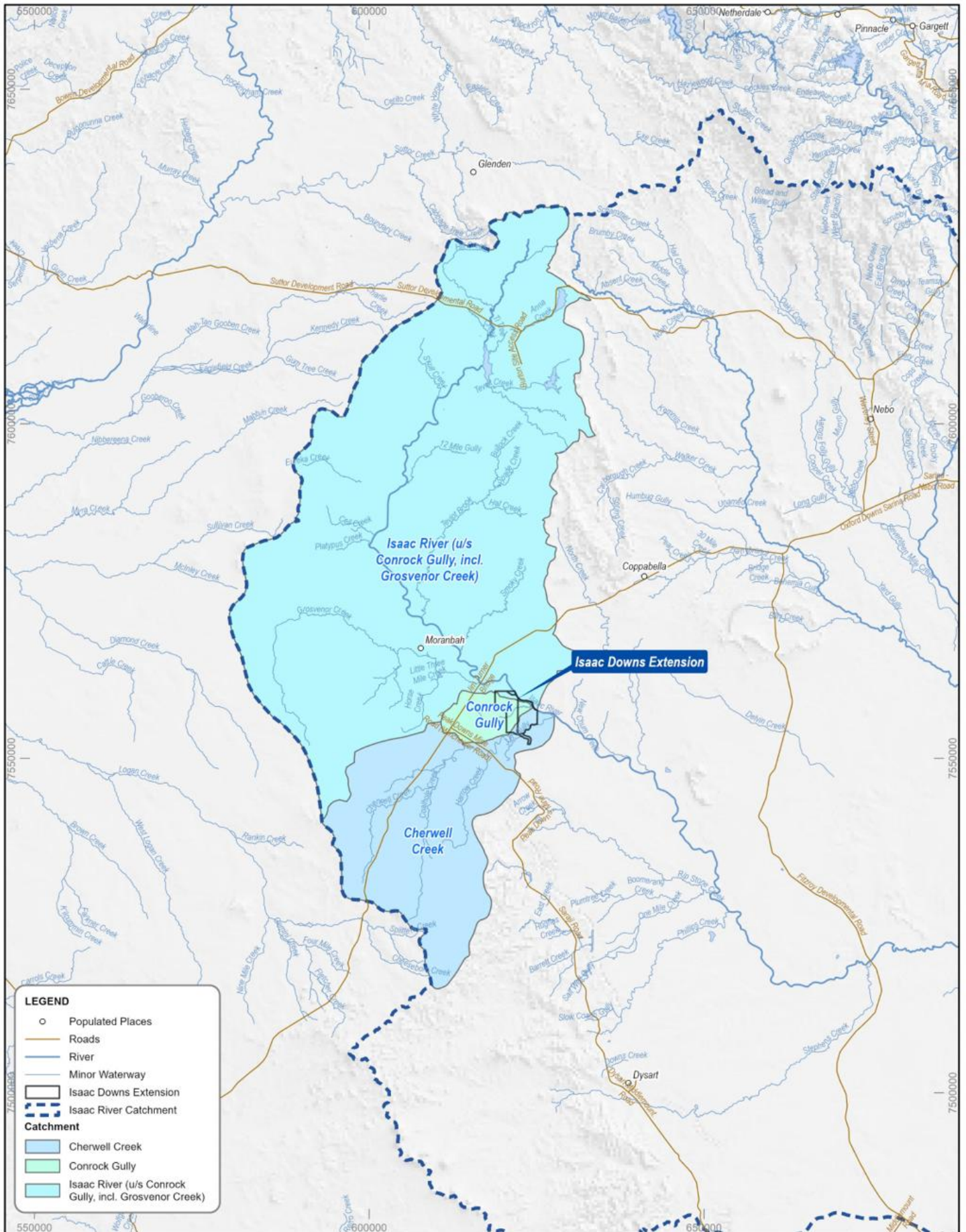
Ultimately, the Mackenzie River joins the Fitzroy River, which flows initially north and then east towards the east coast of Queensland and discharges into the Coral Sea southeast of Rockhampton near Port Alma. Port Alma is located approximately 450 km downstream of the Project.

The Project area is approximately 27 km², which represents 0.02% and 0.12% of the overall Fitzroy River and Isaac-Connors catchment areas, respectively.

The Isaac River is a seasonally flowing watercourse, typically with surface flows in the wetter months from November to April, reducing to shallow subsurface flows from about May to October. All other waterways in the vicinity of the Project are ephemeral and experience flow only after sustained or intense rainfall in the catchment. Stream flows are highly variable, with most channels drying out during winter to early spring when rainfall and runoff is historically low.

The following ephemeral drainage systems are located in the vicinity of the Project (Figure 6) and are designated as watercourses under the *Water Act 2000*:

- Isaac River – 2,759 km² catchment to the Project (upstream of the confluence with Conrock Gully).
- Cherwell Creek – 698 km² catchment to its confluence with the Isaac River.
- JB Gully – 26 km² catchment to its confluence with Cherwell Creek.



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 File: 20260223 Upper Isaac River Drainage.aprx
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ISAAC DOWNS EXTENSION

Local Drainage Network

2.1.2.5 Groundwater

A groundwater impact assessment was completed for the Project and is presented in **Appendix K**. The groundwater impact assessment has been informed by numerous fieldwork studies comprising installation and monitoring (water levels and water quality) of a Project bore network (34 bores) and other nearby bores (26 bores), a bore census of landholder bores, Isaac thrust fault drilling and geophysical surveys, hydraulic testing of bores, and electrical resistivity imaging to determine the extent and depth of alluvium. This is complemented by desktop geological and hydrogeological data from regional studies.

Based on the understanding of the local and regional geological settings, the hydrogeological regime located within the Project area comprises the following key hydrogeological units:

- Cenozoic sediments:
 - Quaternary alluvium (i.e. alluvium) – forms the unconfined alluvial aquifer (sporadically water-bearing strata of permeable unconsolidated sand or gravel with interlayered clays and silts) localised to major ephemeral drainage lines (Isaac River and Cherwell Creek) in the Project area and greater Study area.
 - Perched groundwater systems are likely to occur within the alluvium. These are discrete groundwater units sitting above the alluvial water table / aquifer and are separated by unsaturated zone. Downward percolation of groundwater in these perched systems is restricted by a material of localised low permeability such as a clay lens.
 - Quaternary to Tertiary non-alluvial sediments and weathered units (collectively termed 'regolith') – unconfined unit with variable but limited saturation and generally present at the surface within the Project Area.
- Triassic Rewan Group – Generally considered a regional scale aquitard. However, some saturated more hydraulically conductive horizons exist within, particularly within the upper weathered zone. The Rewan Group subcrops on the eastern side of the Project Area.
- Permian coal measures with:
 - Low permeability interburden and overburden units with aquitard properties.
 - Coal seams that exhibit water bearing properties associated with secondary porosity through cracks and fissures.

The coal seams within the Permian Rangal Coal Measures (RCM) are the main aquifer units in the Project area. The coal seams can be characterised as confined aquifers, with the Leichhardt and Vermont coal seams forming the main aquifer units locally. The RCM overburden and interburden act as aquitards and are typically dry, or very low yielding.

A conceptual hydrogeological model (CHM) of the groundwater regime was developed based on the review of the hydrogeological information for the Project area and Study area. Visual representation of the CHM is shown in Figure 7. Further details on the Project's CHM are provided in Section 6 of **Appendix K**.

Salinity is a key constraint to water management and groundwater use by receptors and can be described by total dissolved solid (TDS) concentrations. Figure 8 presents the TDS data associated with groundwaters screened in the various hydrostratigraphic units for the Project's groundwater monitoring bores. Further details on the salinity of the Project's hydrostratigraphic units are provided in Section 5.6.2 of **Appendix K**.

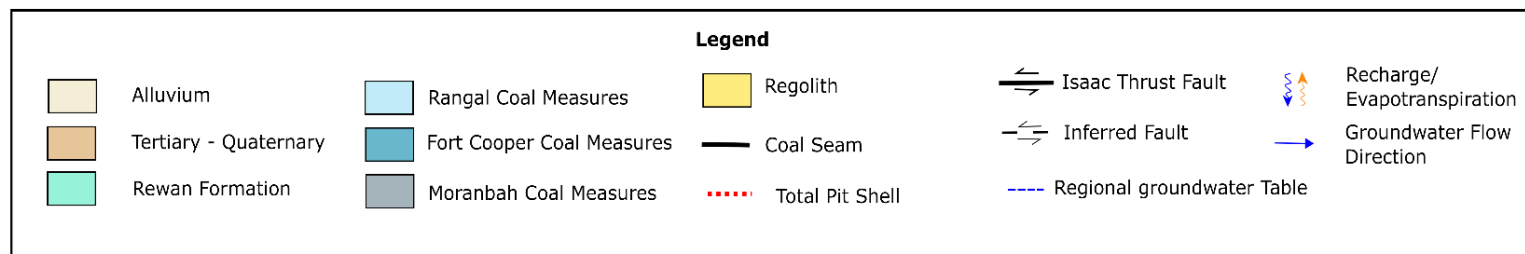
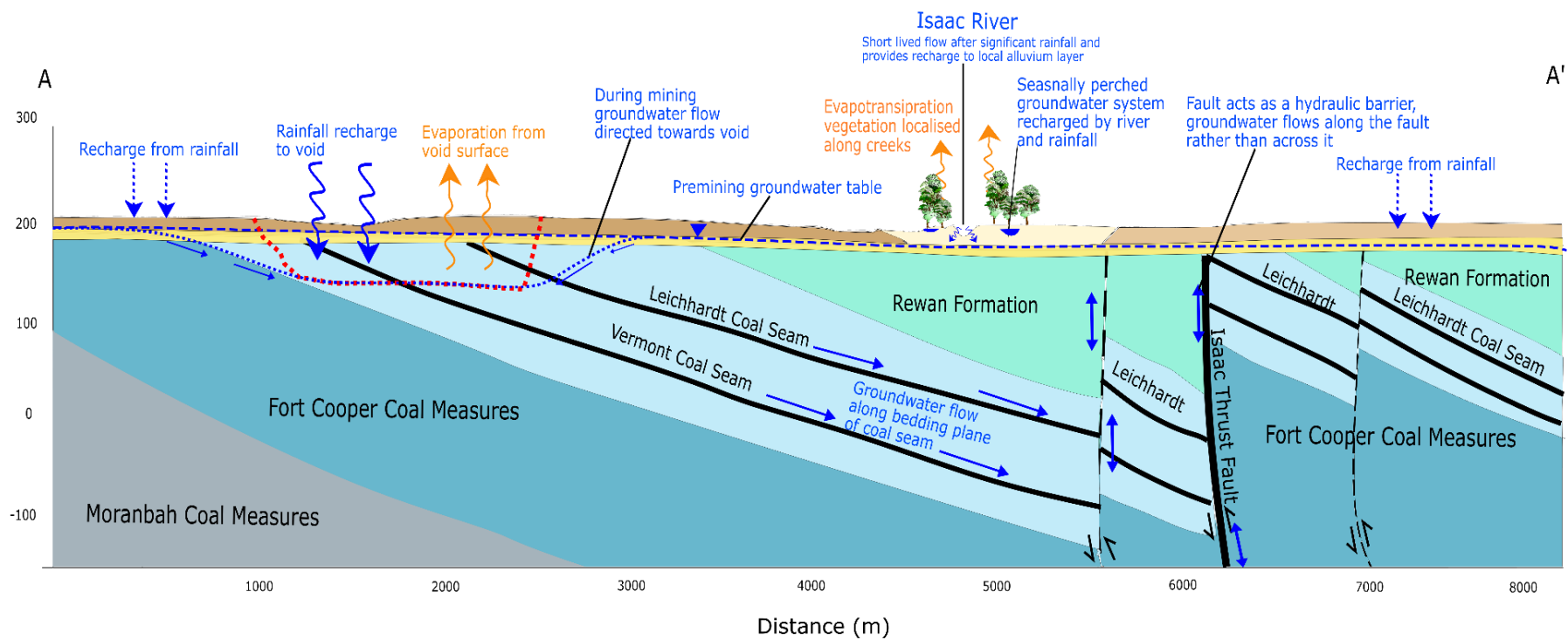


Figure 7: Conceptual Hydrogeological Model

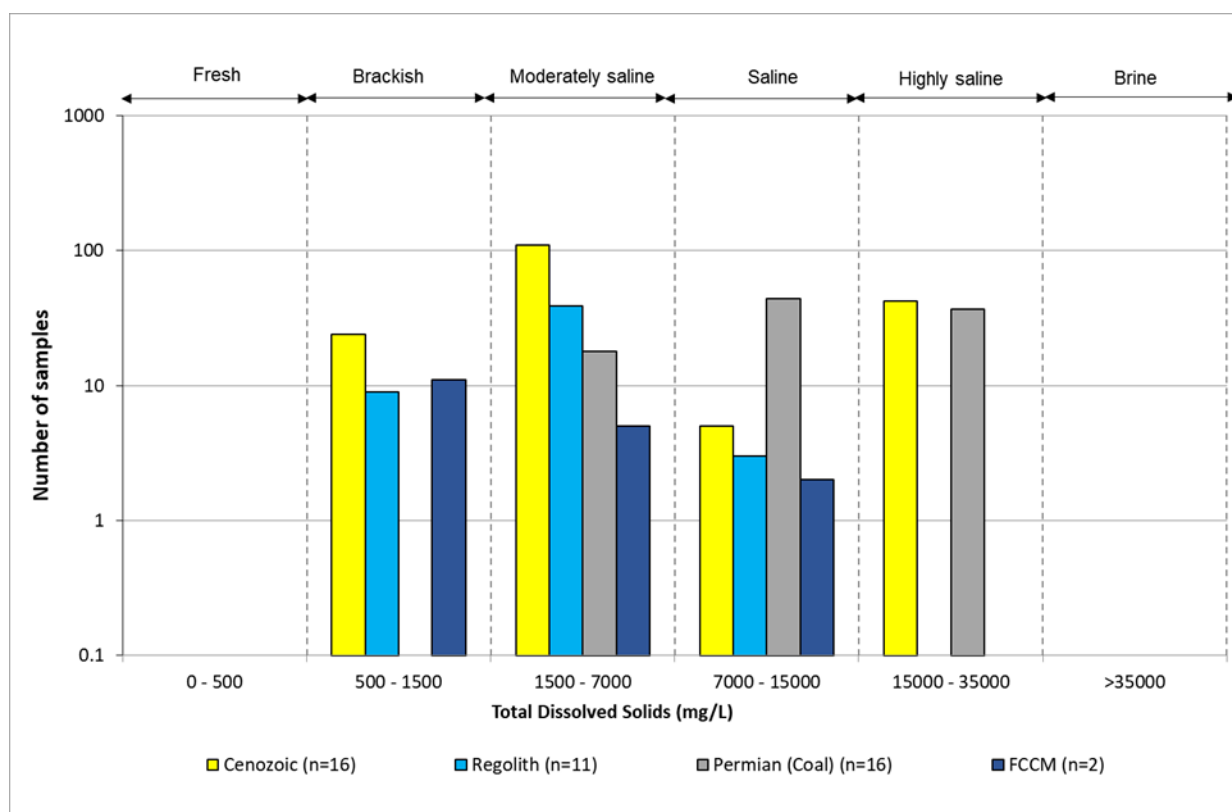


Figure 8: Salinity Ranking by Hydrostratigraphic Unit – Project and Study areas (FAO, 2013)

2.1.2.6 Soils and Land Suitability

2.1.2.6.1 Soils

A soils assessment to characterise the baseline soils of the Project area and surrounds (study area) is provided as **Appendix E**. The soils assessment identified a total of nine soil mapping units (SMUs) within the study area. A summary of the SMUs is presented in Table 3, in descending order according to the total land area (%).

Table 3: Soil Mapping Units in Order of Dominance within the Study Area

SMU	Description	Tuck and Baker (2007) Soil Units	Total Land Area (ha)	Total Land Area (%)
Taurus (Ta)	Sodic texture contrast soils with moderately thick sandy surfaces. Occurs on gently undulating rises within the southern half of the study area.	Sodosols	1,122	29
Davey (Da)	Deep alluvial sands occurring on the levees along the Isaac River and Cherwell Creek.	Tenosols	692	18
Krongie (Kg)	Cracking clay soils with normal gilgai microrelief. Occurring on alluvial floodplains along the Isaac River	Vertosols	515	13
Taurus-Teviot Complex (Ta-Tv)	Complex soil unit consisting of sodic texture contrast soils (Taurus) with sporadically occurring cracking clay soils (Teviot) in gilgai depressions. Occurs on a gently undulating rise within the southern half of the study area.	Sodosols	388	10
Retro (Rt)	Sodic texture contrast soils with thin loamy surfaces. Occurs on gently undulating rises on the northern half of the study area.	Sodosols	343	9

SMU	Description	Tuck and Baker (2007) Soil Units	Total Land Area (ha)	Total Land Area (%)
Teviot (Tv)	Cracking clay soils in the depressions of normal gilgai microrelief. Texture contrast soils on the mounds. Occurs on gently undulating rises, central within the study area.	Vertosols	340	9
Arcturus (Ac)	Cracking clay soils derived from basalt with crabhole microrelief. Occurs on gently undulating rises and colluvial depositions on the western boundary.	Vertosols	246	6
Luxor (Lx)	Texture contrast soils with thick sandy surfaces and clay subsoils. Occurring on a prominent rise on the northern half of the study area.	Chromosols	201	5
Pegunny (Pg)	Cracking clay soils in low lying flood plains, subject to prolonged waterlogging. Occurs in a minor area on the southeastern tip of the study area.	Vertosols	16	1

2.1.2.6.2 Land Suitability

Land suitability mapping for the Project's soils study area is provided in Appendix A of **Appendix E**. Overall, the Project's soils study area is assessed as majority (96%) Class 4 and 5 (unsuitable) with a small proportion (6%) of Class 3 (suitable) for grazing on improved pastures. Land Suitability Class 4 can support low intensity grazing on established mixed native and introduced pasture species (i.e. similar to the basis for existing grazing land use). However, long-term productivity is reliant on climate and grazing management.

2.1.2.7 Land Stability

The Moranbah area is characterised by complex soil profiles that are inherently prone to instability, particularly when exposed to anthropogenic land uses (e.g. grazing and mining). In general, many of the local soils, including Sodosols and Chromosols, contain high levels of exchangeable sodium, and therefore, are sodic and dispersive soils that when saturated lose their coherence, and are susceptible to erosion.

The local valley floors often feature Brigalow reactive clay plains that are reactive and can exhibit "gilgai" (natural undulating micro-relief). These clays shrink and swell with moisture changes.

Geotechnical assessments within the region show a wide spectrum of rock stability. While some trachyte and basalt formations offer high stability, others are classified as "weak" or "poor quality," leading to risks of rockfalls and soil slides in steeper terrain.

Local vegetation cover plays an important role in soil stabilisation and minimising erosive forces, particularly in undulating topography where slope length and gradient play an important role in influencing the effects of rainfall runoff. Local drainage lines often display bank instability and erosion, particularly where riparian vegetation has been cleared for agricultural and mining purposes.

2.1.2.8 Flora

A comprehensive terrestrial ecology assessment was completed for the Project's EIS (**Appendix P**). The terrestrial ecology assessment incorporated detailed desktop investigations, Queensland Herbarium-certified Regional Ecosystem mapping, habitat suitability mapping and comprehensive wet and dry season targeted field surveys in accordance with relevant Commonwealth and State survey guidelines. The study area was 5,227 ha comprising the Project area and the nearby surrounding area (e.g. Isaac River, Cherwell Creek and Conrock Gully).

The ecological field survey completed within the study area identified regulated vegetation and regional ecosystems (REs) under the *Vegetation Management Act 1999* (VM Act). The REs verified consist of least concern, of concern and endangered REs under the VM Act. Some of these REs are recognised as Matters of State Environmental Significance (MSES) under the *Environmental Offsets Act 2014* (EO Act). REs that are MSES prescribed REs in the study area include RE11.3.1, 11.3.2, 11.3.3, 11.4.8, 11.4.9 and 11.8.13.

The majority of extant native vegetation across the study area comprises Eucalypt open forests and woodlands on a range of landforms including Cainozoic sandplains, alluvial flats, and basalt-derived substrates. Riparian and fringing communities occur along Isaac River, Cherwell Creek, Conrock Gully, and their tributaries, and clay-soil Brigalow forests and woodlands occur in patches. The vegetation communities verified within the study area include:

- Semi-evergreen to deciduous microphyll vine thicket.
- Eucalypt woodlands on lowlands and ranges (Moist to dry eucalypt open forests to woodlands, usually on coastal lowlands and ranges).
- Eucalypt woodlands on basalt plains (Moist to dry eucalypt open forests to woodlands, mainly on basalt areas).
- Wet eucalypt woodlands on alluvial plains and drainage lines (Eucalyptus-dominated open forests and woodlands along drainage lines and alluvial plains).
- Dry to moist woodlands on sandy plains (Dry woodlands to open woodlands on sandplains and depositional plains).
- Brigalow woodlands (Acacia harpophylla, sometimes with Casuarina cristata open forests to woodlands on heavy clay soils).
- Native Tussock Grasslands (Astrebla spp. (Mitchell Grass) and Dichanthium spp. (Bluegrass) tussock grasslands).
- Ephemeral wetlands (Wetlands associated with permanent and ephemeral lakes, swamps, claypans; includes fringing woodland and shrubland vegetation).
- Cleared areas/ exotic grasslands.

The threatened ecological communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), confirmed within the study area are as follows:

- Brigalow (Acacia harpophylla dominant and co-dominant) TEC (endangered).
- Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin TEC (endangered).
- Poplar Box Grassy Woodland on Alluvial Plains TEC (endangered).
- Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions TEC (endangered).

A total of 170 flora species from 48 families, consisting of 134 native species, and 36 introduced species recorded within the study area. All native flora species were least concern species under the *Nature Conservation Act 1992* (NC Act) or not listed under the EPBC Act.

No Commonwealth-listed or State-listed threatened flora species were recorded within the study area. However, suitable habitat for two Commonwealth-listed threatened flora species was verified within the study area. Suitable habitat was verified for *Dichanthium queenslandicum* (listed as endangered under the EPBC Act and vulnerable under the NC Act) and *Dichanthium setosum* (listed as vulnerable under the EPBC Act, and not listed under the NC Act).

Habitat for threatened flora species was verified within native grassland areas (RE11.3.21 and RE11.8.11), in the north-western portion of the study area. However, this habitat is outside of the Project disturbance area.

The ecological field surveys within the study area identified field-verified wetlands and gilgais areas, and seasonally inundated depressions. The field-verified wetlands were palustrine systems associated with RE11.3.27b, while the field-verified depressions were associated with RE11.3.27b, 11.4.9, 11.5.3b or non-remnant areas. The field-verified wetlands and depressions are hydrologically natural and occur as ephemeral systems.

A total of 36 introduced flora species were recorded within the study area during field surveys. Introduced flora were concentrated in non-remnant areas of the study area. However, weed species were also recorded within the ground and shrub layers of remnant and regrowth areas. From the identified introduced flora species, eleven are listed as Category 3 restricted matters under the *Biosecurity Act 2014*.

2.1.2.9 Fauna

Both native and introduced fauna species were recorded during the ecological field surveys within the study area (**Appendix P**). A search of the WildNet database of the Area of Interest identified 449 species (25 Amphibians, 247 Bird, 26 Fish, 85 Mammal, and 92 Reptilia). Through the dry and wet season ecological surveys spanning from November 2024 to May 2025, a total of 106 fauna species, from 61 families were recorded in the study area (seven amphibians, 54 birds, 31 mammals, and 14 reptile species).

Most native fauna species identified within the study area were least concern species under the NC Act and not listed under the EPBC Act. However, five conservation significant fauna species were recorded within the study area during targeted ecological field surveys.

Five conservation significant fauna species were recorded within the study area during the targeted ecological field surveys, namely:

- Squatter Pigeon (vulnerable under both the EPBC Act and NC Act)
- Koala (endangered under both the EPBC Act and NC Act)
- Greater Glider (endangered under both the EPBC Act and NC Act)
- Oriental Cuckoo (EPBC Act migratory species)
- Short-beaked Echidna (special least concern (SLC) species under the NC Act).

In addition, the Ornamental Snake, while not detected during the targeted ecological field surveys, has previously been recorded within the study area in 2019.

The following Commonwealth and or State -listed threatened and migratory species had habitat verified within the study area:

- Australian Painted Snipe, listed as endangered and migratory under the EPBC Act, and endangered under the NC Act.
- Sharp-tailed Sandpiper, listed as vulnerable and migratory under the EPBC Act.
- Common Greenshank, listed as endangered and migratory under the EPBC Act.
- Fork-tailed Swift, listed as migratory under the EPBC Act.

Eight introduced and restricted vertebrate fauna species were recorded within the Survey area during the ecological field surveys. These species included Cane Toad, Wild Dog, European Fox, Feral Cat, and Feral Deer (*Cervus elaphus*), European Rabbit (*Oryctolagus cuniculus*), Feral Pig and Domestic Cattle (*Bos taurus*). Several of these species are recognised as restricted matters under the *Biosecurity Act 2014*.

2.1.2.10 Pre-mining Land Use

The properties within the Project area are utilised for cattle grazing and include:

- Winchester Downs property (Lot 8 SP277834)
- State Reserve (Lot 9 GV33) which is leased to the owner of Winchester Downs property
- Isaac River and Cherwell Creek boundary watercourses.

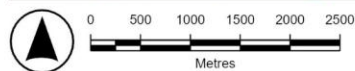
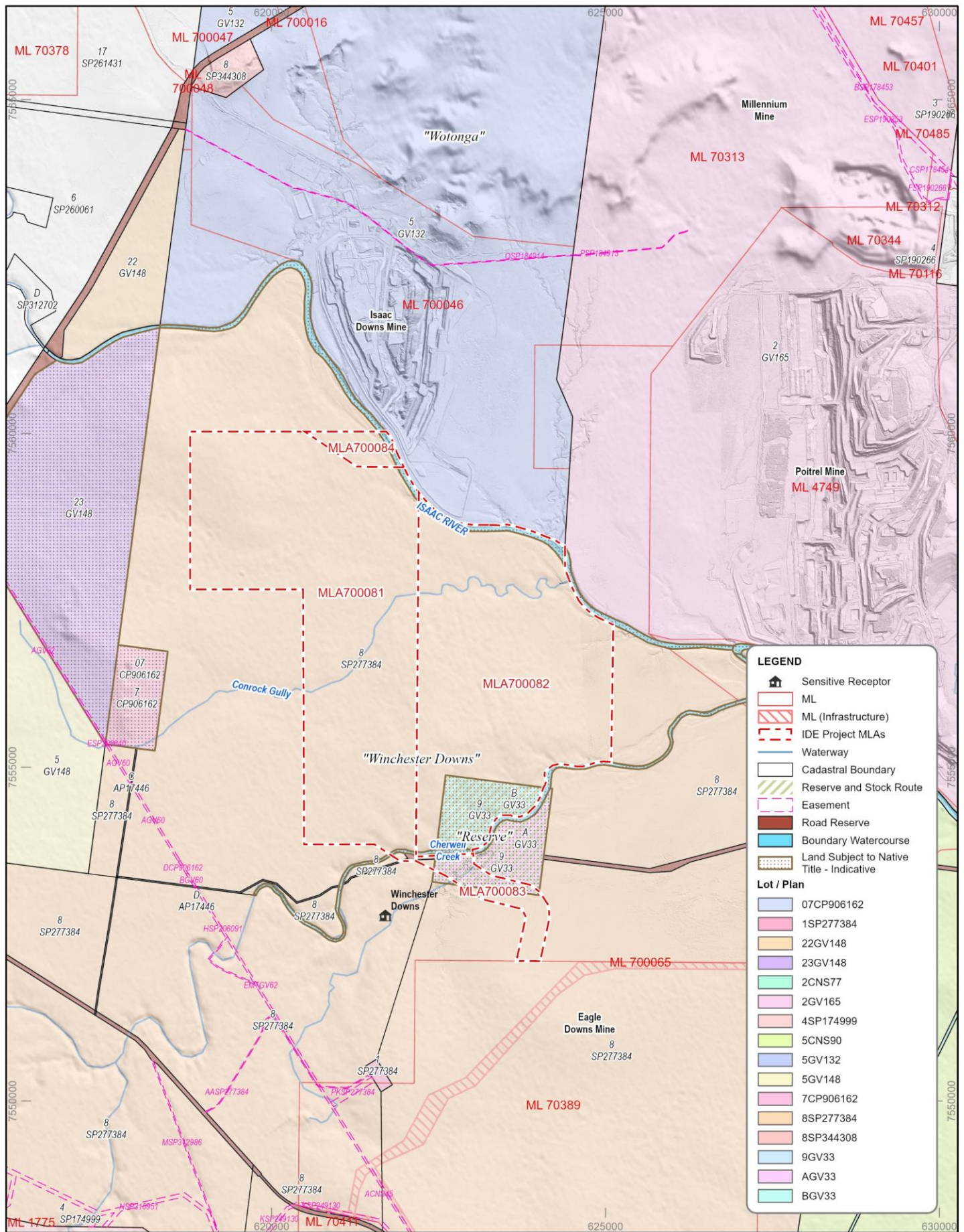
In the vicinity of the Project, coal mining and pastoral activities (grazing on native and/or modified pastures) are the predominant land uses. The Project's planned coal mining activities are consistent and compatible with the surrounding land uses. An operational quarry reserve (Lot 7 CP906162 and Lot 23 GV148), known as Coolibah Quarry, is located approximately 2-3 km to the west of the Project area.

2.1.2.11 Landholders

Table 4 and Figure 9 describe and show the property boundaries within and adjoining the Project's MLA boundaries. Winchester Downs Homestead is the only sensitive receptor site in close proximity (< 2 km) to the Project's planned mining operations. All other potential sensitive receptors are located more than five kilometres away from the Project area.

Table 4: Properties within the Project Area

Lot and Plan	Tenure	Owner
8 SP277384 (Winchester Downs)	Freehold	Private landowner
9 GV33	Reserve, with purpose of 'camping, water and road' as a stock route	State Owned
B GV33 (on Lot 9 GV33)	Lands Lease	Lease held by owner of Lot 8 SP277384 (Winchester Downs) for grazing purposes
A GV33 (on Lot 9 GV33)	Permit to occupy	Permit to occupy held by trustees of estate for former owner of Lot 8 SP277384 (Winchester Downs) for grazing purposes
Isaac River	Boundary watercourse	State Owned
Cherwell Creek	Boundary watercourse	State Owned
Road	Local road (segment 37555066), for access to parts of Winchester Downs	Isaac Regional Council



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ISAAC DOWNS EXTENSION

Properties within the Project Area

2.1.3 Design for Closure

2.1.3.1 Location of Mine Features and Infrastructure

2.1.3.1.1 Protection of Environmental Values

The following design elements have been incorporated into the design of the Project for the protection of environmental values:

- The Project disturbance area has been designed to minimise impacts to areas of remnant vegetation within the MLA areas. As a result of properties developing in the late 19th century for pastoral purposes, the Project area (i.e. the area of the MLAs) and the Project disturbance area (i.e. the area within the MLAs where disturbance is nominated) have been substantially cleared of native vegetation for decades. Table 5 provides the proportion of remnant to non-remnant vegetation within the Project area and Project disturbance area. Remnant vegetation comprises 16.5% of the Project disturbance area and 69% of the avoidance area (i.e. the areas within the Project MLs that will be avoided). This demonstrates that Project design, including selection of infrastructure and activity locations, has avoided and thereby reduced, direct impacts on remnant vegetation.

Table 5: Vegetation of the Project Area and Disturbance Footprint

Type of Vegetation	Project Area		Disturbance Area		Avoidance Area	
	Area (ha)	Percentage	Area (ha)	Percentage	Area (ha)	Percentage
Remnant	768	28.4%	333	16.0%	435	69.5%
Non-remnant	1,939	71.6%	1,748	84.0%	191	30.5%
Total:	2,707	100%	2,081	100%	626	100%

- The majority of the Isaac River levee has been situated at least 200m from the Isaac River high bank, and greater than 50m in all other areas. However, the Isaac River levee will be decommissioned and rehabilitated post mine life to allow the movement of Isaac River flood waters across the floodplain.
- Conrock Gully diversion has been designed so that it is geomorphically stable in the long term, as it will be a permanent feature post mine life. **Appendix J** provides an assessment of the hydraulic performance of the diversion, demonstrating that it will be geomorphically stable.
- The Cherwell Creek and Conrock Gully levee plugs have minimal impacts on environmental values, and will be integrated into the final dump landforms post mine life.
- The width of the bridge crossing of the Isaac River will be minimised. Whilst a 200m buffer has been allowed for construction and design purposes, the ultimate bridge construction width is likely to be smaller, with rehabilitation of areas not required for bridge infrastructure. The proponent will seek third party agreement for retention of the bridge, as a potentially important local asset post-mining. However, in the absence of an agreement, the bridge will be decommissioned and rehabilitated post mine life.
- The dragline crossing of the Isaac River will be temporary (e.g. less than 6 months), with any material used to facilitate crossing in the bed of the river removed after the dragline has been walked. Any cuttings within the banks of the river will be stabilised and rehabilitated, to facilitate the potential return of the dragline from the Project to IDM at the end of life. Similar to the initial crossing, at the end of mine life, any material used to facilitate the crossing in the bed of the river will removed after the dragline has been walked.
- The width of the Cherwell Creek bridge crossing will be minimised. Whilst a 200m buffer has been allowed for construction and design purposes the ultimate bridge construction width is likely to be less than this, with rehabilitation of areas not required for bridge infrastructure.
- Other mining infrastructure has been located to minimise impacts on environmental values as a part of the Project disturbance area and will be decommissioned and rehabilitated post mine life (e.g. ROM pads, go line, crib area, roads, mine water dam, sediment dams, water pipelines).
- The proposed PMLUs have been located within the Project's nominated disturbance area, and therefore, do not result in any additional disturbance.

2.1.3.1.2 Surrounding Land Uses and Sensitive Receptors

As described in Section 2.1.2.11, Winchester Downs Homestead is the only sensitive receptor site in close proximity (< 2 km) to the Project's planned mining operations. Within the Project area, the private owners of Winchester Downs property are the main background landowner, except for the local watercourses, a State Reserve (leased by the owners of Winchester Downs property), and a segment of an access road to Winchester Downs Homestead (Table 4 and Figure 9).

As described in Section 2.1.2.10, The properties within the Project area are utilised for cattle grazing. In the vicinity of the Project, coal mining and pastoral activities (grazing on native and/ or modified pastures) are the predominant land uses in the local area.

The post closure landforms and PMLUs have been designed in consultation with the owners of Winchester Downs, to allow for the ongoing use of the land for pastoral activities, as well as other potential post-mining benefits. This has been achieved by:

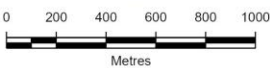
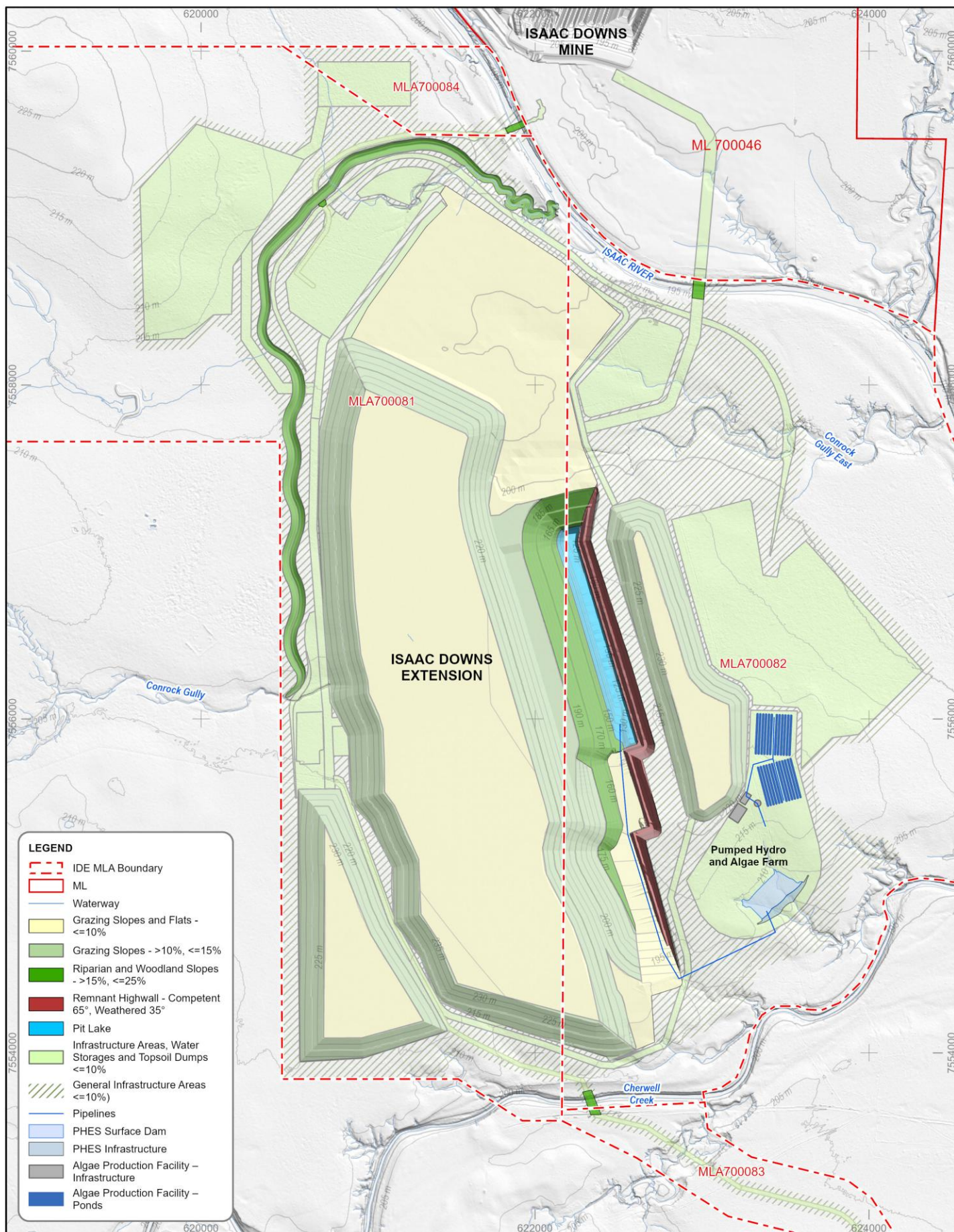
- Returning the majority of the Project disturbance area to a grazing PMLU.
- Designing the final void so that water quality within the void remains suitable for stock watering purposes in the long term (i.e. as a beneficial water storage).
- Designing a ramp within the final landform, through backfilling the southern portion of the pit area, to allow stock to access water within the void lake.
- Providing a long term geomorphically stable diversion of Conrock Gully which will replicate the functioning of the pre-mining Conrock Gully, in a similar location within the Winchester Downs property.
- The potential commercial benefits from the operation of the proposed PMLUs, as a supplementary income stream for the owners of Winchester Downs, as well as potential integration into pastoral activities (e.g. additional power supply or products from algae production suitable for cattle feed).

Recognising that Winchester Downs homestead is approximately 1.2 km south of mining activities, these areas, in particular the southwest out-of-pit dump, have been targeted for progressive rehabilitation early in mine life, to reduce potential amenity impacts. Post-mining, with rehabilitation of operational areas, and the absence of mining equipment, it is expected that amenity at Winchester Downs homestead will be similar to pre-mining.

2.1.3.1.3 Disturbance Area Gradients

The gradients of the Project's proposed final landform are shown in Figure 10. The gradients of the final landform have been carefully designed to support the proposed PMLUs as follows:

- The northern portion of the pit area will be backfilled to a level similar to pre-mining topography, which along with the decommissioning and rehabilitation of the Isaac River levee will allow the movement of Isaac River flood waters across the floodplain post-mining.
- The southern portion of the pit area has been partially backfilled to support a ramp at $\leq 10\%$ to allow access to the final void lake for cattle and PMLU operations.
- The majority of in-pit and out-of-pit dump areas will have slopes $\leq 10\%$, with sides and batters of the dumps areas with slopes $\leq 15\%$. This will be achieved through dump scheduling and design as dumping operations progress, with landform shaping once dumping is completed.
- As part of final pit design, the final low wall batter above the lake level will be shaped to $\leq 25\%$, with a woodland PMLU and rock armouring for slope stability.
- The high wall, which supports the PMLUs for the lake, has been designed to be geotechnically stable with slopes ranging from ≤ 35 degrees in the upper weathered sections to ≤ 65 degrees in the competent unweathered sections (**Appendix H**).
- Other areas of mining infrastructure and activities will be returned to a similar gradient as existing pre-mine life following rehabilitation.



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ISAAC DOWNS EXTENSION

Final Landform Gradients

2.1.3.1.4 Open Cut Access

The pit area will be accessed via ramps during mine life. This open cut access has been designed to facilitate efficient and safe access to the Project's coal resource for mining purposes. These ramps will be rehabilitated as part of the in-pit dump rehabilitation.

2.1.3.1.5 Local and Regional Topography

As described in Section 2.1.2.1, the topography is relatively flat and falls towards the Isaac River and Cherwell Creek from the centre of the Project area. Elevation ranges between approximately 230 m AHD on a rise to the north of Cherwell Creek and 190 m AHD along the Isaac River (Figure 5).

The final landform topography of the in-pit and out-of-pit dumps is similar to the surrounding local and regional topography which includes hilly areas and valleys. The proposed void and void lake are similar to many other coal mine final landforms in the region, and are integral to the PMLUs proposed for the Project. Long-term the Project's rehabilitated final landform will blend into the existing surrounding environment.

2.1.3.1.6 Surface Water and Groundwater

Design elements relevant to surface water are described in Section 2.1.3.1.1.

The Project has been designed to minimise direct impacts on the alluvial aquifer associated with the Isaac River and Cherwell Creek. However, the northern portion of the resource and pit area, which will be backfilled, does intersect the alluvium. Drawdown impacts during and post-mining on this aquifer are assessed in **Appendix K**.

The perched groundwater systems associated with the Isaac River and Cherwell Creek alluvium exist separately above the Project's defined alluvial aquifer. The perched groundwater systems are relevant to identified local groundwater-dependant ecosystems (GDEs) that fringe the Isaac River and Cherwell Creek (see Section 5.7.2 of **Appendix K**).

2.1.3.1.7 Geotechnical Conditions and Landform Design

An evaluation of the geotechnical stability of the Project's final landform is provided in **Appendix H**. The geotechnical properties of the material in the high wall, comprising weathered and unweathered (competent) material have been used to design high wall slope angles that achieve the nominated minimum factor of safety (FoS) of ≥ 1.5 . The minimum FoS of ≥ 1.5 was developed for the Project's final landform design based on the geotechnical model's classification to ensure a minimal risk of slope failure. The geotechnical model's assessment reported critical FoS values of 1.6 to 4.5 for all the selected cross-sections within the Project's final landform (which included all landform types), including an analysis of the northern low wall's stability under 1:1,000 year flood conditions (Table 6). These results meet or exceed the design acceptance criteria for the Project's final landform of a FoS ≥ 1.5 , and therefore, demonstrate the long-term stability of the Project's final landform.

Table 6: Final Landform Geotechnical Factor of Safety

Sections	Void Slope	Surface Type	Search Method	Factor of Safety
Northern void area	Highwall	Non-Circular	Block	1.6
	Low wall	Non-Circular	Block	2.6
Southern void area (partially backfilled)	Highwall	Non-Circular	Auto-Refine	2.5
	Low wall	Circular	Auto-Refine	3.0
Re-profiled in-pit spoil dump (western side)	Batter Slopes In-Pit Dump	Circular	Auto-Refine	4.0

Sections	Void Slope	Surface Type	Search Method	Factor of Safety
Re-profiled in-pit spoil dump (southern end)				3.8
East out-of-pit dump (western side)	Out-of-Pit Dumps	Non-Circular	Block	4.5
Southwest out-of-pit dump (western side)				4.3
Re-profiled in-pit dump (north of final void)	Final Landform Low wall	Non-Circular	Block	1.9
	Final Landform Low wall (1:1,000 year flood)	Non-Circular	Block	1.7

2.1.3.1.8 Competing Land and Water Uses

The surrounding land is predominantly used for cattle grazing. The proposed PMLUs will return a majority of the mined land back to cattle grazing and introduce an additional water source for cattle, which will supplement existing water sources. As described in Section 2.1.3.1.2, the Project's potential pumped hydroelectric energy storage (also referred to as 'pumped hydro') and algae production PMLUs could provide the landowner with an alternative electricity supply, possible income stream and additional food source to support their grazing business.

Should there be any impact to groundwater levels within surrounding landholder groundwater bores post-mining (**Appendix K**), then the proponent will enter into 'make good agreements' with the affected landholder. In the case of bores on Winchester Downs, additional water supply could be provided through the proposed PMLU void lake (beneficial water storage).

2.1.3.1.9 Visual Impact

The rehabilitated closure landform will be visible from the Winchester Downs homestead. However, this landform will look similar to other landforms surrounding the homestead. A visual impact assessment from the Winchester Downs homestead using a worst-case scenario, highlights that the 2043 view and 2058 view are two-thirds obscured by vegetation. In addition, the 2058 view is further enhanced by the rehabilitated state of the Project's final landform because it blends naturally into the surrounding landscape. Therefore, the visual impacts in 2043 and 2058 at Winchester Downs Homestead because of the Project are considered negligible to minor.

2.1.3.1.10 Void in Floodplains

Refer to Section 2.5 for a description of Project design so that the residual void is not located in the 1,1,000 year flood event, following decommissioning of the Isaac River levee.

2.1.3.2 Size, Shape and Design of Mine Features and Infrastructure

The proposed Project layout is described in Section 2.1.1 and shown in Figure 3. The Project's conceptual final landform is displayed in Figure 11. The Project's proposed rehabilitated final landform with the specified rehabilitation areas is shown in Figure 12.

There are two out-of-pit dumps in the final landform – the southwest out-of-pit dump and the east out-of-pit dump. Both dumps have been designed to be erosionally stable when rehabilitated (as demonstrated in **Appendix D**), with externally draining slopes $\leq 15\%$, and lower gradient slopes elsewhere. The southwest and east out-of-pit dumps are 88.4 ha and 77.1 ha, respectively.

The majority of the in-pit dump (main landform) is internally draining towards the final void, with some external batters draining outwardly. The majority of in-pit and out-of-pit dump areas will have slopes $\leq 10\%$, with sides and batters of the dumps areas with slopes $\leq 15\%$, other than the final low wall batter draining to the void lake which will be $\leq 25\%$. The in-pit dump has been designed to be erosionally stable when rehabilitated (as demonstrated in **Appendix D**). The in-pit dump is approximately 576.0 ha, excluding the backfilled northern section which is approximately 149.1 ha. The void area at its crest is 133.3 ha (Table 22); noting that the rehabilitation area associated with the void is 71 ha, as the void area at its crest includes in-pit dump areas, which are assigned to different rehabilitation areas.

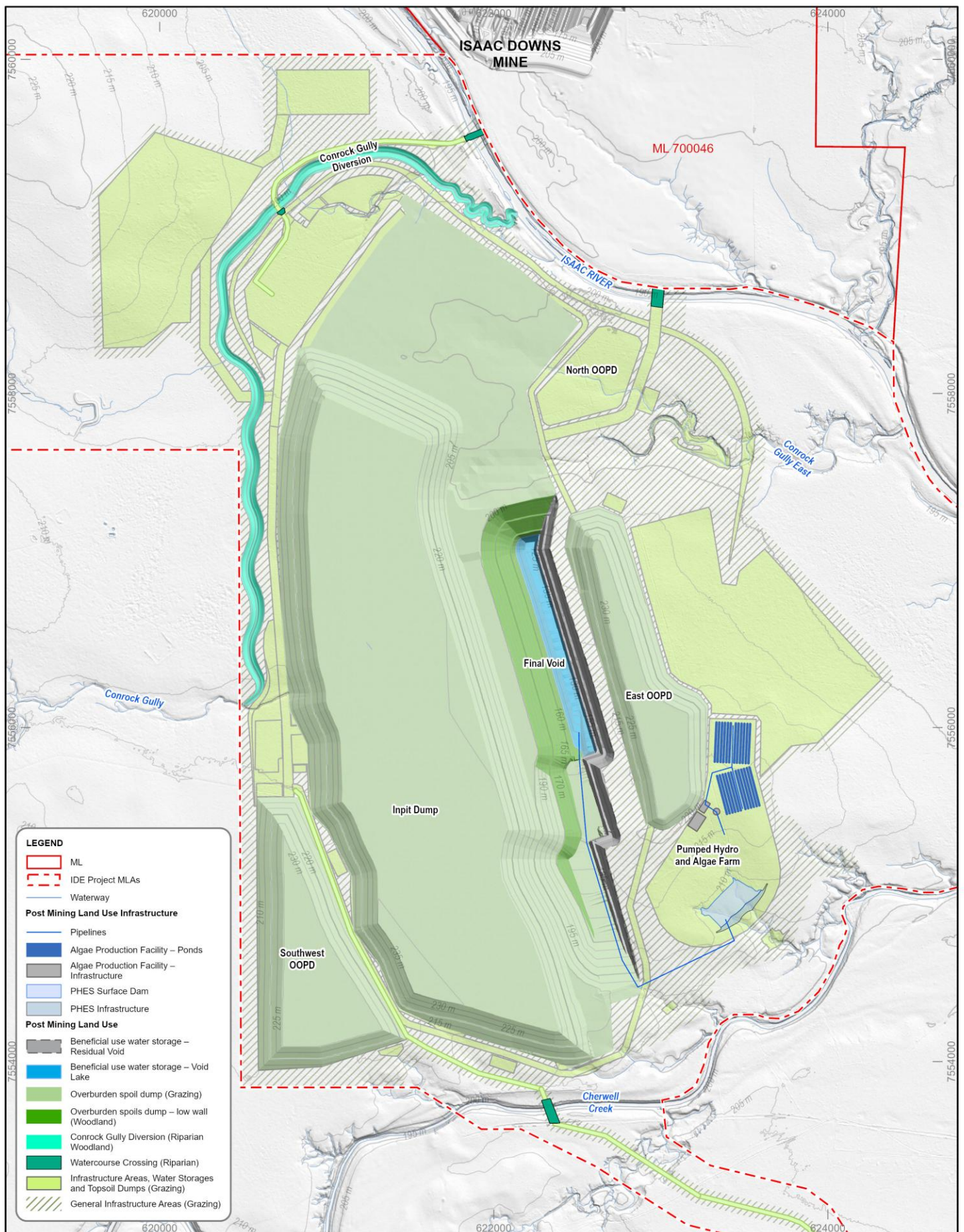
To demonstrate erosional stability, the Project's proposed final landform design was 3D modelled using a SIBERIA landform evolution model (**Appendix D**), based on the:

- range of soils available within the Project's disturbance area (Table 14)
- proposed final slope designs (Figure 10)
- SSP3-7.0 climate prediction to simulate potential future climate change impacts
- accepted long-term mean average annual erosion rate of 5 tonnes/hectare/year (t/ha/y), being a rate at which the risk of rill erosion being initiated is low.

The SIBERIA landform evolution model output after 300 years of simulation of the Project's main in-pit landform, southwest out-of-pit dump and east out-of-pit dump, demonstrated that the Project's final landforms after 300 years are stable under the current climate change predictions for the region, and are predicted to erode at the acceptable erosion rate of ≤ 5 t/ha/y.

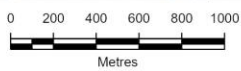
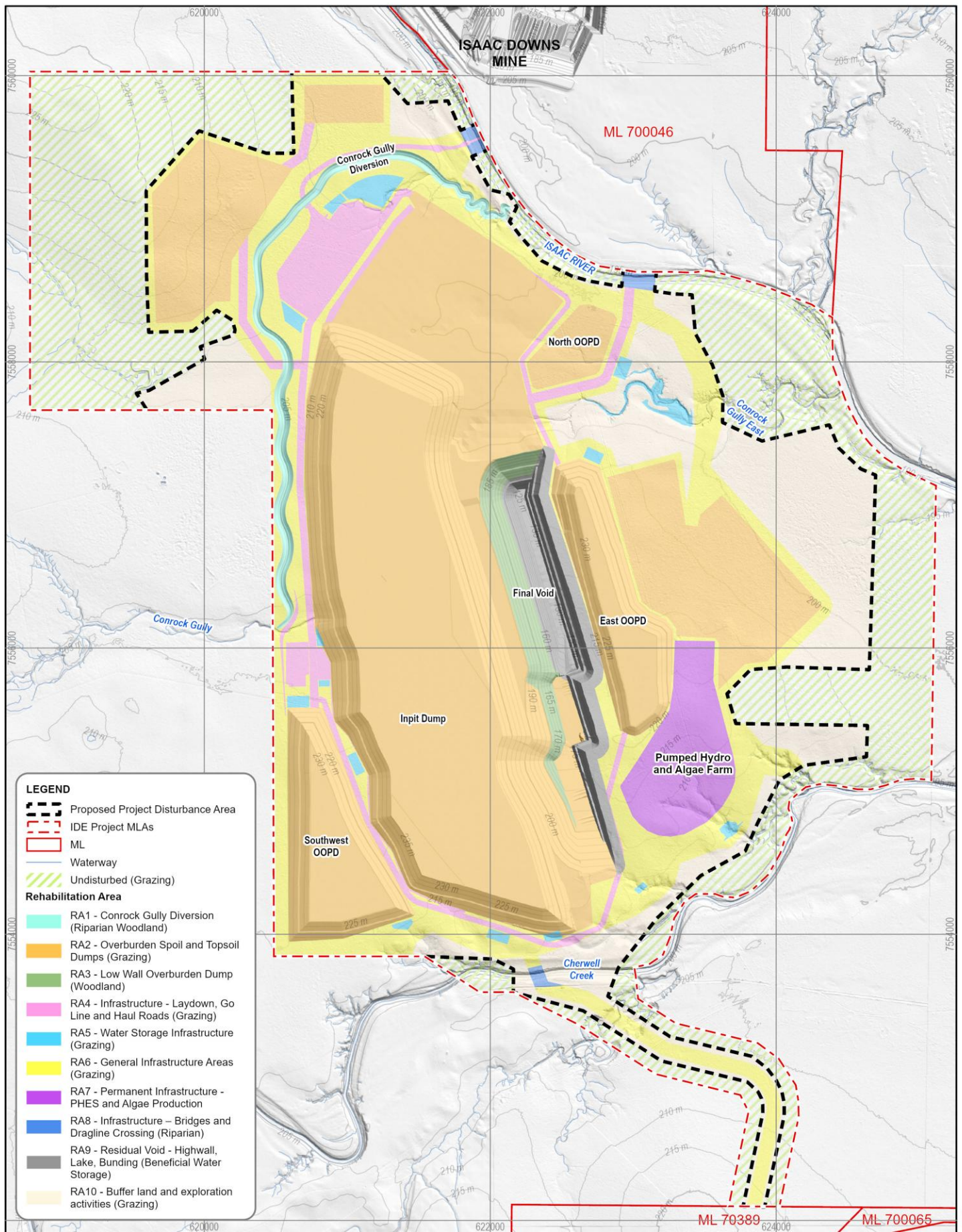
2.1.3.3 Mining Method

Mining will utilise open cut mining methods, typical of many other open cut coal mines in the Bowen Basin. No new or alternative mining methods or underground mining are proposed for the Project. Further information on the mining method is provided in Section 2.1.1.4.



ISAAC DOWNS EXTENSION

Conceptual Final Landform



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 27/05/2026 10:51 AM
 Drawn: Minserv
 Source: Minserv
 File: 20260527 Rehabilitation Areas.aprx

DISCLAIMER: Third party data sources are used in this map compilation. Minserv makes no warranty regarding this data's accuracy or currency.



ISAAC DOWNS EXTENSION

Final Landform and Rehabilitation Areas

2.1.4 Rehabilitation 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

2.1.4.1 Relevant Activities - Rehabilitation Areas

Under Queensland's EP Act, "relevant activities" in the context of the Project's PRCP refer explicitly to the mining activities authorised by the Project's EA, and can be described as the operational processes that cause environmental disturbance.

Rehabilitation areas (RAs) are specific, mapped zones within the Project's disturbance area that have been designated for progressive environmental restoration through detailed mine planning. Each Project RA is planned to be progressively rehabilitated to a specific PMLU that is safe, stable, non-polluting and sustainable.

The Project's progressive rehabilitation has been optimised in the PRCP Schedule based on the current life of mine plan and is designed to ensure the safe and efficient extraction of the coal resource, the best possible availability of disturbed areas for progressive rehabilitation purposes, and the achievement of the proposed PMLU for each RA. The Project's draft PRCP Schedule is provided in **Appendix AC**.

Table 7 provides the planned RAs for the Project's relevant activities, and includes the intended PMLU, predicted duration, size/extent and planned progressive rehabilitation availability for each RA. The Project's RAs are shown in Figure 12.

Table 7: Project Rehabilitation Areas and their associated Post-mining Land Uses

Rehabilitation Area (RA)	Post-mining Land Use (PMLU)	Relevant Activity	Predicted Duration (Years) ⁺	Size (ha)	Availability for Progressive Rehabilitation [#]
RA1	Native vegetation (riparian woodland)	Conrock Gully diversion	16	34.4	10/12/2028
RA2	Grazing	Overburden and topsoil dumps (out-of-pit and in-pit)	32	1074.9	10/12/2031
RA3	Native vegetation (woodland)	Final low wall overburden dump (≤25%)	20	36.9	10/12/2043
RA4	Grazing	Infrastructure - laydown, go line and haul roads	15	106.9	10/12/2043
RA5	Grazing	Infrastructure - water storages	15	23.9	10/12/2043
RA6	Grazing	General infrastructure areas - not contaminated	25	368.8	10/12/2038
RA7	Pumped Hydroelectricity Energy Scheme and Algae Production	Permanent PMLU infrastructure area	5	65.9	10/12/2043
RA8	Native vegetation (riparian)	Infrastructure – bridges and dragline crossing (Isaac River and Cherwell Creek)	20	6.7	10/12/2048

Rehabilitation Area (RA)	Post-mining Land Use (PMLU)	Relevant Activity	Predicted Duration (Years) ⁺	Size (ha)	Availability for Progressive Rehabilitation [#]
RA9	Beneficial Water Storage	Residual Void (void highwall, pit lake, safety setbacks, bunding and fencing))	15	71.0	10/12/2043
RA10	Grazing	Buffer land and exploration activities	20*	290.6*	10/12/2043*

Note:

* = Buffer land is unlikely to be disturbed. Availability, duration and size only apply if the buffer land is disturbed by the Project's mining activities.

= The nominated date of availability for progressive rehabilitation is based on Project commencement and duration in accordance with the timeframes in Section 2.1.1.5. If these timeframes change then the date of availability for progressive rehabilitation would change.

* = The predicted duration for a RA is the period from commencement to completion of rehabilitation.

2.1.4.2 Rehabilitation Areas and Milestones

Rehabilitation milestones (RMs) are required for all RAs and identify each significant event or step necessary to rehabilitate the disturbed land to its PMLU in a safe, stable, non-polluting and sustainable condition. A high level summary of the Project's RMs is provided in Table 8, with their maximum expected durations. As required by the PRCP Guideline, only PMLU areas where disturbance will occur are mapped as a RA and incorporated into the PRCP Schedule. Areas that are not within a nominated RA (see Table 7) are not subject to RMs – this being the case for areas within the Project's MLAs, but not within the nominated disturbance area.

The Project's minor ancillary activities, which 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, were not designated as RAs. Disturbance from minor ancillary activities will be rehabilitated in accordance with the provisions detailed in the Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP, 2016).

Table 8: Project Rehabilitation Milestones

Rehabilitation Milestones		Maximum Expected Duration (Years)
RM1	Infrastructure decommissioning and removal	1
RM2	Identification, remediation and removal of contaminated land	1
RM3	Landform establishment	2
RM4	Surface preparation	2
RM5	Revegetation:	
	• Grazing PMLU	
	• Native vegetation (riparian woodland) – Conrock Gully diversion PMLU	2
	• Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) PMLU	
RM6	• Native vegetation (riparian) – River/creek crossings PMLU	
	Achievement of surface requirements:	
	• Grazing PMLU	5
	• Native vegetation (riparian woodland) – Conrock Gully diversion PMLU	10
RM7	• Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) PMLU	10
	• Native vegetation (riparian) – River/creek crossings PMLU	10
	Achievement of the post-mining land use to a stable condition:	
	• Grazing PMLU	
RM8	• Native vegetation (riparian woodland) – Conrock Gully diversion PMLU	5**
	• Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) PMLU	
	• Native vegetation (riparian) – River/creek crossings PMLU	
RM9	Achievement of post-mining land use water quality	5**
RM10	Functioning stable water supply source for RM10 and cattle	
	• Achievement of stable final landform for the final void	10*
	• Achievement of safety requirements	
	• Achievement of final void water quality	
RM10	Achievement of permanent infrastructure – pumped hydroelectricity energy storage and/or algae production PMLUs	5*

Note: * = From the end of operations, except for the completion of RM10's bankable feasibility studies that will occur prior to the end of mining (RM10.1). ** = RM7 and RM8 are expected to run concurrently after RM6 is achieved.

2.2 Community Consultation

Legislative Requirement

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

- details of the consultation undertaken by the applicant in developing the proposed PRCP, 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 PRCP, 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 PRCP).

2.2.1 Community Consultation Register

To comply with section 126C(1)(c)(iii) of the EP Act, a register of the PRCP consultation and engagement outcomes has been completed for the Project. The Project's current Community Consultation Register is provided in Table 9.

Table 9: Community Consultation Register

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
April-May 2026	Department of Natural Resources and Mines, Manufacturing and Regional and Rural	Written email correspondence	Continued consultation in relation to establishing a consent for Reserve access under the <i>Mineral</i>	DNRMMRRD is responsible for Stock Route reserves. There is no distinction between a Stock Route Reserve and	A consent is required from the State for access to part of the Stock Route reserve (Lot 9 GV33) covered by	A departmental officer has been assigned and is currently assessing the matter.	The proponent is committed to continuing to work with DNRMMRRD to establish the

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
	Development (DNRMMRRD)		<i>Resources Act 1989</i> (MR Act).	another Reserve under the <i>Land Act 1994</i> .	one of the Project's ML applications.		required consent for Reserve access.
September 2025	DETSI	Public Notice	Project overview provided in the initial advice statement (IAS) including proposed rehabilitation strategies	DETSI raised that EIS could include a final post-rehabilitation map in the PRCP to show comparison of pre-activity site topography.	The PRCP requires information and mapping on pre-mining topography and the topography of the final closure landform. The PRCP requires that post mining land uses are developed for the final closure landform.	Information presented in PRCP	Suitable information describing the pre mining topography is presented in the PRCP (section 2.1.2.1).
September 2025	Office of the Coordinator General	Public Notice	Project overview provided in the IAS including proposed rehabilitation strategies	Demonstrate how the post mining land use for the Conrock gully diversion will align with surrounding land uses and how the values and productivity of the land uses will be achieved and maintained.	The PRCP will assess the post mining land uses for the Project in consultation with stakeholders, including the landholder.	Information presented in PRCP	Suitable information describing the surrounding land uses and the Conrock gully diversion are presented in the PRCP (section 2.1.2.10 and 2.6.1.7).

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
September 2025	DETSI	Public Notice	Project overview provided in the IAS including proposed rehabilitation strategies	It is important that the impact assessment considers the closure phase of Project as well in terms of cumulative PMLU and NUMA impacts.	The ToR amended to ensure that impact assessment consider all PMLUs and / or NUMAs for the Project.	Information presented in PRCP	PRCP considers all PMLUs in assessments, including combined effects on void lake (section 2.3).
September 2025	DETSI	Public Notice	Project overview provided in the IAS including proposed rehabilitation strategies	Inclusion of Project specific requirements to address the possibility of a residual void remaining within a floodplain.	The residual void will not remain within a floodplain.	Information presented in PRCP	Suitable information describing the residual void not being within the floodplain.
29 October 2025	Office of Coordinator General	Briefing	Project overview	Ensuring that the outcome is complimentary to surrounding landscape.	Integrated grazing as a PMLU.	Engagement with landholder on PMLUs	PMLUs described in the PRCP that compliment surrounding land uses (section 2.1.2.10)
9 February 2026	Isaac Regional Council	Briefing	Project overview, land rehabilitation options, waste management strategies	No issues raised, but supportive of proposed approach to PMLUs	No issues raised	Engagement for information purposes	Provide further technical information throughout the EIS and PRCP process.

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
25 February 2026	Queensland Rehabilitation Commissioner	Briefing	Project overview and involvement of the Commissioner	No issues raised, but supportive of proposed approach to PMLUs	No issues raised	Engagement for information purposes	Provide further technical information throughout the EIS and PRCP process.
23 March 2026	Winchester Foundation (Landowner)	Briefing	Project overview, land rehabilitation options, infrastructure retention	No issues raised, with rehabilitation outcomes to be further discussed	No issues raised, future engagement planned	Engagement for information purposes	Provide further technical information throughout the EIS and PRCP process.
16 April 2026	Barada Barna Aboriginal Corporation (BBAC)	PRCP Specific Briefing	Provided overview of the proposed PMLUs as part of the PRCP.	BBAC interested in further consultation for rehabilitation contracting opportunities and seed propagation initiatives.	Stanmore to continue engaging with BBAC on the rehabilitation activities for Project.	No changes to PMLUs and rehabilitation described in PRCP	Stanmore committed to ongoing rehabilitation engagement (section 2.2.2).

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
29 April 2026	Winchester Foundation (Landowner)	PRCP Specific Briefing	Project overview, land rehabilitation options, infrastructure retention, possible PMLU continuation projects	No issues raised. Provided strong support for grazing PMLUs and use of void lake for water for stock watering purposes. Also engaged in the possibility for the algae farm and pumped hydro PMLU options. Further technical information outlining the feasibility of the novel PMLUs will be provided as part of the PRCP and EIS submission package.	Landholder preferences for grazing PMLUs and void lake water supply to support grazing, incorporated into PMLUs.	No changes to the proposed PMLUs and rehabilitation activities described in PRCP.	Provide further technical information throughout the EIS process and progress of compensation agreement. Stanmore to actively engage with the Winchester Foundation on any updates to the proposed rehabilitation outcomes.

2.2.2 Community Consultation Plan

To comply with section 126C(1)(c)(iv) of the EP Act, a community consultation plan has been developed to detail how consultation will be carried out in relation to closure planning. The Project's Community and Stakeholder Engagement Plan (CSEP) (**Appendix AK**) seeks to involve the key community stakeholders during the planning, progressive rehabilitation and decommissioning of the Project before and during the Project's closure phase.

2.2.2.1 Objectives

The objectives of the CSEP are to:

- identify stakeholder groups that may be affected by or may have an interest in the Project, ongoing progressive rehabilitation and the PMLUs.
- maintain transparent and inclusive community and stakeholder engagement to facilitate ongoing management of the progressive rehabilitation and maintain strong key stakeholder relationships
- tailor engagement methods and opportunities with sensitivity to potential consultation fatigue and/or community and cultural expectations
- ensure that the Project's planning and delivery of progressive rehabilitation and post-mining land use considerations continue to be informed by key stakeholder views
- continue to provide a mechanism that enables affected communities and stakeholders to register any complaints, queries or feedback, and have these matters addressed in a timely manner.

2.2.2.2 Identified Community Members

The key stakeholders who are likely to have the highest interest in the rehabilitation and closure activities for the Project are the Winchester foundation (landowner), BBAC, Isaac Regional Council and the administering authority (DETSI). These stakeholders have engaged on the development of the PRCP, and will continue to be engaged through the Project's EIS process with continued engagement about the operational and closure phases of the Project. Other interested stakeholders have the opportunity to review and make submissions on the proposed rehabilitation and closure through the public notification process for the EIS.

The Project's wider key stakeholders and community groups are shown in Table 10, with varying degrees of interest in rehabilitation and closure.

2.2.2.3 Proposed Consultation Frequency

The Project's CSEP as it relates to rehabilitation and closure phase of the is outlined in Table 11 . The proponent will adapt its community and stakeholder engagement activities to reflect local concerns related to rehabilitation and closure as they arise in the future.

Table 10: Key Stakeholders and Community Members

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
Federal agencies	Federal Department of the Environment and Energy	Environmental protection and monitoring	Direct correspondence (letters, emails, phone calls) Briefing/individual meetings
State agencies	Queensland Department of Environment, Tourism, Science and Innovation Queensland Treasury Office of the Coordinator-General-Coordinated Queensland Ambulance Service Queensland Police Service Queensland Fire and Emergency Service Queensland Department of Transport and Main Roads Mackay Hospital and Health Service Queensland Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism Queensland Department of Housing and Public Works Queensland Department of Trade, Employment and Training Queensland Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development	Sustainable resource development Approval processes Pressure on regional infrastructure Employment and business opportunities including First Nations people Education and training opportunities Housing availability and affordability Safety and emergency response Capacity of health and education services Impact on road networks Stock Route activities in regard to Reserve Land	Website / social media Direct correspondence (letters, emails, phone calls) Briefing/individual meetings Newsletter Fact sheets to announce Project changes and updates Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project
Local governments	Isaac Regional Council	Employment and business opportunities	Website / social media

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
	Mackay Regional Council	Education and training opportunities Housing availability and affordability Safety and emergency response Community funds and benefits Approvals process Capacity of social services and infrastructure Water supply Traffic impacts and roads Constituent complaints Timely and accurate revised Project information Proposed rehabilitation and closure, including job creation	Direct correspondence (letters, emails, phone calls) Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Newsletter Fact sheets to announce Project changes and updates Participation in local business forums Presentations to local service providers and interagencies where requested Briefings / individual meetings
Social and public services providers	Moranbah State School Moranbah Primary School Moranbah East Primary School Moranbah Police Station Moranbah Hospital Ambulance services Moranbah and District Support Services Moranbah Men's Shed Mackay, Whitsunday Isaac Suicide Prevention Network	Capacity of social services and infrastructure Employment and business opportunities Education and training opportunities Safety and emergency response Community funds and benefits Traffic impacts and roads Timely and accurate revised Project information Early engagement and involvement in the Project	Website / social media Direct correspondence (letters, emails, phone calls) Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Fact sheets to announce Project changes and updates Briefing/individual meeting

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
	Simply Sunshine Childcare Centre, Moranbah Early Learning Centre		
Local and regional employment, education and training providers	Principle mine contractor Country University Centre (CUC) Winchester Foundation Moranbah State High School Dysart State High School Local training providers (MREAL etc.) Local employment providers (Work Pac etc.)	Employment and business opportunities Education and training opportunities Project timeframes and updates	Presentations to employment and training bodies Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Dedicated Project phone number or email address Website / social media Fact sheets to announce Project changes and updates Briefing/individual meeting
Housing and accommodation providers	Isaac Affordable Housing Trust Emergency and Long-Term Accommodation (ELAM) Moranbah Real estate agencies in Moranbah, Dysart Worker Accommodation Village (WAV) Providers (Civeo etc.) Other accommodation providers who are providing housing services and programs of relevance to the SIMP.	Housing availability and affordability Capacity of social services and infrastructure Project timeframes and updates	Presentations to housing providers Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Dedicated Project phone number or email address Website / social media Newsletters Fact sheets to announce Project changes and updates Briefing/individual meeting
Industry groups and businesses	Isaac Business Chamber Greater Whitsunday Alliance	Supply chain opportunities Tender requirements	Presentations to business representative bodies

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
	MEU Mining and Energy Union Various local business owners Major infrastructure providers (e.g. Rail, Port, Energy) Overlapping and adjacent resource tenement holders	Project timeframes and updates Labour requirements for the operation Impacts on their operations Potential future opportunities associated with rehabilitation and closure	Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Dedicated Project phone number or email address Website / social media Newspaper advertisements Newsletters Fact sheets to announce Project changes and updates
Local and regional commerce and community development organisations	Moranbah and District Support Service Association Inc. Dysart Community Support Group Association Inc. Moranbah Community and Youth Hub management committee Nebo Community Development Group Mackay, Whitsunday, Isaac Suicide Prevention Network Other organisations who are providing services and programs of relevance to the SIMP Natural resource management organisations	Employment and business opportunities Education and training opportunities Access to Stanmore's Community Grants Program Housing affordability Community safety Timely and accurate revised Project information' Environmental issues and management Potential future opportunities associated with rehabilitation and closure	Newsletter Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Dedicated Project phone number or email address Website / social media Regular community information sessions Participation in local events Complaint mechanism Stanmore Community Grants Program and supporting materials
Aboriginal and Torres Strait Islander peoples	BBAC Barada Barna people	Employment and business opportunities, including those associated with rehabilitation and closure	Presentation to Aboriginal representative bodies

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
	Local indigenous residents, businesses and training providers	Education and training opportunities Labour requirements for the operation Supply chain opportunities Community funds and benefits Timely and accurate revised Project information Cultural heritage management Native title agreement requirements	Principal Communities and Social Performance role representing a dedicated stakeholder contact point for the Project Dedicated Project phone number or email address Website / social media Newspaper advertisements Newsletters Regular community information sessions Participation in local events Complaint mechanism Stanmore Community Grants program and supporting materials Fact sheets to announce Project changes and updates
Local communities including local and adjoining landholders	Landholders in and surrounding the Project area Residents including Moranbah, Coppabella, Dysart and other residents in Isaac LGA with an interest in the Project	Job and business opportunities Education and training opportunities Community funds and benefits Community cohesion and social values Dust, noise and light emissions Housing affordability and availability Access to social services Traffic and congestion Mine site environmental management	Ongoing working relationship with directly affected landholders Regular community information sessions Community relations officer dedicated as community contact point Newsletter Dedicated Project phone number and email address Participation in local events Complaint mechanism

Stakeholder Group	Stakeholder	Primary Interest	Engagement Mechanisms
		Rehabilitation and closure Groundwater and surface water management Changes to farming practices	Stanmore Community Grants program and supporting materials Website / social media Media releases
Workforce	Stanmore employees and contractors	Work shifts and schedules Impact on families Transport and commuting arrangements Codes of conduct for behaviour Housing and accommodation options Service provision in nearby towns Road safety Opportunities in the closure stage	Company newsletter Website – intranet Human resource management Onsite notice boards Induction processes and training Toolbox talks and safety messages Senior Management Team meetings (senior staff) General Management meetings (general managers) Regular informal social events Employee grievance mechanism

Table 11: Community and Stakeholder Engagement Program

Actions	Associated Stakeholders / Partners	Monitoring Frequency
Maintain a dedicated Communities and Social Performance Principal role as the primary community contact point for the Project through to rehabilitation and closure.	Key stakeholders (Table 10)	Annual review during construction, first year of operation, and every three years thereafter
Continue to engage with affected landholder representatives to monitor impacts through to rehabilitation and closure.	Winchester Downs owners, property manager and Winchester Foundation Other adjoining landholders	Annual review during construction, first year of operation, and every three years thereafter
Continue in identifying issues, disseminating information throughout the life of the Project including progressive rehabilitation and closure activities and providing a forum for discussion	Isaac Regional Council Moranbah interagency SIMP partners – IAHT, CUC, CLA, Winchester Foundation, SelectAbility Isaac Business Chamber Coppabella Community Centre Relevant government agencies	Annual review during construction, first year of operation, and every three years thereafter
Establish and maintain long-term respectful relations with the Barada Barna including managing cultural heritage in accordance with the Cultural Heritage Management Plan and meeting the requirements of the Native Title Agreement.	BBAC	Annual review during construction, first year of operation, and every three years thereafter
Co-design with Barada Barna a culturally sensitive meeting place in the Project area, and opportunities to enhance cultural awareness through onsite signage in traditional language	BBAC	Annual review during construction, first year of operation, and every three years thereafter

Actions	Associated Stakeholders / Partners	Monitoring Frequency
Regularly attend and participate in locally-led stakeholder networks and forums	Isaac Business Chamber events Moranbah interagency	Annual review during construction, first year of operation, and every three years thereafter
Continue to engage with local service providers if and when blasting and other Project related activities have any potential to impact on the community	Service providers	Annual review during construction, first year of operation, and every three years thereafter
Early and ongoing engagement through development of a Progressive Rehabilitation and Closure Plan (PRCP) for the Project	Department Of Environment, Tourism, Science and Innovation BBAC Isaac Regional Council Winchester Downs owners, property manager and Winchester Foundation	Annual review during construction, first year of operation, and every three years thereafter
Establish, publicise, and maintain a readily accessible community complaints and resolution process	Key stakeholders (Table 10)	Annual review during construction, first year of operation, and every three years thereafter
Bi-annual publication and dissemination of Project Community Updates	Local community and SIMP partners	Annual review during construction, first year of operation, and every three years thereafter

2.2.2.4 Community Feedback Management

The proponent will maintain a dedicated Communities and Social Performance role to represent a central contact point for local stakeholders and community members. Project community contact details will be provided on all Project communication material, including external correspondence. These details will also be published online for the purpose of receiving complaints and enquiries from stakeholders in relation to the Project's activities.

All incoming enquiries, feedback loops and complaints will be logged into the Project's stakeholder database and reported within the specified timeframes. This communication contact point will provide the opportunity for stakeholders to raise any questions or concerns in relation to the Projects progressive rehabilitation and closure phases.

2.2.2.5 Complaints Management

For community members, landholders, Traditional Owners and other external parties affected by the Project including the progressive rehabilitation and closure aspects, the proponent will also implement its Grievance Management Process. This process has been updated in accordance with the systematic procedure set out in Stanmore's Stakeholder Engagement Guideline (SMR-EMC-GDL-000008). The external grievance mechanism provides a clear pathway for raising concerns.

Key features of the process include:

- Swift response: All complaints are acknowledged within 24 hours.
- Transparent investigation: Concerns are assessed within 30 days, with regular updates provided.
- Collaborative resolution: Solutions are developed in consultation with the complainant.
- Escalation options: Independent mediation is available if the proposed resolution is unsatisfactory.
- Cultural sensitivity: The process is adaptable to local context and responsive to vulnerable groups.

A summary of the process to be undertaken by the proponent when receiving a community and stakeholder complaint or feedback is outlined in Figure 13.



Figure 13: Community and Stakeholder Complaint or Feedback Process

2.3 Post-Mining Land Uses

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 PRCP carried out on the land have ended. Relevant activity for a PRCP 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 PRCP 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.

Legislative Requirement

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

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

2.3.1 PMLU Options and Constraints Analysis Summary

The PMLUs planned for this PRCP for the Project are outlined below and are defined with their applicable RAs in Table 7 and Figure 11:

- Native vegetation (riparian woodland) – Conrock Gully.
- Grazing.
- Native vegetation (woodland) – Final low wall batter (≤25%).
- Native vegetation (riparian) – River/creek crossings.
- Final void - Beneficial use water storage.
- Permanent infrastructure – PHES and/or algae production.

2.3.1.1 Native Vegetation (Riparian Woodland) – Conrock Gully PMLU

Diversion of Conrock Gully allows for access to economic resources, and was an important consideration for final landform design. Stanmore considered mining around Conrock Gully (i.e. leaving Conrock Gully in place) but this would have resulted in a material reduction in economic coal resources mined. Therefore, a diversion was required. Stanmore considered whether this diversion should be permanent around the mining area, or temporary around the mining area followed by a permanent diversion in a similar location to the pre-mining Conrock Gully, with a single, permanent diversion preferred as:

- A later permanent diversion in a similar location to the pre-mining Conrock Gully would have to be designed through the in-pit overburden dump, with associated risks for long term stability.
- The diversion, whether temporary or permanent, would need to be designed to a similar standard for operations, and hence construction of a temporary and later permanent diversion would significantly increase costs for the same outcome.

- The diversion, whether temporary or permanent, would be subject to rehabilitation from the commencement of operations with achievement of rehabilitation milestones during the operational life of the mine. Hence any later permanent diversion would require another series of rehabilitation milestones with little environmental benefit compared to rehabilitation of the single permanent diversion around the mine workings.

The Conrock Gully diversion functionally connects with the existing watercourse within the Project area, was aligned to minimise interference with mining infrastructure, and was designed to remain within the Project area. The proposed diversion channel possesses similar dimensions to the Conrock Gully existing channel, and has a similar design capacity. The Conrock Gully diversion includes a number of meanders that have been introduced at the upstream end of the diversion, which results in a length of channel and bed slope similar to the existing Conrock Gully channel. The diversion's meanders have similar amplitude, wavelength, sinuosity, and bend radius to bends found in the existing creek channel.

The Conrock Gully diversion is supported by a Functional Design Report that was developed by an AQP to address the objectives, design criteria and required outcomes of the 'Guideline: Works that interfere with water in a watercourse for a resource activity—watercourse diversions authorised under the *Water Act 2000* (DNRME, 2019)'. The Conrock Gully diversion's Functional Design Report is provided in Appendix D of **Appendix J**. The geomorphic assessment within the Functional Design Report demonstrates that the diversion design reasonably matches the existing Conrock Gully geometry. The design hydraulic conditions of the diversion are similar, and generally improved, to those in the existing Conrock Gully channel, and are consistent with the 'ACARP guideline: Bowen Basin River Diversions Design and Rehabilitation Centre (Hardie and Lucas, 2002)' for channel-averaged shear stress, stream power and velocity.

Revegetation of the land adjacent to Conrock Gully diversion channel with a self-sustaining groundcover will facilitate erosional stability and topsoil retention during rainfall and flood events, and the re-established native shrub and tree cover will enhance the riparian zone and support the return and improvement of native fauna habitat. The native flora species selection for rehabilitation will be consistent with the local surrounding environment (Appendix 3.3 of this PRCP).

The permanent diversion of Conrock Gully will be substantially similar to the existing Conrock Gully, and therefore, will function in a similar manner for the purpose of operating the Winchester Down property as a pastoral business.

In terms of local and State government planning strategies and schemes, the native vegetation (riparian woodland) – Conrock Gully PMLU is consistent with the Isaac Regional Planning Scheme (2024) and Mackay, Isaac, and Whitsunday Regional Plan (2012). Section 2.3.5 provides further details detail on the consistency between the PMLUs and the local and State government planning strategies and schemes.

Therefore, once the Native vegetation (riparian woodland) – Conrock Gully PMLU is established in accordance with the PRCP Schedule, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU will be integrated into current land uses, and is consistent with how the land was used before the mining activities were carried out.

2.3.1.2 Grazing PMLU

As described in Section 2.1.2.10, grazing is the primary land use within the Project area, and is one of the two predominant land uses in the vicinity of the Project. The grazing PMLU will allow the return of the land to the Winchester Downs landowner in a productive state for reintegration into their pastoral business (Table 4). The grazing PMLU will also allow the return of a majority of the land associated with the State Reserve (Lot 9 GV33) to a productive state for its reintegration into the reserve and continued use as a stock route (Table 4).

A majority of the Project's land disturbed by mining will be returned to a grazing PMLU (Table 7), which from an agricultural perspective will be beneficial to the landowners, the region and Queensland. The grazing PMLU will return the land to its pre-mining land suitability class (see Section 2.1.2.6.2). Final landform geotechnical and erosional stability assessments confirm that long-term the land will remain geotechnically stable and will erode at an acceptable rate, which supports the rehabilitation of the land to a grazing PMLU (see **Appendix H** and **Appendix D**, respectively).

The return of the majority of the land to a sustainable grazing condition is likely to be a part of two separate compensation agreements under the MR Act between the proponent and the two landowners.

Revegetation of the mined land to a sustainable state will involve the use of a pasture seed mix that is compatible with surrounding non-mined land. The Project's planned pasture seed mix for the grazing PMLU is provided in Appendix 3.2 of this PRCP. The self-sustaining groundcover will facilitate erosional stability and topsoil retention, and will also provide habitat for local ground-dwelling fauna.

In terms of local and State government planning strategies and schemes, the grazing PMLU is consistent with the Isaac Regional Planning Scheme (2024)¹ and Mackay, Isaac, and Whitsunday Regional Plan (2012). Section 2.3.5 provides further details detail on the consistency between the PMLUs and the local and State government planning strategies and schemes.

Therefore, once the grazing PMLU is established in accordance with the PRCP Schedule, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU will be integrated into current land uses, and is consistent with how the land was used before the Project's mining activities were carried out.

2.3.1.3 Native Vegetation (Woodland) – Final Low Wall Batter ($\leq 25\%$) PMLU

The development of the Project's final void involved assessed of options using multiple inputs from specific models (e.g. surface water, groundwater, void geochemistry and mine design) to establish the best possible final geometry (e.g. size, surface area, depth, and catchment) to return a suitable water quality to support the use of the final void (pit lake) as a beneficial water storage PMLU for grazing and a suitable water source for the Project's other proposed PMLUs (permanent infrastructure – PHES and/or algae production). The Project's surface water, groundwater and void geochemistry reports that support the development of the Project's final void design are provided in **Appendix I**, **Appendix K** and **Appendix M**, respectively.

As a result of the Project's final void design and the progression of the final stages of mining to achieve this design, the final low wall batter that drains directly to the void and is above the predicted void water level possesses a slope of $\leq 25\%$. Consequently, the Native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU was developed to ensure long-term erosional and geotechnical stability, and an ecological benefit for this specific rehabilitation area.

Landform stability modelling and a geotechnical assessment were completed by AQPs to demonstrate the long-term stability of final landform, including the final low wall batter (**Appendix D** and **Appendix H**, respectively). Section 2.1.3.1.7 provides a summary of the geotechnical summary that demonstrates that the Project's final landform, including the final low wall batter, meets or exceeds the design acceptance criteria for the Project's final landform of a FoS ≥ 1.5 , and therefore, demonstrate the long-term stability of the Project's final landform. Section 2.1.3.2 provides the main findings of the landform erosional stability which demonstrates that after 300 years of simulation of the Project's main in-pit landform (which includes the low wall batter), southwest out-of-pit dump and east out-of-pit dump are stable under the current climate change predictions for the region, and are predicted to typically erode at the acceptable erosion rate of ≤ 5 t/ha/y. The landform stability modelling report also advises on the recommended rehabilitation actions required to achieve long-term stability for the low wall batter PMLU, which includes achieving a groundcover level of $\geq 30\%$ with rock armouring comprising fresh non-carbonaceous sandstone and fresh carbonaceous sandstone.

Revegetation of the final low wall batter with a self-sustaining groundcover and appropriate rock armouring will facilitate erosional stability and topsoil retention during rainfall and flood events, and the re-established native shrub and tree cover will improve the habitat for local native fauna. The native flora species selection for rehabilitation will be consistent with the local surrounding environment (see Appendix 3.3 of this PRCP).

In terms of local and State government planning strategies and schemes, the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU is consistent with the Isaac Regional Planning Scheme (2024) and Mackay, Isaac, and Whitsunday Regional Plan (2012). Section 2.3.5 provides further details detail on the consistency between the PMLUs and the local and State government planning strategies and schemes.

Therefore, once the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU is established in accordance with the PRCP Schedule, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU will be integrated into current land use, and is consistent with how the land was used before the mining activities were carried out.

¹ <https://www.isaac.qld.gov.au/Residents/Planning-and-Development/Planning-Scheme>

2.3.1.4 Native Vegetation (Riparian) – River/Creek Crossings PMLU

The Project will require a primary access including a bridge over the Isaac River, a temporary bed-level crossing of the Isaac River to walk the dragline to and from the Project area at the start and finish of mining operations, and a secondary access including a bridge over Cherwell Creek.

There are no other feasible alternative access options for the Project. The Project's primary access connects with IDM's road network and provides connection with the Peak Downs Highway for off-site travel, and with the existing ROM coal haul roads for hauling ROM coal to the IPM CHPP.

These access routes intersect ecologically sensitive areas associated with the Isaac River and Cherwell Creek crossings. Therefore, the native vegetation (riparian) – River/creek crossings PLMU was developed for the rehabilitation of the Project's crossing infrastructure within existing riparian areas to ensure long-term erosional and geomorphic stability and an ecological benefit from the re-establishment of the riparian zone.

Revegetation of the land adjacent to each crossing with a self-sustaining groundcover will facilitate erosional stability and topsoil retention, and the re-established native shrub and tree cover will enhance the riparian zone and support the return and improvement of native fauna habitat. The native flora species selection for rehabilitation will be consistent with the local surrounding environment (see Appendix 3.1 of this PRCP).

In terms of local and State government planning strategies and schemes, the native vegetation (riparian) – River/creek crossings PMLU is consistent with the Isaac Regional Planning Scheme (2021) and Mackay, Isaac, and Whitsunday Regional Plan (2012). Section 2.3.5 provides further details detail on the consistency between the PMLUs and the local and State government planning strategies and schemes.

Therefore, once the native vegetation (riparian) – River/creek crossings PLMU is established in accordance with the PRCP Schedule, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU will be integrated into the current land use, and is consistent with how the land was used before the mining activities were carried out.

2.3.1.5 Beneficial Water Storage PMLU

As explained in Section 2.3.1.3, the Project's final void was designed to ensure a suitable water source for livestock (cattle) and the Project's other proposed PMLUs (permanent infrastructure – PHES and/or algae production).

The Project's final void studies (**Appendix M** and **Appendix I**) demonstrate that the water quality within the final void is predicted to be suitable for the proposed PMLUs. Section 2.6.3.7 provides additional supporting information in relation to the beneficial water storage PMLU.

The Project's rehabilitation design has resulted in no NUMAs at closure.

The beneficial water storage PMLU will provide the Winchester Downs landowner with a sustainable additional water source for their pastoral operations.

In terms of local and State government planning strategies and schemes, the beneficial water storage PMLU is consistent with the Isaac Regional Planning Scheme (2024) and Mackay, Isaac, and Whitsunday Regional Plan (2012). Section 2.3.5 provides further details detail on the consistency between the PMLUs and the local and State government planning strategies and schemes.

Therefore, once the beneficial water storage PMLU is established in accordance with the PRCP Schedule, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU will be integrated into the current land use, and whose use will deliver, or is aimed at delivering, a beneficial environmental and economic outcome.

2.3.1.6 Permanent Infrastructure – PHES and/or algae Production PMLU

As explained in Sections 2.3.1.3 and 2.3.1.5, the Project's beneficial water storage PMLU supports the Project's permanent infrastructure – PHES and/or algae production PMLU through the provision of a long-term water supply of suitable quality.

To advance this PLMU, the proponent commissioned separate concept-level feasibility studies for PHES and algae production using recognised third parties (e.g. University of Queensland). The outcomes of these studies

demonstrated that PHES and algae production are technically and commercially feasible as planned. Further work is continuing to advance both the PHES and algae production to a pilot stage of production.

The main benefit of the hydroelectricity generation is a potential long-term source of power or income for the landholder or possibly another third party.

Potential benefits of the algae production are:

- income generation (e.g. food grade algae sales)
- potential cattle feed supplement
- biomatter for use in improving grazing land in rehabilitation
- removal of salts from water
- potential for carbon sequestration
- new industry for the local region, supported by local government and new employment opportunities.

Sections 2.6.3.7.2 and 2.6.3.7.3 provide additional supporting information in relation to the permanent infrastructure – PHES and/or algae production PMLU.

Therefore, once the permanent infrastructure – PHES and/or algae production PMLU is established in accordance with the PRCP Schedule and has reached a commercial stage of development, it will be safe and structurally stable, not cause environmental harm, and will be sustainable under natural conditions. In addition, this PMLU can be integrated into the current land use or developed by a third party as a future productive land use, and whose establishment will deliver, or is aimed at delivering, beneficial environmental and economic outcomes.

2.3.2 Rehabilitation Milestones

The proposed RMs and milestone criteria are provided in Table 12. Specific, measurable, achievable, reasonable/relevant and time-specific (SMART) principles have been applied in developing these RMs, with consideration given to the following parameters:

- Milestone criteria have been developed using the rehabilitation and closure technical assessments completed for the Project that underpin this PRCP.
- Milestone criteria development has considered the principles of industry best practice.

For the Project, the defined RMs (Table 8) apply to the nominated RAs (Table 7) as follows:

- RM1 applies to all RAs, except RA1, RA7, RA9 and RA10.
- RM2 only applies to RA4 and RA5.
- RM3 applies to all RAs, except RA7, RA9 and RA10.
- RM4 applies to all RAs, except RA7, RA9 and RA10.
- RM5 applies to all RAs, except RA7 and RA9.
- RM6 applies to all RAs, except RA7 and RA9.
- RM7 applies to all RAs, except RA7 and RA9.
- RM8 applies to all RAs, except RA3, RA7, RA9 and RA10.
- RM9 only applies to RA9.
- RM10 only applies to RA7.

Table 12: Project Rehabilitation Milestone Criteria

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
RM1	Infrastructure decommissioning and removal	<u>All PMLUs requiring infrastructure removal (RA2, RA3, RA4, RA5, RA6, RA8)</u>
		RM1.1 With the exception of any infrastructure to remain as part of the post-mining land use (PMLU), where infrastructure is agreed to be retained by the landholder as evidenced by a signed landholder agreement, or required for rehabilitation activities, the following actions must be complete: • All services disconnected and removed. • All buildings and associated infrastructure not associated with a PMLU dismantled and removed offsite. • All hardstand, concrete areas and roads removed (e.g. bitumen, blue metal, aggregate etc). • All fencing and associated foundations removed. • All pipelines drained and removed. • All waste non-authorised to be disposed of on-site will be removed offsite and managed in accordance with the EP Act. • All surface water drainage infrastructure that is not compatible with the sustainment of the PMLU is removed. • All drillholes, sediment ponds and sumps decommissioned. • All machinery and equipment, not required for rehabilitation works removed from site. • All required dams dewatered and desilted as per an appropriately qualified person (AQP)'s recommendation. • Watercourse crossings and culverts removed.
		RM1.2 For all surface to seam boreholes, including but not limited to exploration bores, water monitoring bores and resource delineation bores, not required for ongoing monitoring in accordance with RM8, must be: • grouted and/or plugged. • capped 0.5 m below surface. • exploration bores decommissioned in accordance with 'Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP, 2016)'.
RM2	Identification, remediation and/or removal of contaminated land	<u>All PMLUs requiring contaminated land assessment (RA4, RA5)</u> RM2.1 Contaminated land investigations involving investigation, remediation and validation will be conducted in accordance with the EP Act, including a site investigation report, and where required, a validation report and/or a draft Site Management Plan if the site is to remain on the Environmental Management Register or Contamination Site Register.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
RM3	Landform development (re-profiling / reshaping)	RM2.2 Contaminated water and sediment are removed from dams and disposed of in an appropriate manner.
		RM2.3 Contaminated material is either remediated in-situ or removed and transported to a facility lawfully able to accept the material.
		RM2.4 A Contaminated Land Auditor certifies that that no contamination unsuitable for the PMLUs remains, is likely to occur or is occurring.
		<u>All PMLUs requiring landform development (RA1, RA2, RA3, RA4, RA5, RA6, RA8)</u>
		RM3.1 All major earthworks, including reshaping and pushing/trimming, are completed in accordance with the design specification provided by an AQP that achieves an outcome that is safe, erosionally and structurally stable, and appropriate to support the achievement of the PMLU.
		RM3.2 All major earthworks, including reshaping and pushing/trimming, are completed in accordance with a design specification provided by an AQP for the final landform design and have completed the following tasks: • a landform evolution modelling demonstrates that the landform is erosionally stable. • a geotechnical assessment demonstrates the ability of the landform to achieve a Factor of Safety (FoS) of ≥ 1.5. • the batters of the dumps areas possess slopes of overall $\leq 15\%$ (RA1, RA2, RA4, RA5, RA6, RA8), other than the final low wall batter draining to the void lake which is overall $\leq 25\%$ (RA3). • the landform is water shedding. • the landform is suitable to sustain the PMLU.
		RM3.3 The constructed landform achieves geotechnical stability with a FoS of ≥ 1.5 , which includes consideration of flood stress.
		RM3.4 All drainage is constructed in accordance with the engineering designs developed by an AQP.
		RM3.5 Erosion and sediment control structures are installed as per the requirements of an ESCP certified by an AQP.
		<u>Native vegetation (riparian) – River/creek crossings (RA8)</u>
		RM3.6 Disturbed natural watercourse bed and banks are returned to a natural condition with a profile similar to the pre-disturbance condition.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
RM4	Surface preparation (topdressing, contour ripping, soil amelioration, rock armouring)	<u>Native vegetation (riparian woodland) – Conrock Gully (RA1)</u>
		RM3.7 The Conrock Gully diversion is constructed in accordance with its Functional Design Report (Appendix D of Appendix J).
		<u>All PMLUs requiring surface preparation (RA1, RA2, RA3, RA4, RA5, RA6, RA8)</u>
		RM4.1 Prior to placement on landform, plant growth media is ameliorated (if required) and representatively tested as required by an AQP to confirm the following parameters are achieved: - pH in the range of 6 – 8.5. - Electrical Conductivity (saturated extent) is ≤ 2 dS/m or 2,000 μS/cm. - Exchangeable sodium percentage (ESP %) < 6. - Emerson aggregate class is ≥ 4.
		RM4.2 Plant growth media placement of a minimum 0.3 m in areas where topsoil has previously been removed.
		RM4.3 Deep ripping of compacted surfaces to a depth of no less than 0.3 m into the soil profile along the contour of the slope.
		RM4.4 The surface and groundwater monitoring network are appropriately installed under supervision of an AQP, and monitoring is underway and at least one year of sampling completed.
		<u>Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) (RA3)</u>
		RM4.5 Rock armouring will be placed on the final low batter ($\leq 25\%$) and will comprise: - Fresh non-carbonaceous sandstone and carbonaceous sandstone in preference to fresh non-carbonaceous and carbonaceous siltstones/mudstones. - The rock fraction will include particles greater than approximately 50 mm in diameter. - The rock source will contain less than 40% fines (< 2 mm diameter).
RM5	Revegetation	<u>All PMLUs requiring revegetation (RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA10)</u>
		RM5.1 Appropriate erosion controls installed and functioning as designed by an AQP to ensure plant establishment is not significantly impacted from erosive events.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		<u>Native vegetation (riparian woodland) – Conrock Gully (RA1) and Native vegetation (riparian) – River/creek crossings (RA8)</u> RM5.2 Seeding completed using a specific seed mix (upper storey tree species, mid and lower storey tree and shrub species, and groundcover species) for RE11.3.25 as described in Appendix 3.1 of this PRCP. RM5.3 Seeding completed as per recommended sowing rates for individual species where possible, and with total recommended seeding rates for dominant tree species (5 kg/ha), mid-storey species (5 kg/ha), and groundcover species (5 kg/ha). RM5.4 Non-native seed must not be included in the seed mix for the establishment of native revegetation PMLUs, except when sterile cover crops are used. <u>Grazing land (RA2, RA4, RA5, RA6, RA10)</u> RM5.5 Completed seeding with a selection of species and seeding rates listed in Appendix 3.2 of this PRCP for the grazing PMLU. <u>Native vegetation (woodland) – Final low wall batter (≤25%) (RA3)</u> RM5.6 Seeding completed using a specific seed mix (upper storey tree species, mid and lower storey tree and shrub species, and groundcover species) for RE11.5.3 as described in Appendix 3.1 of this PRCP. RM5.7 Seeding completed as per recommended sowing rates for individual species where possible, and with total recommended seeding rates for dominant tree species (5kg/ha), mid-storey species (5kg/ha), and groundcover species (5kg/ha). RM5.8 Non-native seed must not be included in the seed mix for the establishment of native revegetation PMLUs, except when sterile cover crops are used.
RM6	Achievement of surface requirements	<u>All PMLUs requiring revegetation (RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA10)</u> RM6.1 Weed presence is less than 10% of total vegetative groundcover confirmed by an AQP, as a component of annual monitoring. RM6.2 Groundcover for slopes of ≤15% possesses a total vegetative ground cover of ≥65% which is confirmed by an AQP, as a component of annual monitoring.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		RM6.3 As a component of annual monitoring, erosion is assessed by an AQP using the Erosion Classification Framework provided in Figure 25 and achieves a 'minor' classification. RM6.4 Any erosion present will not compromise the achievement of a PMLU to a stable condition. RM6.5 Erosion requiring intervention has been appropriately remediated and does not impact achieving the PMLU. RM6.6 Surface water runoff and/or seepage is collected and compared with Table 35: Surface Water Quality Limits to determine any trends over time, as collected from representative areas of rehabilitation when surface water flows occur, if physically possible and it is safe to carry out the sample collection. RM6.7 Surface water quality is monitored during flow events within the Isaac River at the upstream and downstream monitoring stations (ID-IR2 and PTM-MP5, respectively; Table 34) for all the water quality parameters listed in Table 35: Surface Water Quality Limits. RM6.8 All contour banks and other temporary erosion and sediment control structures have been removed. <u>Native vegetation (riparian woodland) – Conrock Gully (RA1) and Native vegetation (riparian) – River/creek crossings (RA8)</u> RM6.9 The revised BioCondition benchmarks nominated for RE11.3.25, as specified in Table 20, are confirmed by an AQP, as a component of annual monitoring. <u>Grazing land (RA2, RA4, RA5, RA6, RA10)</u> RM6.10 The groundcover comprises a self-sustaining vegetative groundcover of species listed in Appendix 3.2 of this PRCP and is confirmed by an AQP, as a component of annual monitoring. RM6.11 Annual monitoring by an AQP confirms a minimum vegetation composition (per hectare (averaged)) of: • Four pasture species. • Two legumes species. • Two shade tree species. RM6.12 Monitoring data and technical assessments completed by an AQP indicate that the overburden dump rehabilitation is on a trajectory to achieve a stable condition.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
RM7	Achievement of post-mining land use to a stable condition	RM6.13 A land suitability class of ≤ 4 is confirmed by an AQP, as a component of annual monitoring.
		RM6.14 An AQP confirms the establishment of a pasture condition rating ≤ 3 , based on the Pasture Condition Assessment Table as per “Stocktake: Balancing Supply and Demand” (Developed by FutureBeef – futurebeef.com.au), as a component of annual monitoring.
		<u>Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) (RA3).</u>
		RM6.15 An AQP confirms that the groundcover for slopes of $\leq 25\%$ has achieved a total vegetative groundcover of $\geq 30\%$ and when combined with rock armouring, as a component of annual monitoring.
		RM6.16 The revised BioCondition benchmarks nominated for RE11.5.3, as specified in Table 21, are confirmed by an AQP, as a component of annual monitoring.
		<u>All PMLUs requiring revegetation (RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA10)</u>
		RM7.1 Safety hazards in the rehabilitation area are not significantly different to surrounding unmined landscapes subject to the same land use.
		RM7.2 An AQP certifies that the final landform is geotechnically stable and has achieved a factor of safety ≥ 1.5 .
		RM7.3 An AQP certifies based on annual monitoring that the erosion targets have been successfully achieved and any erosion present will not compromise the achievement of a PMLU to a stable condition.
		RM7.4 An AQP certifies that the presence of weeds are less than 5% of total vegetative groundcover.
		RM7.5 Representative soil testing of growth media across the PMLU by an AQP confirms: - pH in the range of 6 - 8.5. - Electrical Conductivity (saturated extract) (dS/m) ≤ 2 (2,000 $\mu\text{S/cm}$). - Exchangeable sodium percentage (ESP) (%) < 6.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		Emerson aggregate class: ≥ 4.
	RM7.6	All remaining infrastructure no longer required is rehabilitated or removed in accordance with RM1.1. <u>Native vegetation (riparian woodland) – Conrock Gully (RA1) and Native vegetation (riparian) – River/creek crossings (RA8)</u>
	RM7.7	A BioCondition assessment of the revised BioCondition benchmarks nominated for RE11.3.25 (Table 20) is completed by an AQP in accordance with latest version of Queensland Herbarium's BioCondition Assessment Manual and certifies that the PMLU has reached the required revised BioCondition status. <u>Native vegetation (riparian woodland) – Conrock Gully (RA1)</u>
	RM7.8	An AQP certifies that the Conrock Gully diversion has achieved a long-term geomorphic stability consistent with the requirements of its Functional Design Report (Appendix D of Appendix J). <u>Grazing land (RA2, RA4, RA5, RA6, RA10)</u>
	RM7.9	A self-sustaining groundcover of comprising the vegetative groundcover species listed in Appendix 3.2 of this PRCP is certified by an AQP based on monitoring data and consists of a minimum (per hectare (averaged)) of: - Four pasture species. - Two legumes species. - Two shade tree species.
	RM7.10	An AQP certifies that a land suitability class of ≤ 4 has been achieved.
	RM7.11	An AQP certifies the establishment of a pasture condition rating ≤ 3, based on the Pasture Condition Assessment Table as per "Stocktake: Balancing Supply and Demand" (Developed by FutureBeef – futurebeef.com.au).
	RM7.12	An AQP certifies that the rehabilitated land can be sustainably grazed and is fire resilient. <u>Native vegetation (woodland) – Final low wall batter ($\leq 25\%$) (RA3).</u>
	RM7.13	An AQP certifies based on annual monitoring that the groundcover for slopes of $\leq 25\%$ has achieved a total vegetative groundcover of $\geq 30\%$ and when combined with rock armouring.
	RM7.14	A BioCondition assessment of the revised BioCondition benchmarks nominated for RE11.5.3 (Table 21) is completed by an AQP in accordance with latest version of Queensland Herbarium's

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		BioCondition Assessment Manual and certifies that the PMLU has reached the required revised BioCondition status.
		<u>Contaminated Land (RA4, RA5)</u>
		RM7.15
		An AQP certifies that RM2.1 to RM2.4 have been achieved.
		RM8.1
		Surface water quality is monitored during flow events within the Isaac River at the upstream and downstream Isaac River monitoring stations (ID-IR2 and PTM-MP5, respectively) for at least five consecutive years for all the quality characteristics listed in Table 35: Surface Water Quality Limits.
		If the surface water quality exceeds the specified limits during a specific monitoring event, the upstream (ID-IR2) and downstream (PTM-MP5) monitoring results must be compared and where the downstream result is less than the upstream result no further action is required.
		RM8.2
		If the surface water quality results monitored per RM8.1 exceed the specified limits during a specific monitoring event, the upstream (ID-IR2) and downstream (PTM-MP5) monitoring results must be compared and where the downstream result is greater than the upstream result, an AQP must complete an assessment of the cause of the exceedance and risk of rehabilitation not achieving a stable condition within the schedule timeframe.
RM8	Achievement of post-mining land use water quality	- Where the assessment concludes that there is a low risk to achieving a stable condition, then no further action is to be taken. - Where the assessment concludes that there is a risk greater than low to achieving a stable condition, then an assessment of potential environmental harm and any changes or rectification actions to rehabilitation activities must be determined and implemented.
		RM8.3
		RM8.2 can only be triggered three times over five consecutive years prior to surrender.
		RM8.4
		Groundwater quality is monitored quarterly for at least five consecutive years at, but not limited to, the compliance monitoring bores listed in Table 36: Groundwater Compliance Monitoring Bores, and for the quality characteristics specified in Table 38: Groundwater Quality Limits.
		RM8.5
		The limits specified in Table 38: Groundwater Quality Limits must not be exceeded, for three consecutive sampling events within the five-year period immediately prior to surrender.

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		If monitoring demonstrates that a compliance bore exceeds a specified groundwater quality limit during three consecutive sampling events within the five-year period immediately prior to surrender, an AQP must complete an assessment of the cause of the exceedance to determine if there is a reasonable risk of rehabilitation not achieving a stable condition in relation to groundwater quality. RM8.6 Groundwater level must be monitored quarterly at the compliance bores listed in Table 36: Groundwater Compliance Monitoring Bores, and all results must not exceed the Level Thresholds outlined in Table 40: Groundwater Level Trigger Thresholds, for a minimum of 10 consecutive years. If monitoring demonstrates that a compliance bore triggers its specified Level Threshold, an AQP must complete an assessment of the cause of the threshold exceedance to determine if there is a reasonable risk of rehabilitation not achieving a stable condition in relation to groundwater levels. RM8.7 An AQP must certify achievement of RM8.2 to RM8.6 inclusive.
RM9	Achievement of a stable water supply source for RM10 and cattle	<u>Beneficial Water Storage (RA9)</u> RM9.1 An AQP recertifies that all slopes of the final void are geotechnically stable and have achieved a factor of safety of ≥ 1.5. RM9.2 An AQP recertifies that the final void is not subject to inundation from floodwaters up to and including the 0.1% AEP flood event and will not over top, based on the re-running of flood modelling at the end of mine life and calibrated against the final landform. RM9.3 An AQP certifies the following safety requirements: • A competent safety bund or equivalent landform is in place to prevent access to the final void, at the geotechnical set-back distance of a minimum of 15 m (distance necessary to achieve $FoS \geq 1.5$). • The safety bund is constructed from non-weathered, non-dispersive dumped rockfill and is a minimum of 2 m in height, a minimum of 4 m in base width and possesses 1 in 3 batters. • Fencing is erected, where required to prevent access to the final void, around the perimeter of the safety bund. • Safety signage (design in accordance with Australian standard) is erected at 100m intervals along the fence. • The final void is safe to humans and livestock. RM9.4 As demonstrated by void water quality monitoring and modelling, an AQP certifies that void water quality meets, and is predicted to meet,

Milestone Reference	Rehabilitation Milestone	Proposed PMLU Milestone Criteria
		the ANZG guidelines for stock drinking water for the purpose of a water source for beef cattle. RM9.5 An AQP demonstrates, based on void water balance and groundwater modelling data, that the final void will act as a groundwater sink post-closure. RM9.6 The final void will not present an unacceptable risk of environmental harm. RM9.7 An AQP certifies that the erosion of the landform will not negatively impact on the stability of any adjacent rehabilitation areas, or their ability to sustain their PMLU.
RM10	Achievement of the PHES and/or algae Production PMLUs	<u>PHES and/or Algae Production PMLUs (RA7)</u>
		RM10.1 The proposed PHES and/or algae Production PMLUs are subject to bankable feasibility studies prior to the end of Project operations, with RM10.2 to RM10.5 applicable to the demonstration of feasible PMLUs.
		RM10.2 A signed agreement is obtained from the Landowner accepting the long term installation and operation of the PHES and/or algae Production PMLUs.
		RM10.3 ‘Development Approvals’ are obtained under the <i>Planning Act 2016</i> or other relevant legislation in force at the time for operation of the PHES and/or algae production PMLUs.
		RM10.4 The PHES and/or Algae Production PMLUs are constructed ready for operational feasibility testing.
		RM10.5 The PHES and/or Algae Production PMLUs are commercially operational based on their design parameters.

2.3.2.1 Rehabilitation Milestone Timeframes

Progressive rehabilitation will continue throughout the life of the mine as soon as practicable after land becomes available. The term 'mined' in this case refers to the meaning under section 6A of the *Mineral Resources Act 1989*, which refers to mining of a probable or proved ore reserve. Disturbed land is available for rehabilitation (as per section 126D (5) of the EP Act) if the land is not being mined, unless:

- The land is being used for operating infrastructure or machinery for mining.
- The land contains a proved or probable ore reserve that is to be mined within 10 years after the land would otherwise have become available for rehabilitation.
- The land is being used to access active mining areas or proved or probable ore reserves, that is, haul and pit roads, and active mine face access.
- The land contains infrastructure to be handed over to a third-party post-mining.

At the Project, there are site specific factors that influence when land is available for rehabilitation including:

- Coal market drivers may influence mining rates (pit progression). For this purpose, and with consideration to the EP Act definition provided above, evidence and experience shows that mine areas typically become available for rehabilitation within 5 – 10 years of commencement of activities.
- As recognised in the EP Act definition above, there is a standing requirement to maintain roads accessing mining areas and active mine faces in mining areas. For this reason, these areas remain unavailable for rehabilitation until the end of end of mine life to accommodate such operational requirements.

Section 2.1.1.3 provides a description of the infrastructure required to support the Project's mining operations. Following cessation of mining, a schedule for decommissioning will be developed. The demolition and/or removal of this infrastructure is unlikely to commence immediately and is dependent on a range of factors:

- The desire for third party land use partners to retain or reuse some assets.
- Many facilities will be required to support closure operations while the mining areas are subject to rehabilitation activities (e.g. rehabilitation fleet access to the Project area) which may take upward of 5-10 years to complete rehabilitation execution works.

For PRCP scheduling purposes, a general allowance of 1 - 5 years is provided for most infrastructure to be available for rehabilitation following cessation of mining operations. Where the opportunity arises, areas no longer required to support closure activities will be rehabilitated. Rehabilitation of Conrock Gully diversion will commence immediately after installation.

In addition to this general allowance, there may be some buildings and other infrastructure which will not be decommissioned or rehabilitated (therefore not made available for 'rehabilitation') that will have the potential to be utilised for:

- Post-closure maintenance and monitoring activities; and/or
- Post-closure community benefit, where agreed with relevant third party(s), and are thus assumed to be made safe and transitioned as agreed.

Timeframes associated with the milestones for each RA were developed by considering the requirements of each rehabilitation activity outlined in previous sections and the associated risks identified through the risk assessment (Refer to Section 2.7). The nominated timeframes and respective justifications are detailed in Table 13. These timeframes have been used to develop the milestone schedule in the PRCP Schedule and are also provided in Table 8.

Table 13: Timeframe Justification of the Rehabilitation Milestones

Rehabilitation Milestone	Nominated Timeframe	Justification
RM1 - Infrastructure decommissioning and removal	1 year	A one year timeframe is considered appropriate to ensure that all relevant decommissioning and demolition works can be undertaken safely, considering the Project does not possess major or complex infrastructure. This timeframe is triggered when the infrastructure item becomes available for decommissioning.
RM2 - Identification and remediation of contaminated land	1 year	A one year timeframe is considered appropriate to investigate and remediate contamination. The Project site possesses a limited risk of significant contamination due to the continued use of IPC's infrastructure and the expected small number of 'notifiable activities' to be actually undertaken within the Project area.
RM3 - Landform establishment	2 years	Two years is justified as a sufficient time to complete this milestone considering that this milestone requires progressive bulk earthworks across domains that are considerably large, factoring in that iterative works may be required to confirm that the landform is behaving as per the design intent and to reduce potential impacts associated with seasonal rainfall. This timeframe is triggered when the area of land to be established becomes available under the current mine plan.
RM4 – Surface preparation	2 years	Aspect of this milestone requires verification from an AQP that growth medium is appropriate to sustain vegetation, a two year timeframe is considered sufficient to account for investigations, and if required, the development of appropriate amelioration strategies. The knowledge gained from the operation of IPM and IDM will assist the Project.
RM5 - Revegetation	2 years	To account for further investigations to ensure the vegetation mix can be sustained and factoring in that optimal seed growing seasons may not occur during the nominated period that revegetation is planned, two years is deemed appropriate. The knowledge gained from the operation of IPM and IDM will assist the Project.
RM6 – Achievement of surface requirements	5-10 years	Achievement of surface requirements is reliant on the landform achieving the expected geotechnical stability of the defined FoS and also minimum vegetative cover for the PMLUs. Five years has been allowed for the grazing PMLU and 10 years has been allowed for the native vegetation (riparian woodland) PMLU – Conrock Gully diversion, native vegetation (woodland) PMLU – final low wall batter ($\leq 25\%$), and native vegetation – riparian PMLU – River/creek crossings. These timeframes are considered adequate for the specific PMLUs.
RM7 - Achievement of stable condition	5 years	Achievement of stable condition relies on extensive monitoring by AQPs that the planned rehabilitation measures are on the trajectory towards successfully sustaining the nominated PMLU. This requires extensive monitoring over large domains whereby frequent sampling is required to be undertaken and in some instances rehabilitation intervention may be required. Five years is considered an appropriate timeframe to account for natural variation in rehabilitation and potential rectification works if erosion outside of tolerable limits is occurring.

Rehabilitation Milestone	Nominated Timeframe	Justification
		Achievement of this milestone will be aided by monitoring conducted for RM6.
RM8 - Achievement of post-mining land use water quality	5 years	This timeframe is considered adequate as monitoring occurs continuously over the life of the Project, which will generate a considerable database for an AQP to look at trends and investigate anomalous results, and certify compliance. This timeframe commences from when RM7 is completed and therefore when runoff from the final landform should have negligible impact on receiving waters, when groundwater quality should be similar to pre-mining baseline data, and when groundwater levels should be as predicted by modelling of drawdown in relevant aquifer units.
RM9 - Functioning stable water supply source for RM10 and cattle	10 years	This timeframe commences from the end of operations and is considered adequate to achieve the milestone criteria. Considerable work will have already been completed to support the associated RA9 and demonstrate that the outcomes are feasible (e.g. modelling).
RM10 - Achievement of PHES and/or algae Production PMLUs	5 years	This timeframe commences from the end of operations, with the exception of the completion of RM10's bankable feasibility studies that will occur prior to the end of mining to support the progression of the PMLUs (RM10.1). The timeframe is considered adequate to achieve the milestone criteria. This timeframe is largely dependent on securing finance, a landowner and / or 3 rd party agreement, the timing of the required development approval process and PMLU infrastructure construction commencement.

2.3.3 Exploration

In accordance with RM1.2, all exploration drill holes will be rehabilitated in accordance with the eligibility criteria and standard conditions for exploration and mineral development projects – V2 (DEHP, 2016).

2.3.4 Community Consultation

Achievement of the PMLUs is consistent with consultation completed to-date (refer to Section 2.2).

2.3.5 Consistency with Local, State and Commonwealth Strategies and Plans

The PMLUs at the Project consider the pre-mining land use, adjacent land uses and EIS studies. Existing land use in the local and regional area is primarily cattle grazing and coal mining.

Under the Isaac Regional Planning Scheme (April 2024), the Project is located within a rural zone, which includes uses such as grazing, farming, forestry, tourism, and extractive industries. Land use performance outcomes for this rural zone include ensuring development:

- is consistent with the rural character of the locality
- supports the primary rural function of the zone
- protects rural, natural, and scenic values of the locality
- includes boundary realignments where they used to align with mining or petroleum tenements.

Concurrently, the Queensland Government, via its Mackay, Isaac, and Whitsunday Regional Plan (February 2012), maps the Project 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 regional plans are consistent with the PMLUs proposed for the Project.

2.4 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 PRCP 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 PRCP that cannot be rehabilitated to a stable condition after all relevant activities for the PRCP 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 PRCP must also include:

- information demonstrating that the proposed footprint of each NUMA is as small as practicable.
- 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.
- a description of the proposed location of each NUMA and the environmental values of the surrounding environment.
- 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 PRCP. 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.

The proposed PRCP must include a detailed description of the nominated NUMA(s) for the site. The description must include, but is not limited to:

- description of the land at surrender;
- any relevant safety features;
- completion criteria for measuring whether the NUMA has achieved sufficient improvement.

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 PRCP, the applicant must include all of the requirements identified in this section.

PMLUs have been developed for the Project's disturbance areas, including the residual void (inclusive of void lake), and therefore, no NUMAs are proposed for mine closure.

2.5 Voids in Floodplains

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 PRCP 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.

2.5.1 Background

The proposed final landform for the Project includes a void, which will have PMLUs when rehabilitated to a stable condition, as described in Section 2.3.1.5. Hence, if the void were to be situated wholly or partly in a floodplain, the 'stable condition' void would comply with section 126D (3) of the EP Act.

Nevertheless, the proponent has sought to locate the void wholly outside of a floodplain, as defined in the EP Act, *Environmental Protection Regulation 2019* (EP Regulation) and relevant information sheets, to minimise risks to the environment, as described below. This has been achieved by backfilling the northern part of the pit area to a similar topography as pre-mining (see Figure 12).

2.5.2 Relevant Watercourses

Under the Voids in Flood Plains Information sheet, a '*Relevant Watercourse*' is defined as:

- A watercourse classified as stream order 4 or higher under the Strahler stream order classification system; or
- If a watercourse mentioned in paragraph (a) is permanently diverted under—
 - A condition, or proposed condition, of an environmental authority mentioned in the *Water Act 2000*, Section 98; or
 - A water licence or proposed water licence under the *Water Act 2000*;
- the watercourse as permanently diverted.

There are two relevant watercourses in proximity to the Project, the Isaac River and Cherwell Creek.

Conrock Gully is proposed to be permanently diverted. Conrock Gully is stream order 2 before its confluence with the Isaac River, and under the *Water Act 2000*, is a defined drainage feature in its upper reaches and defined watercourse near the confluence with the Isaac River. Therefore, it is not a 'relevant watercourse' for the purpose of defining a floodplain. Nevertheless, the diversion of Conrock Gully has been considered in floodplain modelling as a permanently diverted feature (**Appendix J**).

The Isaac River levee will be decommissioned at the end of mining operations, and therefore, no artificial structures needed to be considered within the floodplain modelled for the final landform.

2.5.3 Flood Modelling Results – Final Void

Modelling of the 0.1% AEP flood event for the final landform is presented in Figure 14, demonstrating that the final void is not within the defined floodplain. In general, there would be insignificant interactions between floodwaters and the final landform for an event more frequent than the 2% AEP. The Project's flood modelling is described in **Appendix J**.

The findings of the modelled 0.1% AEP final landform flood depths and velocities are as follows:

- The flood does not interact with the proposed final void. The final void crest has a freeboard of at least 1.1 m above the flood level.
- The Isaac River floodwaters interact with the main spoil dump. The flood does not interact with either the eastern or southwestern out-of-pit dumps. Conrock Gully floodwaters will be directed to the diversion by a stabilised final landform design, incorporating the rehabilitated raised haul road and adjacent spoil dump.
- The Isaac River floodwaters may reach up to 3.3 m against the main spoil dump. Conrock Gully may reach up to 3.6 m against the final landform.
- Velocities range between 0.5 and 2.0 m/s may occur along the northern face of the main spoil dump within the Isaac River floodplain. Velocities do not exceed 0.8 m/s for the 1% AEP along this face and there is minimal interaction for the 2% AEP flood event and more frequent events. Therefore, potentially erosive flows will be very infrequent and only occur for short durations. For the vast majority of Isaac River flood events, interaction between floodwaters and the final landform will be either minimal or non-existent. The final landform will be revegetated, with vegetation cover providing sufficient protection against interaction with infrequent flood events.
- Velocities up to 1.1 m/s may occur in an approximate 25 m wide section of the stabilised final landform where the existing Conrock Gully channel is redirected to the diversion. The velocities within the remainder of the Conrock Gully where it interacts with the stabilised final landform are typically 0.1 m/s or lower (i.e. minor). The vegetation cover on the final landform is expected provide sufficient scour protection in this section for the flood events up to and including the 0.1% AEP.

The findings of the modelled 0.1% AEP flood level changes for the final landform are as follows:

- The final landform results in negligible change to flood levels in the Isaac River. There are minor increases in water levels, up to 0.2 m, in the reach where the Conrock Gully diversion meets the floodplain.
- The flood levels upstream of the diversion will be increased by up to 1.9 m, with changes up to 0.1 m localised and propagating up to 1.1 km upstream.
- There are no water level changes in Cherwell Creek in the vicinity of the final landform.
- The magnitude of change in flood level is reduced compared to during mining operations, as the final landform allows for the expansion of the floodplain into areas previously protected by the Isaac River levee.
- There are no changes in flood levels in the downstream remnant section of Conrock Gully as this area is subject to backwater flooding from the Isaac River.

The findings of the modelled 0.1% AEP flood velocity changes for the final landform are as follows:

- The final landform results in negligible change to velocity in the Isaac River channel.
- Velocities within the Conrock Gully diversion are increased compared to the pre-mining/existing scenario without a diversion. Appendix D of **Appendix J** provide an assessment of the Conrock Gully diversion hydrology and geomorphology which demonstrates that the planned design meets accepted operational standards.
- There are decreased velocities in the existing Conrock Gully channel downstream of the Project, noting that these areas will continue to receive flood flows from Isaac River backwater flooding, but at reduced velocities.

- The flood velocities upstream of the diversion will be decreased by up to 0.8 m/s, propagating up to 1.1 km upstream.
- There are no flood velocity changes in Cherwell Creek in the vicinity of the final landform.
- The magnitude of velocity change is generally reduced compared to during mining operations.
- The magnitude of flood level and velocity change reduces for more frequent flood events.

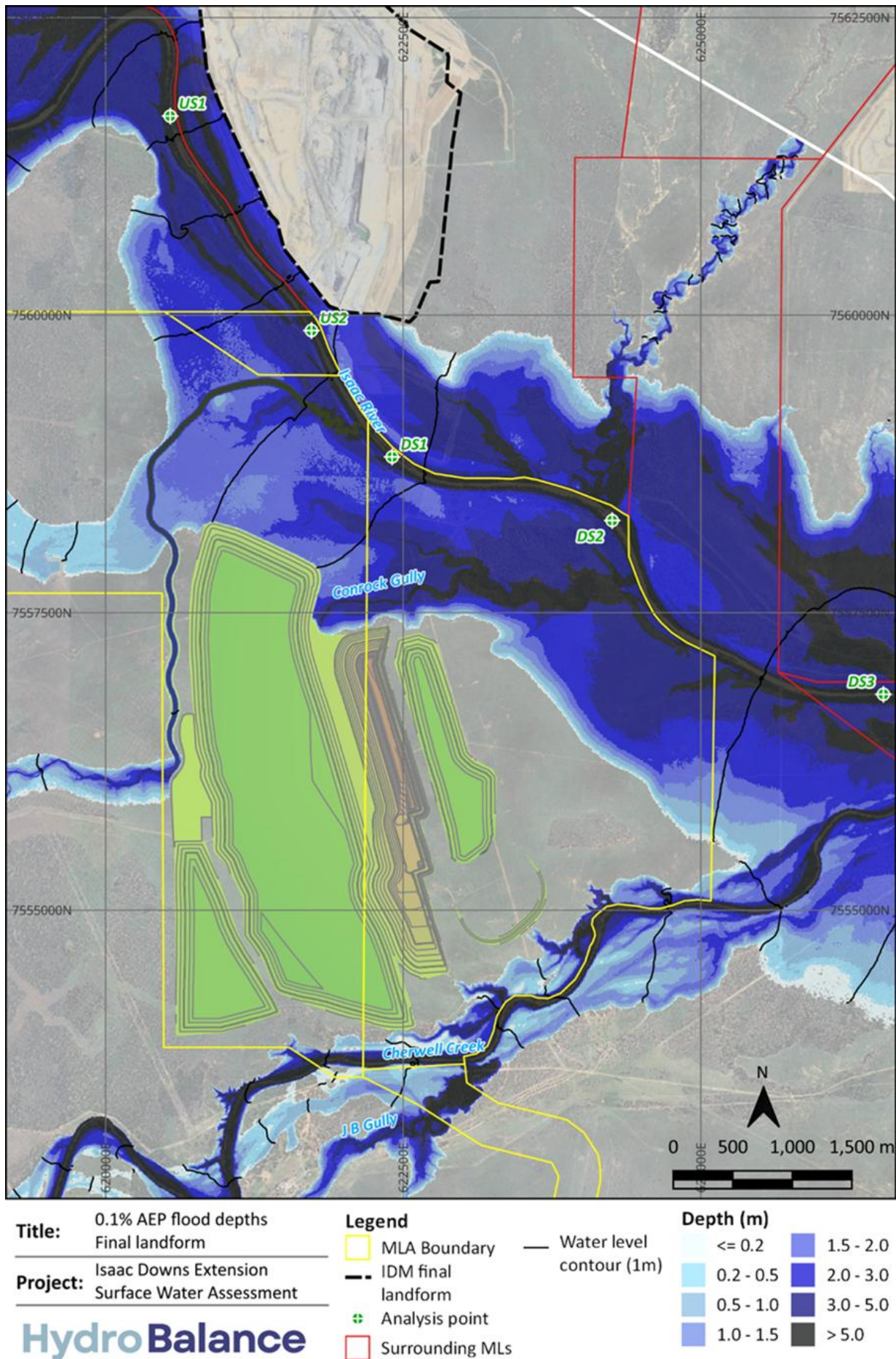


Figure 14: Final Landform 0.1% AEP Flood Depths

2.6 Rehabilitation and Management Methodology

Legislative Requirement

In accordance with section 126C (1)(e) and (i), the rehabilitation planning part of the PRCP 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 PRCP. If any of the required information outlined below is not relevant to the specific operation, the applicant must provide justification in the PRCP outlining why the information is not required.

2.6.1 General Rehabilitation Practices

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.

The following series of technical studies have been completed for the Project to both inform the final landform design and to address and support the planned rehabilitation practices:

- flood modelling (**Appendix J**)
- void water balance modelling (**Appendix I**)
- void hydrogeochemical water quality modelling (**Appendix M**)
- final landform geotechnical assessment (**Appendix H**)
- baseline soil assessment (**Appendix E**)
- materials characterisation and final landform erosional stability modelling (**Appendix D**)
- groundwater modelling (**Appendix K**)
- mine waste geochemical characterisation and assessment (**Appendix F**)
- soils characterisation (**Appendix E**)
- terrestrial ecology assessment (**Appendix P**).

2.6.1.1 Groundwater

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 groundwater impact assessment has been undertaken to support the development of this PRCP and is provided in **Appendix K**. This section provides a summary of the findings of that assessment.

2.6.1.1.1 Conceptual Hydrogeological Model

A conceptual hydrogeological model for the Project area and surrounds is provided in Section 2.1.2.5.

Where present, the alluvial aquifer is disconnected from the riverbed elevation. Spatially, the alluvial aquifer is locally variably saturated and drilling results close to the Project have indicated it is dry and/or comprised only of clay in several locations, with groundwater hosted only in the deeper coarser grained intersections of alluvium that are likely representative of incised paleochannels.

Shallow perched groundwater systems occur locally within recent channel sands and bank deposits, typically within 1–2 m of the ground surface. These perched systems are transient, seasonally recharged during flow and flood events, and are hydraulically disconnected from the deeper alluvial aquifer. Perched groundwater is facultatively accessed by riparian vegetation, predominantly River Red Gum, fringing the Isaac River and lower reaches of Cherwell Creek. Away from the immediate proximity of the river channel, the alluvial aquifer occurs at depth generally between 10 and 12 mBGL and not accessible by terrestrial vegetation. Groundwater levels within the alluvial aquifer and the Leichhardt and Vermont coal seams are all below the stream bed elevations of the Isaac River and Cherwell Creek, indicating there is no potential for groundwater discharge into these surface water features.

Regionally, groundwater flow within the alluvial aquifer is a subdued reflection of topography, with groundwater flowing in a southeasterly direction consistent with the alignment of the Isaac River and northeasterly along Cherwell Creek. Groundwater levels within the alluvium are also highest close to the main surface water features, indicating losing conditions from the surface water features to the underlying alluvium aquifer during flow periods. Over 50% of flow events are shorter than 10 days, highlighting that most flow events are relatively brief. Recharge to the unconsolidated sediments is primarily from stream flow losses or flooding (i.e. losing streams), with direct infiltration of rainfall also occurring rapidly where there are no substantial clay barriers in the shallow sub surface.

Hydraulic connection between the Cenozoic unconsolidated sediments (including alluvium) and the underlying formations is limited to areas where relatively high hydraulic conductivity units (e.g. coal seams) subcrop beneath the unconsolidated sediments, although the weathering horizon at the interface of the Permian and overlying Cenozoic units may reduce this connectivity. General downwards recharge to deeper units is limited by the low hydraulic conductivity (confining) coal measure interburden sequences. Water quality in the Cenozoic sediments (including alluvium) ranges from brackish to highly saline and is indicated to be unsuitable for aquatic ecosystem protection. However, it is considered suitable for stock watering and irrigation.

The Triassic aged Rewan Group, present across the eastern extent of the Project area is considered a regional scale aquitard, although still contains some saturated horizons. Due to its typically fined grained nature, the Rewan Group generally exhibits a low vertical hydraulic conductivity, resulting in limited hydraulic connection between the unit and the underlying/overlying units. However, local permeability testing indicates hydraulic conductivity values may be higher in the upper weathered zone of the unit.

In the Permian aged coal measures strata, groundwater is encountered mainly in the coal seams, and only occasionally in the sandstone/siltstone units. As with the rest of the Bowen Basin, the coal seams are the main groundwater bearing units within the Permian sequences, with low hydraulic conductivity interburden generally confining the individual seams. Hydraulic conductivity of the coal decreases with depth due to increasing overburden pressure reducing the aperture of fractures. Vertical movement of groundwater (including recharge) is limited by the confining interburden layers, meaning that groundwater flow is primarily horizontal through the seams with recharge only occurring at subcrop where the overlying strata permits. Regionally, groundwater within the Permian coal measures flows in a south-easterly direction with local flow towards the active mining areas proximal to the Project.

The Permian coal measures at and surrounding the Project have undergone extensive deformation, including folding and faulting. The main northwest-southeast trending fault is the Isaac Thrust Fault. Faults significantly compartmentalise the Permian groundwater system, particularly the major northwest-southeast trending faults. Hydraulic testing of faults at sites near to the Project area indicate that faulting zones tested are not pathways for preferential flow but rather act as hydraulic barriers. Testing of the Isaac Thrust Fault immediately east of the Project has supported the previous findings that the fault zone is 'healed' by mineralisation and the fault does not provide a higher permeability pathway for groundwater flow in the Permian coal measures, with hydraulic conductivity values several orders of magnitude lower than the coal seams.

Recharge to the Permian coal measures occurs where the unit subcrops. Due to the low hydraulic conductivity of the interburden material, groundwater largely flows horizontally, along the bedding plane of the coal seams.

Groundwater discharge occurs predominantly via evaporation from pit faces in mining operations. Water quality in the Permian units ranges from brackish to highly saline and is indicated to be generally unsuitable to be used for stock watering, irrigation, and aquatic ecosystem protection.

During mining, excavation of open-cut pits and depressurisation of the coal seams will create strong localised hydraulic sinks, resulting in a change of natural hydraulic gradients in the vicinity of mining area. Groundwater flow will become directed toward the pit from the surrounding coal seams, and regolith. This inward flow regime causes localised drawdown and depressurisation. However, the extent of these changes is constrained by the low permeability interburden. In the alluvial aquifer, the conceptual model indicates that changes to groundwater flow direction will be minimal. The discontinuous nature of the alluvial aquifer, combined with its weak hydraulic connectivity to deeper units, means that regional flow directions (aligned to drainage) are largely maintained.

Further details on the Project's conceptual groundwater model is provided in Section 6 of **Appendix K**.

2.6.1.1.2 Numerical Groundwater Model

A complex and detailed numerical groundwater model has been developed for the Project, based on an established regional numerical groundwater model (see Appendix I and Appendix J of **Appendix K**). The model has been peer reviewed and found to be fit for purpose (see **Appendix L**). The model was developed in accordance with all relevant State and Commonwealth guidelines. The model was utilised to assess impacts on groundwater during and post mining.

The model predicts drawdown from the Project (incremental drawdown) and cumulative drawdown with all other regional resource projects. Key conclusions include:

- No incremental drawdown impacts exceeding 1 m are predicted for the alluvium as a result of the proposed Project.
- The incremental drawdown extent within the regolith is confined to a small area directly south of the Project area.
- The coal seams of the Rangal Coal Measures are the primary groundwater bearing strata targeted by mining at the Project and experience drawdowns as a direct result of mining at the Project. Groundwater level drawdown within the mined coal seams is influenced by unit structure and is confined to unit extents.
- Cumulative drawdown increases with depth, with the most pronounced depressurisation occurring within the mined coal seams, particularly the Vermont Seam. Shallower units exhibit broader but lower-magnitude drawdown patterns.
- The spatial extent of cumulative drawdown reflects the combined influence of long-term mining activities within the Project area and neighbouring operations.

The model predicts the volume of groundwater take during and post mining. During mining groundwater take ranges between 40 and 155 ML/ year. Post mining groundwater take ranges between 200 to 600 m³/day (75 to 220 ML/ year), with the almost all inflows via spoil in the pit.

The model predicts the incremental change in groundwater take from the alluvial aquifer, which ranges between 0 and 34.5 ML/ year, which is negligible. The post-mining results demonstrate that Project-related impacts on alluvium water take are short-term, with no ongoing Project-specific increase in alluvium loss following mine closure.

Modelling demonstrates that there is no net flux in water moving in or out of the Isaac River that is attributable to the Project. There is no ongoing Project-specific loss of river baseflow predicted during the post-mining period. The incremental net flux demonstrates that the Project has no impact on River flux, as the rivers act as 'losing systems'. A natural hydraulic gradient exists between the Isaac River and the associated alluvium that results in seepage from the Isaac River to the alluvium (i.e. a losing system). The change in alluvial aquifer groundwater levels induced by mining does not have the potential to increase the hydraulic gradient between the Isaac River and associated alluvium. Consequently, the model does not predict that the average rate of seepage from the Isaac River to the alluvium will increase over the life of the Project, and therefore, the Project does not result in any loss of baseflow to the Isaac River and there are no other predicted groundwater-related impacts to surface drainage as a result of the Project.

Modelling results indicate that groundwater impacts are generally limited, with predicted drawdown remaining below regulatory thresholds at most landholder bores. The model predicts marginal exceedance of a 2 m drawdown threshold at two landholder bores. These bores will be monitored to assess drawdown, and if required, a make good agreement will be established with the landholder under the *Water Act 2000*. Overall, the likelihood of significant or widespread exceedances due to the Project is low.

An analysis of the water movement within the final landform was undertaken to simulate and assess the movement and fate of water particles through the groundwater system post mining. The predicted movement of water particles in the 475-year recovery simulation of the final landform indicates the particles generally move toward the void lake, with many of the particles terminating in the voids. Particles that move into the void during the post-mining simulation remain within the void for the duration of the simulation. Particles starting in the void themselves remain within the void for the duration of the simulation. Therefore, the modelling demonstrates that the residual void will act as a long term groundwater sink, and as a result, there will be no discharge offsite to the surrounding groundwater environment. Further detail on the Project's flow path simulation is provided in Section 8.4.2 of **Appendix K**.

As there is an inward hydraulic gradient to the pit and residual void, and any seepage from spoil has been demonstrated through geochemical testing to be low risk (see 2.6.1.3), and as a result, there is low risk of impacts to groundwater quality as a result of the Project.

2.6.1.1.3 Groundwater Risk Assessment

Section 10.5 of **Appendix K** provides a risk assessment of the potential groundwater impacts identified by the Project's groundwater impact assessment. The risk assessment analysis included the potential receptor, a risk description, the likely cause, the potential impact, consequence, likelihood, and a final risk rating. From the risks assessed, all were found to be insignificant, except one, which was deemed to be moderate. The moderate risk was identified as the possible loss of supply (yield) at a third party bore.

As explained in Section 2.6.1.1.2, only two landholder bores are predicted to possibly experience a marginal exceedance of the 2 m drawdown threshold, and in the event of an exceedance, will be managed by the establishment of a make good agreement with the affected landholder under the *Water Act 2000*.

2.6.1.1.4 Groundwater Monitoring and Management Plan

A Groundwater Monitoring and Management Plan (GMMP) has been developed to manage the monitoring of groundwater quality and levels during the Project's operations and progressive rehabilitation until the RM criteria are achieved (i.e. RM1 to RM8). The GMMP is provided in **Appendix AE** and the Project's planned groundwater quality and level monitoring is outlined in Section 2.8.6.

2.6.1.2 Flooding Assessment

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 domain.

The Project's Flooding, Hydrology and Geomorphology Assessment was undertaken to support the EIS and the development of this PRCP (see **Appendix J**). The hydrology model of the catchment and a hydraulic model of the proposed Project activities were developed to address the following requirements:

- The location of the Project's mining operations and final landform in relation to potential flood levels for the 1% and 0.1% AEP flood events and a Probable Maximum Flood (PMF) event.
- To demonstrate that the Project's mining operations and final landform won't significantly alter the upstream and downstream flow regime or hydraulic conditions of the local drainage network.
- To provide a range of modelled flood events (including probable maximum flood levels) within the local drainage network during mining operations and for the final landform.

This section of the PRCP focuses on the flood model results for the closure landform. Information on flood modelling for the operational landform is provided in **Appendix J**.

2.6.1.2.1 Flooding – Final Landform

Section 2.5.3 describes the flood modelling outcomes for the final landform during a 0.1% AEP flood event. Appendix C of **Appendix J** provides the Modelled 1% AEP and PMF flood depths and velocities for the final landform. Section 5.6 of **Appendix J** provides a climate change assessment for a 0.1% AEP flood event using Year 2100 climate change predictions.

There are no significant impacts to the Project's final landform from a 0.1% AEP flood event, and the final void is not within the defined floodplain. For the vast majority of Isaac River flood events, interaction between floodwaters and the final landform will be either minimal or non-existent. The final landform will be revegetated, with vegetation cover providing sufficient protection against interaction with infrequent flood events. Therefore, no specific mitigation measures are required.

The PMF event is a hypothetical extreme event that is larger than the 0.1% AEP event, with the Isaac River floodwaters being 3 m to 5 m higher during the PMF. The larger event may cause floodwater to encroach on the northern end of the void. If required, the final landform elevation could be adjusted with a bund to provide immunity the PMF flood event. The safety bund around the final void will be designed to provide immunity against the extremely unlikely PMF flood event.

The modelling results indicate that the Project's final void will not be inundated following mine closure during a year 2100 0.1% AEP climate change flood event. The predicted velocities under this future climatic change condition are similar to the predicted velocities under the climatic conditions. In addition, the modelled final landform will include at least a 0.5 m high safety bund adjacent to the final void that will be part of the normal void safety requirements for mine closure. The safety bund will provide additional protection from a year 2100 0.1% AEP climate change flood event. Therefore, no specific mitigation strategies are required for the final landform to manage possible future climate change impacts.

The modelled impacts of the Project's final landform flood regime in the Isaac River, Cherwell Creek, JB Gully and Conrock Gully are summarised as follows:

- In relation to water levels:
 - The final landform results in negligible change to flood levels in the Isaac River. There are minor increases in water levels, up to 0.2 m, in the reach where the Conrock Gully diversion meets the floodplain.
 - The flood levels upstream of the Conrock Gully diversion are impacted to a similar level as during mining operations.
 - There are no water level changes in Cherwell Creek in the vicinity of the final landform.

- The magnitude of change in flood level is reduced compared to during mining operations, as the final landform allows for the expansion of the floodplain into areas previously protected by the Isaac River levee.
- There are no changes in flood levels in the downstream remnant section of Conrock Gully as this area is subject to backwater flooding from the Isaac River
- In relation to velocities:
 - The final landform results in negligible change to velocity in the Isaac River channel.
 - There are decreased velocities in the existing Conrock Gully channel downstream of the mine, noting that these areas will continue to receive flood flows from Isaac River backwater flooding, but at reduced velocities.
 - The flood velocities upstream of the Conrock Gully diversion are impacted to a similar level as during mining operations.
 - There are no flood velocity changes in Cherwell Creek in the vicinity of the final landform.
 - The magnitude of velocity change is generally reduced compared to during mining operations.

Overall, the final landform, which incorporates the hydraulically stable diversion of Conrock Gully, and decommissioning and rehabilitation of the Isaac River levee, Cherwell Creek levee plug, the bridge crossings, and the dragline crossing, results in negligible changes to water levels and velocities.

The Project's geomorphic impact assessment indicated that the Project's infrastructure and final landform are likely to have negligible to minor impacts on velocity, bed shear stress and stream power, and therefore, are unlikely to have a material impact on the geomorphology of the Isaac River floodplain in the vicinity of the Project.

2.6.1.2.2 Flood Management and Rehabilitation Measures

Prior to commencement of the Project's mining operations within a 0.1% AEP floodplain, the Isaac River levee and Cherwell Creek and Conrock Gully levee plugs will be constructed to protect the open cut pit area from flooding, up to a 0.1% AEP (1:1,000 year) flood event. The levee and levee plugs are regulated structures, and therefore, will be designed and certified by an AQP. The Isaac River levee will be decommissioned and rehabilitated at an appropriate time after the cessation of the Project's mining activities and will form part of the Project's grazing PMLU (Table 7). The Cherwell Creek and Conrock Gully levee plugs will be incorporated into the final, stable dumped landforms and will form part of the Project's grazing PMLU.

The northern part of the pit area will be backfilled to a similar topographical level as pre-mining. As part of the final landform preparation, floodplain surfaces will be stabilised and rehabilitated to achieve a self-sustaining vegetation cover. This vegetation cover will increase erosion resistance and stability. The hydraulic characteristics of flow within the Project's backfilled pit area are similar to or lower than under existing conditions, and therefore, the Project's backfilled pit area is expected to remain a stable landform with revegetation of the floodplain surface.

Prior to commencement of the Project's mining operations in the area of Conrock Gully, Conrock Gully will be diverted around the active mining areas into the Isaac River, with the diversion remaining post mining. A functional design report for the Conrock Gully diversion was produced by an AQP (Appendix D of **Appendix J**). Section 8 of Appendix D of **Appendix J** demonstrates that within the Conrock Gully diversion, the design hydraulic conditions are similar, and generally improved, to those in the existing Conrock Gully channel, and are consistent with the ACARP guideline for channel-averaged shear stress, stream power and velocity.

General Flood Management Measures – Final Landform

Levee and Levee Plugs

The following mitigation and management measures will be applied to the Project's levees:

- At the completion of mining and all other major rehabilitation works, the Project's levee and levee plugs will be decommissioned and rehabilitated as specified by the PRCP Schedule.
- If possible, the Project's levee and levee plugs will be decommissioned and rehabilitated during the dry season.

- To ensure safe and efficient operations, weather conditions will be monitored prior to and during the decommissioning and rehabilitation of the Project's levee and levee plugs.
- Monitoring of the rehabilitated area of the levee and levee plugs will continue as specified by the PRCP Schedule to demonstrate rehabilitation success for surrender of the Project's mining leases (MLs) and EA.

Conrock Gully Diversion

The following mitigation and management measures will be applied to the Conrock Gully diversion:

- Monitoring of the rehabilitated levee area will continue as specified by the PRCP Schedule to demonstrate long term establishment success of a hydraulically and geomorphically stable structure for surrender of the Project's MLs and EA.

Isaac River Bridge and Cherwell Creek Bridge

The following mitigation and management measures will be applied to the Isaac River and Cherwell Creek bridge:

- At the completion of mining and all other major rehabilitation and post-mining land use works, the bridges will be decommissioned and rehabilitated as specified by the PRCP schedule (unless a third party agreement is reached for its retention).
- The proposed post mining land use for the rehabilitation bridge area is riparian vegetation.
- If possible, the bridges will be decommissioned and rehabilitated during the dry season.
- To ensure safe and efficient operations, weather conditions will be monitored prior to and during the decommissioning and rehabilitation of the bridges.
- Monitoring of the rehabilitated bridge areas will continue as specified by the schedule to demonstrate rehabilitation success for surrender of the Project's MLs and EA.

Temporary Isaac River Dragline Crossing

The following mitigation and management measures will be applied to the temporary Isaac River dragline crossing following the return of the dragline to IDM:

- Once the dragline has returned to IDM, the crossing will be fully rehabilitated with the gravel base removed, sandy bed reestablished, bank cuttings filled to resemble pre-mining topography and landforms rehabilitated through topsoiling, seeding and revegetation in accordance with the PRCP Schedule requirements.
- The proposed PMLU for the crossing area is riparian vegetation.
- Monitoring of the rehabilitated crossing area will continue as specified by the PRCP Schedule to demonstrate rehabilitation success for surrender of the Project's MLs and EA.

JB Gully Bed-level Crossing and Conrock Gully Diversion Crossing

The following mitigation and management measures will be applied to the JB Gully bed-level crossing and the access / haul road crossing of Conrock Gully diversion:

- At the completion of mining, the crossings will be decommissioned and rehabilitated as specified by the PRCP Schedule.
- If possible, the crossings will be decommissioned and rehabilitated during the dry season.
- To ensure safe and efficient operations, weather conditions will be monitored prior to and during the decommissioning and rehabilitation of the crossings.
- Monitoring of the rehabilitated crossing areas will continue as specified by the PRCP Schedule to demonstrate rehabilitation success for surrender of the Project's MLs and EA.

2.6.1.3 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.

The Project's geochemical assessment for mining waste provided in **Appendix F**, which summarises the chemical and physical properties of the mined material (spoil (i.e. overburden / interburden and coal) at the Project, describes relevant management measures, and informs rehabilitation strategies relevant to the proposed PMLUs.

Over the life of the Project, three main types of mineral waste will be generated, spoil, tailings and rejects. However, only spoil (including minor volumes of waste coal (i.e. coal that is not mined and transported to the CHPP at IPPC)) will be managed at the Project site. The Project's ROM coal will be processed at IPC. Therefore, the Project's tailings and rejects will be managed at IPC in accordance with the approval requirements for IPC, including the IPC PRCP schedule.

2.6.1.3.1 Geochemical Classification of Spoil

Spoil (overburden and interburden) is expected to comprise approximately 97.5% of all mineral waste generated by the Project and will include Tertiary- and Permian-age weathered waste and Permian-age fresh (unweathered) waste. Based on drilling logs, the Project's spoil is expected to comprise approximately 95% non-carbonaceous material and about 5% as carbonaceous spoil, with almost all carbonaceous spoil being fresh (unweathered). About 22% of the Project's spoil is expected to be weathered. The proportions of weathered versus fresh spoil and non-carbonaceous versus carbonaceous spoil are typical for spoil in the vicinity of the Project.

In summary, the Project's spoil dumps are expected to comprise essentially spoil only (overburden and interburden) that is mainly non-carbonaceous. The geochemical assessment conservatively assumed that a minor proportion of waste coal may also be disposed into the Project's spoil dumps. Consequently, the geochemical assessment focused on the geochemical characteristics of spoil and waste coal likely to report to the Project's and spoil dumps. Additional information is provided in Section 1.2 of **Appendix F**.

Acid Mine Drainage (AMD) – Spoil

The Project's spoil is expected to generate pH-alkaline to highly alkaline contact water (run-off and seepage), which is typical for mine spoil within the Bowen Basin.

The total sulfur (S) concentration of the Project's spoil is very low, with a 95th percentile total S concentration of 0.14%. This characteristic when combined with the spoil's generally moderate to moderate-high acid neutralising capacity (ANC) values (median = 28 kilograms of sulfuric acid per tonne of rock (kg H₂SO₄/t)) that are significantly higher than the maximum potential acidity (MPA) [median 0.6 kg H₂SO₄/t], resulted in approximately 98% of the Project's spoil samples tested being classified as non-acid forming (NAF) or UC(NAF) (uncertain, but expected to be NAF).

Less than 2% of spoil samples (5 out of 266 samples) were classified as potentially acid forming (PAF), PAF-LC (PAF, low capacity) or UC(PAF) (uncertain, but expected to be PAF or PAF-LC). No spoil samples were classified as NAF-S (NAF, but with total S greater than one per cent). Notably, of the five spoil samples classified as PAF (of any type), four were closely associated with coal seams and could potentially end up as coal reject if mined with ROM coal.

The assessment undertaken has demonstrated that the ANC for the Project's spoil is generally expected to be about 37-67% available (median 48% available) under field conditions, with iron-dolomite being the main carbonate mineral likely to be contributing to the acid buffering potential of the spoil. Overall, the Project's spoil possesses excess acid neutralising capacity and is expected to be bulk acid consuming.

Total metal and metalloid concentrations (assay) from 37 spoil samples tested very low compared to the average element abundance in un-mineralised soil and rock in the earth's crust. Importantly, no samples were significantly enriched with any of the elements of potential environmental interest.

Soluble multi-element results from 37 spoil samples indicate that leachate from spoil is expected to contain low concentrations of soluble metals and metalloids. For many spoil samples, particularly the weathered samples, the concentrations of most of the 17 environmentally important elements were below or marginally above to the laboratory limit of reporting (LOR).

The assessment demonstrated that the Project's spoil possesses AMD characteristics that are comparable to spoil from nearby IDM. For the key geochemical characteristic assessed, including total S, sulfide, ANC, total metals / metalloids and soluble metals / metalloids, the Project's spoil samples had concentrations / values within the same range as spoil samples from IDM.

In summary, based on the results of 266 samples, the Project's spoil has a very low potential to generate AMD as either acid/acidic drainage (AD) and/or pH-neutral and metalliferous drainage (NMD) and/or sulphide-derived saline drainage (SD). Further details are provided in Section 5.1 of **Appendix F**.

Salinity, Sodicty and Dispersion Potential – Spoil

The Project's spoil has low median and low-moderate 95th percentile aged electrical conductivity (aged EC)1:5 values of 406 and 821 microSiemens per centimetre ($\mu\text{S}/\text{cm}$), respectively, and has very low total S concentrations. On this basis, contact water (run-off and seepage) from spoil is expected to be generally non-saline to slightly saline, as a result of dissolution of geogenic salts more so than from sulfide oxidation (sulfate salinity). Weathered spoil generally has higher aged EC1:5 values compared to fresh spoil.

The Project's spoil has generally low cation exchange capacity (CEC) values and generally high exchangeable sodium percentage (ESP) values, and as a result, all spoil samples being classified as 'sodic' to 'strongly sodic', and therefore, possess the potential for dispersion. Based on Emerson aggregate class testing to directly measure dispersion, very few of the Project's spoil samples displayed dispersive characteristics, which was generally inconsistent with the dispersion predictions from the ESP results. Despite the inconsistencies between the ESP and Emerson Class results, the data suggests that a significant proportion of the Project's spoil can be expected to be dispersive to varying degrees. Further information is provided in Section 5.2 of **Appendix F**.

2.6.1.3.2 Geochemical Spoil Landform Assessment

Three spoil dumps, comprising an in-pit spoil landform, the southwest out-of-pit spoil landform and the east out-of-pit spoil landform, are planned to remain at closure as part of the Project's final landform (Figure 11). A fourth spoil dump, called the north out-of-pit spoil dump, will be rehandled back into the pit during late-stage operations to develop the final void, and therefore, will not exist as a post-closure landform.

The in-pit spoil landform comprises mined overburden and interburden dumped behind the active mining face to form a low-wall spoil dump (effectively backfilling the pit behind the active mining face). The southwest and east out-of-pit spoil dumps will comprise mined overburden and interburden dumped outside the pit shell adjacent to the active pit (i.e. as box-cut spoil). The southwest and east out-of-pit spoil dumps will be reshaped to form two final spoil landforms located on the southwestern and eastern sides of the pit, respectively. It should be noted, none of the Project's spoil dumps or final spoil landforms will contain rejects.

Therefore, considering the material quantities (proportions) and expected proportion of PAF materials reporting to each individual landform, it was assessed that each of the Project's spoil landforms pose a low AMD hazard, with AMD generation rated as highly unlikely.

In summary, the low AMD hazard of the Project's spoil landforms is largely a result of only 1.2% of non-carbonaceous spoil samples being conservatively classified as PAF of some type and non-carbonaceous spoil comprising the overwhelming majority (about 94%) of mineral waste within each spoil landform. Additional supporting information is provided in Appendix C of **Appendix F**.

2.6.1.3.3 Geochemical Final Void Assessment

A narrow final void will remain at closure at the centre east side of the Project's former mine pit (Figure 11). The void is conservatively assumed to have coal (Vermont seam group) remaining on the void (former pit) floor. Environmental geochemical data and drill-hole geological logs were used to aid in the assessment of AMD risk associated with the final void highwall and floor.

The highwall hazard assessment concluded that approximately 2.8% of the void highwall is estimated to be PAF, which includes material classified as UC(PAF), PAF-LC and NAF-S. As a result, the assessment has

found that the likelihood of AMD generation from the void highwall is unlikely, and any expression of AMD from the highwall is likely to be localised. Additional supporting information is provided in Appendix C of **Appendix F**.

2.6.1.3.4 Geochemical Source-Path-Receptor Assessment

A geochemical source-pathway-receptor (SPR) assessment was conducted for the Project, which involved the likelihood of an event occurring (e.g. the likelihood of AMD impacting a local creek), the severity of the event should it occur and the calculated risk rating (likelihood times severity). A risk rating was calculated for each of the Project's spoil landform and the final void with respect to plausible surface water and groundwater receptors.

The SPR assessment identified plausible surface water and final void receptors associated with final Project's spoil landforms, and the run-off and seepage pathways linking the sources (final spoil landforms) to the surface water and final void receptors. In summary, with respect to AMD, the overall SPR risk rating for the Project's final spoil landforms is low. In addition, with respect to non-oxidative salinity, the overall SPR risk for the Project's final spoil landforms is also rated as low. Further supporting information is provided in Appendix D of **Appendix F**.

Groundwater modelling predicts that the Project's final void is likely to be a 'sink' in relation to receiving surface water run-off, seepage from spoil landforms and surface water run-off from the void highwall. The Project's final void is expected to receive inflow from the Permian groundwater aquifer (**Appendix K**).

The SPR assessment concluded that it's unlikely that undiluted salinity or AMD from a flooded post-closure final void floor would impact on the final void's water quality to any significant degree, as evapo-concentration and other processes are the key drivers of the void lake's water quality. In summary, with respect to AMD, the SPR risk rating on the overall water quality of the Project's final void is low (**Appendix F**).

2.6.1.3.5 Geochemical Management and Rehabilitation Measures

Based on the Project's geochemical assessment results, no specific AMD management measures are expected to be required to manage spoil dumps at the Project during rehabilitation and closure (e.g. alkaline amendment or engineered capping systems). Importantly, the operational mixing and burial of small quantities of PAF waste with the predominantly NAF waste during spoil placement and landform reshaping activities, ensures that AMD generation is insignificant and highly unlikely to cause environmental harm (Section 7 of **Appendix F**). These outcomes are consistent with other nearby mines in the Bowen Basin.

The Project's geochemical assessment found that spoil is expected to be sodic to strongly sodic with potential for dispersion and erosion if left unrehabilitated and exposed to climatic conditions over a period of time (e.g. rainfall events). During the Project's operation, it is unlikely that sodic and potentially dispersive spoil will be able to be selectively handled and emplaced. Therefore, spoil dumps will be designed to ensure they possess long-term erosion control. The final landforms will be appropriately shaped, topsoiled and revegetated to facilitate long-term stability and compatibility with the surrounding land uses. If a dispersion issue is identified as part of the Project's rehabilitation and monitoring process, an AQP will provide advice on an appropriate amelioration strategy.

Where rock is used for construction activities, this will be limited, where practicable, to unweathered Permian sandstone, as this material is generally more suitable for construction and for use as embankment covering on final landform surfaces (**Appendix D**). Regardless of the rock type, especially where engineering or geotechnical stability is required, laboratory testing and rehabilitation field trials will be undertaken as required to determine the propensity for dispersion and erosion of the spoil landforms.

Surface water run-off and seepage from the Project's spoil landforms will be monitored for 'standard' water quality parameters including, but not limited to, pH, EC, major anions, major cations and a broad suite of soluble metals and metalloids at high resolution analysis.

The proponent will continue to undertake geochemical test-work of overburden and interburden throughout the life of the Project to compare against the test-work undertaken for the EIS assessment and to reaffirm the planned management and rehabilitation measures. To support the future test-work undertaken for this geochemical assessment, a program of kinetic leaching test-work of the Project's spoil under unsaturated and saturated conditions has commenced. The kinetic leaching program is designed to test the assumptions around seepage water quality from the out-of-pit spoil landforms (unsaturated conditions) and the deeper zone

of the in-pit spoil landform (saturated to partially saturated conditions). The outcomes of this additional testing will be used as required to further guide the Project's planned management and rehabilitation measures.

2.6.1.4 Soil Assessment

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 soils assessment and rehabilitated landform erosion assessment were conducted for the Project to assess the quality and quantity of soil and rock armouring available for rehabilitation (**Appendix E** and **Appendix D**, respectively). The objectives of the assessments included:

- Development of an inventory of materials available for rehabilitation and assess the suitability of materials as growth media in rehabilitation.
- Interpretation of available data to characterise materials for use as growth media to support vegetation and rock armouring to meet specific PMLU requirements.

2.6.1.4.1 Soils

A rehabilitated landform erosion assessment was undertaken for the Project's disturbance area (**Appendix D**). As part of the assessment, the Project's soil management units within the proposed disturbance area were grouped into three classes based on their characteristics, which were 'good quality topsoil', 'marginal topsoil', and 'subsoil'. Section 7.1 of **Appendix E** provides clarification on the three classes of topsoil.

Soil will be recovered from all mining activity and infrastructure areas within the Project's proposed disturbance area where topsoil stripping is required, including the mine pit area, out-of-pit landforms, infrastructure areas (e.g. haul roads, diversion, levees and dams) and the proposed PHES and algae production PMLU area. Table 14 provides the estimated volume of recoverable soils from the Project's disturbance area. Key characteristics of the good quality topsoil and marginal topsoil within the Project's proposed disturbance area are summarised in Table 2 of **Appendix D**, and was limited to soils in the surface 0.6 m for all soil except for Retro, which was limited to 0.25 m, and Arcturus, which was limited to 0.3 m. Additional information on the Project's recoverable soil volumes is provided in Section 2.2.4 of **Appendix D**.

Taurus, Krongie, and Taurus-Teviot Complex soils are most common, comprising 77% of the soil within the proposed disturbance area. Good quality topsoil exists in the surface 0.3 m of the soil profile, and marginal topsoil exists from 0.3 m to approximately 0.6 m below ground level. Good quality topsoil from the other soil types exists at variable depths, ranging from 0.1 m for Arcturus soil to 1.5 m for Davey soil. The depth of marginal topsoil is also variable. Table 3 of **Appendix D** provides the depth of the soil resources within the proposed disturbance area at the Project.

In summary, a total 11,587,517 m³ of soil are recoverable, comprising 5,108,647 m³ of good quality topsoil (44.1%), 4,530,750 m³ of marginal topsoil (39.1%), and 1,948,120 m³ of subsoil (16.8%). Taurus, Krongie, Taurus-Teviot Complex, and Teviot soils are the dominant recoverable soils, with 85.6% of the recoverable soils captured in these soil types. These soil types also represent 78.7% of the recoverable good quality topsoil, 97.5% of the recoverable marginal topsoil, and 76.0% of the recoverable subsoil.

In relation to topsoil stripping, some areas such as infrastructure areas and roads may simply push soils into windrows ready for their respreading over the same area when rehabilitated. If it is assumed that the only source of soils for use in rehabilitation will come from the waste landform and pit area footprints, the good quality topsoil would result in a 0.23 m thick growth medium layer. If both the good quality topsoil and marginal topsoil is used, it is estimated that a 0.46 m thick soil layer could be used in rehabilitation. To allow for topsoil stripping variances, an estimated 0.3 m thick soil layer will be used for rehabilitation purposes, comprising good quality topsoil and marginal topsoil.

Sufficient volumes of good quality topsoil and marginal topsoil can be recovered from the Project's disturbance area for rehabilitation, and as a result, the recovery and use of the subsoils that have properties less suited to being a growth medium is not required. More detail on the soil balance is given in Appendix E of **Appendix D**.

Table 14: Project Disturbance Area – Estimated Recoverable Soil Volumes

Soil Management Unit	Estimated Recoverable Volume (m ³)		
	Good Quality Topsoil	Marginal Topsoil	Subsoil
Arcturus	11,769 (0.1%)	23,538 (0.2%)	47,076 (0.4%)
Davey	968,051 (8.4%)	0 (0%)	0 (0%)
Krongie	819,944 (7.1%)	956,602 (8.3%)	956,602 (8.3%)
Luxor	50,208 (0.4%)	50,208 (0.4%)	0 (0%)
Retro	60,129 (0.5%)	40,086 (0.3%)	420,903 (3.6%)
Taurus	2,023,299 (17.5%)	2,023,299 (17.5%)	0 (0%)
Taurus-Teviot Complex	913,478 (7.9%)	913,478 (7.9%)	0 (0%)
Teviot	261,770 (2.3%)	523,539 (4.5%)	523,539 (4.5%)
Total	5,108,647 (44.1%)	4,530,750 (39.1%)	1,948,120 (16.8%)

Note: Bracketed percentage: percentage of the total recoverable volume.

2.6.1.4.2 Rock Armouring

Rock armouring is required to assist the stabilisation of the slopes of the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU (Section 2.3.1.3).

The Project's wastes were defined into two groups that align with the material groups used for the Project's geochemical waste characterisation study (Section 2.6.1.3.1 and **Appendix F**):

- fresh, non-carbonaceous waste
- fresh, carbonaceous waste.

From analysis of the sampled drill holes, fresh wastes account for 77.7% of the waste and weathered wastes account for the remaining 22.3% of waste. As a result, it was concluded that fresh waste, and particularly fresh non-carbonaceous wastes are very common and available for rehabilitation purposes as rock armouring. Fresh non-carbonaceous sandstone and carbonaceous sandstone will be targeted for use as rock armouring in preference to fresh non-carbonaceous and carbonaceous siltstones/mudstones. Therefore, the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU's rock armouring requirements can be achieved using the Project's fresh non-carbonaceous sandstone and carbonaceous sandstone.

2.6.1.4.3 Amelioration and Surface Treatment

Fertiliser and amelioration rates for soil materials are dependent on the intended PMLU for a rehabilitated area. For example, cattle grazing requires generation of biomass from the growth media and planted grass and legume species. Nitrogen and phosphorus-based amendments may be recommended for these areas. As a guide, soil amelioration should aim to provide appropriate levels of nitrogen, phosphorus and potassium, enhance macro and micronutrients, and reduce the potential for dispersion. As required, advice from an AQP will be sought on fertilizer and soil ameliorant application for each of the Project's applicable PMLU. The threshold criteria for the Project's good quality and marginal topsoils will help guide fertilizer and soil ameliorant application. Tables 39 and 40 of **Appendix E** provide initial guidance on the use ameliorants for the Project's soil types.

In terms of potential ameliorant usage, good quality topsoil is the preferred choice for soil resources for rehabilitation and has negligible limitations to plant growth and nil to low levels of ameliorants required. Marginal topsoil can be used in rehabilitation where there is a deficit in good quality topsoil. Marginal topsoil has minor limitations to plant growth (slightly more acidic or alkaline, slightly elevated salinity, and/or higher sodicity) that can be ameliorated if used (see Section 2.2.2 of **Appendix D**).

2.6.1.4.4 Surface Treatment

It is important that flow concentration on the slopes subject to rehabilitation is minimised. Concentration of runoff will be prevented by minimising the size of cross-slope rip lines. Rip lines will be no deeper than 300 mm from peak to trough of the rip line once settlement has occurred. To achieve this outcome, an unconsolidated rip line of approximately 500 mm deep is recommended. Ripping will be desirable to reduce machinery compaction, remove track marks that are not on contour, and incorporate amendments if required, as determined by an AQP for the available growth media to encourage rapid vegetation growth.

2.6.1.4.5 Topsoil Management

Soil recovery will be guided by the findings of the Project's soils assessment and rehabilitated landform erosion assessment (**Appendix E** and **Appendix D**, respectively). Soil will be recovered in layers and managed according to the quality and suitability of materials. For example, topsoil, marginal topsoil and subsoil materials will not be mixed. While the use of marginal topsoil and subsoil materials are not planned, if these poorer growth mediums are incorporated during the soil recovery process, and AQP will be engaged to advise on the possible use of soil ameliorants.

Where possible, the Project's topsoil will not be stockpiled and will be directly returned to the next available rehabilitation area within the progressively developing final landform to:

- avoid double handling (time and cost)
- minimise the loss of seed storage and nutrient quality to promote future revegetation
- reduce structural degradation of the soil to promote future revegetation and reduce the potential for erosion.

However, the Project's mine planning (progression of the pit and stage of rehabilitation development) may not always facilitate this preferred outcome. As a result, where stockpiling of topsoil is required for the Project, the following management actions will be applied:

- Stockpiling will be kept to the shortest possible time to reduce decline in topsoil quality.
- Stockpiles will not exceed the height of 2 m and will have a large surface area.
- Revegetation of stockpiles will be a high priority to protect from erosion, discourage weeds and maintain soil microbes.
- Stockpiles will be located where they will not be disturbed by future mining, or in areas that may be subject to overland flow or ponding of water.
- Topsoil will be stockpiled separately. It should be noted that there is no intention to use subsoil as a growth medium.
- Stripping of soil material will be avoided in wet conditions or when the soil is in a saturated state.

- A Geographical Information System or similar will be used to record stockpile locations and volumes, as well as the origin of the material (soil type).
- If required and as directed by an AQP, amelioration will be incorporated into the soil prior to stripping and stockpiling. This action allows mixing of ameliorants into soil material, and importantly, allowing ameliorants time to take effect.
- If necessary, weeds will be removed by an appropriate form of treatment.

2.6.1.5 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

The final landform design is based on detailed mine planning, which considers the landform development and associated reshaping of all relevant areas within the MLs after the removal of infrastructure that is no longer required post mining. Import factors in the development of the Project's final landform design included:

- Ensuring the most efficient extraction of the coal resource over the life of the Project.
- Maximising the Project's economics by delivering a Project with a positive net present value with socio-economic benefits to local and regional communities (**Appendix Z**).
- Ensuring an effective design of Conrock Gully diversion, to allow access to economic resources, with a long term geomorphically stable diversion design (Section 2.3.1.1 and Appendix D of **Appendix J**).
- Locating the final void outside the 0.1% AEP flood event of the Isaac River and Cherwell Creek, in accordance with regulatory requirements of the EP Act, without causing long term changes to the hydrology or geomorphology of the Isaac River and Cherwell Creek (Section 2.5 and **Appendix J**).
- Delivering stable dump designs to:
 - Minimise interactions with Isaac River and Cherwell Creek flood events, with consideration for other constraints in dump location such as tenement boundaries and ecological values (e.g. significant vegetation) (see Section 2.6.1.2 and **Appendix J**).
 - Ensure the development of suitable slopes to achieve erosional stability (gradient and length) and deliver geotechnical stability for a long-term stable landform (Sections 2.1.3.1.7, 2.6.1.5.2 and 2.6.1.5.3, and **Appendix D** and **Appendix H**).
- Developing a safe and stable final void design, to act as a groundwater sink and to provide the required water quality in a void lake to support the associated PMLUs (see Section 2.6.3), as well as being geotechnically stable.
- Developing an efficient mine plan to allow the maximisation of the areas available for progressive rehabilitation (where possible).
- Identifying PMLUs that were compatible with the landholders preferred use of the land, as well as being technically and commercially feasible with the ability to provide long-term economic benefits to the landholder, third parties and / or local and regional communities (see Section 2.3.1).
- Meeting the specific requirements of each PMLU (see Section 2.3.1).
- Incorporating the outcomes of relevant technical studies as outlined in Section 2.6.1 (e.g. erosional landform stability, geotechnical stability, soils, hydrology and geomorphology, surface water, groundwater, and void geochemistry).
- Consideration of the Winchester Downs landowner's requirements for the return of the majority of the land to a sustainable grazing regime for integration into pastoral land uses.
- Ensuring the avoidance of unacceptable post mining impacts and the longevity of the planned PMLUs.
- Delivering the PRCP requirements.

As a result, the Project's final landform will:

- be safe, stable and non-polluting
- be able to sustain the required PMLUs
- not leave a void in the floodplain
- have a beneficial use for the final void (i.e. there will be no NUMA)
- incorporate additional PMLU(s) (e.g. permanent infrastructure – PHES and/or algae production) in the potential beneficial uses of the final void lake.

The Project's final landform design has considered the relevant PMLUs that apply to the rehabilitation areas (Table 7) and has ensured that geotechnical stability is achieved (see Section 2.1.3.1.7 and **Appendix H**), long-term erosional stability is achieved (Section 2.6.1.5.3 and **Appendix D**), and that the Project has negligible to minor impacts on hydrology and geomorphology (Section 2.6.1.2 and **Appendix J**). Revegetation of the Project's final landform will support the applicable PMLU, and is an important requirement for long-term erosional stability, and the mitigation of erosive forces where the rehabilitated landform interacts with flood waters.

2.6.1.5.1 Method of Determining Landform Design

The final landform design for the Project has considered the relevant design objectives outlined in Table 15. The design objectives were established to facilitate an optimised cut/fill balance with slope gradient, slope length, slope stability and groundcover criteria defined to achieve a safe, stable, non-polluting landform that sustains the required PMLUs.

Table 15: Landform Design Criteria

Post-mining Land Use	Rehabilitation Area	Landform Design Objectives	Design Criteria
Native vegetation (riparian woodland) – Conrock Gully	RA1	Geomorphically stable diversion with hydraulic properties similar to Conrock Gully.	Designed, constructed and operating in accordance with the Conrock Gully' Functional Design Report (Appendix D of Appendix J). Revegetated with RE11.3.25 (upper storey tree species, mid and lower storey tree, and shrub species and groundcover species) as specified by the revised BioCondition benchmarks nominated for RE11.3.25 (Table 20). A Hydrological and Geomorphic Assessment confirms the hydrology and geomorphology of the diversion is similar to Conrock Gully (Appendix J).

Post-mining Land Use	Rehabilitation Area	Landform Design Objectives	Design Criteria
Grazing	RA2, RA4, RA5, RA6, RA10	Landforms with gradients of $\leq 15\%$ shall have the identified soils (Table 14) applied as growth media. Landforms will be geotechnically stable. Landforms will be free draining.	Landform evolution modelling demonstrates that the landform is erosionally stable (Appendix D). A geotechnical assessment demonstrates the ability of the landform to achieve a FoS of ≥ 1.5 (Appendix H). Groundcover for slopes of $\leq 15\%$ possesses a total vegetative ground cover of $\geq 65\%$ (Appendix D). Erosion is assessed using the Erosion Classification Framework (Figure 25) and achieves a 'minor' classification. Landforms are to be free draining, except for the slopes that report to the final void. The groundcover comprises a self-sustaining vegetative groundcover.
Native vegetation (woodland) – Final low wall batter ($\leq 25\%$)	RA3	Landforms with a slope of $\leq 25\%$ will have appropriate rock armouring. Landforms with a slope of $\leq 25\%$ will drain towards the final void.	Rock armouring will be placed on the final low batter ($\leq 25\%$) and will comprise: – Fresh non-carbonaceous sandstone and carbonaceous sandstone in preference to fresh non-carbonaceous and carbonaceous siltstones/mudstones. – The rock fraction will include particles greater than approximately 50 mm in diameter. – The rock source will contain less than 40% fines (< 2 mm diameter) (Appendix D). Revegetated with RE11.5.3 (upper storey tree species, mid and lower storey tree, and shrub species and groundcover species) as specified by the revised BioCondition benchmarks nominated for RE11.5.3 (Table 21). Groundcover for slopes of $\leq 25\%$ achieves a total vegetative groundcover of $\geq 30\%$ and when combined with rock armouring (Appendix D).

Post-mining Land Use	Rehabilitation Area	Landform Design Objectives	Design Criteria
Native vegetation (riparian) – River/creek crossings	RA8	Long-term stabilisation of the bed and banks.	Disturbed natural watercourse bed and banks are returned to a natural condition with a profile similar to the pre-disturbance condition. Revegetated with RE11.3.25 (upper storey tree species, mid and lower storey tree, and shrub species and groundcover species) as specified by the revised BioCondition benchmarks nominated for RE11.3.25 (Table 20).
Beneficial water storage	RA9	The final void is safe for humans, stock and wildlife. The final void will not have an unacceptable risk of environmental harm. The final void will be geotechnically stable. The final void is not within the 0.1% AEP flood plain.	An AQP certifies that all slopes of the final void are geotechnically stable and have achieved a factor of safety ≥ 1.5 (Appendix H). An AQP certifies that the final void is not subject to inundation from floodwaters up to and including the 0.1% AEP and will not over top (Appendix J). A competent safety bund or equivalent landform is in place to prevent access to the final void, at the geotechnical set-back distance of a minimum of 15 m (distance necessary to achieve $FoS \geq 1.5$) (Appendix H). The safety bund is constructed from non-weathered, non-dispersive dumped rockfill and is a minimum of 2 m in height, a minimum of 4 m in base width and possesses 1 in 3 batters. Fencing is erected where required to prevent access to the final void, around the perimeter of the safety bund.
Permanent infrastructure – PHES and/or algae production	RA7	Stable and safe infrastructure site.	Constructed in accordance with the approved final design criteria developed by an AQP.

2.6.1.5.2 Geotechnical Stability

An evaluation of the geotechnical stability of the Project's final landform is provided in **Appendix H**. As discussed in Section 2.1.3.1.7, the geotechnical model's assessment reported critical FoS values of 1.6 to 4.5 for all the selected cross-sections within the Project's final landform, including an analysis of the northern low wall's stability under 1:1,000 year flood conditions (Table 6). These results meet or exceed the design acceptance criteria for the Project's final landform of a $FoS \geq 1.5$, and therefore, demonstrate the long-term stability of the Project's final landform.

2.6.1.5.3 Long-term Erosional Stability

WEPP runoff/erosion modelling was undertaken to investigate a range of scenarios using erodibility parameters for five soils that exist at the Project - Taurus, Taurus-Teviot, Krongie, Teviot, and Retro. These soils account for 89% of the good quality topsoil and marginal topsoil resource. The WEPP modelling used a long-term climate sequence adjusted to reflect the SSP3-7.0 climate scenario assessed at 2090. A range of vegetation groundcover levels (0%, 50%, 65%, and 80%) were also considered. The addition of fresh Permian waste to the soils as a rock armour was also included. The WEPP-predicted maximum erosionally stable slope lengths for each model scenarios considered are provided in **Appendix D**.

Taurus and Teviot soils are predicted to erode at acceptable rates when groundcover levels are $\geq 50\%$. Taurus and Teviot soils are considered suitable for use on all the slopes of all three landforms except for the steep, 25% eastern low wall slope of the main landform that drains to the final void. For Retro soil, the groundcover level needs to be $\geq 65\%$ for 15% gradient slopes to be stable to 500 m. When the groundcover level is only 50%, the maximum stable slope length is predicted to be 185 m. Retro soil could be used on all three landforms except for the steep, 25% eastern slope of the main landform that drains to the final void. For Taurus-Teviot soil, erosion rates are high when only 50% groundcover is achieved. However, when the groundcover level is $\geq 65\%$, which is considered achievable, the stable slope length is at least 335 m. Therefore, Taurus-Teviot soil could be used on all three landforms except for the steep, 25% eastern slope of the main landform that drains to the final void. For the Krongie soil, erosion rates are higher than other soils and a groundcover of $\geq 80\%$ is needed to achieve erosional stability. To reduce erosion risk, Krongie soil will be preferentially placed on low gradient portions of the final landform, for example, the landform tops or the southern end of the backfilled surface of the final void.

The rock-armoured soils are all suitable for use on the gradients $>15\%$. For the southern section of the low wall dump slope of the main landform with a 25% gradient slope and a slope length of approximately 200 m, the rock-armoured Taurus and rock-armoured Retro soils, with 30% groundcover, are predicted to be acceptably stable.

The Project's proposed final landform design was modelled using SIBERIA landform evolution model and the SSP3-7.0 climate prediction (**Appendix D**), and was based on the following surface materials:

- Taurus soil with 65% groundcover on the slopes of the main landform, except the low wall with 25% gradient which was modelled using rock-armoured Taurus soil with 30% groundcover.
- Taurus-Teviot soil with 65% groundcover on the outer slopes of the SW landform.
- Retro soil with 65% groundcover on outer slopes of the east landform.

The soils were selected for use on the slopes to reflect the range of soils available within the Project's disturbance area. The soils could be used interchangeably on any of the surfaces. For example, it is noted that Retro soil is in limited supply, but there is sufficient Taurus, Taurus-Teviot, and Teviot soils to use on this landform instead. On all the Project's landforms, the lower-gradient surfaces were covered with vegetated Krongie soil as a means of mitigating their higher erosion potential.

All the modelled visualisations for 50, 100, 200, and 300 years are provided in Appendix D of **Appendix D**. The statistically predicted maximum gully depths, average erosion rates, and cumulative average erosion for the Project's main landform (in-pit dump), southwest landform (out-of-pit dump), and east landform (out-of-pit dump) from the SIBERIA landform evolution modelling are summarised in **Appendix D**.

The Project's landforms are predicted to typically erode at acceptable erosion rates. The acceptable long-term mean average annual erosion rate was set at 5 t/ha/y, being a rate at which the risk of rill erosion being initiated is low.

For the Project's main landform (in-pit dump), the mean average annual erosion rate is 3.7 t/ha/y after 50 years of simulation, increasing to 4.5 t/ha/y after 300 years of simulation. For the Project's southwest landform (out-of-pit dump), the mean annual average erosion is 2.9 t/ha/y after 50 years of simulation, increasing to 4.6 t/ha/y after 300 years of simulation. For the Project's east landform (out-of-pit dump), the mean average annual erosion is 3.9 t/ha/y after 50 years of simulation, increasing to 5.4 t/ha/y after 300 years of simulation.

Overall, the results the Project's erosion and stability assessment indicate that vegetated soil and vegetated rock-armoured soil surfaces can be used to create a rehabilitated landform that is erosionally stable in the long-term. The shape of the Project's final landform was developed and confirmed with consideration of the following factors:

- The development of rehabilitated surfaces with a low tendency for rill erosion to achieve erosion rates consistent with the soil erosion targets.
- The application of erodibility testing of the Project's soils and soil-fresh rock mixtures to guide rehabilitation requirements to achieve stable slopes.
- The inclusion of rainfall erosivity of the climate at the Project, with the appropriate adjustment for climate change as part of the development of the rehabilitation requirements to achieve stable slopes.
- The assessment of the suitability of the soils and fresh Permian waste as a primary growth media and the fresh wastes as secondary growth media for application under the primary growth media layer. The assessment findings were used to direct the correct application of the growth media to achieve stable slopes.
- The defining of the required groundcover for each growth media to achieve the best possible rehabilitation outcomes to support stable slopes.
- The development of predicted long-term erosion rates for land surfaces planned within the Project's final landform to confirm the long-term acceptability of the design.
- The modelled demonstration that the Project's landforms after 300 years are stable under the current climate change predictions for the region.

2.6.1.5.4 Slope Design Summary

The results of the Project's rehabilitated landform erosion modelling show that the linear slopes present within the final landform design are predicted to erode at acceptable rates in the long-term when appropriately covered with the soils progressively sourced from the Project's disturbance area and when the required vegetation groundcover levels are achieved.

The slope angles of the final landform, which are based on achieving the erosionally stable outcomes demonstrated through landform evolution modelling, are shown in Figure 10.

2.6.1.5.5 Vegetation Establishment

Establishment of vegetation, and in particular groundcover, is critical for long-term erosional stability of the Project's final landform. There is a period directly after seeding when the landform surface will be unconsolidated and have low vegetation groundcover levels. This period represents a risk to rehabilitation success. Rainfall that leads to significant runoff during this period is likely to lead to the development of rills and potentially gullies, particularly for those Project soils that possess a low infiltration capacity.

All efforts will be made to encourage rapid establishment of vegetation groundcover. Seed mixes will include a significant proportion of grasses, preferentially stoloniferous grasses as they spread in contact with the soil surface and provide better erosion control than tussocky grasses. The use of a fast germinating sterile cover crop is also advantageous within the seed mix as it provides a temporary ground cover while the permanent grass, shrub or tree species are establishing.

If required, consideration may be given to temporary soil stabilisation techniques such as the use of hydromulches, surface tackifiers, or compost blankets. These techniques are able to provide resistance to erosion for the initial 1–2 years as the groundcover develops. The specific techniques used would be trialled under guidance from an AQP, with the results of the trial used to inform progressive rehabilitation plans for the Project site.

The Project's rehabilitation areas will be scientifically monitored to demonstrate rehabilitation success and guide maintenance of rehabilitation areas that are under performing.

2.6.1.5.6 3D Design

Three dimensional (3D) imagery of the Project at the end of mining (approximately Year 16) and after completion of all RMs is provided in the following figures:

- Figure 15: End of Mining Imagery
- Figure 16: Final Landform Closure Imagery and View Points
- Figure 17: Residual Void (Beneficial Use) and End Wall (Woodland) – Looking Southwest
- Figure 18: Residual Void (Beneficial Use) and Low Wall (Woodland) – Looking Northeast

- Figure 19: Inpit Spoil Dump at Ground Level (Grazing) – Looking Northeast
- Figure 20: Inpit Spoil Southern Backfill of Void (Grazing and Woodland) – Looking North
- Figure 21: Conrock Gully Diversion (Riparian Woodland)
- Figure 22: Residual Void (Beneficial Use): PHES and Algae Production – Looking Northeast.

Figure 15 provides a composite image of the Project at the end of mine life with various areas at different stages of rehabilitation, or recently completed active mining. The imagery in Figure 16 to Figure 22 has been developed to represent the PMLUs for each RA at completion of all RMs. The location of the viewpoint for each image is shown on Figure 16.

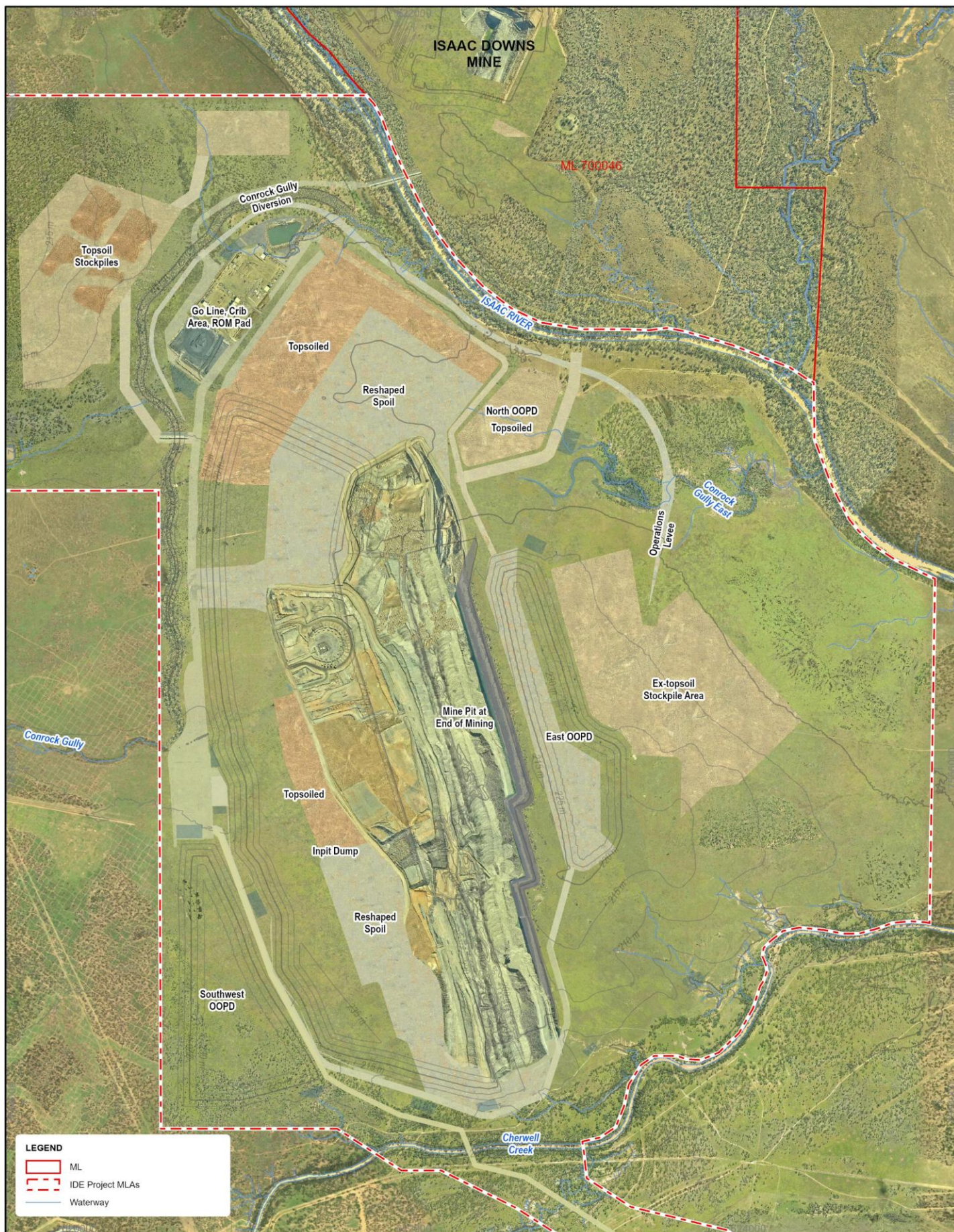
The key factors that guided the development of the Project's final landform are provided in Section 2.6.1.5.1. The primary long-term objectives for the Project's final landform was to ensure it was safe, stable, non-polluting, able to sustainably support the planned PMLUs, aesthetically compatible with the surrounding landscape, and would not leave any legacy issues for the local landowner, region or Queensland. Significant mine and environmental planning were undertaken to achieve these long-term objectives at closure of the Project. The key specifications for the final landform are outlined in Table 16.

Table 16: 3D Final Landform Key Characteristics

Component	Specification	Unit of Measure
Footprint area (total)	2080.0	ha
Void surface area at the crest	133.3*	ha
Landform heights (approximate):		
Main in-pit landform	40	m
Southwest out-of-pit landform	30	
East out-of-pit landform	30	
Maximum landform slope angle (Grazing PMLU)	≤15	%
Maximum landform slope angle (Native vegetation (riparian woodland) – Conrock Gully PMLU)	5.2	km
	0.147 (approximately)	%
Maximum landform slope angle (Native vegetation (woodland) – Final low wall batter (≤25%) PMLU)	≤25	%
Maximum landform slope angle (Native vegetation (riparian) – River/creek crossings PMLU)	≤15	%

Note:

* = As explained in Section 2.1.3.2, it should be noted that the rehabilitation area associated with the void is 71 ha, as the void area at its crest includes in-pit dump areas, which are assigned to different rehabilitation areas.



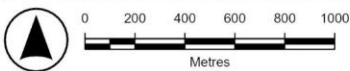
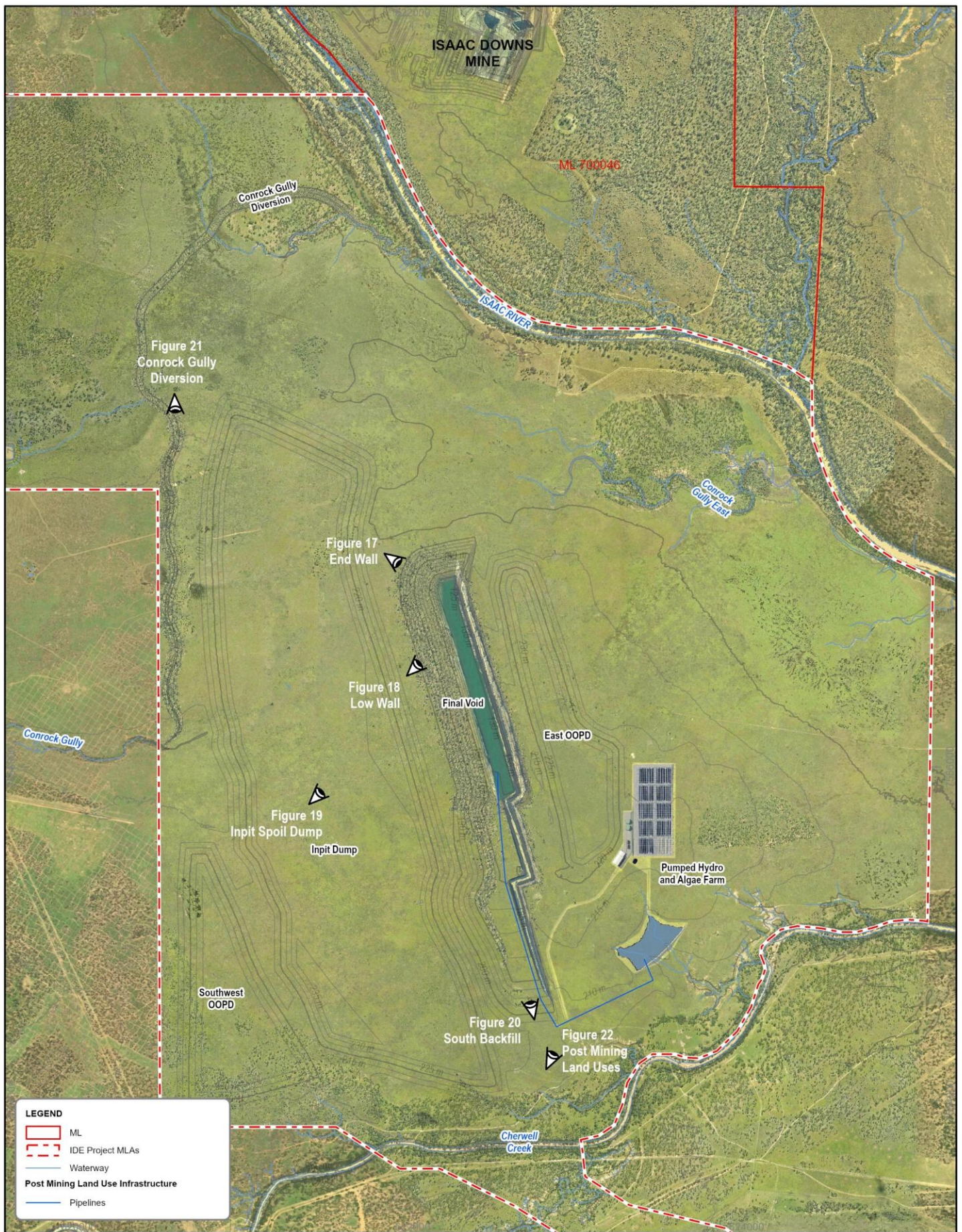
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 Scale: See Scale Bar
 Date: 10/06/2026 6:26 AM
 Drawn: Minserv
 Source: Minserv/Stanmore
 File: 20260606 End of Mining Aerial.aprx

DISCLAIMER: Third party data sources are used in this map compilation.
 Minserv makes no warranty regarding this data's accuracy or currency.



ISAAC DOWNS EXTENSION

End of Mining Imagery



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 10/06/2026 12:01 PM
 Drawn: Minserve
 Source: Minserve/Stanmore
 File: 20260525 Final Landform Image.aprx

DISCLAIMER: Third party data sources are used in this map compilation.
 Minserve makes no warranty regarding this data's accuracy or currency.

stanmore
 ISAAC DOWNS EXTENSION

Final Landform Closure
 Imagery and View Points



NORTH-WEST

NORTH-EAST



Date: 10/06/2026 7:04 AM
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Source: Map My Mine Pty Ltd
File: 20260608 Closure Images.aprx



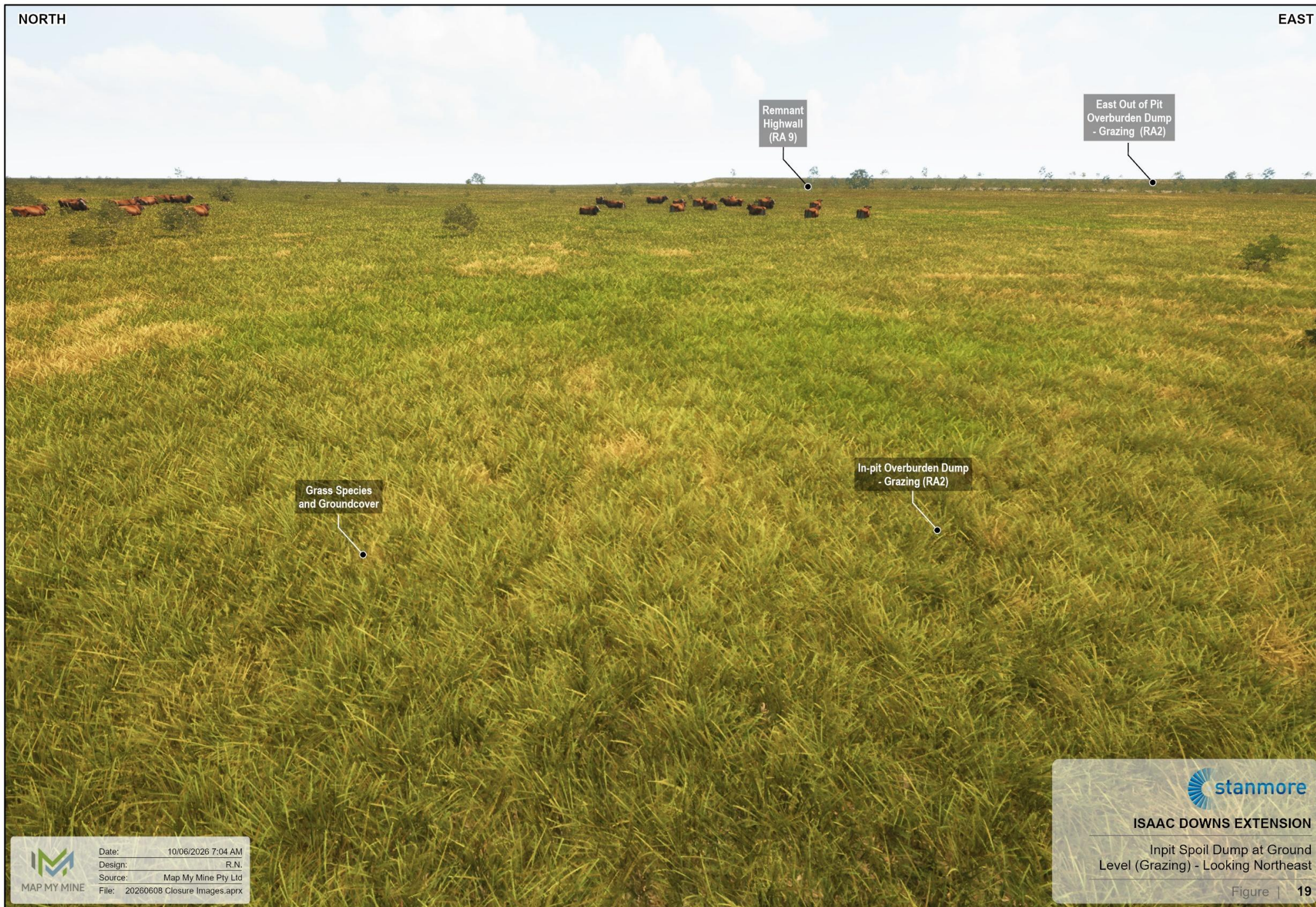
ISAAC DOWNS EXTENSION

Residual Void (Beneficial Use) and
Low Wall (Woodland) Looking Northeast

Figure | 18

NORTH

EAST



Grass Species
and Groundcover

In-pit Overburden Dump
- Grazing (RA2)

Remnant
Highwall
(RA 9)

East Out of Pit
Overburden Dump
- Grazing (RA2)



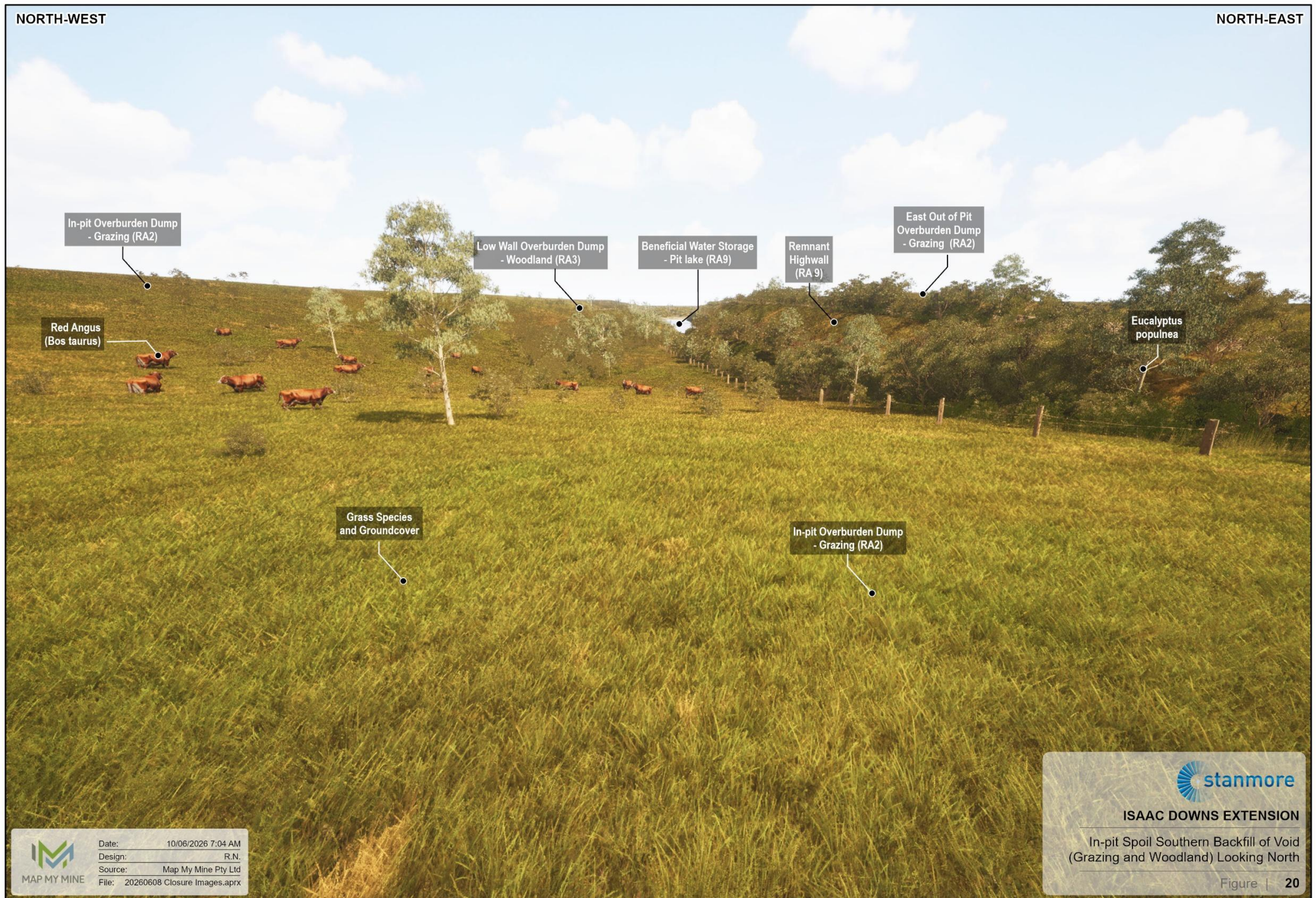
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Design: R.N.
Source: Map My Mine Pty Ltd
File: 20260608 Closure Images.aprx



ISAAC DOWNS EXTENSION

Inpit Spoil Dump at Ground
Level (Grazing) - Looking Northeast

Figure | 19





EAST

SOUTH

Melaleuca
bracteata

Conrock Gully Diversion
- Riparian Woodland (RA1)

Eucalyptus
coolabah

Eucalyptus
populnea

Eucalyptus
tereticornis

Acacia leiocalyx

Intermittent
Ponding

Grass Species
and Groundcover

Cymbopogon
refractus



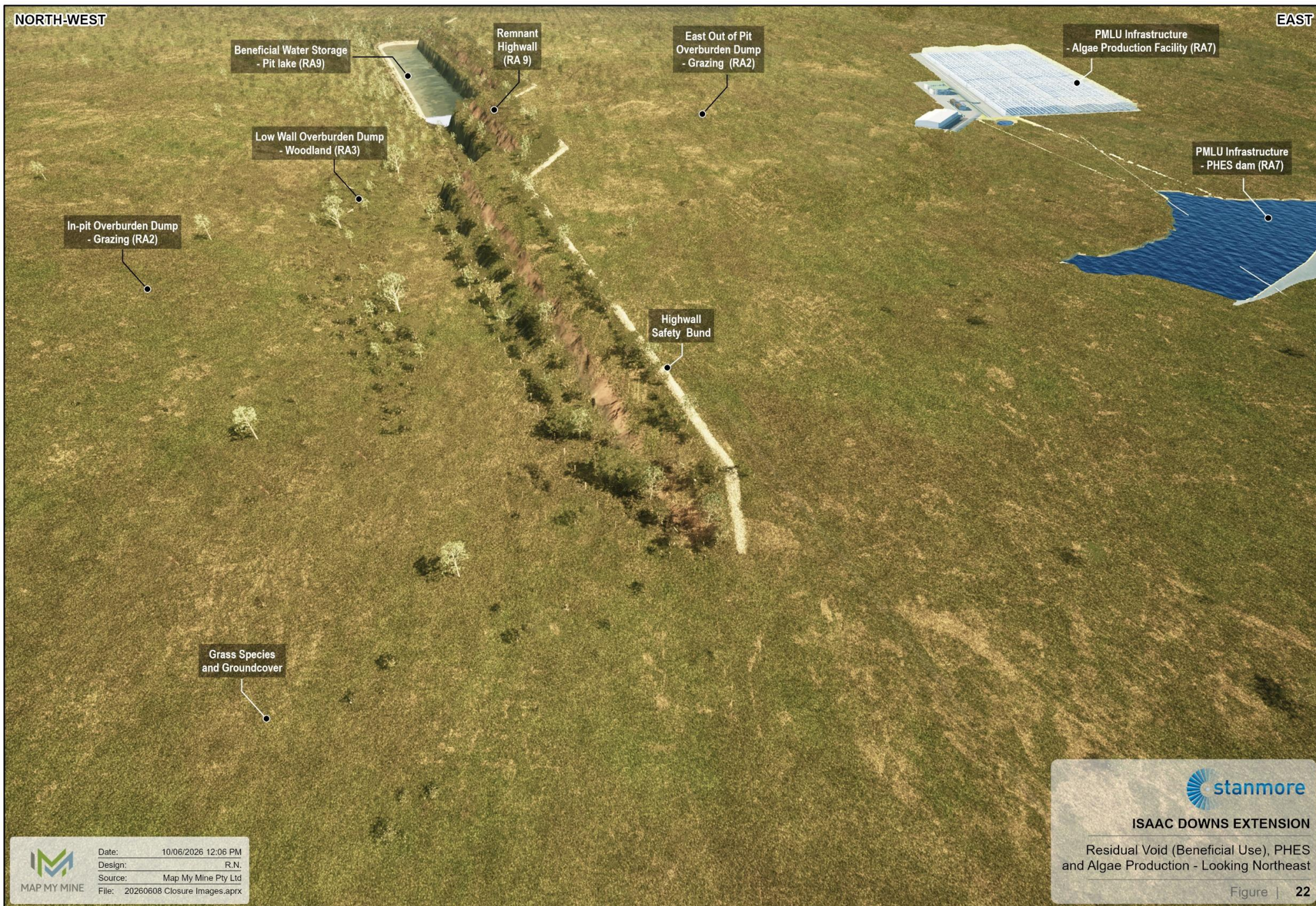
ISAAC DOWNS EXTENSION

Conrock Gully Diversion
(Riparian Woodland)

Figure | 21



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Design: R.N.
Source: Map My Mine Pty Ltd
File: 20260608 Closure Images.aprx



2.6.1.5.7 Method of Construction

In alignment with the rehabilitation milestone criteria, the relevant infrastructure will be removed, then the landform will be reprofiled to be consistent with design requirements. Dump areas will be reshaped using typical earthmoving equipment.

Where required, temporary drainage controls will be designed and constructed to ensure erosion of the final landform is minimised. Uncontrolled discharge of runoff from the flat top surfaces of the landform will be controlled by roughening surfaces to increase depression storage and decrease the ability of surface water to move laterally across the top. An AQP will inform design and applicability to the landform.

Following landform profiling with the requisite fresh Permian layer established, topsoil will be applied and spread, with shallow ripping included to facilitate consistent mixing. For the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU, rock armouring will be placed on the final low batter ($\leq 25\%$) and will comprise fresh non-carbonaceous sandstone and carbonaceous sandstone. As guided by an AQP, ameliorants and seeding will be applied using appropriately specialised machinery. Deep ripping along contour to a depth of no less than 0.3 m into the soil profile will be conducted for surface water management.

2.6.1.5.8 Quality Assurance/Quality Control

Construction methodologies applied to landforms will be appropriately designed by an AQP to ensure success in achieving the proposed completion criteria. Records of the method applied in construction of final landforms in the form of inspection test plans will enable objective assessment and monitoring against proposed rehabilitation milestones, as well as inform any corrective actions and changes to methodologies required to support success.

Typically, reshaping activities should achieve the design geometries ± 0.2 m vertical height measured over a maximum distance of 50 m, allowing for some greater variation in microrelief caused by blockiness of the wastes (i.e. some rocks or larger particles may protrude from an otherwise suitably level surface).

It is critical that flow concentration on the batter slopes is minimised following construction, and temporary erosion and sediment controls, such as contour banks may be installed temporarily to facilitate revegetation and to protect bare surfaces. Cross ripping of the landform surface to approximately 500mm deep is also recommended to reduce the effects of sheet flow on landforms.

The key controls to manage the landform risks associated with achieving the PMLUs are discussed in the PRCP Risk Assessment (Section 2.7). Quality assurance and quality control activities are built into all necessary execution and verification activities of these controls. Construction monitoring and reporting records will verify controls and ensure that controls are executed effectively.

2.6.1.5.9 Trial Methodology

Assessments and modelling undertaken as part of this PRCP have indicated that as the landform rehabilitation will be executed as a single project, and accordingly trials on individual slopes may not be a viable option. If specific landform areas can be identified as appropriate for selected trials, these may be considered to confirm current milestone criteria can be achieved. Maintenance and ongoing monitoring following construction will verify if the landforms are trending toward milestone criteria, or whether corrective actions, maintenance or change to the rehabilitation methodology is required. An AQP will conduct all monitoring.

2.6.1.5.10 Limitations and Assumptions

The key limitations and assumptions of the final landform design at the current conceptual level of engineering maturity include:

- A life-of-mine plan has been developed for the Project to meet the outcomes required by this PRCP.
- Long, medium and short term mine planning will be applied at all stages of mine development.
- Landforms designs are conceptual and may be optimised during detailed design within acceptable design parameters as the base knowledge is progressively improved over the life of the Project.
- The final landform is dependent on the mining schedule, which can change due to increased geological knowledge, market factors and technology. These changes may result in differences to the landform, but the key considerations to ensure long-term stability, such as slope profiles and materials, will be maintained in the final closure landform design.

- The final landform must be located within the Project's mining leases.
- Contaminated land assessments undertaken for RM2 will not impact this stage of the engineering design.
- All landforms are assumed to be track compacted during construction and internally reshaped with uniform soil/capping application. Accordingly, settlement over the long-term is expected to be consistent across the landform and does not require specific management.
- Fresh Permian overburden will be preferentially used in upper dump layers over the less suitable Tertiary overburden.
- All overburden poses a low risk of acid, metalliferous and saline drainage. Therefore, the intent of the cover is for management of erosion and promotion of vegetation growth.
- Fresh, benign, rocky Permian overburden can be sourced in sufficient quantities to achieve the rock armouring cover for the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU.
- Vegetation groundcover levels of $\geq 65\%$ can be sustainably achieved for the grazing PMLU.
- Vegetation groundcover levels specifically consider contact cover of vegetation on the surface. Practically, this means a combination of grass cover and anchored (not readily moved) surface litter.
- No uncontrolled discharge of runoff from landform tops onto outer batter slopes is expected.
- That batter slopes will not be formed with excessive flow-concentrating profiles (e.g. variations in surface elevation such that there is cross-slope concentration of flow into consistent depressions running downslope).
- Sufficient topsoil has been identified on-site to support rehabilitation.
- Any cross-slope ripping will be carried out strictly on the contour.
- Soil management, including stripping, stockpiling, replacement, amendment, and fertilisation, will be carried out effectively to maximise plant establishment and growth.
- The landform shape has been guided by multiple factors. As mining progresses, there are sections that will likely be modified as further design work and refinement to the mine plan occurs. However, the landforms will still generally have the same overall conceptual 3D rehabilitation shape.
- The geotechnical and erosional stability of the final landform have been confirmed through assessments using recognised industry-standard modelling packages.
- Overall, the final landform will be water-shedding, except for the slopes reporting to the final void. Specific, detailed surface water management features may be developed for final landform design. If required, an AQP will guide the design and placement of surface water management structures.
- The landform is not lined, and does not require specific treatment, as the waste stored is considered geochemically benign.
- No tailings or coarse rejects will be managed within the Project area.
- Spoil management and scheduling will be sufficiently aligned with eventual closure requirements to enable material to be incorporated into the upper layers of the final design.

2.6.1.6 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.

As part of this PRCP, the risk of the movement or migration of AMD, NMD and SD causing failure to achieve the PMLU was assessed, considering the geochemical characteristics of waste stored in the landform (Section 2.6.1.3 and **Appendix F**). The assessment found that the Project's spoil has a very low potential to

generate AMD as either AD and/or NMD and/or SD. In addition, the assessment indicated that a significant proportion of the Project's spoil has very low concentrations of metals and low salinity. However, spoil is expected to be dispersive (Section 5 of **Appendix F**).

Therefore, the recommended cover design is an erosion protection system only to manage erosion risks and promote vegetation establishment in line with the relevant milestone criteria. The soil and capping design, including justification for the use of the growth medium, is presented in Sections 2.6.1.4, 2.6.1.5.3, and 2.6.1.5.4. No other specialised 'capping' or cover designs are required for the Project.

2.6.1.7 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).

Management of water during operations is conducted in accordance with the Project's Water Management System (WMS) and the Project's environmental authority (EA). The WMS is the primary management measure to mitigate the Project's impacts to surface water quality and flows and was developed from the Surface Water Impact Assessment (**Appendix I**). The key objectives of the WMS are as follows:

- Minimise mine-affected water accumulation within the Project's WMS and the risk of uncontrolled discharges (Appendix I demonstrates there is no risk of uncontrolled discharges from the mine affected water system and that controlled discharges will occur in accordance with water quality and flow criteria design to protect the downstream environment).
- Maintain sufficient water for the operations during dry periods.
- Successfully engage with external stakeholders to be a good custodian of society's water resources.

Specific objectives for the WMS's operational water types are as follows:

- Mine-affected water: minimise generation, maximise reuse and prevent uncontrolled releases.
- Sediment water: minimise generation, maximise reuse and remove sediment prior to discharge, as per the designs described in the erosion and sediment control plan (**Appendix AD**).
- Clean/diverted water: separate the mine-affected and sediment water systems as much as reasonable and feasible and allow it to pass uninterrupted through the catchment.
- Raw/external water: Ensure that external water allocation and associated infrastructure is sufficient to meet site demands particularly under low rainfall conditions.
- Contaminated water: Ensure full separation from other water sources and manage to prevent contaminant release, including under the requirements of AS1940 – Storage and Handling of Flammable and Combustible Liquids.

Monitoring of water quality in the WMS and the receiving environment (upstream and downstream of Project activities) will occur in accordance with the requirements of the EA during operations. Monitoring of flows in the receiving environment will occur in accordance with the requirements of the EA during operations.

Water management transitions from the operational WMS to water management for final landform as staged rehabilitation occurs. In the final landform, once RMs have been achieved, water will drain from the final landform to the receiving environment and will not pass through water management control such as sediment dams or mine-affected water dams. These dams will be decommissioned and rehabilitated once the areas from which they are capturing runoff are successfully rehabilitated.

Water management for the Project's final landform aims to satisfy the specified RM criteria, eliminating the necessity for continuous water management or dewatering post-closure. The evaluation of ongoing water management post-mining takes into account key considerations, including:

- The final landform surface is intended to be free draining, with a portion of the in-pit dump draining to the final void, prevent ponding in the rehabilitated landform, and to promote clean runoff flowing to the surrounding watercourses.
- Any bunds installed to support runoff from slopes prior to achievement of vegetative cover will be removed.
- All dams will be removed, unless retained by agreement with a third party.
- The Isaac River flood levee will be removed, and the Cherwell Creek and Conrock Gully levee plugs will be integrated into the final dumped landform.
- Contaminated land investigations will be undertaken at the completion of mining where required (i.e. RA4 and RA5), and any identified remediation/management requirements to render the site suitable for the nominated PMLUs will be undertaken (RM2).
- The final void will remain as a groundwater sink and groundwater will not flow from the final void off-site (**Appendix K**).
- The final void is outside the 0.1% AEP flood level (**Appendix J**).
- The final void will not spill to the receiving environment (**Appendix I**).

The proponent will engage a AQP to develop a Closure Water Management Plan (CWMP) prior to closure, addressing specific closure and post-closure water management requirements, monitoring, and maintenance.

2.6.1.7.1 Potential Contaminants

Environmentally relevant activities (ERAs) are authorised under the Project's EA. ERAs have the potential to release emissions and contaminants that can impact the environment and surrounding land users, causing environmental harm. The Project's ERAs involve vehicles and equipment necessary for coal extraction and transport. These operations involve the storage, utilisation, and disposal of various hazardous materials such as hydrocarbons (fuels, oils), combustible liquids or chemicals. Management measures will be implemented to minimise the risk of accidental release of these materials such as storage and handling in accordance with Australian standards. Nevertheless, contaminants associated these activities may mobilise to the local environment. Upon completing the Project's mining operations, a contaminated land investigation (RM2) will evaluate relevant areas for potential contamination, in accordance with the PRCP Schedule. A register of notifiable activities will be maintained for the Project to help guide contaminated land investigation (RM2).

Mine affected water and sediment water management during operations and the interim stage of rehabilitation will be managed under the Project's operational WMS.

2.6.1.7.2 Contaminant Pathways

Water is a primary pathway of potential contamination to the receiving environment. At closure, dams and other infrastructure within the mine-affected water management system and sediment water management system will be assessed for potential contaminants, remediated (where required) and decommissioned and reshaped to achieve free draining conditions.

Based on the geochemical nature of the spoil and the fact that coarse rejects will not be store at the Project site, the risk of developing acidic and metalliferous conditions in mine affected water and sediment water is considered low (Section 2.6.1.3 and **Appendix F**). Spoil dumps will be progressively rehabilitated and reshaped to form a free-draining, vegetated landform designed to limit excess runoff and prevent the mobilisation of sediments to the receiving environment.

As outlined in Section 2.6.1.3.4, an SPR assessment determined that there was a low risk associated with seepage to the environment from the Project's final landform (Appendix D of **Appendix F**).

The numerical groundwater modelling undertaken for the Project indicates that, under post-mining conditions, the residual void lake remains a hydraulic sink for surrounding aquifers. Predicted groundwater levels in the adjacent regolith, alluvium and Permian units remain above void lake levels, maintaining inward hydraulic gradients over the long term. As a result, outward leakage of void lake water to the surrounding groundwater system is not predicted.

Modelling confirmed that groundwater levels in the final void is expected to stabilise after mine closure. The final void will act as a groundwater sink (**Appendix K**). Therefore, there are no dedicated infiltration or seepage collection controls required. However, monitoring of groundwater and water within the void lake will still occur (Section 2.8.6.3).

The Project's flood modelling summarised in Section 2.5.3 demonstrates that the final void is not within the defined floodplain up to an including a 0.1% AEP flood event, and for the vast majority of Isaac River flood events, interaction between floodwaters and the final landform will be either minimal or non-existent. Importantly, the final landform will be revegetated, with vegetation cover providing sufficient protection against interaction with rare flood events. Therefore, potential contamination pathways will not be exacerbated by flooding.

2.6.1.7.3 Surface Water Diversions and Long-Term Management

As described in Sections 2.3.1.1, the Conrock Gully diversion will remain as a component of the Project's final landform. Section 2.6.1.2.1 and Section 8 of Appendix D of **Appendix J** demonstrate that the diversion will be geomorphically stable in the long-term and will function in a similar manner to the existing Conrock Gully.

The Conrock Gully diversion will be monitored regularly to collect data for evaluating the performance of the constructed diversion (Section 2.8.5). Collection of monitoring data will help identify any issues with the construction of the diversion, guide remediation works (if required), and demonstrate the long-term stability of the diversion. The Conrock Gully diversion's monitoring program will be conducted by an AQP using the process documented in Section 7 of Appendix D of **Appendix J**.

2.6.1.7.4 Dewatering

During the interim stages of rehabilitation, dewatering will occur in accordance with the requirements of the EA for mine affected water and sediment water. Mine affected water dams and sediment dams to be decommissioned once areas from which they are collecting runoff are successfully rehabilitated. Prior to decommissioning, all water within these storages will be transferred to the final void or other mine water storages or used for dust suppression during the rehabilitation phase.

There are no other dewatering requirements with the final landform and associated PMLUs.

2.6.1.7.5 Ongoing Water Management

Based on the proposed rehabilitation strategy and the applicable assessment reports for the Project, once rehabilitation milestones are met and PMLUs have been achieved, no further water management requirements are expected, including infiltration and seepage interventions and dewatering.

All other water storages, that were created for or by the mining operations, will be decommissioned and rehabilitated. Potential contamination will have been investigated, remediated and/or appropriately managed (RM2).

The final void will continue to act as a long-term sink capturing and containing any groundwater seepage from the site, will not overtop, and will not be flooded by the Isaac River or Cherwell Creek.

Monitoring of the Conrock Gully diversion will continue over the life of the Project to demonstrate that the diversion is hydraulically functional and stable, and will not require on-going management.

The final void will be established as a beneficial water storage PMLU for grazing and/or a suitable water source for the Project's permanent infrastructure – PHES and/or algae production PMLU.

2.6.1.8 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.

2.6.1.8.1 Revegetation Objectives

Rehabilitation methods proposed for the Project consider the disturbed soil condition, such as depleted seed bank and increased susceptibility to weed growth. Specifically, revegetation of disturbed land at the Project seeks to establish vegetation consistent with the proposed PMLUs, with milestone goals and timing that reflect the regeneration of the targeted ecological community or productive agricultural pasture.

The plan is aimed at establishing a safe, stable, and non-polluting landform, with a self-sustaining vegetation cover consistent with the proposed PMLUs. The revegetation plan for the native revegetation does not aim to completely mimic conditions of the target REs in their remnant or undisturbed state, instead revised BioCondition benchmarks developed by an AQP will be used to demonstrate a developmental trajectory towards a sustainable ecological community for the applicable REs.

Revegetation activities for the native vegetation (riparian woodland) – Conrock Gully, native vegetation (woodland) – final low wall batter ($\leq 25\%$) and native vegetation (riparian) – River/creek crossings PMLUs will focus on the establishment of groundcover to facilitate stability and topsoil retention, to return and enhance the targeted REs, which will also provide shrub and tree cover to help re-establish fauna habitat. Native seed mixtures will contain a variety of perennial grass, shrub, and tree species introduced by direct seeding to establish a self-sustaining ecosystem.

Revegetation activities for the grazing PMLU will focus on establishment of a stable and productive pasture to facilitate stability and topsoil retention, and to enable the return of sustainable grazing and fauna habitat.

Cattle Grazing Objectives

A majority of the Project's disturbance area is proposed to have a grazing PMLU, which is consistent with its former use. The objectives related to revegetation for this PMLU include:

- To ensure the establishment of cattle grazing pasture with land suitability class ≤ 4 .
- To ensure the establishment of a pasture condition rating ≤ 3 , based on the Pasture Condition Assessment Table as per "Stocktake: Balancing Supply and Demand" (Developed by FutureBeef – futurebeef.com.au).
- To ensure the rehabilitated land can be sustainably grazed and is fire resilient.

Native Revegetation Objectives

The objective of the native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLUs is to establish habitat characteristics consistent with the revised BioCondition benchmarks nominated for RE11.3.25 as specified in Table 20, which will be a component of annual monitoring by an AQP using the methodology outlined in the Queensland Herbarium's BioCondition Assessment.

The objective of the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU is to establish habitat characteristics consistent with the revised BioCondition benchmarks nominated for RE11.5.3 as specified in Table 21, which will be a component of annual monitoring by an AQP using the methodology outlined in the Queensland Herbarium's BioCondition Assessment.

Diversion Objectives

The native vegetation (riparian woodland) – Conrock Gully PMLU includes aspects of the Conrock Gully diversion such as the beds of the diversion. The objective for this component of the PMLU is to ensure the diversion is constructed and operates in accordance with its Functional Design Report (Appendix D of **Appendix J**).

2.6.1.8.2 Species of Conservation Significance

Species of conservation significance that will be impacted by the Project will be managed in accordance with the statutory requirements of the EO Act for MSES and the EPBC Act for MNES, which will involve the use of agreed offset areas located outside the Project's boundary and accompanying approved offset area management plans.

Species of conservation significance that will not be impacted by the Project will be protected by a GIS site-based land management system, signage (if required) and a permit-to-disturb system for the authorisation of clearance and disturbance.

2.6.1.8.3 Surface Preparation and Topsoil Quality to Support Vegetation Establishment and Management

Final rehabilitation will be undertaken progressively on disturbed areas as they become operationally available with the progression of mining operations. The general sequence of works during each progressive rehabilitation campaign includes:

- Reshaping of mining disturbed areas when they become operationally available. Reshaped to the final design shape (Section 2.6.1.5) (RM3).
- Identify and conduct sampling of the topsoil to be applied, to confirm the soil type and if ameliorant(s) are required (RM4).
- Rip surface to no less than 0.3 m to reduce compaction and allow adequate water and root penetration into this layer.
- Spread growth medium at a minimum depth of 0.3 m.
- Apply ameliorants (e.g. fertiliser) as required based on the sampling completed by an AQP.
- If required, scarify the topsoil to incorporate soil ameliorants but not to a depth that will bring any spoil material to the surface.
- Apply seed and till on the contour with a tined implement that possesses tyne spacing no greater than 0.5 m.
- Complete supplemental hand planting of trees and shrubs as required.

Topsoil Quality

Topsoil properties to support the desired PMLU will have:

- pH in the range of 6 – 8.5.
- Electrical Conductivity (saturated extent) is ≤ 2 dS/m or 2,000 μ S/cm.
- Exchangeable sodium percentage (ESP %) < 6 .
- Emerson aggregate class is ≥ 4 .

Prior to application, soil should be assessed by an appropriately qualified person, with amendments recommended and applied as required (RM4) to suit any particular requirements of a PMLU.

2.6.1.8.4 Plant Species

Cattle Grazing Species

The recommended revegetation species mix for grazing PMLU is based on preferred, palatable and productive (3P) pasture species and legumes cognisant of grazing best management practice. Suitable pasture species are provided in Appendix 3.2. These species are based on a combination of 3P species used for rehabilitation at IDM and other mines in the Bowen Basin.

Woodland Habitat Species

The recommended revegetation species mix for the native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLUs is based on the re-establishment of RE11.3.25 and is provided in Appendix 3.1.

The recommended revegetation species mix for the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU is based on the re-establishment of RE11.5.3 and is provided in Appendix 3.1.

The total recommended seeding rates for upper-story tree species (>12 m), mid and lower story tree (5-12 m) and shrub (1-5 m) species, and ground cover species (<1 m), is 5 kg/ha for each structural vegetative tier (i.e. the upper and mid stories and groundcover).

Planting Rates and Timing

A contingency of +20% will be applied to the seeding rates specified, to account for plant mortality.

Care will be taken to not overseed tree and shrub species, as this may cause undesirable densities of trees and shrubs to establish. Excess trees and shrubs can hinder and/or limit the establishment of groundcover species that are critical for limiting erosion of the final landform.

Revegetation activities will preferentially occur in the late summer or early autumn when soil moisture is normally high, and temperatures are milder.

Seed Collection and Procurement

If required, and where possible, native seed may be collected from populations on or near the Project to maintain endemic tolerance or local provenance qualities. Seed collection could occur in the years prior to commencement of rehabilitation, and continue as rehabilitation occurs progressively through to the end of mining.

In the case where seed collection cannot supply sufficient seed (e.g. future dry periods that reduce seed set), species planted from seed may need to be purchased from local suppliers up to six months in advance and in quantities sufficient to undertake direct seeding operations. Seed shall be stored appropriately on-site once received and/or collected.

2.6.1.8.5 Vegetation Establishment and Management Methods

Seeding

Direct seeding will be preferred to achieve an even and continuous cover of vegetation for the PMLUs requiring revegetation. Seeding may be undertaken using conventional broadcast seeding equipment (e.g. combine seeders, spread with harrows or spinner).

In most cases, *Acacia* spp. seeds have a hard coat which is impermeable to water and germination will not normally occur unless some sort of pre-treatment is conducted. In nature this hard coat leads to seed dormancy until it is broken down over time or by the heat of bushfire. Approximately half of the hard-coated *Acacia* spp. seeds will be scarified prior to sowing. This action will allow scarified seeds to imbibe and germinate. By only scarifying half of the seeds, additional reserves are maintained in the soil seed bank. Seed scarification can be conducted by the seed supplier prior to delivery. However, to improve germination performance, scarified seed needs to be sown as soon as possible after scarification.

Weed Control

Establishment of a self-sustaining ecosystem with comparable management requirements to similarly regional ecosystem will require weed management. Weed management for rehabilitation areas will aim to ensure:

- weed species are less than 5% of the vegetative cover
- restrictive or prohibited invasive plants are managed in accordance with Queensland's general biosecurity obligation.

Weed management methods include the following actions:

- Weed and feral pest awareness training will be provided to employees at inductions and scheduled toolbox talks.
- Wash down facilities and procedures will be developed for the Project's mobile equipment and vehicle.
- Wash down bays will collect seeds that are washed from the vehicles to prevent ingress to drainage lines.
- Regular weed monitoring and control programs will be established for the Project.

- As required, weed management advice will be sought from an AQP.
- A weed and pest management plan will be established for the Project (see **Appendix AI**).

Planting Success

Monitoring of newly seeded rehabilitation will be conducted annually by an AQP and will continue until successful establishment has been scientifically proven. Plant health and mortality will be recorded, and any damaged or distressed plants will be attended to (e.g. watered, fertilised). If the mortality rate exceeds 30% of total plants, supplementary planting will be undertaken.

Fauna Control

Over grazing activity from native animals (e.g. kangaroos and wallabies), livestock (e.g. cattle), and feral pests (e.g. pigs, goats, and mice) have the potential to impact rehabilitation success, particularly in younger less established areas.

Grazing activity that impacts rehabilitation will be recorded during annual rehabilitation monitoring assessments by an AQP. Where damage exceeds acceptable levels, grazing reduction treatments are to be engaged. Feral pest controls will be instigated if they are found to be damaging revegetated areas and will form part of the Project's weed and pest management plan (e.g. trapping and shooting). Damage from other grazing animals may need to be managed through the establishment of exclusion areas until rehabilitation has recovered (e.g. fencing) or in the case of cattle, managing stocking rates.

2.6.1.8.6 Revegetation Monitoring

Monitoring is an integral part of the revegetation management strategy, enabling early detection of risks to rehabilitation and an indicator to commence effective mitigation management actions in areas that are under performing.

Key objectives of the monitoring program are to:

- Track the progress of rehabilitation activities with respect to milestones and benchmarks for comparable communities at analogue sites (grazing revegetation).
- Track the progress of rehabilitation activities with respect to milestones and the nominated revised BioCondition benchmarks (native woodland revegetation).
- Identify problems affecting the progress or success of rehabilitation, which can then be addressed through remedial management actions.
- Identify key site-specific success factors for successful rehabilitation and apply these more broadly throughout the Project.
- Collect data to objectively assess compliance with the Project PRCP Schedule, relating to the creation of ecological values that are self-sustaining.

The timescales over which rehabilitation activities will be conducted can be expected to vary considerably between woodland and grazing communities. The establishment of functional woodland ecosystems may take decades, due to the slow growth rates of canopy vegetation. However, a range of incremental benefits in habitat value for ecosystem services can be expected throughout this period. In contrast, grazing pastures can be expected to form functional ecosystems over shorter timeframes of 5-10 years. The shorter timeframes for rehabilitation relate to the fast growth rate of grasses and legumes.

A summary of key stages expected in the rehabilitation of woodland and grazing ecosystems at the Project is provided in Table 17.

Table 17: Summary of Key Stages Expected in the Rehabilitation of Woodland and Grazing Ecosystems

Revegetation Phase	Definition	Anticipated Timeframe	
		Woodland Habitat	Cattle Grazing
Initiation and Establishment	Preparation of rehabilitated landform (topsoil, surface preparation and ameliorants) and seeding. The period required for rehabilitation to become self-reliant in normal seasonal conditions. Maintenance works may be required to maintain weeds, replace vegetation losses and rectify erosion.	0-3 years	0-2 years
Maintenance	The period of growth post establishment until the time that the rehabilitation becomes dominant and self-sustaining on site.	3-10 years	2-5 years
Completion	Final vegetation community and associated fauna habitats establish.	10+ years	5 years

The monitoring program allows for assessment of ecological values through time. In this way the assessment can track trends in ecological values with the intent that values trending towards those present in analogue sites or consistent with published benchmarks but that may take long periods to reach (30+ years) can be used to demonstrate revegetation success in shorter periods of time (not less than 5 years).

Comparisons of ecological indicators will be made with those at analogue sites and/or with respect to published benchmarks for relevant ecosystem indicators (e.g. RE benchmarks and water quality guidelines). In addition to ecological indicators, soil indicators are also to be assessed against those present in analogue sites or those consistent with published benchmarks or suitability targets.

Monitoring of the Conrock Gully diversion will be conducted at the Project to assess the performance of the rehabilitated diversion. The purpose of the monitoring is to assess the performance of the rehabilitated drainage feature in achieving the requirements of the Functional Design Report (Appendix D of **Appendix J**) and the final applicable PMLU milestone criteria for relinquishment (RM7 and RM8).

Monitoring of the Conrock Gully diversion will be conducted in accordance with Section 7 of Appendix D of **Appendix J**.

The rehabilitation monitoring methodology for the Project, including rehabilitation success indicators and reporting requirements is provided in the attached PRCP Schedule and outlined further in Section 2.8.

2.6.1.8.7 Revegetation Monitoring – Analogue Reference Sites

Vegetation analogue sites for pasture will be established by an AQP within or in the vicinity of the Project prior to the first annual rehabilitation monitoring assessment to provide comparable data for rehabilitated sites. These vegetation analogue sites will be selected based on their representative features of the respective land disturbances such as topography, soil characteristics, and vegetation type and structure. Each analogue site will be clearly identified and recorded by an AQP, incorporated into the Project's permit-to-disturb system to prevent future disturbance, entered into a site-based GIS database, and used for annual monitoring purposes. The Project's site-based environmental team will be responsible for long-term management of the established analogue sites.

2.6.1.8.8 Revegetation Milestones and Objectives – Grazing

Pasture rehabilitation will be assessed by an AQP to certify that it meets a pasture condition rating of class ≤ 3 , based on the Pasture Condition Assessment Table outlined in "*Stocktake: Balancing Supply and Demand*" (developed by FutureBeef –futurebeef.com.au) and provided in Table 18. A summary of key assessable pasture attributes includes:

- Certification that pasture achieves a pasture condition rating class ≤ 3 .
- Preferred pasture species (3P grasses) diversity of ≤ 2 species.
- Preferred pasture (3P grasses) % dry matter yield $\leq 10\%$.

- Annual grass species dry matter yield <70%.
- Grasses other than 3P grasses and other weeds dry matter yield <80%.
- Crown cover (3P grasses) – at worst, moderate to low density and some plants dead.
- Land suitability class ≤4.
- Certification from an AQP that rehabilitation is resilient to fire and grazing pressures.

Table 18: Summary of Pasture Condition Assessment

Condition Rating	Condition Indicators				
	Preferred Pasture Species		Annual Grass % DM Yield	Undesirable Grasses and Other Weeds % DM yield	Preferred Pasture Species Diversity
	% Dry Matter (DM) Yield	Crown Cover			
1	>80%	Dense and plants healthy	<20%	<20%	>5 species
2	60 – 80%	High to moderate density and some plants unhealthy	20 – 40%	20 – 30%	3 – 5 species
3	10 – 60%	Moderate to low density and some plants dead	40 – 70%	30 – 80%	2 – 3 species
4	<10%	Sparse and many plants dead	>70%	>80%	0 or 1 species

2.6.1.8.9 Revegetation Milestones and Objectives – Woodland Habitat RE Benchmarks – RE11.3.25 and RE11.5.3

The overarching objective for the native vegetation (riparian woodland) – Conrock Gully PMLU (RA1), native vegetation (woodland) – final low wall batter (≤25%) PMLU (RA3), and native vegetation (riparian) – River/creek crossings PMLU (RA8) is to establish stable, self-sustaining native woodland systems consistent with the nominated REs and capable of achieving long-term landform stability and ecological function within PRCP timeframes. An AQP has nominated RE11.3.25 for RA1 and RA8, and RE11.5.3 for RA3 (see Appendix 3.3 of this PRCP). Table 19 provides a summary of the Project's RAs, nominated REs, PRCP timeframes, and associated objectives and trajectories.

Rehabilitation objectives common to all woodland RA areas are as follows:

- Establishment of a persistent native groundcover sufficient to stabilise soils and minimise erosion risk.
- Development of a canopy and subcanopy layers consistent with the nominated RE.
- Achievement of a native-dominated species composition aligned with the target RE.
- Progressive biomass accumulation and canopy consolidation indicative of structural development.
- Evidence of ongoing recruitment and vegetation persistence.
- Demonstration of a positive ecological trajectory toward a stable woodland ecosystem.

The anticipated rehabilitation trajectory for all areas comprises the following phases:

- Establishment Phase (Years 0–3): Rapid germination and establishment of native groundcover and planted canopy species, with high stem density and low basal area.
- Structural Development Phase (Years 3–10): Increasing canopy height and cover, progressive basal area accumulation, and thinning of early cohorts.

- Consolidation Phase (Years 10+): Stabilised groundcover, increasing canopy maturity, evidence of recruitment (where feasible within species maturation constraints), and a sustained positive structural trajectory.

It is recognised that certain late-successional attributes characteristic of mature remnant woodland systems are unlikely to be achieved within PRCP timeframes (e.g. large trees and advanced structural complexity). Accordingly, the revised BioCondition benchmarks focus on measurable indicators of stability, structural development and positive trajectory rather than full remnant equivalence.

This trajectory-based framework ensures that assessment of rehabilitation success reflects ecological development pathways appropriate to reconstructed landforms while remaining consistent with regulatory requirements for demonstrating achievement of the nominated woodland PMLUs to a stable condition.

2.6.1.8.10 Revegetation Milestones and Objectives – Revised Benchmarks – RE11.3.25 and RE11.5.3

Appendix 3.3 presents the proposed revised BioCondition benchmarks for the nominated REs associated with the woodland PMLUs. The revised benchmarks are derived from the BioCondition framework, with proportional adjustments and supplementary Queensland Biodiversity and Ecology Information System (QBEIS) -informed attributes incorporated where necessary to reflect achievable rehabilitation trajectories within PRCP timeframes.

For each attribute, Appendix 3.3 summarises the revised benchmark and provides justification outlining the ecological rationale, reference source and alignment with anticipated structural development. These revised criteria are intended to provide measurable, auditable and trajectory-based indicators of rehabilitation stability consistent with regulatory requirements.

During monitoring of the RAs, the benchmark for each assessable attribute for the nominated RE must be met, rather than the overall BioCondition score, for the BioCondition assessment to demonstrate achievement of the PRCP success criteria.

To develop the revised BioCondition benchmarks, consideration was given to the potential use of staged or interim benchmark thresholds corresponding to different phases of rehabilitation (e.g. post-establishment and later structural development stages). Under such an approach, different benchmark values would apply during early rehabilitation phases compared to benchmarks applied once vegetation has progressed toward a more stable woodland structure. This approach was not adopted for the PRCP. Introducing multiple benchmark thresholds across different stages of rehabilitation would increase complexity in both monitoring and interpretation of results, potentially creating uncertainty regarding the point at which a site is considered compliant or whether management intervention is required. In particular, the practical management response to failure to meet an interim benchmark is unclear. For example, it may be difficult to determine whether a shortfall represents normal ecological variability during early development or whether additional interventions such as supplementary planting or structural augmentation would be warranted.

Instead, the revised benchmarks have been established as a single set of criteria representing the structural and compositional attributes expected of a stable woodland system within the defined PRCP timeframes. Monitoring results will be interpreted using a trajectory-based assessment approach, whereby successive monitoring events will be used to evaluate whether RAs are progressing toward these benchmarks. This allows early-stage rehabilitation areas to demonstrate positive development without the need for multiple numerical thresholds, while still ensuring that vegetation communities are trending toward the intended woodland structure and function.

This approach aligns with contemporary rehabilitation assessment principles, which emphasise evidence of progressive ecosystem development and structural consolidation over time rather than compliance with fixed interim condition targets.

The finalised BioCondition benchmarks to be used as milestone criteria (RM6 and RM7) are provided for the native vegetation (riparian woodland) – Conrock Gully PMLU (RA1) and native vegetation (riparian) – River/creek Crossings PLMU (RA8) in Table 20, and for the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PLMU (RA3) in Table 21.

Table 19: Summary of RAs, nominated REs, PRCP timeframes, and associated Objectives and Trajectories (Appendix 3.3 of this PRCP)

Rehabilitation Area	Pre-Mine RE	Area (ha)	PMLU	Nominated RE for Rehabilitation	Expected PRCP Timeframe	Rehabilitation Objectives	Rehabilitation Trajectory
RA1 - Conrock Gully Diversion	Non-remnant	26.60	Native Vegetation (Riparian Woodland) – Conrock Gully	11.3.25	16 years (initial planting proposed early on in operations)	- Establish a stable woodland community consistent with one of the nominated pre-mine REs. - Achieve stable channel and bank conditions with no active gully erosion. - Establish persistent native groundcover, shrub and tree layers appropriate to a watercourse setting. - Support a self-sustaining vegetation community capable of meeting the woodland PMLU.	- Initial establishment of native groundcover and riparian species following seeding. - Development of riparian structure and increasing canopy cover. - Progression toward a stable, functioning woodland system consistent with the nominated RE. - Stabilisation of banks and persistence of native species over time. - Late-successional structural attributes not expected within PRCP timeframes.
	11.3.1	0.02					
	11.3.2	0.12					
	11.3.3	3.35					
	11.3.25	0.68					
	11.5.3	3.73					
	<i>Total:</i>	34.50					
RA3 - Low Wall (Overburden Dump)	Non-remnant	34.82	Native Vegetation (Woodland) – Final Low Wall Batter (≤25%)	11.5.3	20 years (rehabilitation to occur post operations)	- Rehabilitate the low wall dump slope to a stable open woodland consistent with a nominated RE that will establish on the low wall slope. - Achieve long-term landform stability and erosion resistance, inclusive of rock armouring. - Establish and maintain native species dominance across ground and canopy layers. - Support a self-maintaining vegetation community suitable for the approved woodland PMLU.	- Early establishment of native groundcover and woodland tree species. - Development of woodland structure and increasing canopy cover. - Ongoing recruitment and persistence of native species indicating functional stability. - Progression toward a stable, functioning woodland system consistent with the nominated RE.
	11.4.9	2.18					
	<i>Total:</i>	37.00					

Rehabilitation Area	Pre-Mine RE	Area (ha)	PMLU	Nominated RE for Rehabilitation	Expected PRCP Timeframe	Rehabilitation Objectives	Rehabilitation Trajectory
							Late-successional structural attributes not expected within PRCP timeframes.
RA8 - Watercourse Riparian Zone (Isaac River and Cherwell Creek)	11.3.25	6.39	Native Vegetation (Riparian) – River/creek Crossings	11.3.25	20 years (rehabilitation to occur post operations and use of crossings in initial closure phase)	- Establish a stable riparian woodland consistent with the nominated RE. - Provide bank stability and minimise erosion within the riparian corridor. - Establish native riparian species capable of withstanding variable flow conditions. - Support long-term vegetation stability consistent with the woodland PMLU.	- Early establishment of riparian groundcover, shrubs and juvenile trees. - Development of a young riparian woodland with increasing structural complexity. - Stabilisation of banks and persistence of native species over time. - Late-successional structural attributes not expected within PRCP timeframes.

Table 20: Revised RE11.3.25 Benchmark Criteria: Native Vegetation (Riparian Woodland) – Conrock Gully and Native Vegetation (Riparian) – River/creek Crossings PMLUs (Appendix 3.3 of this PRCP)

Regional Ecosystem		RE11.3.25 Benchmark	PRCP Benchmark - RE11.3.25 revised
Short Description		<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	
BioCondition Standard Attributes			
Recruitment of woody perennial species in Ecological Dominant Layer (EDL)		100	≥40% ¹
Native plant species richness	Trees	4	≥3
	Shrubs	4	≥1
	Grasses	8	≥1
	Forbs	13	≥3
Emergent canopy (E) height (m)		N/A	N/A
Tree canopy (T1) height (m)		23	≥12
Tree subcanopy (T2) height (m)		11	≥5
Average Canopy height		17	8.5
Emergent canopy (E) cover (%)		NA	NA
Tree canopy (T1) cover (%)		34	≥27
Tree subcanopy (T2) cover (%)		12	≥7
Average canopy cover		23	17
Shrub canopy cover (%)		7	4
Native grass cover (%)		35	≥23
Organic litter (%)		21	≥10
Coarse woody debris (CWD) (m/ha)		473	≥142
Non-native plant cover		0	≤10
QBEIS Supplementary Attributes			
Basal Area Trends (m²/ha)		14.7 ²	≥7
Woody Species Composition		Nil	NA ³
Stem density measures of abundance (stems/ha)		Nil	>500

Note:

¹ = To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

² = QBEIS attributes (e.g., Basal area trend, woody species composition, stem density) benchmarks taken from the Technical Description for the REs.

³ = Woody species composition will be recorded as a contextual monitoring indicator only to help interpret rehabilitation trajectory toward the nominated REs and support adaptive management, but it will not be assessed against a benchmark.

Table 21: Revised RE11.5.3 Benchmark Criteria: Native Vegetation (Woodland) – Final Low Wall Batter (≤25%) PMLU (Appendix 3.3 of this PRCP)

Regional Ecosystem		RE11.5.3 Benchmark	PRCP Benchmark - RE11.5.3 revised
Short Description		<i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces	
BioCondition Standard Attributes			
Recruitment of woody perennial species in Ecological Dominant Layer (EDL)		100	≥40% ¹
Native plant species richness	Trees	3	≥2
	Shrubs	6	≥1
	Grasses	9	≥1
	Forbs	11	≥2
Emergent canopy (E) height (m)		N/A	N/A
Tree canopy (T1) height (m)		17	≥8
Tree subcanopy (T2) height (m)		8	≥4
AVERAGE Canopy height		12.5	6
Emergent canopy (E) cover (%)		NA	NA
Tree canopy (T1) cover (%)		25	≥20
Tree subcanopy (T2) cover (%)		5	≥3
AVERAGE canopy cover		15	11.5
Shrub canopy cover (%)		10	5
Native grass cover (%)		26	≥17
Organic litter (%)		30	≥15
Coarse woody debris (CWD) (m/ha)		342	≥103
Non-native plant cover		0	≤10
QBEIS Supplementary Attributes			
Basal Area Trends (m²/ha)		10.5	≥5
Woody Species Composition		Nil	N/A ²
Stem density measures of abundance (stems/ha)		Nil	>500

Note:

¹ = To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

² = Woody species composition will be recorded as a contextual monitoring indicator only to help interpret rehabilitation trajectory toward the nominated REs and support adaptive management, but it will not be assessed against a benchmark.

2.6.2 Tailings

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.

There are no tailings storage facilities to be located within the Project area. Therefore, the requirements of this part of the PRCP Guideline are not applicable.

2.6.3 Final Void – Beneficial Water Storage PMLU

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.

2.6.3.1 Final Void Option

The options assessment for the Project's final void involved:

- Developing potential final void configurations which were plausible within the overall landform constraints.
- Modelling long term lake levels, volumes and salinity as key factors in determining whether a particular void configuration was likely to result in a void lake that would support one or more PMLUs.
- Assessing the long term geotechnical stability of void high wall and low wall slopes.

The final void geometry, and catchment reporting to the final void from the in-pit spoil dump, are key inputs into the void model after accounting for the other variables in the modelling methodology.

Key factors influencing final void lake levels and quality are the surface area to volume ratio of the final void lake, and the size of the catchment draining to the lake. It was found that the smaller the surface area to volume ratio, and the larger the catchment, the more likely water quality within the void would remain suitable for PMLUs. The configuration of the in-pit dump, both in terms of the size and shape of the void that would contain a lake, and the proportion of the in-pit dump catchment reporting to the lake, were considered for void options. In addition, in accordance with the landholder's preference for additional water supply to support grazing, all final void modelling allowed for extraction of water from the void where salinity remained below acceptable limits for stock watering, which was selected to be 7,800 µs/cm (see section 8.5 of **Appendix I** for a justification for the livestock drinking water guideline value for salinity). This has the effect of removing salts from the lake provided water quality remains suitable for stock watering.

Different void configurations were assessed (see **Appendix I**). The following physical parameters, which represent the 'bookends' of potential void configurations, were modelled:

1. Minimise void size, maximise the catchment from in-pit dumps (also referred to as the 'base case' option) – a small deep void in the central pit area, with the southern portion of the pit area partially backfilled, which resulted in a small, deep lake

2. Maximum void size – a large void along the length of the final mined highwall (other than the northern portion of the pit in the 0.1% AEP floodplain which is backfilled), with a maximum catchment from in-pit dumps, which resulted in a broad, shallow lake forming in the base of the pit. This option represents the most cost effective option for the Project as requires minimal modification of the in-pit dump profile following the completion of mining operations.
3. Partial backfill - a partially backfilled void to around 175 metres above Australian Height Datum (mAHD), with a maximum size void catchment which resulted in a shallow, broad lake forming across the backfilled area. This option represents a high cost for the Project (circa \$232 M) which could only be justified if it provides an improved long-term sustainable PMLU compared to other options.

Based on the iterative approach to mine design / engineering and final void modelling, the preferred final void design, with the greatest potential to support one or more PMLUs was Option 1 – minimise the void size and maximise the catchment from in-pit dumps. This option maintains a usable volume of water in the void at a salinity level that can reasonably supply various PMLUs, and despite the inherent conservatism of the modelling (i.e. likely to overestimate void water quality results), demonstrates that the modelled void water quality is unlikely to pose an unacceptable risk as a livestock drinking water supply or as a source of water for algae production (see **Appendix M**). Over the life of the Project and prior to a void lake forming post closure, additional information, studies and modelling will be undertaken to support the intended use of void water as a livestock drinking water supply and other PMLUs utilising the water in the void lake.

2.6.3.2 Final Void – Hydrology

2.6.3.2.1 Flooding Interaction

As described in Section 2.5.3, modelling of the 0.1% AEP flood event for the final landform is presented in Figure 14, demonstrating that the final void is not within the defined floodplain.

2.6.3.2.2 Water Balance

The Project's final void was modelled under a number of potential future scenarios based on its planned use for stock watering and the permanent infrastructure – PHES and/or algae production PMLU, which included:

- a stock watering use only as the base case (see Sections 8.6 of **Appendix I**)
- a stock watering use only under an extreme weather event (i.e. a 0.1% AEP 72-hour (3 day) design storm event) (see Sections 8.6 of **Appendix I**)
- a combined stock watering and algae production use only (see Sections 8.7 of **Appendix I**)
- a combined stock watering, PHES and algae production use (see Sections 8.8 of **Appendix I**).

The final void's water levels were modelled using a 500-year simulation period, with the median (50th percentile) and 95th percentile results from the stochastic climate assessment.

In summary, for all the modelled scenarios using the median (50th percentile) and 95th percentile results, the pit crest does not overtop at any point in the 500-year simulation. The Project's modelling of the final void's long-term water level and salinity behaviour is fully detailed in Sections 8 of **Appendix I**.

2.6.3.3 Final Void – Geotechnical Stability

As described in Sections 2.1.3.1.7 and 2.6.1.5.2, the assessment demonstrates that the Project's final void, including highwall and low wall slopes, is predicted to be geotechnically stable in the long term based on achieving a factor of safety of ≥ 1.5 . The geotechnical stability modelling of the Project's final void is detailed in **Appendix H**.

2.6.3.4 Final Void – Groundwater Modelling

As outlined in Section 2.6.1.1.2, the numerical groundwater modelling undertaken for the Project indicates that, under post-mining conditions, the residual void lake remains a hydraulic sink relative to surrounding aquifers. Predicted groundwater levels in the adjacent regolith, alluvium and Permian units remain above void lake levels, maintaining inward hydraulic gradients over the long term. As a result, outward leakage of void lake water to the surrounding groundwater system is not predicted.

2.6.3.5 Final Void – Water Quality

A numerical hydrogeochemical model of the Project's final void was developed to assess the potential water quality of the pit lake post closure and is detailed in **Appendix M**.

The Project's final void water quality model results for all parameters are provided in Section 7 of **Appendix M**. Key points from the final void water quality modelling include:

- All modelled parameters generally show an increasing concentration trend for the first 110 years, after which the values reach a quasi-steady state.
- Modelled pH in the quasi-steady state after 110 years ranges between 8.92 and 9.07 (slightly alkaline), with a median value of 9.00 (Figure 23). The corresponding total alkalinity indicates there is an excess of acid buffering capacity of the lake water.
- Modelled EC (salinity) in the quasi-steady state varies from ~2,275 $\mu\text{S}/\text{cm}$ to ~3,450 $\mu\text{S}/\text{cm}$, with a median of ~2,825 $\mu\text{S}/\text{cm}$ (Figure 23).
- The major ion, represented by sulfate (SO_4) and chloride (Cl), and metal/metalloid concentrations, represented by arsenic (As), manganese (Mn), lead (Pb), and zinc (Zn), generally follow the same trend as EC.
- The dominant major ions, other than bicarbonate alkalinity, are sodium (Na) and chloride (Cl) with lesser sulfate (SO_4), magnesium (Mg), potassium (K) and calcium (Ca).
- The spikes in salinity, major ions and metals/metalloids, once a quasi-steady state is reached, tend to be associated with lower rainfall years when runoff volumes and direct rainfall are lower relative to spoil and groundwater inflow and thus dilution effects from runoff and direct rainfall are reduced while evapoconcentration of accumulated water in the void is relatively higher.

A comparison of the modelled post-closure pit lake water quality results to the livestock drinking water guidelines (LDWG) values indicated:

- Salinity as defined by EC is well below the LDWG value of 7,800 $\mu\text{S}/\text{cm}$ over the 500-year modelling period.
- Ca and SO_4 are below the LDWG value.
- The vast majority of modelled dissolved metal/metalloid concentrations in the void lake are within the LDWG values except for fluorine (F), molybdenum (Mo) and selenium (Se), which at some point in the 500-year modelling period, exceed LDWG value.

The modelled concentrations of F, Se and Mo, which are inferred to be mobilised from backfilled spoil, are considered conservative estimates (i.e. likely to be overestimated concentrations). This conservatism arises from methodological assumptions and testing conditions that likely overstate constituent mobilisation under long-term field conditions, and therefore, are unlikely to pose an unacceptable risk for livestock drinking water.

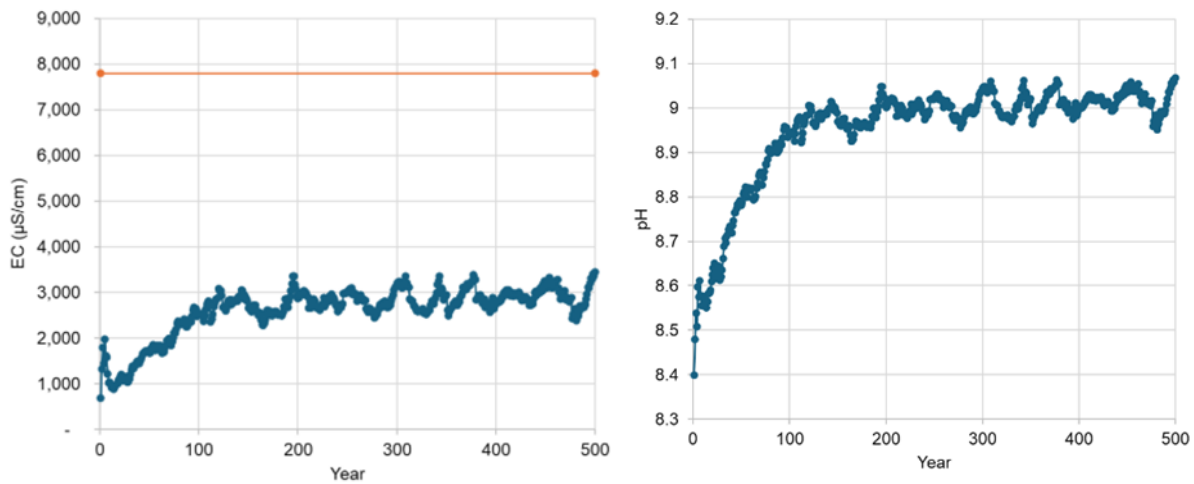


Figure 23: Final Void Salinity (EC) and pH Modelling Results

2.6.3.6 Final Void – Dimensions

A digital elevation model (DEM) of the final landform, including the final void, was developed for the Project based on the final surface expected at the end of the mine life. A summary of the final void geometry from the DEM is provided in Table 22.

Table 22: Final Void Geometry

	Floor Level (mAHD)	Crest level (mAHD)	Depth (m)	Volume to Crest (ML)	Surface Area at Crest (ha)
Final Void	122	203	80	34,641	133.3*

Note:

* = As explained in Section 2.1.3.2, it should be noted that the rehabilitation area associated with the void is 71 ha, as the void area at its crest includes in-pit dump areas, which are assigned to different rehabilitation areas.

2.6.3.7 Final Void – PMLU Use

Based on the results of the final void design and void lake modelling, the following potential PMLUs were evaluated for the Project's final landform:

- stock watering
- algae production
- PHES
- irrigation of agricultural land
- aquatic ecosystem.

Where the potential PMLU was considered feasible, an assessment of the long term final void water balance and salinity was undertaken with the PMLU or combination of PMLUs. Modelling of the void lake with various PMLUs is provided in Section 8 of **Appendix I**. The PMLU evaluation demonstrated that stock water, algae production and PHES were feasible options, and that the irrigation of agricultural land and establishment of an aquatic ecosystem were not feasible options.

2.6.3.7.1 Stock Watering

The void water quality modelling for the preferred final landform demonstrated that the void lake can be used for stock watering in the long-term. To further assist with stock watering the backfilled southern portion of the pit area has been designed with a gently sloping ramp ($\leq 10\%$) to allow cattle access to the lake.

Consequently, stock watering forms the 'base case' for all modelling of long term final void water balance and salinity. Where other PMLUs are considered feasible, void modelling was undertaken inclusive of stock watering (i.e. as likely future scenarios).

2.6.3.7.2 Algae Production

Over six years of collaborative research has been undertaken by the Centre for Solar Biotechnology at the University of Queensland (UQ) and Valarion on the potential to cultivate and process *Spirulina* as a platform species within a microalgae-based PMLU for final voids. This research has been supported by the Australian Coal Association Research Program (ACARP), CRC TIME, and mining industry partners, including Stanmore. The research has progressed through three ACARP funded stages including laboratory and pilot scale studies and product development experiments. Extensive bioeconomic surveys and techno-economic analyses have also supported the research's transition into a pre-commercialisation phase. The research program has progressed through laboratory-scale strain isolation and pilot-scale cultivation trials using Bowen Basin void water, to experimental studies investigating partial desalination potential, biomass composition screening for bioproducts, downstream processing trials, and techno-economic modelling. A detailed report on the Project's proposed algae production is provided in **Appendix AL**.

The research outcomes, final void water balance modelling, commercial feasibility and possible operational risks of the Project's proposed algae production were assessed to test its viability for use as a PMLU.

In conclusion, the Project's proposed algae production facility represents a technically and commercially plausible and environmentally aligned PMLU concept, with potential to contribute bioeconomic value, and environmental and socially aligned outcomes, subject to further validation, regulatory clarity, and market conditions. The concept is informed by approximately six years of experimental research and early pilot scale evidence, indicating technical feasibility under managed conditions. The analysis of potential cost and revenue streams indicates that the algae production facility is commercially viable.

2.6.3.7.3 Pumped Hydroelectricity Energy Storage

Stanmore commissioned GHD to develop a concept for a floating small scale PHES ('pumped hydro') system utilising water from the final void to generate electricity during periods of peak demand. A pumped hydro system requires the movement of water under gravity to generate power, with water moving between an upper storage and a lower storage. The pumped hydro system assessed for the Project includes a dam at surface (the upper storage) with water released to the void lake (lower storage) to generate power. Water will be released from the upper storage to turbines during periods of high demand for power (e.g. evening and morning shoulder periods). Water will be pumped back to the upper storage during periods of low demand for power (e.g. in the middle of the day). The upper storage will be a repurposed sediment dam utilised during the Project's operations. Above ground pipelines between the upper storage dam and the void lake will facilitate the movement of water.

The concept study outcomes, final void water balance modelling, commercial feasibility and operational risks of the Project's proposed PHES system were assessed to test its viability for use as a PMLU. This assessment identified that the PHES system is subject to risks requiring further evaluation:

- There is variability in the National Electricity Market that determines the 'buy' price to pump water and the 'sell' price assumed during the daily high value market period for power generation.
- Configuration of plant and equipment within the void lake.

In general, the concept study demonstrates the potential commercial and technical feasible of the PHES system, with the ability to provide a positive income stream from a PMLU utilising void water, that is, subject to further evaluation, which will be conducted over the operational life of the Project.

2.6.4 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.

These requirements of the PRCP Guideline are not applicable, because there is no underground mining planned for the Project.

2.6.5 Removal of Mine 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:

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

All infrastructure constructed during the mining activities, including water storage structures, will be removed from the Project site prior to mine closure, except where agreed in writing by a third party (e.g. the landowner).

Table 23 details the infrastructure associated with the mining activities at the Project that is currently planned to be removed at the cessation of mining activities. The decommissioning and removal of the Project's mining infrastructure is RM1. The timing of the decommissioning and removal of the infrastructure is based on the proposed scheduling of the Project's mining operation, period of utilisation of infrastructure, decommissioning strategy, and rehabilitation activities. The decommissioning and removal of the infrastructure will be conducted in accordance with IPC's SHMS, which includes the Project's operations.

As part of the Project's decommissioning phase, the priority will be to repurpose, salvage or recycle any infrastructure to be removed. Demolition and disposal will only be undertaken when alternative options are deemed to not be environmentally or commercially viable, or safe. This approach is in line with the waste and resource management hierarchy outlined in the Queensland Waste Management and Resource Recovery Strategy created under Queensland's *Waste Reduction and Recycling Act 2011* (i.e. waste avoidance, reduction, increased resource recovery and safe management and disposal).

Table 23: Mining Infrastructure for Removal at Closure

Category	Infrastructure
Built Infrastructure	• Go-line. • Crib area (including a potable water storage and supply, a small sewage storage facility, non-mining waste storage, a remote power supply and a parking area). • Internal haul and access roads. • RoM pads. • Self-bunded fuel, oil, and chemical storage at go-line area. • Communications towers. • Bridges. • Temporary dragline crossing of the Isaac River. • Fences.
Supporting Services	• Pipes and pumps. • Switchyard and substations. • Communication and lighting towers. • Concrete pads and bitumen. • Culverts.
Water Infrastructure	• Flood levee and levee plugs. • Mine-affected water and sediment dams. • Drains, diversion banks and pipelines.

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.

2.6.5.1 Decommissioning Mine Infrastructure

Planned decommissioning activities for the Project's mining infrastructure includes:

- All services will be disconnected (e.g. dismantle power feeds, water, or communication-related feeder lines).
- All buildings will be demolished and removed from site.
- All mine roads, access tracks and bridges will be progressively removed, except where agreement supports their retention.
- All powerlines, substations and communication equipment will be removed from site.
- All fuel, oil, and chemical storage will be drained, with materials disposed of in accordance with regulatory requirements, safely decommissioned and removed from site.
- All waste will be removed from site and disposed of in accordance with the Project's waste management plan.
- All remaining exploration drill holes and pads will be rehabilitated in accordance with the eligibility criteria and standard conditions for exploration and mineral development projects – V2 (DEHP, 2016).

2.6.5.2 Decommissioning Water Infrastructure

Planned decommissioning activities for the Project's water infrastructure includes:

- All levee and levee plugs will be progressively removed when deemed to be safe in terms of on-going operational flood protection and potential flood interactions during removal activities (noting that levee plugs will be integrated into the final dump landforms).
- All sediment dams will be progressively removed based on the advice from an AQP.
- All other surface water will be progressively removed based on the advice from an AQP.
- All water supply pipelines will be drained and removed from site.

Conrock Gully diversion will remain as permanent within the closure landform.

2.6.5.3 Contaminated Land Assessment

Contaminants must not be released in a manner that constitutes serious environmental harm, and spillage of any waste, contaminants or other materials must be remediated as quickly as practicable, treated or stored in accordance with relevant standards, and managed in a way that prevents environmental harm.

The proponent will fulfill its statutory responsibilities under the EP Act, particularly as an entity conducting notifiable activities (e.g. general environmental duty and duty to notify of environmental harm, and duty to restore environment).

At completion of mining operations and after infrastructure decommissioning (RM1) but prior to landform establishment, surface preparation and revegetation, a contaminated land investigation will be undertaken for relevant RAs with potential for contamination (i.e. RA4 and RA5) in accordance with RM2, and as a minimum, will include:

- A contaminated land investigation will be completed by an AQP in accordance with the EP Act, and if contamination is identified:
 - Contaminated and hazardous material will either be remediated in-situ, or removed and transported to an approved landfill for disposal, which will include waste tracking information being recorded and submitted as required. Following these actions, validation testing will be undertaken and reported to confirm that contaminated and hazardous materials have been removed or remediated successfully.
- In accordance with the EP Act, sites where notifiable activities have been conducted within the Project area and recorded on the Environmental Management Register (EMR), results from the contaminated land investigation and validation testing of these sites will be used to remove the sites from the EMR (preferred option), or alternatively, to allow these sites to remain on the EMR with an appropriate site-based management plan.

- If required, a contaminated land investigation document, including a site suitability statement, will be prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act. The site suitability statement from an AQP will confirm that the uses or activities for which the land is 'suitable aligns' to the approved PMLU.

2.7 Risk Assessment

Legislative Requirement

In accordance with section 126C(1)(f) of the EP Act, the rehabilitation planning part of the PRCP 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 PRCP 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 PRCP.

2.7.1 Risk Methodology

The Project's risks of a stable condition for land described as a PLMU not being achieved has been undertaken using the methodology described in Figure 24.

As a result of no NUMA being proposed for the Project, no risk assessment of a NUMA is required.

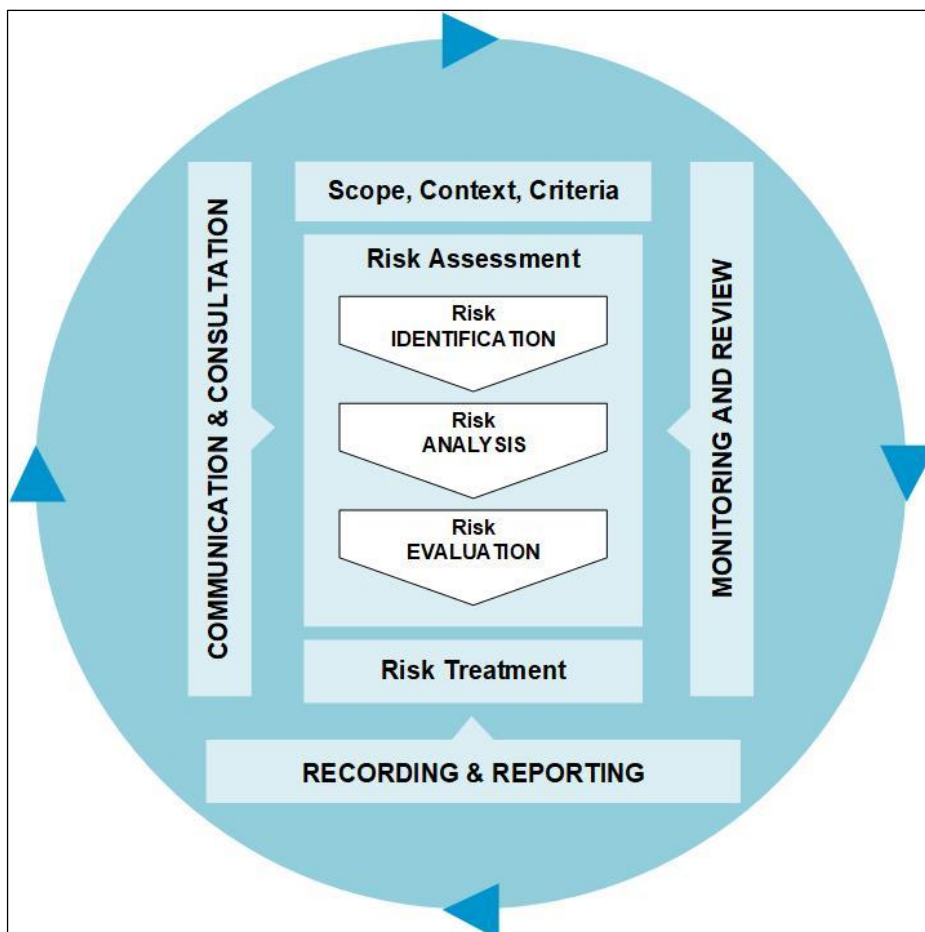


Figure 24: ISO 31000-Compliant Risk-Based Approach

2.7.2 Risk Identification

As required, the risk event was deemed a stable condition for land described as a PMLU not being achieved and was assessed as per ISO 31000 methodology described in Figure 24. The Project's risk assessment is included in Table 28.

For the purpose of the risk assessment, a stable condition was defined as per section 111A of the EP Act:

- The land is safe and structurally stable.
- There is no environmental harm being caused by anything on or in the land.
- The land can sustain a PMLU.

The Project PMLUs assessed were as follows:

- Native vegetation (riparian woodland) – Conrock Gully.
- Grazing.
- Native vegetation (woodland) – final low wall batter ($\leq 25\%$).
- Native vegetation (riparian) – River/creek crossings.
- Beneficial water storage.
- Permanent infrastructure – PHES and/or algae production.

A number of scenarios were identified in the risk identification process related to a stable condition for the land described as the PMLUs not being achieved:

- Contaminated land impacting on environmental receptors, rehabilitation and attainment of the PMLU.
- Alteration of hydrogeological conditions.
- Alteration of local hydrologic and geomorphic conditions.
- Insufficient volume of material available or unsuitable quality for rehabilitation activities.
- Inadequate vegetation cover and establishment.
- Impact of extreme weather events prior to final landform establishment leads to instability of the final landforms.
- Landform establishment is inconsistent with milestone criteria.
- Beneficial Water Storage (final void) does not meet stable condition consistent with milestone criteria.
- Permanent infrastructure – PHES and/or algae production PMLU does not meet the milestone criteria.

2.7.2.1 Risk Analysis, Evaluation and Relevant Treatments

Table 28 provides the detail of risk analysis, risk evaluation and risk treatment for these scenarios. Worst case outcomes were assessed for each scenario, preventative and mitigating controls were identified, and a subsequent final (residual) risk rating was calculated. The likelihood and severity tables used for the purpose of the risk assessment are provided in Table 24 and Table 25, respectively. The outcomes of the final risk rating heat map ratings matrix are provided in Table 26. Table 27 details the risk treatments identified to achieve a stable condition for the PMLUs.

Table 24: Risk Likelihood

Likelihood Table			
Uncertainty	Frequency	Likelihood Factor	Guidance
Highly Likely	Likely to occur within a 1 year period	3	Event is expected to occur >80% of the time during a 5 year planning cycle
Likely	Likely to occur within a 1 to 5 year period	1	Event is expected to occur 60% to 80% of the time during a 5 year planning cycle
Probable	Likely to occur within a 5 to 20 year period	0.3	Event is expected to occur 30% to 60% of the time during a 5 year planning cycle
Unlikely	Likely to occur within a 20 to 50 year period	0.1	Event is expected to occur 10% to 30% of the time during a 5 year planning cycle
Highly Unlikely	Not likely to occur within a 50 year period	0.03	Event is expected to occur <10% of the time during a 5 year planning cycle

Table 25: Risk Severity

Severity Table		
Severity Level	Descriptor	Severity Factor
S5	Severe impact to the environment and where recovery of ecosystem function takes 10 years or more.	1000
S4	Serious impact to the environment, where recovery of ecosystem function takes between 4 and 10 years.	300
S3	Substantial impact to the environment, where recovery of ecosystem function takes between 1 and 3 years.	100
S2	Measurable but limited impact to the environment, where recovery of ecosystem function takes less than 1 year.	30
S1	Minor, temporary impact to the environment, where the ecosystem recovers with little intervention.	10

Table 26: Residual Risk Rating Heat Map Matrix

			Severity Level	S1	S2	S3	S4	S5
			Severity Factor	10	30	100	300	1000
Likelihood	Likelihood	Likelihood Factor	Timeframe	Residual Risk Calculation (with Effective Controls Established)				
	Highly Likely	3	Within 1 year	30	90	300	900	3000
	Likely	1	Within 1-5 years	10	30	100	300	1000
	Probable	0.3	Within 5-20 years	3	10	30	90	300
	Unlikely	0.1	Within 20-50 years	1	3	10	30	100
	Highly Unlikely	0.03	>50 years	0.3	1	3	10	30

Table 27: Risk Treatments to Achieve a Stable Condition for the PMLUs

Aspect	Risk Treatment
Risk Event 1 - Contaminated land impacting on environmental receptors, rehabilitation, and attainment of PMLU	
Reasons for selecting treatment options	Conservatively, additional works are required to reduce contaminated land risks and to achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	AQP to undertake contaminated land investigations and oversee ongoing validation and monitoring requirements Sample collection, laboratory analysis, and engineering controls
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	AQP reporting as per PRCP milestones
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 2 - Insufficient volume of material available or unsuitable quality for rehabilitation activities	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Topsoil inventory Laboratory testing Survey Equipment capabilities Rehabilitation monitoring data AQP to undertake growth media assessment
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Rehabilitation monitoring
Risk timing and scheduling	Alignment with PRCP milestone and schedule
Risk Event 3 - Inadequate vegetation cover and establishment	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Topsoil inventory Survey Equipment capabilities Rehabilitation monitoring data

Aspect	Risk Treatment
	Re-seeding (if required) AQP to undertake growth media assessment
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Rehabilitation monitoring
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 4 - Alteration of hydrogeological conditions	
Reasons for selecting	Studies and analysis performed show that these treatments minimise and/ or prevent impacts
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Monitoring bores maintained and monitoring undertaken
Performance measures and constraints	Alignment with PRCP milestone criteria
Reporting and monitoring	Monitoring at defined frequency Reporting under existing EA requirements
Risk timing and scheduling	Alignment with PRCP milestone criteria and schedule
Risk Event 5 - Alteration of local hydrological conditions	
Reasons for selecting	Studies and analysis performed show that these treatments minimise and/or prevent impacts
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Undertake surface water monitoring
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Monitoring when surface water flows are available Reporting under existing EA requirements
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 6 - Impact of extreme weather events prior to final landform establishment leads to instability of final landforms	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	AQP to undertake monitoring of final landforms post extreme weather (e.g. cyclone) events Rehabilitation monitoring program Emergency response procedures
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Rehabilitation monitoring

Aspect	Risk Treatment
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 7 - Landform establishment inconsistent with milestone criteria	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Data from waste characterisation In-situ geochemical monitoring data Geotechnical data and modelling during mining operations Construction QA
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Rehabilitation monitoring Waste Characterisation sampling and analysis Surface and Groundwater Monitoring
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 8 – Beneficial Water Storage (final void) does not meet stable condition consistent with milestone criteria	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Rehabilitation monitoring data Void water quality monitoring and modelling Surface and groundwater monitoring AQP to undertake certification
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Rehabilitation monitoring
Risk timing and scheduling	Alignment with PRCP milestones and schedule
Risk Event 9 – Permanent infrastructure – PHES and/or algae production PMLU does not meet the milestone criteria	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments achieve a stable condition for the proposed final landform
Responsibility for plan: • Approval. • Implementation.	ID Extension
Proposed actions	Refer to Table 28
Resource requirements	Specialist technical studies Feasibility testing Surface and groundwater monitoring AQP to undertake certification

Aspect	Risk Treatment
Performance measures and constraints	Alignment with PRCP milestones
Reporting and monitoring	Feasibility reporting
Risk timing and scheduling	Alignment with PRCP milestones and schedule

Table 28: Risk Register

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
Landform does not reach stable condition consistent with selected PMLU.	RM7, RM8, RM9	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA9, RA10	• Erosional instability (including due to erosion risk of spoil material). • Geotechnical instability. • Geochemical instability. • Insufficient or incorrect construction methods. • Inadequate vegetation cover and establishment (see separate risk event). • Insufficient volume of rehabilitation materials or unsuitable materials used (see separate risk event). • Extreme or significant weather events (see separate risk event). • Low pasture productivity/diversity. • Poor native woodland establishment. • Contaminated land impacting on environmental receptors, rehabilitation, and attainment of PMLU (see separate risk event).	• Unable to relinquish mining lease and environmental authority. • Extended period required to remediate landform. • Loss or degradation of cover materials. • Poor landform design (soil capping depth, soil material selection, armouring (where applicable) and thickness). • Ineffective monitoring, inspection and remediation program.	Probable (0.3)	3	Medium (30)	• Adopt setbacks to achieve geotechnical stability as a management measure, to ensure the risk of the beneficial water storage not achieving stable conditions is managed. • Construction management, technical supervision, and QA/QC of final landforms and covers will be done by an AQP. • Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. • Mine planning will be conducted by an AQP to ensure the final landform design is achieved. • Grazing PMLU landforms reshaped with a maximum 15% or less overall slope (RA2, RA4, RA5, RA6). • Grazing PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA2, RA4, RA5, RA6). • Native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLU areas are assessed by an AQP as possessing slopes designed in accordance with engineering and guideline standards as being stable long-term (RA1, RA8). • Native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU area is assessed by an AQP as possessing a slope of $\leq 25\%$, as being stable long-term and as possessing the required rock armouring (RA3). • Native vegetation (riparian woodland) – Conrock Gully, native vegetation (riparian) – River/creek crossings and native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA1, RA3, RA8). • Hydraulic flood modelling is undertaken by an AQP (Appendix J). • Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use by an AQP and in accordance with the IPC SHMS. • The geochemical assessment has shown that the wastes are not anticipated to pose a significant risk in terms of acid, neutral metalliferous, or saline drainage, or elevated metal and/or sulphate concentration in surface waters or groundwaters. As a result, the recommended cover design is an erosion protection system to manage erosion risks and promote vegetation establishment in line with the milestone criteria (Appendix F and Appendix D). • An annual rehabilitation monitoring program designed by an AQP will be implemented. • Dams, perimeter drainage, and erosion and sediment control systems will be monitored and maintained during establishment. • Minimum requirement for vegetative cover is $\geq 65\%$ for the grazing PMLU (RA2, RA4, RA5, RA6, RA10).	Unlikely (0.1)	3	Medium (10)

					Risk Analysis						Residual Risk Ranking		
Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Likelihood	Severity	Risk	Controls Mitigation	Likelihood	Severity	Risk		
								● Minimum requirement for vegetative cover of ≥65% for the native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLUs (RA1, RA8). ● Minimum requirement for vegetative cover of ≥30% with rock armouring for the native vegetation (woodland) – final low wall batter (≤25%) PMLU (RA3). ● Erosion monitoring be undertaken pre and post wet season until a minimum 50% vegetative cover is achieved (RA1, RA2, RA3, RA4, RA5, RA6, RA8). ● Rehabilitation activities will reduce the risk of impacts to the final landform stability as a result of flooding (Appendix J). ● Monitoring of rehabilitated areas will be completed in accordance with monitoring criteria established by an AQP and identify areas requiring maintenance will be action as soon as practicable. ● No evidence of erosion in excess of design criteria for all RAs, excluding RA7 and RA9. ● An assessment report is completed by an AQP certifying that the Conrock Gully diversion (RA1) is operating in accordance with its Functional Design Report (Appendix D of Appendix J) and is in a stable condition. ● Certification by an AQP that pasture meets a pasture condition rating suitability is class ≤3, based on the Pasture Condition Assessment Table as per “Stocktake: Balancing Supply and Demand” (developed by FutureBeef – futurebeef.com.au). ● A BioCondition assessment at RA1, RA3, and RA8 is completed on an annual basis by an AQP using the methodology outlined in the latest version of the Queensland Herbarium’s BioCondition Assessment Manual. ● The BioCondition assessment required for RA1, RA3, and RA8 demonstrates achievement of the PRCP Benchmark criteria for each assessable attribute for the relevant regional ecosystem as per Table 20 (RA1 and RA8) and Table 21 (RA3). ● Contaminated land investigation completed by an AQP in accordance with the EP Act. ● Surface water runoff is non-polluting to receiving waters and complies with PRCP criteria for RM8. ● A site suitability statement from an AQP confirms the uses or activities for which the land is suitable for each approved PMLU for the site. ● Vegetation establishment is confirmed by monitoring data using the applicable rehabilitation criteria. ● Where possible, earthworks are timed to avoid periods of heavy predicted rainfall. ● Fencing or other methods are established for protection from un-approved livestock access. ● Only approved seed mixes will be used and all efforts will be made to ensure seeding occurs at the optimal time for favourable weather conditions to promote germination. ● See also in rows below – controls for inadequate vegetation cover and establishment, insufficient volume of rehabilitation materials or unsuitable materials used and extreme or significant weather events.					

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
Contaminated land impacting on environmental receptors, rehabilitation, and attainment of PMLU.	RM2	RA4, RA5	- Seepage from soils dumps - Potential contamination sources not adequately investigated and/or remediated. - Incorrect storage and handling of waste materials. - Seepage from mine affected water dams sources or final void.	- Contamination of soil, surface water and groundwater above selected thresholds / guidelines. - Migration of contaminants from source to sensitive receptors.	Unlikely (0.1)	3	Medium (10)	- A contaminated land investigation with a site investigation report is prepared by an AQP. - All contaminated materials are either removed and disposed of in an appropriate manner or treated insitu and following treatment validated as no longer contaminated. - Validation testing will be conducted to confirm that contaminated materials have been removed or remediated. An AQP will certify that all contaminated land has either been remediated or removed. - Landform design technical specifications must include a QA/QC program. - Construction management, technical supervision, and QA/QC of final landforms will be done by an AQP. - An AQP confirms low risk of seepage from dumped landforms impacting receiving environment (Appendix F). - Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use by an AQP and in accordance with the IPC SHMS. - All surface water management infrastructure is appropriately decommissioned and rehabilitated to the requirements of the grazing PMLU. - All mining infrastructure is appropriately decommissioned and rehabilitated to the requirements of the grazing PMLU - Environmental monitoring and reporting as per the EP Act 1994, existing EA requirements and post closure requirements is completed. - A rehabilitation monitoring program will be designed and conducted by an AQP to confirm RA4 and RA5 are rehabilitated to the requirements of the grazing PMLU.	Unlikely (0.1)	2	Low (3)
Insufficient volume of material available or unsuitable quality for rehabilitation activities.	RM4, RM5, RM6, RM7	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA10	- Poor planning and management of rehabilitation materials (soil, seed) leading to degradation. - Insufficient characterisation of soil and waste material. - Inadequate amelioration does not prepare soil for target vegetation impacting PMLU.	- Insufficient quantities of cover materials to achieve rehabilitation of final landform to support PMLU. - Insufficient quality of cover materials to achieve rehabilitation of final landform to support PMLU. - High cost of remediation.	Unlikely (0.1)	4	Medium (30)	- An AQP confirms sufficient quantities of growth material can be sourced from site for establishment of the vegetative layer of the final landform (Appendix D and Appendix E). - An AQP confirms the quality of growth material sourced from site for construction of the vegetative layer of the final landform (Appendix D and Appendix E). - An AQP confirms how the identified growth media will be used for establishment of the vegetative layer of the final landform (Appendix D and Appendix E). - The erosional stability of the final landform is confirmed by an AQP (Appendix D). - Mine planning will ensure soil and spoil management and scheduling will be sufficiently aligned with eventual closure requirements to enable material to be incorporated into the upper layers of the final design. - Soil sampling of stockpiles will be conducted prior to placement to refine amelioration rates (if required), six months prior to progressive rehabilitation. - Soil management stockpiling will be conducted according to Section 2.6.1.4.5. - Growth medium will be placed at a minimum depth of 300mm. - An assessment of growth media characteristics is completed by an AQP that identifies amelioration and other treatments required to achieve the primary growth media quality targets.	Highly Unlikely (0.03)	3	Low (3)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
Inadequate vegetation cover and establishment.	RM5, RM6, RM7	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA10	- Inadequate amelioration does not prepare soil for target vegetation impacting PMLU. - Weed and pest species infestation(s). - Soil / growth media not managed or applied as per required specifications. - Insufficient or incorrect construction methods. - Inadequate and/or inappropriate revegetation not in accordance with milestone criteria. - Seed unavailability or poor quality. - High erosion risk of spoil material. - Placement of unsuitable spoil within 2m of the surface. - Poor introduction of livestock due to inadequate fencing or deviation from schedule.	- Excessive erosion of rehabilitated areas. - Extended period required to remediate landform. - Loss or degradation of cover materials. - Premature grazing could lead to poor seeding establishment or destruction of establishing vegetation. - Loss or degradation of cover materials.	Probable (0.3)	4	Medium (90)	- Suitable erosion management measures will be designed by an AQP and installed as designed to minimise the risk of loss of topsoil. - The risk of AMD is confirmed as low by an AQP (Appendix F). - Waste characterisation is confirmed by an AQP (Appendix F). - Primary growth media quality targets are achieved based on a number of representative samples as determined by an AQP. - Appropriate vegetation species, seed species and their rates are determined by an AQP (Appendix 3.1 and Appendix 3.2). - Soil sampling of stockpiles will be conducted prior to placement to refine amelioration rates (if required), six months prior to progressive rehabilitation. - Soil management stockpiling will be conducted according to Section 2.6.1.4.5. - Growth medium will be placed at a minimum depth of 300mm. - A rehabilitation monitoring program will be designed and conducted by an AQP on an annual basis. - The appropriate management of growth media is defined by an AQP (Appendix D and Appendix E). - Rehabilitation activities will be conducted as planned and documented. - Appropriate seed sources will be established. Seed application rates/density, planting timing and areas will be conducted as planned and documented. - Surface roughening and/or ripping (across slope) will be conducted as required to minimise rapid run off and promote infiltration. - Topsoil stripping requirements will be guided by an AQP. - Ameliorants and fertiliser will be applied as required under the guidance of an AQP. - Appropriate equipment to be utilised for rehabilitation activities. - Seeding at will be conducted at an optimal time of year with respect to favourable rainfall conditions. - Monitoring of rehabilitated areas will be used to identify poor rehabilitation performance for repair. - Maintenance of underperforming rehabilitation areas will be conducted as soon as practicable using appropriate methods (e.g. re-seeding). - Where applicable, erosion and sediment control measures will be implemented. - Annual rehabilitation monitoring results will be used to guide continual improvement of rehabilitation activities. - Only authorised vehicles and persons will be allowed to access rehabilitated areas. - Fencing surrounding the Project will be maintained to control external livestock access. - Monitoring will be conducted by an AQP to identify any erosion initiation and guide early rectification of erosion.	Unlikely (0.1)	3	Medium (10)
Alteration of hydrogeological conditions	RM1, RM2, RM3, RM4, RM5, RM6,	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA9, RA10	Insufficient or incorrect landform design or construction methods.	Adverse impacts to the receiving groundwater environment including	Unlikely (0.1)	4	Medium (30)	Construction management, technical supervision, and QA/QC of the final landform and covers will be done by an AQP.	Highly Unlikely (0.03)	4	Medium (10)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
	RM7, RM8, RM9		- Incorrect placement of waste materials. - Seepage from mine affected water dams or final void.	reduction in groundwater levels in excess of predicted drawdown, and / or contamination of groundwater above selected thresholds/guidelines.				- Landforms will be free draining, except the slope of the in-pit dump that reports to the final void. - The risk of AMD is confirmed as low by an AQP (Appendix F). - The geochemical assessment has shown that the wastes are not anticipated to pose a significant risk in terms of acid, neutral metalliferous, or saline drainage, or elevated metal and/or sulphate concentration in surface waters or groundwaters. As a result, a specific cover design to address these risks is not required (Appendix F). - An AQP confirms low risk of seepage from dumped landforms impacting receiving environment (Appendix F). - Contaminated land investigation with a site investigation report is prepared by an AQP. - All contaminated materials are either removed and disposed of in an appropriate manner or treated insitu and following treatment validated as no longer contaminated. - Validation testing will be conducted to confirm that contaminated materials have been removed or remediated. An AQP will certify that all contaminated land has either been remediated or removed. - Mine planning will be conducted by an AQP to ensure the final landform design is achieved. - The final void will continue to act as a sink is confirmed by an AQP (Appendix K). - The final void will not spill is confirmed by an AQP (Appendix I). - An AQP confirms that the final void is not located within a 0.1% AEP flood event (Appendix J). - A groundwater monitoring and management program, including groundwater quality and level monitoring, is designed by an AQP, and is implemented as designed (Appendix AE). - Groundwater monitoring and modelling confirms predicted reductions in groundwater levels. - All hazardous materials on-site will be managed in accordance with the IPC SHMS to minimise the risk of contamination - All hazardous materials will be removed from site on completion of the operations. - The final landform's stability is confirmed (Appendix D and Appendix H). - Flooding will not significantly impact the final landform (Appendix J).			
Alteration of local hydrologic conditions	RM1, RM2, RM3, RM4, RM5, RM6, RM7, RM8, RM9	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA9, RA10	- Insufficient or incorrect landform design or construction methods. - Erosional instability of landforms resulting in sediment mobilisation into receiving environment.	Adverse impacts to the receiving surface water environment including erosion and sedimentation.	Probable (0.3)	3	Medium (30)	- Construction management, technical supervision, and QA/QC of final landforms will be done by an AQP. - Temporary erosion and sediment control systems during rehabilitation stages are designed by an AQP, installed, and fit for purpose. - Grazing PMLU landforms reshaped with a maximum 15% or less overall slope (RA2, RA4, RA5, RA6). - Grazing PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA2, RA4, RA5, RA6).	Unlikely (0.1)	2	Low (3)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
			- Inadequate surface preparation or vegetation cover establishment. - Failure of temporary ESC structures during rehabilitation stages leading to loss of sediment offsite. - Interactions with the flood plain and final landform. - High velocities in landform drainage leading to erosion instability.					- Native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLU areas are assessed by an AQP as possessing slopes designed in accordance with engineering and guideline standards and as being stable long-term (RA1, RA8). - Native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU area is assessed by an AQP as possessing a slope of $\leq 25\%$, as being stable long-term and as possessing the required rock armouring (RA3). - Native vegetation (riparian woodland) – Conrock Gully, native vegetation (riparian) – River/creek crossings and native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA1, RA3, RA8). - Hydraulic flood modelling is undertaken by an AQP (Appendix J). - Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use by an AQP and in accordance with the IPC SHMS. - The geochemical assessment has shown that the wastes are not anticipated to pose a significant risk in terms of acid, neutral metalliferous, or saline drainage, or elevated metal and/or sulphate concentration in surface waters or groundwaters. As a result, the recommended cover design is an erosion protection system only to manage erosion risks and promote vegetation establishment in line with the milestone criteria (Appendix F and Appendix D). - Appropriate surface water management system is established under the advice of an AQP (Appendix I) for use in operations and during initial stages of rehabilitation. - An annual rehabilitation monitoring program designed by an AQP will be implemented. - Dams, perimeter drainage, and erosion and sediment control systems will be monitored and maintained. - An assessment report is completed by an AQP certifying that the Conrock Gully diversion (RA1) is operating in accordance with its Functional Design Report (Appendix D of Appendix J) and is in a stable condition. - Establishment of vegetation within the applicable PMLUs will be undertaken as practicable following the PRCP Schedule to reduce erosion risks. - An appropriate surface water monitoring regime is established (Appendix I). - All contaminated materials are either removed and disposed of in an appropriate manner or treated insitu and following treatment validated as no longer contaminated. - Validation testing will be conducted to confirm that contaminated materials have been removed or remediated. An AQP will certify that all contaminated land has either been remediated or removed. - All hazardous materials on-site will be managed in accordance with the IPC SHMS to minimise the risk of contamination - All hazardous materials will be removed from site on completion of the operations.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
								- Landforms will be designed with appropriate erosion protection for any areas with flood interactions. - Surface water monitoring to be undertaken in accordance with EA conditions and monitoring requirements. - Rehabilitation of disturbed areas will be undertaken as soon as practicable after land becomes available in accordance with PRCP Schedule. - Monitoring of the Conrock Gully diversion is undertaken in accordance with the Functional Design Report to ensure a trajectory to achieving long term stability and the applicable rehabilitation milestones (Appendix D of Appendix J). - Proposed rehabilitation activities are conducted to reduce the risk of impacts to the final landform stability as a result of flooding. - Mine planning will be conducted by an AQP to ensure the final landform design is achieved. - The final void will continue to act as a sink is confirmed by an AQP (Appendix K). - The final void will not spill is confirmed by an AQP (Appendix I). - An AQP confirms that the final void is not located within a 0.1% AEP flood event (Appendix J). - Where possible, the schedule of rehabilitation works will be designed to be outside of high erosion risk periods (i.e. December - February). - The proposed PMLUs and landform are consistent and similar with existing/surrounding landforms and to ensure resilience/tolerability for current weather patterns. - The hydrological design of the final landform is confirmed by an AQP (Appendix J). - If necessary, an AQP will design mitigation measures for appropriate protection works for where floodwaters interact with the final landform. These mitigation measures will be installed as required. - At the cessation of mining activities, a review and update of the void water balance modelling will be conducted.			
Impact of extreme weather events prior to final landform establishment leads to instability of final landforms	RM1, RM2, RM3, RM4, RM5, RM6, RM7, RM8, RM9	RA1, RA2, RA3, RA4, RA5, RA6, RA8, RA9, RA10	- Extreme weather such as cyclones, flooding, or uncontrolled fire. - Interactions with the flood plain and final landform.	- Damage to final landform and rehabilitation area. - Increased likelihood of erosion. - Loss or degradation of cover materials. - Extended period required to remediate landform. - Loss of vegetation cover may result in increased erosion and soil loss.	Probable (0.3)	5	High (300)	- Where possible, the schedule of rehabilitation works will be designed to be outside of high erosion risk periods (i.e. December - February). - An annual rehabilitation monitoring program designed by an AQP will be implemented. - The proposed PMLUs and landform are consistent and similar with existing/surrounding landforms and to ensure resilience/tolerability for current weather extremes and potential changes in climate. - Emergency response procedures (including fire) are established in accordance with the Project's emergency response plan (Appendix AJ) and the IPC SHMS. - A water cart will be available for firefighting purposes. - Establishment of vegetation within the applicable PMLUs will be undertaken as practicable following the PRCP Schedule to reduce erosion risks. - Landforms will be designed with appropriate erosion protection for any areas with flood interactions.	Unlikely (0.1)	4	Medium (30)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
				- Failure to achieve milestone criteria pertaining to vegetation cover. - Loss or alteration of habitat.				- The final landform will be designed as planned to support the final voids water quality and to ensure the final void is outside the 0.1% AEP flood zone. - Mine planning will be conducted by an AQP to ensure the final landform design is achieved. - If necessary, identify and implement mitigation measures for appropriate protection works of landforms where floodwaters interact with the final mine closure landforms. - At the cessation of mining activities, a review and update of the void water balance modelling will be conducted. - Rehabilitation inspections will be conducted immediately after extreme events, and where identified, damaged areas will be repaired as quickly as possible. - Annual rehabilitation monitoring will assess vegetation suitability and resilience to adverse climatic conditions.			
Landform establishment inconsistent with milestone criteria	RM3, RM4, RM5, RM6, RM7, RM8, RM9, RM10	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8, RA9, RA10	- Erosional instability. - Placement of unsuitable spoil within 2m of the surface. - Rehabilitated landforms result in alteration of flood hydrology upstream and downstream. - Interactions with the flood plain and final landform. - High erosion risk of spoil material. - Insufficient or incorrect landform design or construction methods (including non-conformance to design shape). - Adverse climatic conditions (drought, heat, changing climate). - Insufficient volume of material available or unsuitable quality for rehabilitation activities.	- Failure to establish proposed vegetative cover and therefore stable PMLU. - Loss or degradation of cover materials. - Adverse impacts to hydrological or hydrogeological system..	Probable (0.3)	4	Medium (90)	- The erosional stability of the final landform is confirmed by an AQP (Appendix D). - Mine planning will ensure spoil management and scheduling will be sufficiently aligned with eventual closure requirements to enable material to be incorporated into the upper layers of the final design. - Any landform within the final landform floodplain are assessed by an AQP as stable (Appendix J). - Soil sampling of stockpiles prior to placement to refine amelioration rates (if required). - A rehabilitation monitoring program will be designed and conducted by an AQP on an annual basis. - The appropriate management of growth media is defined by an AQP (Appendix D and Appendix E). - If rehabilitation areas are identified as sub-standard by annual monitoring, maintenance of these areas will be conducted as soon as possible under the guidance of an AQP. - Mine planning will be conducted by an AQP to ensure the final landform design is achieved. - Mining methods used are proven and will allow the staged construction of the final landform as mining progresses and in accordance with the PRCP Schedule. - Surface preparation and sowing is to take place with regard to optimal weather conditions (no predicted heavy rainfall or extended periods of drought). - Approved seed mix includes rapidly establishing grasses (e.g. a sterile cover crop). - Erosion and sediment control measures will be implemented under the guidance of an AQP during surface preparation and revegetation. - Soil sampling of stockpiles will be conducted prior to placement to refine amelioration rates, six months prior to progressive rehabilitation. - Soil management stockpiling will be conducted according to Section 2.6.1.4.5. - Growth medium will be placed at a minimum depth of 300mm.	Unlikely (0.1)	3	Medium (10)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
								- Landforms designed and constructed to minimise the potential for flooding of the final void. Flood modelling confirms no ingress to the final void up to and including a 0.1% AEP flood event (Appendix J). - Undertake rehabilitation monitoring include landform erosion monitoring. Remediate areas performing poorly with respect to erosion based on erosion monitoring data. - Implement erosion protection measures for appropriate protection works of landforms where floodwaters from watercourses interact with the final mine closure landforms. - At the cessation of mining activities, a review and update of the void water balance modelling will be conducted. - Certification from an AQP that voids are modelled to act as groundwater sinks. - Development of a revegetation plan that considers vegetation suitability, seeding/planting methods, primary growth media suitability and a secondary growth media. Plan is to include measurable rehabilitation milestones for landform design, growth media and vegetation. - Construction management, technical supervision, and QA/QC of final landforms will be done by an AQP. Records will be documented in the form of inspection test plans. - Grazing PMLU landforms reshaped with a maximum 15% or less overall slope (RA2, RA4, RA5, RA6). - Grazing PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA2, RA4, RA5, RA6). - Native vegetation (riparian woodland) – Conrock Gully and native vegetation (riparian) – River/creek crossings PMLU areas are assessed by an AQP as possessing slopes of $\leq 15\%$ and as being stable long-term (RA1, RA8). - Native vegetation (riparian woodland) – final low wall batter ($\leq 25\%$) PMLU area is assessed by an AQP as possessing a slope of $\leq 25\%$, as being stable long-term and as possessing the required rock armouring (RA3). - Native vegetation (riparian woodland) – Conrock Gully, native vegetation (riparian) – River/creek crossings and native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU landform designs are assessed by an AQP as being geotechnically stable with a factor of safety of ≥ 1.5 (RA1, RA3, RA8). - The final void will continue to act as a sink is confirmed by an AQP (Appendix K). - The final void will not spill to the environment is confirmed by an AQP (Appendix I). - An AQP confirms that the final void is not located within a 0.1% AEP flood event (Appendix J). - Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use by an AQP and in accordance with the IPC SHMS. - Erosion for all RAs, except RA7 and RA9, is confirmed by an AQP to meet the accepted long-term mean average annual erosion rate of 5 tonnes/hectare/year (t/ha/y), being a rate at which the risk of rill erosion being initiated is low.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
Beneficial Water Storage PMLU does not meet stable condition consistent with milestone criteria	RM9	RA9	- Beneficial Water Storage PMLU is not safe. - Beneficial Water Storage PMLU is geotechnical stable. - Beneficial Water Storage PMLU causing environmental harm.	- Steep slopes. - Rock falls. - Slope failure. - Final void extends beyond permitted PRCP schedule domain limits. - Impacts to adjacent PMLUs. - Void switches from a sink to a source to the groundwater aquifer. - Safety bunds and setbacks not achieved. - Overtopping.	Probable (0.3)	4	Medium (90)	- An assessment report is completed by an AQP certifying that the Conrock Gully diversion (RA1) is operating in accordance with its Functional Design Report (Appendix D of Appendix J) and is in a stable condition. - Annual rehabilitation monitoring will assess vegetation suitability and resilience to adverse climatic conditions.	Unlikely (0.1)	4	Medium (30)
								- The final void will continue to act as a sink is confirmed by an AQP (Appendix K). - The final void will not spill is confirmed by an AQP (Appendix I). - An AQP confirms that the final void is not located within a 0.1% AEP flood event (Appendix J). - At the cessation of mining activities, a review and update of the void water balance modelling will be conducted. - Certification by an AQP that the final void is consistent with the approved footprint. - The geotechnical stability of the final void is confirmed by an AQP (Appendix H). - The water quality of the final void is confirmed by an AQP and is deemed suitable for cattle watering and use in the permanent infrastructure – PHES and/or algae production PMLU (Appendix I). - An AQP confirms the final void design as a beneficial water storage (Appendix I). - Groundwater monitoring and void water quality will be reviewed annually by an AQP during closure stages. - Safety bunding is constructed, where required, at the geotechnical set-back distance. - Where required, fencing will be erected around the perimeter of the safety bund. - Warning signage will be placed along the fence line (nominally one sign every 100m). - Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use by an AQP and in accordance with the IPC SHMS. - As mining approaches the final limits, an AQP will re-assess the geotechnical stability of the final void's high and low walls based on the latest available site data. - A minimum factor of safety of ≥ 1.5 will be used as a guide for ongoing void closure planning. - Native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU area is assessed by an AQP as possessing a slope of $\leq 25\%$, as being stable long-term and as possessing the required rock armouring (RA3). - Mine planning will be conducted by an AQP to ensure the final landform design, including the final void, is achieved. - A closure water management plan will be developed by an AQP and implemented. - Risks from the final void is ALARP in accordance with the latest version of AS/NZS ISO 31000:2009 Risk Management is certified by an AQP.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls Mitigation	Residual Risk Ranking		
					Likelihood	Severity	Risk		Likelihood	Severity	Risk
Permanent infrastructure - PHES and/or algae production PMLU does not meet its milestone criteria	RM10	RA7	- Beneficial Water Storage PMLU doesn't achieve the required water quality - Bankable feasibility testing does not secure the required finance - Feasibility testing doesn't confirm the operability of the permanent infrastructure – PHES and/or algae production PMLU - The landowner or a third party doesn't agree to accept the permanent infrastructure – PHES and/or algae production PMLU - The permanent infrastructure – PHES and/or algae production can't operate jointly with cattle watering - The permanent infrastructure – PHES and/or algae production PMLU area is flooded	- Technical feasibility of PMLUs changes - Regulatory barriers to achieving proposed permanent infrastructure – PHES and/or algae production PMLU - Changes in commercial feasibility (e.g. market changes) - Change in void water quality - Loss of the cattle watering source - Safety issues from flooding - The permanent infrastructure – PHES and/or algae production PMLU cannot operate because of flooding - Cattle and native wildlife are injured after entering the permanent infrastructure – PHES and/or algae production PMLU site.	Probable (0.3)	3	Medium (30)	- An AQP confirms that RA7 is not impacted by a 0.1% AEP flood event (Appendix J). - The final void's water balance modelling is confirmed by an AQP as suitable for the permanent infrastructure – PHES and/or algae production PMLU (Appendix I). - The water balance and water quality is confirmed if PHES and/or algae production is operated in conjunction with cattle watering (Appendix I). - Feasibility testing is conducted by an AQP for PHES and/or algae production. - A closure water management plan will be developed by an AQP and implemented. - The permanent infrastructure – PHES and/or algae production PMLU is prepared at the cessation of mining based on the outcomes of the bankable feasibility studies. - The required development approval(s) are obtained for the permanent infrastructure – PHES and/or algae production PMLU under the <i>Planning Act 2016</i>, or other legislative instruments that exist at the time of proposed construction. - Consultation in relation to the permanent infrastructure - PHES and/or algae production PMLU continues with the landowner or other interested parties over the life of the Project. - Mine planning will be conducted by an AQP to ensure the final landform design, including the final void, is achieved. - At the cessation of mining activities, a review and update of the void water balance modelling will be conducted. - Certification by an AQP that the final void is consistent with the approved footprint. - The geotechnical stability of the final void is confirmed by an AQP (Appendix H). - Suitable safety fencing is erected around the permanent infrastructure – PHES and/or algae production PMLU site.	Unlikely (0.1)	2	Low (3)

2.7.3 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 PRCP.

Although no rehabilitation trials are currently planned at the Project, rehabilitation trials may be conducted at the Project as part of continuous improvement. Rehabilitation practices will be executed in line with the PRCP rehabilitation and management methodologies outlined for each PMLU. If required, an AQP will be engaged to design, advise on, monitor and report on the rehabilitation trials. Successful rehabilitation practices at IPM and IDM, where rehabilitation has been conducted and monitored for up to 10 years, will be assessed for implementation at the Project.

2.8 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 PRCP 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 benchmarking 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 PRCP. If there has/is any monitoring or maintenance of areas already rehabilitated, details must be included in the PRCP

2.8.1 Rehabilitation Milestone Monitoring

The RMs and associated milestone criteria for the Project are detailed in Table 8 and Table 12, respectively.

Rehabilitation milestone monitoring and reporting will be undertaken at the Project to demonstrate achievement of the RMs for the following planned PMLUs:

- Native vegetation (riparian woodland) – Conrock Gully.
- Grazing.
- Native vegetation (woodland) – final low wall batter ($\leq 25\%$).
- Native vegetation (riparian) – River/creek crossings.
- Beneficial water storage.
- Permanent infrastructure – PHES and/or algae production.

A combination of approaches will be used to monitor and report on achievement of RMs. Monitoring and reporting requirements for RM1 to RM10 are listed against each milestone in Table 29 and will primarily involve documentation and/or inspections and sign off by an AQP that milestones have been achieved. Rehabilitation milestone monitoring for achieving the PMLUs will involve ongoing monitoring in accordance with a schedule whereby permanent monitoring sites will be established, and data will be collected in a repeatable manner to enable statistical analysis to assess the performance of rehabilitation. The results of ongoing PMLU monitoring will be used to determine if rehabilitation areas are on track towards achieving their relevant PMLU criteria or if rehabilitation areas may require maintenance to improve their performance to re-establish their trajectory to achieving the relevant PMLU criteria.

The approach to monitoring is discussed in more detail for each PMLU as follows:

- Native vegetation (woodland) – final low wall batter ($\leq 25\%$): RE11.5.3 and native vegetation (riparian) – River/creek crossings: RE11.3.25
- Grazing.
- Native vegetation (riparian woodland) – Conrock Gully: RE11.3.25 and Functional Design Report.
- Beneficial water storage.

Further discussion on the estimated time that has been scheduled for achieving each PMLU is provided in Section 2.3.2.1.

Table 29: Rehabilitation Milestones with Relevant Reporting Requirements

Milestone Reference	Rehabilitation Milestone	Reporting Requirements
RM1	Infrastructure decommissioning and removal	Undertake visual inspections. Document inspections. Capture photographic evidence (as required). Landowner agreement(s) for infrastructure to be retained. Retain third party removal documentation. Confirmation of completion for each applicable RA.
RM2	Identification, remediation and/or removal of contaminated land	Documentation of off-site disposal of contaminated land (as required). Documentation of insitu remediation of contaminated land (as required). Documentation of external remediation of contaminated land (as required). Documentation that the site has been removed from the EMR (as required for notifiable activity sites).

Milestone Reference	Rehabilitation Milestone	Reporting Requirements
		Documentation that the site will remain on the EMR with a site management plan (as required for notifiable activity sites). Documentation by an AQP confirming the land does not present an unacceptable risk to proposed future land uses or the environment for each applicable RA.
RM3	Landform development (re-profiling / reshaping)	Survey/LiDAR of the landform. Evidence and analysis that the final landform components have achieved their design parameters (i.e. slopes and slope lengths). Documentation of riverine permits or associated exemptions (if required). Document achievement of the Functional Design Report's requirements (RA1 only). Confirmation of completion for each applicable RA.
RM4	Surface preparation (topdressing, contour ripping, soil amelioration, rock armouring)	Survey/LiDAR of surface and extent after topsoil is placed. Document topsoil depth. Document growth media assessment. Document growth media ameliorants and physical treatments applied. Document rock armouring (RA3 only). Document deep ripping. Document that the surface and groundwater networks are established. Document achievement of the Functional Design Report's requirements (RA1 only). Confirmation of completion for each applicable RA.
RM5	Revegetation	Document seed mix information, planting timing, planting rates and areas seeded as per the PRCP Schedule for each applicable RA. Document erosion control (if required). Confirmation of completion for each applicable RA.
RM6	Achievement of surface requirements	Document total vegetative cover and weed presence. Document total vegetation cover, weed presence and rock armouring cover (RA3 only). Document the erosion status. Document final landform stability as geotechnically stable. Document achievement of the Functional Design Report's requirements (RA1 only). Confirmation of completion for each applicable RA.
RM7	Achievement of post-mining land use to a stable condition	Documentation and certification by an AQP that all RM criteria have been achieved each PMLU, except the beneficial water storage (RA9) and permanent infrastructure – PHES and/or algae production PMLUs (RA7).

Milestone Reference	Rehabilitation Milestone	Reporting Requirements
RM8	Achievement of post-mining land use water quality	Documentation and certification by an AQP that all RM criteria have been achieved each PMLU, except for the beneficial water storage (RA9) and permanent infrastructure – PHES and/or algae production PMLUs (RA7).
RM9	Achievement of a stable water supply source for RM10 PMLUs and cattle drinking water supply	Documentation and certification by an AQP that all RM criteria have been achieved for the beneficial water storage PMLU (RA9).
RM10	Achievement of the PHES and/or Algae Production PMLUs	Documentation and certification of the commercial and technical feasibility by an AQP, including that all RM criteria have been achieved for the permanent infrastructure – PHES and/or algae production PMLU (RA7).

2.8.2 Grazing and Native Vegetation (Woodland) Monitoring – General Requirements

2.8.2.1 Monitoring Locations

Reference sites are not proposed for the native vegetation (riparian woodland) – Conrock Gully, native vegetation (woodland) – final low wall batter ($\leq 25\%$) and native vegetation (riparian) – River/creek crossings PMLUs, because revegetation success will be identified by assessment of the revised Benchmarks for RE11.3.25 (Table 20) and RE11.5.3 (Table 21). As a result, an AQP, using the methodology outlined in the latest version of the Queensland Herbarium's BioCondition Assessment Manual will progressively establish the necessary monitoring sites within each applicable RA as rehabilitation progresses under the PRCP Schedule.

Reference sites are not a key measure for the rehabilitation monitoring program for the grazing PLMU as the performance will be based on standard methods for assessing pasture condition consistent with industry guidelines. If required, reference/analogous sites will be established by an AQP and incorporated into the assessment process of rehabilitation success. An AQP will progressively establish the necessary monitoring sites within each applicable RA as rehabilitation progresses under the PRCP Schedule.

Additional permanent rehabilitation monitoring sites will be established as rehabilitation advances under the PRCP Schedule. The permanent rehabilitation monitoring sites will be assessed during annual rehabilitation monitoring.

In addition, permanent rehabilitation monitoring sites will be selected using the following criteria:

- Representative of the rehabilitation slope.
- Located in a lower slope position to capture maximum hydrologic and erosion processes.
- Accessibility (vehicle access preferred).
- Low risk of the site being disturbed by mining activities in the future.

2.8.2.2 Monitoring Schedule

The number of permanent rehabilitation monitoring site established in each RA will be guided by an AQP.

Following achievement of RM4 (surface preparation) and RM5 (revegetation), the native vegetation (riparian woodland) – Conrock Gully, native vegetation (woodland) – final low wall batter ($\leq 25\%$) and native vegetation (riparian) – River/creek crossings PMLUs' rehabilitation monitoring program will be designed to scientifically validate over time the permanent establishment of safe, stable, non-polluting, and self-sustaining conditions for the applicable native woodland revegetation.

Following achievement of RM4 (surface preparation) and RM5 (revegetation), the grazing PMLU's rehabilitation monitoring program will be designed to scientifically validate over time the permanent establishment of safe, stable, non-polluting, and self-sustaining conditions for grazing.

The monitoring program follows a phased approach whereby initial monitoring is undertaken to assess the performance of rehabilitation as it relates to achieving initial surface preparation and revegetation requirements at Year 0 and Year 1. This approach allows a timely assessment of the performance of rehabilitation post initial seeding (RM5) and provides critical information to determine if rehabilitation is on track towards achieving initial surface requirements and revegetation or if maintenance may be required. Additional rehabilitation parameters are included into the monitoring program commencing year two, and every four years thereafter, to assess the performance and track rehabilitation in relation to achievement of each PMLU (RM6, RM7 and RM8).

The consistent, phased approach of the monitoring program ensures that there is continual monitoring of rehabilitation parameters against milestone criteria for scientific evaluation up to the point of surrender of the EA, PRCP schedule and MLs.

Table 30 illustrates the monitoring schedule for cattle grazing and native woodland habitat PMLUs and indicates the rehabilitation parameters monitored during each phase of the schedule commencing from Year 0. This schedule allows assessment of the performance and trajectory of the rehabilitation against milestone criteria and accounts for the influence of seasonal variations and extreme weather events over time.

Table 30: Monitoring Schedule and Measured Rehabilitation Parameters

	Monitoring Schedule				
	Year 0	Year 1	Year 2	Year 6	Year 10+ (4 Yearly Thereafter)
All PMLUs, except the beneficial water storage and permanent infrastructure - PHES and/or algae production PLMUs					
Landform and erosion	✓	✓	✓	✓	✓
Soil and spoil	✓	✓	✓	✓	✓
Groundcover	✓	✓	✓	✓	✓
Invasive plants	✓	✓	✓	✓	✓
Grazing PMLU					
Pasture species diversity	✓	✓	✓	✓	✓
Pasture yield	x	x	✓	✓	✓
Pasture condition	x	x	✓	✓	✓
Grazing Land Suitability Assessment	x	x	x	✓	✓
Native vegetation (riparian woodland) – Conrock Gully PMLU					
Revised RE11.3.25 benchmark criteria	✓	✓	✓	✓	✓
Non-native plant cover	✓	✓	✓	✓	✓
Native vegetation (woodland) – Final low wall batter (≤25%) PMLUs					
Revised RE11.5.3 benchmark criteria	✓	✓	✓	✓	✓
Non-native plant cover	✓	✓	✓	✓	✓
Native vegetation (riparian) – River/creek crossings PMLU					
Revised RE11.3.25 benchmark criteria	✓	✓	✓	✓	✓
Non-native plant cover	✓	✓	✓	✓	✓

2.8.2.3 General Rehabilitation Monitoring Parameters

2.8.2.3.1 Landform and Erosion

Landform and erosion will be assessed by an AQP as part of all monitoring events.

Prior to commencing the field monitoring work, a desktop assessment using LiDAR data and aerial imagery will be completed to:

- develop a DEM to assess the rehabilitated slope against the landform design (Year 0)
- identify new areas of potential erosion for field validation.

Field-based erosion monitoring will be conducted at the permanent monitoring sites as well as any new areas identified in the desktop assessment.

The field survey involves establishing an erosion monitoring transect by running a 50 m tape perpendicular to the slope and across the erosional activity identified during the LiDAR analysis. Any identified erosion will be compared against the Erosion Classification Framework (Australian Soil and Land Survey Handbook, 2009) and assigned a relevant classification of erosion (Figure 25).

This framework will be used as a systematic method to assess and categorise the severity, type and causes of soil or land surface erosion. The framework considers factors such as erosion type (e.g. sheet, rill, gully, wind), severity levels, contributing environmental conditions, and potential impacts on ecosystems and infrastructure.

This method supports an informed decision-making process for confirming stability.

This framework has been transitioned into the milestone criteria for RM6 and RM7 of the PRCP Schedule for all RAs, except RA7 and RA9. The milestone criteria require evidence from an AQP of achievement of 'minor' under the framework. It is noted within the milestone criteria, that achievement of the prescribed percentage of groundcover will be a primary methodology in the prevention and mitigation of erosion as predicted by the SIBERIA landform evolution model (Section 2.6.1.5.3 and **Appendix D**).

Erosion classification	Minor	Moderate	Severe
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizon; root exposure; moderate substantial soil deposits downslope
Rill erosion	<0.3m deep Occasional rills	<0.3m deep Common rills	<0.3m deep. Numerous rills forming corrugated ground surface
Gully erosion	>0.3m deep Gullies are isolated, linear, discontinuous, and restricted to primary or minor drainage lines	>0.3m deep Gullies are linear, continuous, and restricted to primary or minor drainage lines	>0.3m deep Gullies are continuous or discontinuous, and either tend to branch away from primary drainage lines and on to foot slopes, or have multiple branches within drainage lines
Tunnel erosion	Absent	Absent	Present
Mass movement	Absent	Absent	Present

Figure 25: Erosion Classification Framework (Australian Soil and Land Survey Field Handbook 2009)

2.8.2.3.2 Topsoil and Spoil

Soil profile pits or cores within the rehabilitated areas will be established at the permanent rehabilitation monitoring sites during Year 0 monitoring. The parameters detailed in Table 31 are monitored during Year 0, Year 2, and every four years thereafter. Surface sampling refers to the layer at 0 – 10 cm; and sub-surface sampling refers to layers at 10 – 30 cm, 30 – 60 cm and 90 – 100 cm.

The surface soil sampling results will be compared to the target suitability characteristics for growth medium in RM4.

Table 31: Soil and Spoil Analysis Parameters – Project Monitoring Program

Category	Analyte	Purpose of Analyte	Depth		Monitoring Phase	
			Surface	Sub-Surface	Year 0	Year 2 (and 4 Yearly Thereafter)
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.	✓	✓	✓	✓
	Chloride	Identify leaching profile. High chloride can lead to poor vegetation germination and establishment, reduced plant growth and vigour.	✓	✓	✓	✓
Exchangeable Cations	Cation exchange Capacity (CEC)	Major factor in soil fertility. Controls soil stability, nutrient availability, and buffers soil's chemical properties.	✓	✓	✓	✓
	Exchangeable cations	Exchangeable Calcium is linked to soil stability. High levels of exchangeable Magnesium can cause clay dispersion, instability when wet and hard setting.	✓	✓	✓	✓
	Exchangeable Sodium Percentage (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.	✓	✓	✓	✓
Organic Matter	Organic carbon	An indicator of soil nutrient stores and a contributor to improvements in soil structure. Changes through time in organic carbon are a key indicator of rehabilitation success.	✓	x	✓	✓
Major Elements	Total Nitrogen	Indicator of soil nutrient store and is also a major plant nutrient.	✓	x	✓	✓

Category	Analyte	Purpose of Analyte	Depth		Monitoring Phase	
			Surface	Sub-Surface	Year 0	Year 2 (and 4 Yearly Thereafter)
Trace Elements	Extractable Phosphorous (Colwell method)	Indicator of Phosphorous readily available to plants.	✓	x	✓	✓
	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.	✓	x	✓	✓
	Potassium	Important plant nutrient.	✓	x	✓	✓
	Total Sulphur	Indicator of potential for Acid and Metalliferous Drainage processes.	✓	x	✓	✓
	Sulphate	Important plant nutrient and can be an indicator of potential Acid and Metalliferous Drainage processes.	✓	x	✓	✓
	Calcium	Important plant nutrient.	✓	x	✓	✓
	Magnesium	Important plant nutrient.	✓	x	✓	✓
	Manganese	Trace element with minor importance for vegetation success.	✓	x	✓	✓
	Iron	Trace element with minor importance for vegetation success.	✓	x	✓	✓
	Zinc	Trace element important for vegetation success.	✓	x	✓	✓
Metals	Copper	Trace element important for vegetation success.	✓	x	✓	✓
	-	Metals that have been identified as occurring at elevated levels during material characterisation analysis should be tested during monitoring.	✓	✓	✓	✓

Category	Analyte	Purpose of Analyte	Depth		Monitoring Phase	
			Surface	Sub-Surface	Year 0	Year 2 (and 4 Yearly Thereafter)
Physical Parameters	Particle size (PSA)	Soil texture strongly affects water entry and storage. Soil texture will impact erosion and vegetation success and should be considered when planning species mixes for planting.	✓	✓	✓	x
	Emerson aggregate test	Indicator of clay dispersion. Should be interpreted in conjunction with ESP and EC data.	✓	✓	✓	x
Field Analysis	Soil profile characteristics	Horizon depths, Field colour, Field texture, Structure, Root density and depth, Soil plant available water capacity (PAWC – initial only).	✓	✓	✓	x

2.8.2.3.3 Groundcover

Groundcover will be assessed by an AQP at the permanent rehabilitation monitoring sites as part of all monitoring events.

Groundcover type is recorded as either live cover (with species recorded and distinguishing between non-native, native perennial, preferred pasture species and undesirable/weed grass cover), standing dry cover, litter, rock, coal, fallen woody debris or bare ground, and percent cover calculated.

Groundcover for slopes of $\leq 15\%$ must achieve a total vegetative ground cover of $\geq 65\%$ to be deemed successful. Groundcover for slopes of $15\% - 25\%$ (i.e. RA3) must achieve a total vegetative groundcover of $\geq 30\%$ when combined with rock armouring to be deemed successful.

2.8.2.3.4 Invasive Plants

An invasive plant is a prohibited or restricted matter under the *Queensland Biosecurity Act 2014*, and is defined as a species that has, or is likely to have an adverse impact on a biosecurity consideration because of the introduction, spread or increase in population size of the species in an area. A complete list of invasive plant species is outlined in Schedule 4 of the *Biosecurity Regulations 2016*.

Invasive plants will be assessed by an AQP at the permanent rehabilitation monitoring sites as part of all monitoring events. Invasive plants will be treated as required to ensure compliance with the *Queensland Biosecurity Act 2014*.

The presence and percent cover of invasive plants, calculated as a percentage of the total vegetation cover, is recorded at each site (RM6).

2.8.3 Grazing Rehabilitation Monitoring

2.8.3.1 Pasture Species Diversity

Pasture species diversity is assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. Appendix 3.2 outlines the recommended species list and sowing rates for the grazing PMLU (RA2, RA4, RA5, RA6, and RA10 if required).

Species diversity is classified into the number of preferred pasture species identified as perennial grasses that are productive and palatable to stock (3P), and should comprise a suitable combination of the species listed in Appendix 3.2.

2.8.3.2 Pasture Yield

Pasture yield and quality is assessed at the permanent rehabilitation monitoring sites from Year 2. This schedule allows at least two seasons after seeding for pasture species to establish.

Pasture yield is assessed using percentage dry matter (DM) yield in kg/ha for preferred pasture species as well as the proportion of dry matter yield for annual grasses and undesirable grasses or weeds.

2.8.3.3 Pasture Condition

Pasture condition is assessed at the permanent rehabilitation monitoring sites from Year 2. This allows at least two seasons after seeding for pasture species to establish. Pasture condition is assessed using preferred species diversity, pasture health and pasture yield. Pasture condition ratings and criteria are shown in Table 32.

2.8.3.4 Grazing Land Suitability Assessment

A land suitability assessment will be conducted by an AQP to track achievement of the grazing PMLU from the commencement of rehabilitation in Year 6. If the rehabilitation fails to meet the completion criteria based on the AQP's assessment, amelioration and maintenance works will be implemented, and another assessment will be undertaken during the next scheduled monitoring event.

Table 32: Pasture Condition Assessment Table

Condition Rating	Condition Indicators				
	Preferred Pasture Species		Annual Grass % DM Yield	Undesirable Grasses & Other Weeds % DM Yield	Preferred Pasture Species Diversity
	% DM Yield	Crown Cover			
1	>80%	Dense and plants healthy	<20%	<20%	> 5 species
2	60 – 80%	High to moderate density and some plants unhealthy	20 – 40%	20 – 30%	3 – 5 species
3	10 – 60%	Moderate to low density and some plants dead	40 – 70%	30 – 80%	2 – 3 Species
4	<10%	Sparse and many plants dead	>70 %	>80%	0 or 1 species

2.8.4 Native Vegetation (Woodland) Monitoring

2.8.4.1 Rehabilitation Parameters: Native Vegetation (Riparian Woodland) – Conrock Gully And Native Vegetation (Riparian) – River/Creek Crossings PMLUs

Table 20 details the revised Benchmarks for RE11.3.25 that will be used as the rehabilitation monitoring parameters for the Native vegetation (riparian woodland) – Conrock Gully and Native vegetation (riparian) – River/creek crossings PMLUs. The rehabilitation monitoring parameters for these PMLUs will comprise:

- Native plant species richness (trees, shrubs, grasses and forbs)
- Emergent canopy height (m)
- Tree canopy height (m)
- Tree subcanopy height (m)
- Average Canopy height (m)
- Emergent canopy cover (%)
- Tree canopy cover (%)
- Tree subcanopy cover (%)
- Average canopy cover (%)
- Shrub canopy cover (%)
- Native grass cover (%)
- Organic litter (%)
- Coarse woody debris (m/ha)
- Non-native plant cover
- Basal Area Trends (m²/ha)
- Woody Species Composition
- Stem density measures of abundance (stems/ha).

The rehabilitation monitoring will involve a BioCondition monitoring assessment completed by an AQP using the methodology outlined in the Queensland Herbarium's BioCondition Assessment Manual.

2.8.4.2 Rehabilitation Parameters: Native Vegetation (Woodland) – Final Low Wall Batter ($\leq 25\%$) PMLU

Table 21 details the revised Benchmarks for RE11.5.3 that will be used as the rehabilitation monitoring parameters for the native vegetation (woodland) – final low wall batter ($\leq 25\%$) PMLU. The rehabilitation monitoring parameters and monitoring for this PMLU are the same as those outlined in Section 2.8.4.1.

2.8.5 Native Vegetation (Riparian Woodland) – Conrock Gully PMLU – Diversion Monitoring

Additional monitoring of the Conrock Gully diversion will be conducted by an AQP and will be undertaken in accordance with the monitoring requirements of the diversion's Functional Design Report that are outlined in Section 7 of Appendix D of **Appendix J**.

2.8.5.1.1 Diversion Monitoring – General

The proposed Conrock Gully diversion will be monitored regularly to collect useful data for use in evaluating the performance of the constructed diversion. Collection of monitoring data will help identify any issues with the construction of the diversion and assist with achieving rehabilitation milestones for a stable landform in accordance with this PRCP's requirements. The monitoring program will be conducted using the process documented in DNRM (2019).

2.8.5.1.2 Diversion Monitoring – Goals and Objectives

The overall goal of the monitoring program is for the diversion to be considered as a reach or stream in equilibrium in order to achieve rehabilitation milestones. Early monitoring will ensure sufficient data is available to support achievement of rehabilitation milestones for the diversion. The immediate objective of the monitoring program is to evaluate the performance of the constructed diversion to ensure that any issues are identified early, and also to obtain baseline information for use in evaluating the performance of the diversion later in mine life.

2.8.5.1.3 Diversion Monitoring – Long-term Diversion Plan

Early monitoring of the diversion and the upstream and downstream control reaches will define baseline data for the rehabilitation milestones leading to a long-term stable diversion.

2.8.5.1.4 Diversion Monitoring – Baseline Monitoring

Baseline monitoring will be conducted prior to the construction of the Conrock Gully diversion to provide a reference data set for evaluation of monitoring data collected throughout the life of the monitoring program. During the baseline monitoring period, a control reach located upstream of the diversion and a downstream reach will also be established. Baseline monitoring will include:

- site photography
- aerial photography
- survey
- vegetation characterisation and assessment
- flow event monitoring.

2.8.5.1.5 Diversion Monitoring – Construction Monitoring

Construction monitoring will be conducted to ensure the diversion is constructed to the design specifications. Construction monitoring will include:

- execution database to record construction activities
- site photography

- aerial photography.

2.8.5.1.6 Diversion Monitoring – Operations Monitoring

Operations monitoring will be conducted after construction works have been completed to maintain channel condition and to identify remedial works. The operations monitoring is a combination of visual assessments and survey data and will include:

- survival of works
- site photography
- aerial photography
- visual assessment
- index of diversion condition (idc)
- site survey
- flow events monitoring.

Operations monitoring will be conducted in three reaches. The control reach, located upstream of the diversion, the diversion reach, and the downstream reach, located immediately downstream of the diversion (including the diversion outlet on the Isaac River bank).

Table 33 shows a timeline of the monitoring requirements for the proposed Conrock Gully diversion over the first 10 years of operation (i.e. as highlighted in yellow).

Table 33: Proposed Diversion Monitoring Schedule

Monitoring Package	Monitoring Activity	Years since Construction Commencement									
		-1	0	1	2	3	4	5	6	7	8
Baseline monitoring	Photographs										
	Aerial photograph										
	Survey										
	Vegetation										
	Flow events										
Construction monitoring	Execution database										
	Photographs										
	Aerial photograph										
Operations monitoring	Survival of works										
	Photographs										
	Aerial photograph										
	Visual assessment										
	Index of diversion condition										
	Survey										
	Flow events										

2.8.6 Water Quality Monitoring – Surface Water and Groundwater

2.8.6.1 Overview

Surface water and groundwater quality indicators for monitoring as part of closure have been developed from the monitoring parameters established by the Project's surface water impact and groundwater impact assessments (**Appendix I** and **Appendix K**, respectively), and are aligned with both surface and groundwater monitoring parameters for best practice, and therefore, may include additional parameters where appropriate.

Surface and groundwater will be monitored via field-based surface water and bore sampling that will be conducted as part of the Project's surface water monitoring program (SWMP) (Section 9.10 of **Appendix I**) and GMMP (**Appendix AE**) during operations and the early stages of rehabilitation prior to achieving the RM criteria (i.e. RM1 to RM8). During these stages, and whilst there may still be water management infrastructure (e.g. mine affected water dam or sediment dams) in operation, surface water and groundwater monitoring will be undertaken in accordance with the requirements of the EA. Following completion of RM1 to RM7, when it is expected the rehabilitation landform will be free draining, surface water and groundwater monitoring will be undertaken in accordance with the requirements of the PRCP schedule.

Water monitoring of surface and groundwater parameters, methodology, and frequency, for the operational phase of the Project are prescribed in the SWMP and GMMP, respectively. This monitoring will be updated from the operational to the post closure setting by an AQP and will be designed to capture the most relevant sources and pathways. The adopted quality characteristics and the receiving environment trigger levels are based on the latest Water Quality Objectives (WQOs) relevant to the identified Environmental Values (EVs) or those approved under the Project's EA prior to closure. The water monitoring of surface and groundwater parameters and methodology for closure are based the requirements for protection of the downstream receiving environment during operations.

If water monitoring results indicate a trend away from PMLU objectives (i.e. attaining RM8), then contingency strategies will be developed by an AQP and implemented, which may involve:

- an increased sampling regime until results return to a reliable range within the WQO Guidelines
- temporary exclusion of an area to cattle (e.g. fencing)
- installation of erosion and sediment control infrastructure
- geochemical investigation (if required).

Groundwater monitoring to support the assessment of closure conditions (i.e. for RM8) will be undertaken on bores that provide a geographical distribution across the Project and coverage of the key hydrogeological units. The groundwater monitoring bore network to assess closure conditions will include selected bores existing at closure, and if required, the installation of bores specifically to close data gaps and/or to replace bores that may have been lost due to mining disturbances or otherwise are not operational for another reason (e.g. casing failure), noting that 'compliance bores' in the GMMP (**Appendix AE**) have been selected on the basis that they will not be removed during mining operations

Where the groundwater monitoring program data indicates impacts to water quality that exceed the nominated PRCP schedule criteria, an AQP will assess the applicable groundwater monitoring results, and if required, will develop remedial actions. The criteria for RM8 is that the groundwater quality criteria (i.e. limits) must not be exceeded for three consecutive sampling events within a five-year period prior to surrender of the MLs.

All groundwater quality investigations will be completed and provided to the administering authority within three months of receiving the relevant sampling results

Surface water quality in the downstream environment to support the assessment of closure conditions (i.e. for RM8) will be measured against the nominated criteria for RM8, based on WQOs developed for the receiving environment.

Where the surface water quality monitoring data at the downstream site is less the upstream site, then no further action is required, Where the surface water quality monitoring data at the downstream site exceeds the upstream site, an AQP will complete an assessment of the cause and risk of rehabilitation not achieving a

stable condition within the schedule timeframe. If a low risk to achieving a stable condition is identified, then no further action will be taken. Where there is a risk greater than low to achieving a stable condition, then an assessment of potential environment harm and any changes or rectification actions to rehabilitation activities will be determined and implemented. The criteria for RM8 is that a risk greater than low to achieving a stable condition can only be triggered three times over five consecutive years prior to surrender.

All surface water quality investigations will be completed and provided to the administering authority within three months of receiving the relevant sampling results.

2.8.6.2 Surface Water Quality Monitoring

Monitoring of surface water quality both within and external to the Project area will form a key component of the SWMP. Monitoring of upstream, onsite and downstream water quality will assist in demonstrating that the Project's SWMP is effective in meeting its objective of minimal impact on receiving water quality and will allow for early detection of any impacts and appropriate corrective actions. The proposed monitoring program will be implemented in accordance with the Monitoring and sampling manual (DES, 2018).

The surface water monitoring protocols will:

- ensure compliance with the Project's EA and PRCP Schedule;
- provide valuable information on the performance of the water management system during operations and runoff from a free draining rehabilitated final landform; and
- facilitate adaptive management of water resources on the site.

A number of surface water locations have been monitored in the Project vicinity. The surface water monitoring program will include continued monitoring at a number of these sites to monitor water quality upstream and downstream of the Project. The Project's surface water monitoring locations are provided in Table 34 and shown in Figure 26. Surface water monitoring will help demonstrate that RM8's relevant milestone criteria have been achieved (refer to Table 12).

Table 34: Surface Water Monitoring Locations

Site name	Waterway	Location	
		Longitude (GDA2020)	Latitude (GDA2020)
Upstream monitoring points			
ID-IR2*	Isaac River – upstream of IDM and IDE	148.168197	-22.040876
IDE-CG1	Conrock Gully – upstream of IDE	148.169025	-22.095638
IDE-CC1	Cherwell Creek – upstream of IDE	148.163531	-22.121846
Downstream monitoring points			
ID-IR5	Isaac River – downstream of Conrock Gully diversion	148.205483	-22.077632
IDE-CG2	Conrock Gully – downstream of IDE	148.204658	-22.080908
IDE-CG3	Conrock Gully diversion – downstream before confluence with Isaac River	148.177970	-22.066234
IDE-CC2	Cherwell Creek – upstream of JB Gully	148.191014	-22.117059
IDE-CC3	Cherwell Creek – downstream of IDE	148.232452	-22.096283
IDE-WL1	Unnamed wetland	148.228449	-22.092989
PTM-MP5*	Isaac River – downstream of IDE	148.240546	-22.094180

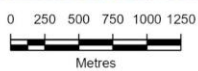
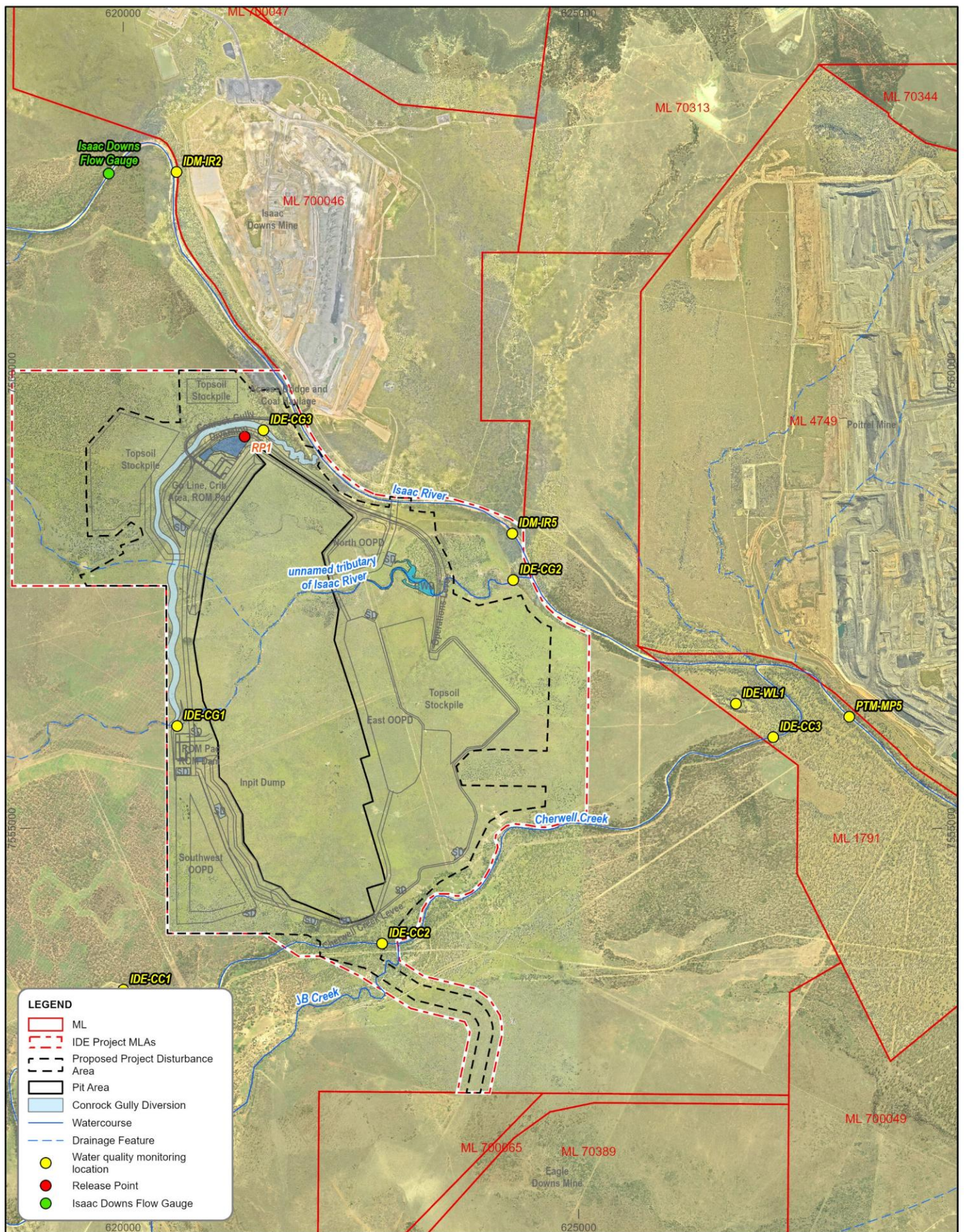
Note: The data from background monitoring points must not be used where they are affected by releases from other mines.

* = Primary upstream and downstream locations within the Isaac River.

A set of proposed surface water quality limits have been developed based on the Final Model Water Conditions for Coal Mines in the Fitzroy Basin (DERM, 2009) and environment trigger levels for the latest WQOs relevant to the identified EVs. These surface water quality limits are consistent with the currently approved EA conditions at IPM and IDM, and are generally consistent with other nearby operating coal mines.

The Project's proposed surface water quality limits for the receiving environment, with successful rehabilitation of the final landform achieved) are presented in Table 35 and are proposed to be measured at the upstream and downstream Isaac River monitoring stations: ID-IR2 and PTM-MP5, respectively. Monitoring at these locations will allow an accurate evaluation water flows from the Project's rehabilitated landform, and allow for identification of any upstream influences that are not associated with the Project.

As additional water quality data is collected in the receiving environment prior to and during the project's operations, the water quality limits in Table 35 may be updated to reflect site specific values.



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 6/06/2026 8:14 AM
 Drawn: Minserve
 Source: Minserve/Stanmore
 File: 20260414 Surface Water Monitoring.aprx

DISCLAIMER: Third party data sources are used in this map compilation. Minserve makes no warranty regarding this data's accuracy or currency.



ISAAC DOWNS EXTENSION

Surface Water Monitoring Locations

Table 35: Surface Water Quality Limits for RM8 – Receiving Environment

Quality characteristic	Units	Trigger level	Source of the Limit
Electrical conductivity (EC)	µS/cm	1,000 (maximum) ¹	Final Model Water Conditions for Coal Mines in the Fitzroy Basin (DERM, 2009)
pH	pH units	6.5 - 8.5 (range) ²	Isaac River Sub-basin WQO
Total suspended solids (TSS)	mg/L	1,050 (maximum) ³	80th percentile of local water quality
Sulphate (SO ₄ ²⁻)	mg/L	250 (maximum) ¹	Final Model Water Conditions for Coal Mines in the Fitzroy Basin (DERM, 2009)
Aluminium	µg/L	212	Site-specific trigger value (SSTV)
Antimony	µg/L	9	Aquatic ecosystem EV
Arsenic	µg/L	13	Aquatic ecosystem EV
Cadmium	µg/L	0.2	Aquatic ecosystem EV
Chromium	µg/L	1.0	Aquatic ecosystem EV
Copper	µg/L	3.0	SSTV
Iron	µg/L	280	Aquatic ecosystem EV
Lead	µg/L	3.4	Aquatic ecosystem EV
Mercury	µg/L	0.2	Aquatic ecosystem EV
Nickel	µg/L	11	Aquatic ecosystem EV
Zinc	µg/L	8.0	Aquatic ecosystem EV
Boron	µg/L	940	Aquatic ecosystem EV
Cobalt	µg/L	1.4	Aquatic ecosystem EV
Manganese	µg/L	1,900	Aquatic Ecosystem EV
Molybdenum	µg/L	34	Aquatic ecosystem EV

Quality characteristic	Units	Trigger level	Source of the Limit
Selenium	µg/L	10	Limit of Reporting
Silver	µg/L	1.0	Aquatic ecosystem EV
Uranium	µg/L	1.0	Aquatic ecosystem EV
Vanadium	µg/L	10	Aquatic ecosystem EV
Ammonia	µg/L	720	Aquatic ecosystem EV
Nitrate	µg/L	1,100	Aquatic ecosystem EV
Petroleum hydrocarbons (C6-C9)	µg/L	20	Model mining conditions
Petroleum hydrocarbons (C10-C36)	µg/L	100	Model mining conditions
Fluoride	µg/L	320	80 th %ile for Isaac River at Goonyella gauge
Sodium	µg/L	188,000	80 th %ile for Isaac River at Goonyella gauge

Note:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The Environmental Protection Policy (Water and Wetland Biodiversity) 2019 was used to determine the water quality objectives (WQOs) to protect or enhance the environmental values of the Isaac and lower Connors River main channel region of the Isaac River Sub-Basin. A comparison of the WQOs against local streamflow water quality monitoring in the Isaac River were then used to develop the local site-specific trigger values.
3. The aquatic ecosystem EV is derived from the Isaac River Sub-basin Environmental Values and Water Quality Objectives scheduling document (DEHP, 2011). The EV was selected to protect from the effects of habitat alteration, contaminated runoff and releases and changed flow to ensure healthy aquatic ecosystems and waterways that are safe for community use.
4. The Model Mining Conditions (MMC) were developed for coal mines in the Fitzroy basin (DERM, 2012). The MCC are designed to manage water discharges to meet the water quality objectives set out in the EPP (Water) and to provide consistency between mining operations in the Fitzroy basin.
5. The environmental authority holder will continue to monitor for all quality characteristics listed in Table C3 until such time that sufficient data has been acquired to either enable additional site specific trigger levels to be determined or to justify the removal of a characteristic from Table C3.
6. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

2.8.6.3 Groundwater Quality Monitoring

The GMMP will continue unchanged during the post mining period until relinquishment of the EA, PRCP schedule and MLs, except where additional requirements are identified through implementation of this PRCP, or are advised by an AQP following a groundwater investigation. As part of the post mining phase, the groundwater monitoring program will also include additional monitoring for the void lake in relation to void water level (i.e. quarterly survey consistent with the frequency of groundwater level monitoring at groundwater bores) and void water quality (i.e. quarterly sampling consistent with the frequency and parameter suite for groundwater quality monitoring at groundwater bores).

The GMMP will remain in effect throughout the post mining period and until relinquishment is achieved, in accordance with relevant State regulatory approvals and statutory requirements. This outcome will include demonstrating that risks to groundwater associated with the Project's final landform have been appropriately managed and mitigated.

The groundwater monitoring results will be assessed against Project-specific groundwater quality limits established for the monitoring network. These criteria have been developed to support interpretation of monitoring data and to identify results that may warrant further review or investigation. These criteria have inform the Project's proposed EA and PRCP Schedule conditions. A groundwater quality trigger exceedance is identified where a bore-specific groundwater quality limit is exceeded on three consecutive sampling occasions in a 5 year period.

Groundwater quality monitoring will help demonstrate that RM8's relevant milestone criteria have been achieved (refer to Table 12).

The Project's groundwater quality monitoring is detailed in **Appendix AE**.

The analytes for which groundwater quality limits were selected based on the following considerations:

- Potential impact from the activity: Natural groundwater conditions could potentially be impacted by the alteration of physiochemical parameters or the increase in/introduction of elements as a result of the activity, although these outcomes are highly unlikely.
- Their relevance to protect identified EVs: The analyte has been identified as necessary to protect an EV relevant to the Project based on relevant guidelines DEHP (2011) and WQOs (e.g. ANZECC, 2018).

The proposed groundwater quality monitoring bores are provided in Table 36 and displayed in Figure 27.

Justification for the proposed quality parameters selected for the Project's groundwater monitoring suite are presented in Table 37, which also indicates which parameters require quality limits to be defined and which are included for reference only.

The initial proposed parameters for the Project's groundwater quality limits for each compliance bore are presented in Table 38. Based on the methodology for developing groundwater quality limits and the statistical data analysis, site specific values have been proposed for some parameters for two bores, MBID23 and MBID28. "TBA" has been placed in Table 38 as it is proposed that these trigger values will be reassessed once additional data become available to ensure they are representative of meaningful hydrochemical conditions.

Table 36: Groundwater Compliance Monitoring Bores

Bore	Install Date	Longitude (GDA2020)	Latitude (GDA2020)	Surface Elevation (mAHD)	Total Depth (mBGL)	Screen Top Elevation (mAHD)	Screen Base Elevation (mAHD)	Aquifer	Proposed GMMP Bore
MBID23	28/06/2020	148.180425	-22.064238	198.86	14	191.35	185.35	Alluvium	Compliance
MBID28	29/06/2020	148.191319	-22.073707	198.37	16	186.36	183.36	Alluvium	Compliance
MBIS04	05/05/2025	148.217114	-22.089108	195.89	19	183.89	177.89	Alluvium	Compliance
MBIS07	15/06/2025	148.202453	-22.107815	199.9	19	190.9	187.9	Alluvium	Compliance
MBIS20	06/07/2025	148.195903	-22.082878	198.88	22	181.88	178.88	Regolith	Compliance
RN182851	31/05/2021	148.172615	-22.121871	208	35	202	174	Regolith	Compliance
MBIS10	26/11/2022	148.211874	-22.104295	183.93	24.15	166.42	160.42	Regolith	Compliance
MBIS02	29/05/2025	148.205221	-22.081048	196.98	138	63.97	60.97	Leichhardt coal seam	Compliance
MBIS05	09/05/2025	148.217154	-22.089189	195.96	155	47.95	41.95	Leichhardt coal seam	Compliance
MBIS08	19/11/2022	148.199423	-22.111731	202.53	50	160.53	154.53	Leichhardt coal seam	Compliance
MBIS11	13/05/2025	148.211847	-22.104449	199.15	94	109.14	106.14	Leichhardt coal seam	Compliance
MBIS13	22/05/2025	148.221560	-22.098912	196.71	153	47.70	44.70	Leichhardt coal seam	Compliance

Bore	Install Date	Longitude (GDA2020)	Latitude (GDA2020)	Surface Elevation (mAHD)	Total Depth (mBGL)	Screen Top Elevation (mAHD)	Screen Base Elevation (mAHD)	Aquifer	Proposed GMMP Bore
MBIS15	12/06/2025	148.225982	-22.092402	194.46	52	152.45	143.45	Leichhardt coal seam	Compliance
MBIS03	16/05/2025	148.205086	-22.081085	196.66	181	25.66	16.66	Vermont coal seam	Compliance
MBIS09	18/11/2022	148.199278	-22.111759	202.57	96.41	122.57	110.57	Vermont coal seam	Compliance

Table 37: Groundwater Quality Parameter Justification

Parameter to be monitored	Limit required	Justification
Physiochemical Parameters		
pH	Yes	Standard parameter, identified in DEHP (2011) and ANZECC (2018) for the relevant EV's
EC	Yes	Standard parameter, identified in DEHP (2011)
TDS	No	Standard parameter, identified in ANZECC (2018) for the stock watering (cattle) EV.
Metal and Metalloids (Dissolved)		
Aluminium	Yes	Identified in ANZECC (2018) for the relevant EV's
Arsenic	Yes	Identified in ANZECC (2018) for the relevant EV's
Boron	Yes	Identified in ANZECC (2018) for the irrigation EV
Cadmium	Yes	Identified in ANZECC (2018) for the relevant EV's
Chromium	Yes	Identified in ANZECC (2018) for the relevant EV's
Cobalt	Yes	Identified in ANZECC (2018) for the irrigation EV
Copper	Yes	Identified in DEHP (2011) and in ANZECC (2018) for the relevant EV's
Iron	Yes	Identified in DEHP (2011)
Lead	Yes	Identified in ANZECC (2018) for the relevant EV's
Manganese	Yes	Identified in DEHP (2011) and in ANZECC (2018) for the relevant EV's
Mercury	Yes	Identified in ANZECC (2018) for the relevant EV's
Molybdenum	Yes	Identified in ANZECC (2018) for irrigation EV
Nickel	Yes	Identified in ANZECC (2018) for the relevant EV's
Uranium	Yes	Identified in ANZECC (2018) for the relevant EV's
Silver	Yes	Identified in ANZECC (2018) for the relevant EV's
Zinc	Yes	Identified in DEHP (2011) and in ANZECC (2018) for the relevant EV's
Major Ions		
Sulphate	Yes	Identified in DEHP (2011) and in ANZECC (2018) for stock watering (cattle) EV
Calcium	No	Identified in DEHP (2011) and in ANZECC (2018) for stock watering (cattle) EV
Magnesium	No	Identified in DEHP (2011) and in ANZECC (2018) for stock watering (cattle) EV
Potassium	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Carbonate	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Bicarbonate	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Sodium	No	Identified in DEHP (2011) and in ANZECC (2018) for stock watering (cattle) EV
Chloride	No	Identified in DEHP (2011) and in ANZECC (2018) for stock watering (cattle) EV
Non-Metallic Elements		
Nitrate	Yes	Identified in DEHP (2011)

Table 38: Groundwater Quality Limits

	Analyte																			
	pH (Field)	EC (Lab)	SO ₄	NO ₃	Ag	Al	As	B	Cd	Co	Cu	Cr	Fe	Hg	Mo	Mn	Ni	Pb	U	Zn
Compliance Bore	-	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MBID23	6.5 - 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.784 ^e	0.0006 ^a	0.1 ^b	1.788 ^e	0.014 ^a	0.0034 ^a	0.0158 ^e	0.06 ^d
MBID28	6.38 - 6.85 ^e	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0062 ^a	0.001 ^a	0.784 ^e	0.0006 ^a	0.1 ^b	1.83 ^e	0.011 ^a	0.0034 ^a	0.004 ^b	0.3214 ^e
MBIS04	6.5 - 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS07	6.5 - 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.14 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS20	6.5 - 8.5 ^a	8910 ^d	TBA	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	TBA	TBA	TBA	TBA	0.14 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
RN182851	6.5 - 8.5 ^a	16000 ^d	TBA	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS10	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS02	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS05	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	TBA	TBA
MBIS08	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS11	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	TBA	0.0034 ^a	0.002 ^b	TBA
MBIS13	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS15	6.5 - 8.5 ^a	TBA	TBA	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	TBA	0.0002 ^a	0.1 ^b	TBA	TBA	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	TBA	TBA
MBIS03	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS09	6.5 - 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA

Note: Dissolved metals

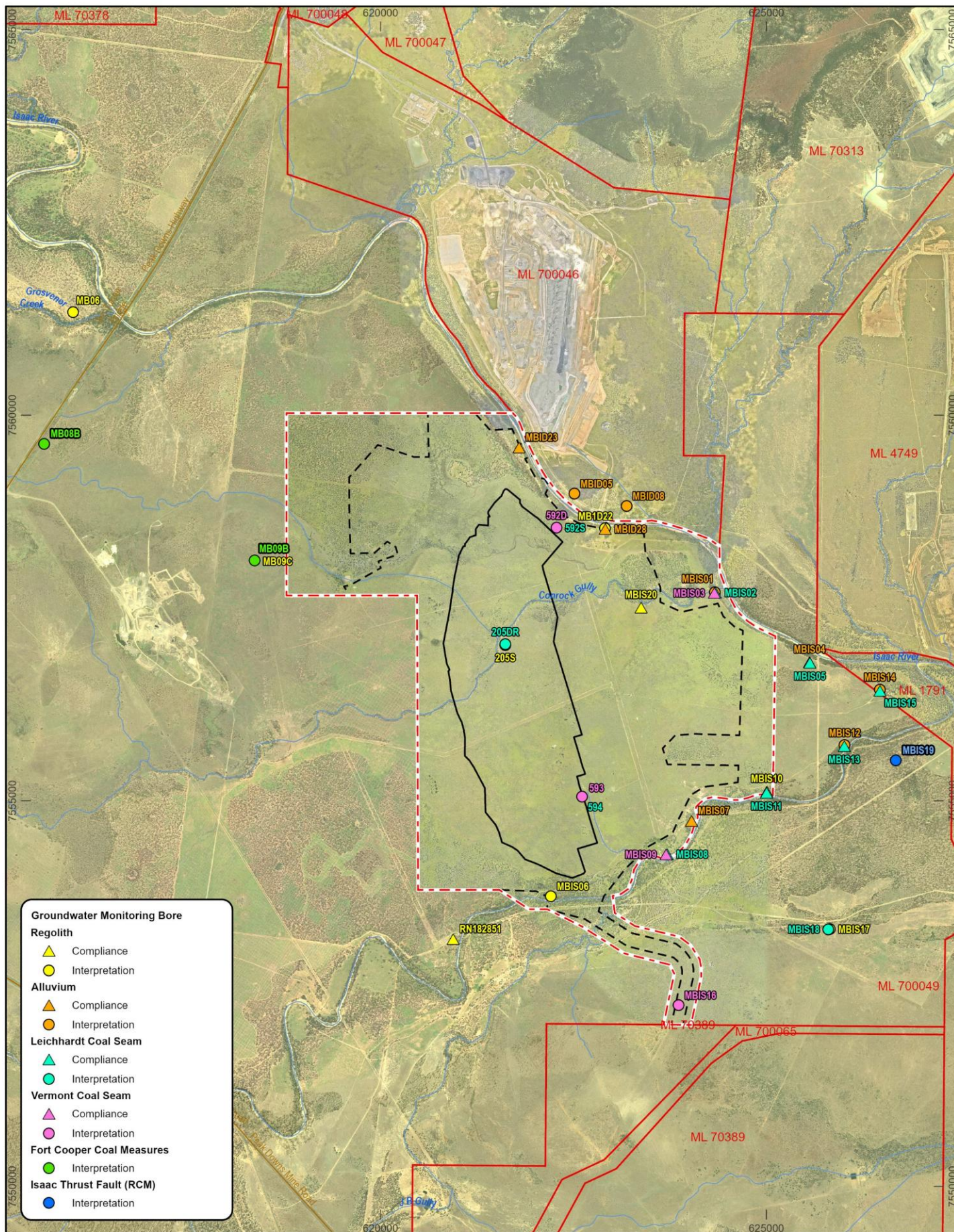
a = Aquatic Ecosystem (95% Protection) (ANZG, 2018).

b = Irrigation (Fitzroy Basin WQO).

c = Stock (Fitzroy basin WQO).

d = Lower Isaac River (zone 34) (DEHP, 2011).

e = Site specific 80th percentile values.



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 4/06/2026 1:05 PM
 Drawn: Minserve
 Source: SLR
 File: 20260527 GMMP Monitoring Network.aprx

LEGEND

- Waterway
- Roads
- ML
- IDE Project MLAs
- Proposed Project Disturbance Area
- Project Pit Extent



ISAAC DOWNS EXTENSION

Groundwater Monitoring Network

2.8.7 Groundwater Level Monitoring

The groundwater monitoring results will be assessed against Project-specific groundwater level trigger thresholds established for the monitoring network, as per the GMMP (**Appendix AE**). These criteria have been developed to support interpretation of monitoring data and to identify results that may warrant further review or investigation. These criteria have informed the Project's proposed EA and PRCP Schedule. A groundwater level trigger exceedance is identified where measured groundwater levels indicate drawdown greater than the established trigger threshold when compared to the reference level for a bore. Groundwater level monitoring will help demonstrate that RM8's relevant milestone criteria have been achieved (refer to Table 12).

The development of groundwater level triggers involves two key components, the calculation of reference level values based on statistical analysis of the available groundwater level monitoring dataset and the derivation of groundwater level trigger thresholds informed by numerical groundwater modelling (**Appendix K**). These two components are subsequently integrated to determine an effective compliance trigger value, referred to as the level trigger elevation. This value is then assessed against historical groundwater level trends, as outlined in **Appendix AE**.

Reference Level

The bore specific groundwater level that all future groundwater level measurements will be compared to for the purpose of calculating actual groundwater drawdown. The reference level is derived on the basis of historic groundwater level monitoring data (i.e. 'baseline' data) as outlined in Section 7.1.1.1 of **Appendix AE**.

Level Trigger Threshold

The bore specific maximum groundwater level drawdown in the future that will be allowed under the EA. The level trigger Threshold is derived on the basis of predictive groundwater modelling (**Appendix K**) such that an exceedance of the level trigger threshold represents greater groundwater level impact than predicted by modelling. the proposed level trigger thresholds are derived in Section 7.1.1.2 of **Appendix AE**.

Trigger Level Elevation

The reference levels and lever trigger thresholds have been tested against the historical dataset using the proposed compliance approach and are presented in the time series plots provided in Appendix B of **Appendix AE**. For the testing, the effective compliance trigger value is termed the level trigger elevation and is calculated as:

- Level Trigger Elevation = Groundwater Reference Level – Level Trigger Threshold

The Project's groundwater reference level values for the compliance bores are presented in Table 39. The Project's groundwater Level trigger thresholds derived using the methodology as above are presented in Table 40.

Table 39: Groundwater Level Reference Values

Compliance Bore	Formation Monitored	Designation	Reference Level (mAHD)
MBID23	Alluvium	Compliance	186.03
MBID28	Alluvium	Compliance	187.27
MBIS04	Alluvium	Compliance	184.89
MBIS07	Alluvium	Compliance	na
MBIS20	Regolith	Compliance	186.56
RN182851	Regolith	Compliance	194.77
MBIS10	Regolith	Compliance	170.44
MBIS02	Leichhardt coal seam	Compliance	186.67

Compliance Bore	Formation Monitored	Designation	Reference Level (mAHD)
MBIS05	Leichhardt coal seam	Compliance	184.74
MBIS08	Leichhardt coal seam	Compliance	190.35
MBIS11	Leichhardt coal seam	Compliance	185.54
MBIS13	Leichhardt coal seam	Compliance	182.93
MBIS15	Leichhardt coal seam	Compliance	183.02
MBIS03	Vermont coal seam	Compliance	187.18
MBIS09	Vermont coal seam	Compliance	188.73

Note: MBIS07 has not been given a water level trigger as the water level trigger elevation falls below the screen of the bore.

Table 40: Groundwater Level Trigger Thresholds

Proposed Compliance Bore	Formation Monitored	Designation	Level Trigger Threshold (m)	Level Trigger Threshold Elevation (mAHD)
MBID23	Alluvium	Compliance	1.50 ¹	184.5
MBID28	Alluvium	Compliance	3.47 ¹	183.8
MBIS04	Alluvium	Compliance	4.28 ¹	180.6
MBIS07	Alluvium	Compliance	na	
MBIS20	Regolith	Compliance	7.60 ¹	179.0
RN182851	Regolith	Compliance	13.38	181.4
MBIS10	Regolith	Compliance	9.64	160.8
MBIS02	Leichhardt coal seam	Compliance	25.86	160.8
MBIS05	Leichhardt coal seam	Compliance	15.50	169.2
MBIS08	Leichhardt coal seam	Compliance	10.31	180.0
MBIS11	Leichhardt coal seam	Compliance	13.08	172.5
MBIS13	Leichhardt coal seam	Compliance	12.82	170.1
MBIS15	Leichhardt coal seam	Compliance	3.05	180.0
MBIS03	Vermont coal seam	Compliance	28.03	159.2
MBIS09	Vermont coal seam	Compliance	13.74	175.0

Note:

1 = Maximum drawdown limited to base of model layer.

MBIS07 has not been given a water level trigger as the water level trigger elevation falls below the screen of the bore.

2.8.8 PMLU Achievement Schedule

RM1 to RM10 will be subject to ongoing reporting requirements to ensure achievement of the associated milestone criteria. RM9 and RM10 (i.e. following achievement of RM10.1) cannot proceed until the Project's mining operations have ceased and shaping of the final landform is completed, particularly in relation to the final void. Table 8 outlines the planned timeframes for each RM and their associated PMLUs. Table 7 details for each RA, its relevant PMLU, the planned time for commencement and the expected duration to completion.

Achievement of RM7 and RM8 are the critical RMs for all PMLUs, except for the beneficial water storage and permanent Infrastructure –PHES and/or algae production PMLUs, which are subject to their own specific milestone criteria.

Final achievement of the PMLU for each RA will be influenced by:

- its availability following the cessation of mining activities
- the progression of the applicable proceeding RMs, for example:
 - the completion of the final landform design (RM3)
 - in certain cases, the requirement for the removal of infrastructure (RM1), which may be governed by the final timing of the need for the infrastructure in question (e.g. removal of the bridge over the Isaac River)
 - where applicable, the requirement to satisfy the contaminated land criteria (RM2).

As a result, some RAs cannot progress until other RAs are advanced or completed. The estimated timing requirements for the rehabilitation of each RA are reflected in the PRCP Schedule.

2.8.9 Data Analysis and Reporting

Rehabilitation monitoring data will be collected and analysed by an AQP and assessed against the milestone criteria for the applicable RMs. 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 remedial actions or maintenance.

The rehabilitation data will be stored and processed within the Project's internal geospatial and document management systems.

2.8.10 Maintenance

Maintenance will be implemented when monitoring identifies issues with the rehabilitation or milestone criteria are not being achieved. To select the most appropriate remedial actions, the cause will be assessed by an AQP. Contributing factors to sub-standard rehabilitation may be related to:

- climatic conditions (i.e. droughts or extreme weather events)
- poor rehabilitation timing
- weed presence
- poor drainage and/or erosion control design
- insufficient vegetation cover
- influence of adjacent land use
- poor seed quality
- soil type.

Rehabilitation remediation actions will be entered into the Project's environmental management system for actioning.

2.8.11 Quality Assurance and Data Management

Where monitoring assessments indicate rehabilitation is not progressing towards completion milestones contingency steps will be implemented. This quality assurance and quality control process as part of the Project's ongoing rehabilitation monitoring is illustrated in Figure 28. The process provides for initial execution of the rehabilitation in accordance with the rehabilitation measures, followed by verification of how this execution was undertaken (again, according to these measures). Based on the verification outcomes, allowance is made for implementation of corrective action and/or maintenance (i.e. as contingency strategies). The rehabilitated areas as well as corrected and/or maintenance areas then undergo further rehabilitation monitoring, and if required, subsequent execution of the rehabilitation measures. This process allows for a repetitive execution-verification-monitoring QA/QC approach, to ensure rehabilitation areas progress on a trajectory towards achievement of their milestone criteria and eventual certification.

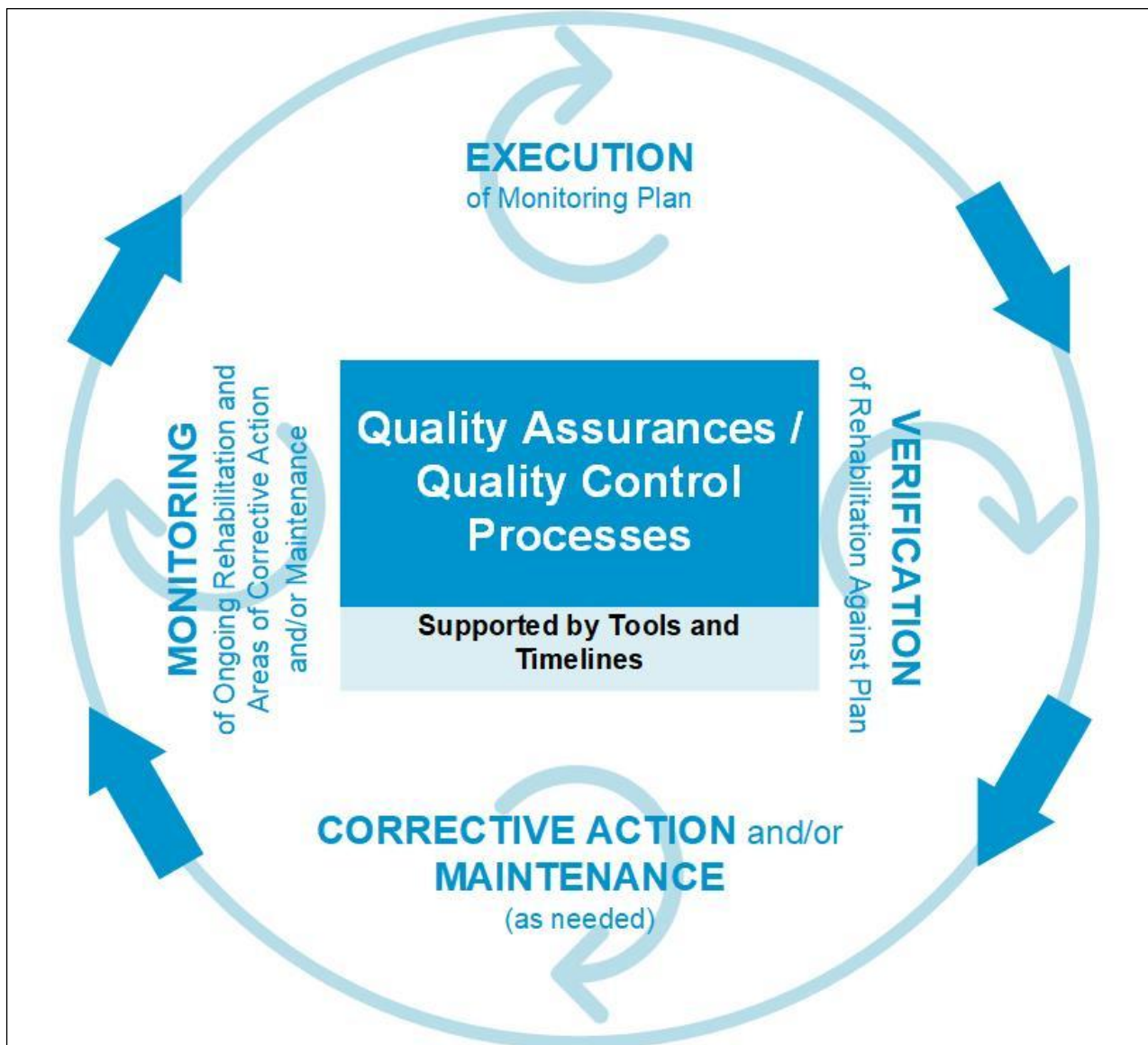


Figure 28: Rehabilitation Monitoring Quality Assurance / Quality Control Process

2.9 PRCP Schedule Audits

As required by sections 285-288 of the EP Act, the proponent, as the PRCP Schedule holder, will commission an independent rehabilitation auditor every three years to conduct an audit of the PRCP schedule and submit an audit report four months after the end of the audit period. The audit period is:

- the three year period starting on the day the schedule takes effect.
- each three year period starting on the day after the previous audit period has ended.

The PRCP schedule audit report will be submitted in the approved form 'PRCP schedule audit report (ESR/2024/6911)' and meet the mandatory requirements outlined in section 286 of the EP Act. These mandatory requirements include an assessment of whether the proponent has progressed towards the milestones approved in the PRCP schedule and whether the holder has complied with conditions imposed in the schedule.

The PRCP schedule audit report will also include recommendations about any actions the proponent should take to achieve the milestones in the schedule and an assessment of whether the post-mining land uses are likely to be achieved based on the current rehabilitation activities being taken. Under section 286 (d) of the EP Act, the administering authority (DETSI) may specify other information that must be provided to help it decide whether to take action to amend the PRCP schedule.

The PRCP schedule audit report will include recommendations about actions the proponent should take to ensure rehabilitation milestones and management milestones are achieved or conditions of the schedule are complied with. The proponent, as holder of the PRCP schedule, must consider the results and recommendations of the audit. If the proponent considers that the PRCP schedule should be amended, an application will be made pursuant to section 224 of the EP Act.

3. APPENDICES

3.1 Proposed Species per nominated RE11.3.25 and RE11.5.3

Nominated Regional Ecosystems	Upper Storey Tree Species	Mid and Lower Storey Tree and Shrub Species	Groundcover Species
RE11.3.25	<i>Angophora floribunda</i>	<i>Acacia disparrima</i>	<i>Chrysopogon fallax</i>
	<i>Casuarina cunninghamiana</i>	<i>Acacia leiocalyx</i>	<i>Cymbopogon refractus</i>
		<i>Acacia salicina</i>	<i>Cyperus gracilis</i>
	<i>Corymbia clarksoniana</i>	<i>Alphitonia excelsa</i>	<i>Dianella caerulea</i>
	<i>Corymbia tessellaris</i>	<i>Brachychiton australis</i>	<i>Dichanthium sericeum</i>
	<i>Eucalyptus camaldulensis</i>	<i>Callitris glaucophylla</i>	<i>Heteropogon contortus</i>
	<i>Eucalyptus coolabah</i>	<i>Cassia brewsteri</i>	<i>Lomandra longifolia</i>
	<i>Eucalyptus crebra</i>	<i>Ficus opposita</i>	<i>Panicum effusum</i>
	<i>Eucalyptus populnea</i>	<i>Geijera parviflora</i>	<i>Sida hackettiana</i>
	<i>Eucalyptus tereticornis</i>	<i>Livistona decora</i>	<i>Themeda triandra</i>
	<i>Melaleuca leucadendra</i>	<i>Lysiphyllum hookeri</i>	<i>Wahlenbergia gracilis</i>
	<i>Eucalyptus melanophloia</i>	<i>Macaranga tanarius</i>	
		<i>Melaleuca bracteata</i>	
		<i>Melaleuca fluviatilis</i>	
		<i>Melaleuca viminalis</i>	
		<i>Terminalia oblongata</i>	
RE11.5.3	<i>Corymbia clarksoniana</i>	<i>Acacia excelsa</i>	<i>Alloteropsis semialata</i>
	<i>Corymbia dallachiana</i>	<i>Acacia salicina</i>	<i>Aristida calycina</i>
	<i>Corymbia erythrophloia</i>	<i>Alectryon oleifolius</i>	<i>Chloris divaricata</i>
	<i>Eucalyptus crebra</i>	<i>Alphitonia excelsa</i>	<i>Chrysopogon fallax</i>
	<i>Eucalyptus melanophloia</i>	<i>Atalaya hemiglauca</i>	<i>Heteropogon contortus</i>
	<i>Eucalyptus populnea</i>	<i>Brachychiton australis</i>	<i>Panicum effusum</i>
		<i>Bursaria incana</i>	<i>Panicum queenslandicum</i>
		<i>Capparis lasiantha</i>	<i>Phyllanthus virgatus</i>
		<i>Cassia brewsteri</i>	<i>Sida hackettiana</i>
		<i>Ehretia membranifolia</i>	<i>Themeda triandra</i>
		<i>Eremophila mitchellii</i>	
		<i>Flindersia dissosperma</i>	
		<i>Geijera parviflora</i>	

Nominated Regional Ecosystems	Upper Storey Tree Species	Mid and Lower Storey Tree and Shrub Species	Groundcover Species
		<i>Grevillea striata</i>	
		<i>Lysiphyllum carronii</i>	
		<i>Lysiphyllum hookeri</i>	
		<i>Terminalia oblongata</i>	

Seed availability will guide species selection.

3.2 Grazing Rehabilitation Species and Seeding Rates

Common Name	Scientific Name	Seeding Rate (kilograms per hectare (kg/ha))
Queensland Blue Grass	<i>Dicanthium sericeum</i>	3
Desert Bluegrass	<i>Bothriochloa ewartiana</i>	3
Rhodes Grass	<i>Chloris gayana</i> cvv. <i>Callide1</i>	3
Rhodes Grass	<i>Chloris gayana</i> cvv. <i>Katambora1</i>	4
Windmill Grass	<i>Chloris truncata</i>	3
Black Spear Grass	<i>Heteropogon contortus</i>	3
Blown Grass	<i>Lachnagrostis filiformis</i>	3
Bisset Creeping Bluegrass	<i>Bothriochloa insculpta</i>	3
Sabi Grass	<i>Urochloa mosambicensis</i>	3
Bermuda Couch	<i>Cynodon dactylon</i>	2
Butterfly Pea	<i>Clitoria ternatea</i>	1
Round-leafed Cassia	<i>Chamaecrista rotundifolia</i>	1
Burgundy bean	<i>Macroptilium bracteatum</i>	2
Snoutbean	<i>Rhynchosia spp.</i>	1
Red Natal Grass	<i>Melenis repens</i>	2
Sugar-drip Sorghum	<i>Sorghum sp.</i>	3
Japanese Millet*	<i>Echinochloa esculenta</i>	0.5

Note: * = Sterile cover crop.

Seed availability will guide species selection. The species listed are commonly used in rehabilitation in the Bowen Basin.

3.3 Trend Memorandum – Development of Revised BioCondition Criteria for the Isaac Downs Extension Progressive Rehabilitation and Closure Plan (9 March 2026)

09/03/2026

Att: Ciara Kruger
Senior Environmental Approvals | Stanmore Resources Ltd
Isaac Downs Extension Project

Technical Memorandum

Development of Revised BioCondition Criteria for the Isaac Downs Extension Progressive Rehabilitation and Closure Plan

1. INTRODUCTION

1.1 Background

The Progressive Rehabilitation and Closure Plan (PRCP) for the Isaac Downs Extension Project ('the Project') requires demonstration that rehabilitated land has achieved the approved post-mining land use (PMLU) to a stable condition, consistent with the requirements of the *Environmental Protection Act 1999* (Queensland; Qld; EP Act) and *Queensland Government PRCP Statutory Guideline* (DESI, 2024).

The *PRCP Statutory Guideline* requires the PRCP schedule to include monitoring systems that demonstrate whether rehabilitation milestone criteria have been achieved. Monitoring programs must clearly describe methodologies and applicable standards, enable the repeatable collection of statistically valid data, and support regular analysis of site performance, including multi-year trend assessment and benchmarking against analogue or reference sites where appropriate.

Accordingly, a standardised and repeatable framework for measuring relevant biophysical attributes and ecological processes is required to enable objective comparison against the PRCP schedule criteria and to demonstrate progressive attainment of rehabilitation stability over time.

The Project will include several rehabilitation areas (RAs) that will be rehabilitated to woodland PMLUs. These RAs require an assessment framework that is ecologically meaningful, measurable and aligned with rehabilitation trajectories, while remaining consistent with regulatory expectations for demonstrating rehabilitation stability under a PRCP. Importantly, the framework must also recognise that certain late-successional attributes characteristic of mature woodland systems may not be achievable prior to EA surrender, given the nominated PRCP timeframe.

Recent guidance from the Queensland Mine Rehabilitation Commissioner in *Evaluating methods for assessing native ecosystem mine rehabilitation success Technical Paper* (Spain et al., 2025) identifies the Queensland Biodiversity and Ecosystem Information System (QBEIS) as the preferred framework for evaluating ecosystem recovery in disturbed landscapes. The Technical Paper also recognises that, while the QBEIS method provides a comprehensive, data-driven platform for assessing ecosystem trajectory, it does not explicitly integrate certain ecological condition concepts that may be strengthened through inclusion of additional components captured within BioCondition Assessments.

The BioCondition Assessment methodology, as described in the *Queensland Herbarium BioCondition Assessment Manual* (Eyre et al., 2015), remains the established and widely applied framework for assessing rehabilitation success on mine sites in Queensland. BioCondition is embedded in regulatory practice, provides clearly defined and auditable condition metrics, and has been consistently applied across mine rehabilitation programs.



These two frameworks are not mutually exclusive. BioCondition offers a practical and compliance-aligned assessment structure, many of whose core attributes derived from, or directly informed by QBEIS datasets. QBEIS, in turn, provides broader ecosystem context and additional structural and compositional indicators that can strengthen interpretation of rehabilitation trajectory.

Accordingly, this Technical Memorandum adopts a complementary approach: revised BioCondition criteria will form the primary assessment framework for compliance and reporting, while selected QBEIS attributes (e.g. basal area trends and additional structural indicators) will be incorporated to enhance evaluation of ecosystem recovery pathways and functional stability within PRCP timeframes. This integrated approach aligns with current Commissioner guidance while maintaining continuity with established regulatory assessment methods.

1.2 Purpose and Objectives

The purpose of this Technical Memorandum is to establish revised, fit-for-purpose milestone criteria for assessing rehabilitated woodland PMLUs under the PRCP. The revised criteria are intended to support the demonstration of achievement of the woodland PMLU to a stable condition in a manner that is ecologically defensible, achievable within rehabilitation timeframes and consistent with regulatory requirements.

The objectives of this Technical Memorandum are to:

- Review the regulatory and technical frameworks relevant to rehabilitation, PMLU and PRCP requirements, including the QBEIS and BioCondition assessment guidance;
- Confirm the pre-mine regional ecosystems (REs) within each woodland PMLU area and identify the REs most suitable for rehabilitation to be nominated for assessing rehabilitation success.
- Identify rehabilitation objectives and proposed rehabilitation trajectories for each woodland PMLU;
- Assess the applicability of standard QBEIS and BioCondition attributes for rehabilitated woodland stability, identifying attributes that are not relevant, not achievable, or critical to demonstrating functional stability; and
- Develop and document revised, ecosystem-specific benchmarks with measurable thresholds aligned with woodland PMLU stability requirements and regulatory expectations, within the context of the Project's rehabilitation strategy.

2. REVIEW OF REGULATORY AND TECHNICAL FRAMEWORK

2.1 Environmental Protection Act 1999 Requirements relevant to Rehabilitation, PMLU and PRCP Requirements

The EP Act contains obligations for rehabilitation, achievement of PMLU outcomes and demonstration of rehabilitation stability. For the Project's mining leases (ML) 700081, 700082, 700083 and 700084, rehabilitation and closure obligations are managed through a PRCP schedule.

The PRCP schedule establishes binding rehabilitation and management milestones, milestone criteria and timeframes, which must be complied with when carrying out relevant activities. The PRCP framework also imposes requirements for ongoing monitoring, maintenance, record keeping and independent auditing. These requirements reinforce the need for rehabilitation milestone criteria that are measurable, auditable and clearly linked to the achievement of a stable condition consistent with the woodland PMLUs.

2.2 Progressive Rehabilitation and Closer Plans Statutory Guidelines

The *Queensland Government's Statutory Guideline for Progressive Rehabilitation and Closure Plans* establishes the framework for development, assessment and approval of PRCPs and PRCP schedules. The guideline outlines how rehabilitation and closure outcomes specified in land outcome documents may be transitioned into a PRCP schedule, and how new milestones and criteria are to be developed where existing information is incomplete.



The Guideline clarifies the application of PRCP objective assessment provisions under the *Environmental Protection Regulation 2019*(Qld), including circumstances where standard rehabilitation or management milestone tables do not apply to pre-approved PMLUs or non-use management areas. It also establishes a clear hierarchy for resolving inconsistencies between land outcome documents, with documents higher in the statutory hierarchy prevailing.

Of particular relevance to this Technical Memorandum, the Guideline emphasises that milestone criteria must be specific, measurable, achievable, relevant and time-bound (SMART), and capable of supporting an assessment of whether the approved PMLU is likely to be achieved. Where existing rehabilitation criteria do not meet these principles, they are required to be reviewed and refined as part of the PRCP development process.

2.3 Technical Paper - Evaluating methods for assessing native ecosystem mine rehabilitation success

The Queensland Mine Rehabilitation Commissioner's *Evaluating Methods for Assessing Native Ecosystem Mine Rehabilitation Success Technical Paper* (Spain et al., 2025) reviews available frameworks for assessing rehabilitation outcomes for native ecosystems in Queensland. The paper evaluates condition-based, trajectory-based and reference-based approaches, with particular focus on their suitability for mine rehabilitation contexts where ecosystems are developing over extended timeframes and full remnant equivalence may not be immediately achievable.

The Technical Paper identifies the QBEIS as the preferred overarching framework for evaluating ecosystem recovery in disturbed landscapes. QBEIS provides a standardised, data-driven platform that enables comparison with RE reference data and supports assessment of structural and compositional trajectory toward target ecosystems. The approach emphasises long-term ecosystem development and alignment with mapped RE characteristics.

However, the paper also acknowledges that no single method fully captures all dimensions of ecosystem recovery. In particular, it recognises that QBEIS does not explicitly incorporate some ecological condition and functionality components that are assessed under existing frameworks such as BioCondition Assessments. The Technical Paper therefore supports the use of complementary indicators, including structural, compositional and functional metrics, to strengthen interpretation of rehabilitation performance.

Overall, the Commissioner's guidance promotes a transparent, repeatable and scientifically defensible approach to assessing rehabilitation success, encouraging integration of established condition-based metrics with trajectory-based assessment to demonstrate progressive attainment of a stable post-mining land use.

2.4 Queensland Herbarium BioCondition Assessment Manual

The Queensland Herbarium BioCondition Assessment Manual provides the standard methodology for assessing vegetation condition relative to a benchmark, based on a suite of structural, compositional and functional attributes (Eyre et al., 2015). BioCondition assessments are widely used across Queensland to inform rehabilitation success, offset delivery and vegetation condition monitoring.

Standard BioCondition attributes are primarily designed to assess remnant or regrowth vegetation and include several attributes associated with late-successional ecosystem characteristics (e.g. large trees and coarse woody debris). When applied to rehabilitated landscapes, particularly within the timeframes relevant to PRCP milestones, some of these attributes are unlikely to be achieved and may not provide a meaningful indication of rehabilitation stability or functional development.

The BioCondition Manual recognises that assessment frameworks may require adaptation where attributes are naturally absent, such as in grassland REs that lack a tree canopy, canopy height or large trees. In such cases, benchmark values for those attributes are set to zero and the maximum achievable score is adjusted accordingly. Where an attribute is assigned a score of zero, it is discounted from the final condition score. A similar principle applies to rehabilitated landscapes, where certain attributes may be absent due to expected rehabilitation trajectories rather than ecological deficiency.



Accordingly, this Technical Memorandum identifies the standard BioCondition attributes appropriate for assessing the Project's woodland PMLUs and establishes revised BioCondition criteria that more accurately reflect rehabilitation trajectories and functional stability, while remaining consistency with the intent and application of the BioCondition methodology.

2.5 Queensland Biodiversity and Ecosystem Information System Method

Broader ecosystem condition frameworks such as the QBEIS place greater emphasis on ecosystem function, structural development and recovery trajectories. While QBEIS has not been routinely applied for regulatory assessment of mine rehabilitation, selected concepts and attributes within QBEIS (e.g., basal area trends) provide useful guidance for refining BioCondition interpretation in rehabilitated landscapes.

In addition to the revised BioCondition criteria, selected QBEIS-based structural and compositional indicators can be incorporated to strengthen assessment of rehabilitation trajectory and functional development. These supplementary metrics do not replace BioCondition scoring but provide additional evidence of ecosystem progression consistent with the Commissioner's guidance (Spain et al., 2025).

The supplementary metrics proposed include:

- **Basal area measure of abundance** – which is used as a trajectory-based structural indicator. While BioCondition includes groundcover basal area, QBEIS basal area measure of abundance uses the Bitterlich stick method to convert basal area count of tree species to metres (m)²/hectare (ha). Repeated measurement of basal area enables assessment of biomass accumulation and stand maturation over time. Monitoring basal area trends (e.g. stable or increasing values across monitoring events) provides quantitative evidence of ongoing tree growth, canopy consolidation and competitive development, strengthening interpretation of canopy cover and height metrics within the BioCondition framework.
- **Woody Species Composition (Contextual monitoring only, no benchmark provided)**- is used to assess alignment of the developing stand with the target RE beyond simple richness counts. While BioCondition evaluates species richness and recruitment, QBEIS-based composition assessment enables comparison of dominant canopy and subcanopy taxa relative to expected RE assemblages. This provides additional assurance that rehabilitation is progressing toward the intended woodland community rather than simply achieving structural metrics.
- **Stem density measure of abundance** - is recorded as supporting structural information to assist interpretation of stand development. Stem density provides useful context for evaluating basal area trends, canopy development and recruitment patterns. For example, high stem density combined with low basal area may indicate early cohort establishment, whereas lower stem density with increasing basal area reflects maturing woodland structure.

Together, these supplementary QBEIS-derived indicators enhance the assessment framework by incorporating both condition-based and trajectory-based measures, providing a more comprehensive evaluation of ecosystem recovery and rehabilitation stability within the defined PRCP timeframe.

Benchmarks for basal area have been included in published the Queensland Herbarium RE Technical descriptions for the Brigalow Belt bioregion, however there are no defined benchmarks for woody species composition or stem density measures of abundance. As a result, woody species composition will provide supplementary information to interpret the results only, and a default benchmark has been provided from stem density measure of abundance.

These concepts have been used in this Technical Memorandum to inform the modification of benchmarks, without departing from BioCondition as the primary assessment framework for demonstrating rehabilitation success.

3. SITE CONTEXT FOR REHABILITATION

3.1 Rehabilitation areas requiring Revised BioCondition Benchmarks

The RAs that will be rehabilitated to a woodland PMLU include:

- RA1 – Conrock Gully Diversion.
- RA3 – Low Wall Waste Rock Dump (WRD).



- RA8 – Watercourse Riparian Zone.

These RAs for the Project are shown in Appendix A (courtesy of Stanmore). All woodland PMLUs will be subject to revised BioCondition benchmarks.

The RAs are associated with a combination of field-verified pre-mine REs and mapped extents. For RA1, pre-mine REs included small extents of RE11.3.1, 11.3.2, 11.3.3, 11.3.25 and 11.5.3 within a largely non-remnant landscape, RA3 was predominantly non-remnant prior to disturbance, with a small, mapped extent of RE11.4.9, while RA8 comprised RE11.3.25 within the riparian corridors.

These verified REs and site characteristics have informed the nomination of a single RE for rehabilitation of each area. Table 1 summarises the relevant pre-mine REs and extents, nominated REs for rehabilitation, expected PRCP timeframes, and the associated rehabilitation objectives and trajectories. This ecological and regulatory context underpins development of the revised BioCondition success criteria and supports assessment of rehabilitation under the PRCP.

3.2 Nominated Regional Ecosystems

3.2.1 RA1 Conrock Gully Diversion – nominated RE11.3.25

RA1 comprises the Conrock Gully Diversion. Conrock Gully (stream order 2) predominantly supports non-remnant vegetation as a result of historical land use clearing. There are however some small patches of remnant and regrowth woodland REs (11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains, 11.3.2 *Eucalyptus populnea* woodland on alluvial plains, 11.3.3 *Eucalyptus coolabah* woodland on alluvial plains and 11.5.3 *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces) present along its length within the Project's disturbance area, with a riparian RE (11.3.25 *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines) in the eastern extent adjacent to the Isaac River (stream order 6).

The nominated RE for RA1 is RE11.3.25. Although the area is predominantly non-remnant and currently supports mostly woodland REs rather than riparian vegetation, Conrock Gully functions as a watercourse (stream order 2) capable of supporting riparian woodland structure. The presence of mature *Eucalyptus coolabah* (Coolabah) within sections of the gully demonstrates its capacity to support larger canopy species under suitable hydrological conditions.

RE11.3.25 has been nominated to provide structural and compositional consistency along the full left of the reconstructed watercourse, rather than splitting the rehabilitated area into separate riparian and woodland REs. This approach simplifies revegetation design and management by limiting the number of REs applied to the landform.

The proposed species for revegetation within the nominated RE are provided in Table 2. The proposed species assemblage for RE 11.3.25 includes canopy species currently present within mapped RE 11.3.25 in the Project area, many of which are also canopy species within the woodland REs occurring along Conrock Gully. These include *Eucalyptus coolabah*, *Eucalyptus populnea* (Poplar Box), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Corymbia clarksoniana* (Clarkson's Bloodwood).

This integrated assemblage provides some flexibility within the PRCP should the riparian-dominant species of RE11.3.25 (e.g., *Eucalyptus tereticornis* [Queensland Blue Gum] and *Eucalyptus camaldulensis* {River Red Gum}) not establish as expected within the diverted Conrock Gully. In this instance, the nominated REs within the PRCP could be amended to a more woodland-aligned RE without requiring replanting as the broader species assemblage would remain consistent with one or more of the pre-mine woodland REs.

The nomination of RE11.3.25 reflects the intended long-term function of RA1 as a stable riparian corridor consistent with the woodland PMLU.

3.2.2 RA3 Low Wall WRD – nominated RE11.5.3

RA3 comprises the Low Wall Waste Rock Dump (WRD), which will be rehabilitated following completion of mining operations. The pre-mine landscape in this area is predominantly non-remnant vegetation, with a minor mapped extent of RE11.4.9 *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains.



The reconstructed WRD represents a purpose-built landform with engineered slopes and replaced growth media, and therefore will not directly replicate the pre-disturbance landform, geology or soil conditions for RE11.4.9. It is also unlikely to constitute a natural Land Zone as defined by the Queensland Herbarium. Accordingly, rehabilitation performance cannot be assessed against the original mapped RE and Land Zone. Instead, assessment will be undertaken against revised benchmarks associated with a nominated RE and corresponding Land Zone that occur within the surrounding landscape and are more representative of the reconstructed slope gradients, soil profiles and drainage characteristics of the WRD.

The nominated RE for RA3 has therefore been *RE 11.5.3 Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces*. This RE represents an open woodland community suited to gently undulating to sloping landforms and is consistent with the surrounding woodland landscape context. The selection of RE11.5.3 reflects the anticipated soil profile, drainage characteristics and slope gradients of the rehabilitated WRD, and is considered appropriate for establishing a stable, erosion-resistant woodland system on the reconstructed landform.

The proposed species assemblage for RE 11.5.3 (refer Table 2) includes dominant canopy species characteristic of this RE including *Eucalyptus populnea*, *Eucalyptus crebra*, *Corymbia clarksoniana* and *Eucalyptus melanophloia*, supported by appropriate midstorey and groundcover species. These species are well suited to the anticipated moisture regime and soil conditions of the WRD and are capable of establishing a persistent, self-sustaining woodland community.

The nomination of RE 11.5.3 recognises that the WRD is a reconstructed landform and that rehabilitation success should be assessed against achievable structural and compositional outcomes within PRCP timeframes.

3.2.3 RA8 Watercourse Riparian Zone – nominated RE11.5.3

RA8 comprises the Watercourse Riparian Zone which is mapped as *RE11.3.25 Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines*.

Unlike RA1 and RA3, this area includes verified remnant riparian vegetation and therefore has a clear ecological reference consistent with RE11.3.25. The nominated RE for RA8 is therefore RE 11.3.25, reflecting both its pre-disturbance mapping and its functional role as a riparian corridor.

The rehabilitation objective is to re-establish a structurally stable riparian woodland consistent with the woodland PMLU and appropriate to the hydrological and geomorphic characteristics of the watercourse.

The proposed species assemblage for RE 11.3.25 (refer Table 2) includes dominant canopy species characteristic of riparian systems within the locality, including *Eucalyptus tereticornis*, *Eucalyptus camaldulensis* and *Eucalyptus coolabah*, supported by appropriate midstorey, shrub and groundcover species.

The nomination of RE 11.3.25 for RA8 reflects its ecological function and landscape position, while recognising that attainment of late-successional riparian attributes (e.g. large trees or high coarse woody debris loads) is not required within PRCP timeframes to demonstrate rehabilitation stability.

3.3 Expected Progressive Rehabilitation and Closure Plan Timeframes

The expected PRCP timeframes for the woodland PMLU RAs reflect the sequencing of mining activities, landform construction and anticipated vegetation establishment periods. These timeframes define the monitoring horizon within which rehabilitation success must be demonstrated and inform development of revised BioCondition benchmarks.

For RA1 – Conrock Gully Diversion, rehabilitation will commence early in the operational phase following construction of the diverted watercourse. A minimum monitoring period of 25 years post-planting is anticipated within an overall PRCP (consists of approximately 15 years mine operation and 10 years post mine operation). This extended timeframe provides sufficient time for a stable riparian corridor to develop with moderate canopy maturity, increasing basal area and progressive structural consolidation.

For RA3 – Low Wall (WRD), rehabilitation will occur only following completion of mining operations. A minimum rehabilitation monitoring period of 10 years is therefore anticipated. This timeframe is considered sufficient to demonstrate



landform stability, persistent native groundcover establishment, and a clear positive trajectory toward a remnant-aligned canopy structure and structural composition.

For RA8 – Watercourse Riparian Zone, rehabilitation will occur post-mining operations with an anticipated monitoring period of at least 10 years. This timeframe is expected to enable establishment of riparian canopy and groundcover layers, demonstrate bank stability and vegetation persistence, with a clear positive trajectory toward a remnant canopy structure and composition.

These timeframes recognise that woodland ecosystems develop progressively and that certain late-successional attributes characteristic of mature remnant systems (e.g. large trees) are unlikely to be achieved within the PRCP monitoring timeframes. The revised BioCondition benchmarks have been developed to assess achievement of a stable and self-sustaining woodland system within these defined timeframes, rather than requiring remnant-equivalent structural maturity prior to EA surrender.

3.4 Rehabilitation Objectives and Trajectories

The overarching objective for the woodland PMLU RAs (RA1, RA3 and RA8) is to establish stable, self-sustaining native woodland systems consistent with the nominated REs and capable of achieving long-term landform stability and ecological function within PRCP timeframes.

Rehabilitation objectives common to all woodland areas include:

- Establishment of persistent native groundcover sufficient to stabilise soils and minimise erosion risk;
- Development of canopy and subcanopy layers consistent with the nominated RE;
- Achievement of a native-dominated species composition aligned with the target RE;
- Progressive biomass accumulation and canopy consolidation indicative of structural development;
- Evidence of ongoing recruitment and vegetation persistence; and
- Demonstration of a positive ecological trajectory toward a stable woodland system.

The anticipated rehabilitation trajectory for all areas comprises:

- **Establishment Phase (Years 0–3):** Rapid germination and establishment of native groundcover and planted canopy species, with high stem density and low basal area.
- **Structural Development Phase (Years 3–10):** Increasing canopy height and cover, progressive basal area accumulation, and thinning of early cohorts.
- **Consolidation Phase (Years 10+):** Stabilised groundcover, increasing canopy maturity, evidence of recruitment (where feasible within species maturation constraints), and a sustained positive structural trajectory.

It is recognised that certain late-successional attributes characteristic of mature remnant woodland systems (e.g. large trees and advanced structural complexity) are unlikely to be achieved within PRCP timeframes. Accordingly, the revised BioCondition benchmarks focus on measurable indicators of stability, structural development and positive trajectory rather than full remnant equivalence.

This trajectory-based framework ensures that assessment of rehabilitation success reflects ecological development pathways appropriate to reconstructed landforms while remaining consistent with regulatory requirements for demonstrating achievement of the woodland PMLU to a stable condition.



Table 1

Summary of rehabilitation areas, nominated REs, PRCP timeframes, and associated objectives and trajectories

Rehabilitation Area	Pre-Mine RE	Area (ha)	PMLU	Nominated RE for Rehabilitation	Expected PRCP Timeframe	Rehabilitation Objectives	Rehabilitation Trajectory
RA1 - Conrock Gully Diversion	Non-remnant	26.60	Woodland habitat	11.3.25	Minimum 25 years • (initial planting proposed early on in operations and include minimum 10 years post mine life)	- Establish a stable woodland community consistent with one of the nominated pre-mine REs. - Achieve stable channel and bank conditions with no active gully erosion. - Establish persistent native groundcover, shrub and tree layers appropriate to a watercourse setting. - Support a self-sustaining vegetation community capable of meeting the woodland PMLU.	- Initial establishment of native groundcover and riparian species following seeding. - Development of riparian structure and increasing canopy cover. - Progression toward a stable, functioning woodland system consistent with the nominated RE. - Stabilisation of banks and persistence of native species over time. - Late-successional structural attributes not expected within PRCP timeframes.
	11.3.1	0.02					
	11.3.2	0.12					
	11.3.3	3.35					
	11.3.25	0.68					
	11.5.3	3.73					
	Total	34.50					
RA3 - Low Wall (WRD)	Non-remnant	34.82	Woodland habitat	11.5.3	Minimum 10 years • (rehabilitation to occur post operations)	- Rehabilitate the WRD to a stable open woodland consistent with a nominated RE that will establish on the low wall slope. - Achieve long-term landform stability and erosion resistance. - Establish and maintain native species dominance across ground and canopy layers. - Support a self-maintaining vegetation community suitable for the approved woodland PMLU.	- Early establishment of native groundcover and woodland tree species. - Development of woodland structure and increasing canopy cover. - Ongoing recruitment and persistence of native species indicating functional stability. - Progression toward a stable, functioning woodland system consistent with the nominated RE. - Late-successional structural attributes not expected within PRCP timeframes.
	11.4.9	2.18					
	Total	37.00					
RA8 - Watercourse Riparian Zone	11.3.25	6.39	Woodland habitat	11.3.25	Minimum 10 years • (rehabilitation to occur post operations)	- Establish a stable riparian woodland consistent with the nominated RE. - Provide bank stability and minimise erosion within the riparian corridor. - Establish native riparian species capable of withstanding variable flow conditions. - Support long-term vegetation stability consistent with the woodland PMLU.	- Early establishment of riparian groundcover, shrubs and juvenile trees. - Development of a young riparian woodland with increasing structural complexity. - Stabilisation of banks and persistence of native species over time. - Late-successional structural attributes not expected within PRCP timeframes.
	Total	6.39					



Table 2
Proposed
species per
nominated RE

Nominated Regional Ecosystems	Upper Storey Tree Species	Mid and Lower Storey Tree and Shrub species	Groundcover species
RE11.3.25	<i>Angophora floribunda</i> <i>Casuarina cunninghamiana</i> <i>Corymbia clarksoniana</i> <i>Corymbia tessellaris</i> <i>Eucalyptus camaldulensis</i> <i>Eucalyptus coolabah</i> <i>Eucalyptus crebra</i> <i>Eucalyptus populnea</i> <i>Eucalyptus tereticornis</i> <i>Melaleuca leucadendra</i> <i>Eucalyptus melanophloia</i>	<i>Acacia disparrima</i> <i>Acacia leiocalyx</i> <i>Acacia salicina</i> <i>Alphitonia excelsa</i> <i>Brachychiton australis</i> <i>Callitris glaucophylla</i> <i>Cassia brewsteri</i> <i>Ficus opposita</i> <i>Geijera parviflora</i> <i>Livistona decora</i> <i>Lysiphyllum hookeri</i> <i>Macaranga tanarius</i> <i>Melaleuca bracteata</i> <i>Melaleuca fluviatilis</i> <i>Melaleuca viminalis</i> <i>Terminalia oblongata</i>	<i>Chrysopogon fallax</i> <i>Cymbopogon refractus</i> <i>Cyperus gracilis</i> <i>Dianella caerulea</i> <i>Dichanthium sericeum</i> <i>Heteropogon contortus</i> <i>Lomandra longifolia</i> <i>Panicum effusum</i> <i>Sida hackettiana</i> <i>Themeda triandra</i> <i>Wahlenbergia gracilis</i>
RE11.5.3	<i>Corymbia clarksoniana</i> <i>Corymbia dallachiana</i> <i>Corymbia erythrophloia</i> <i>Eucalyptus crebra</i> <i>Eucalyptus melanophloia</i> <i>Eucalyptus populnea</i>	<i>Acacia excelsa</i> <i>Acacia salicina</i> <i>Alectryon oleifolius</i> <i>Alphitonia excelsa</i> <i>Atalaya hemiglauc</i> <i>Brachychiton australis</i> <i>Bursaria incana</i> <i>Capparis lasiantha</i> <i>Cassia brewsteri</i> <i>Ehretia membranifolia</i> <i>Eremophila mitchellii</i> <i>Flindersia dissosperma</i> <i>Geijera parviflora</i> <i>Grevillea striata</i> <i>Lysiphyllum carronii</i> <i>Lysiphyllum hookeri</i> <i>Terminalia oblongata</i>	<i>Alloterospis semialata</i> <i>Aristida calycina</i> <i>Chloris divaricata</i> <i>Chrysopogon fallax</i> <i>Heteropogon contortus</i> <i>Panicum effusum</i> <i>Panicum queenslandicum</i> <i>Phyllanthus virgatus</i> <i>Sida hackettiana</i> <i>Themeda triandra</i>

4. DEVELOPMENT OF APPROPRIATE BENCHMARKS

Through a review of the BioCondition framework (Eyre et al., 2015) and appropriate literature, modified versions of the standard benchmarks for the nominated REs have been developed.

The standard benchmarks represent reference site condition of intact remnant ecosystems, as described in the BioCondition Assessment Manual.



The modified benchmarks reflect revised, fit-for-purpose criteria that are achievable within the specified rehabilitation timeframes that align with the rehabilitation objectives and proposed trajectories for each of the nominated REs. The modified benchmarks draw on BioCondition as the primary assessment framework, with additional benchmarks derived from selected QBEIS attributes to align with the Queensland Mine Rehabilitation Commissioner's *Evaluating methods for assessing native ecosystem mine rehabilitation success Technical Paper* (Spain et al., 2025) while maintaining continuity with established regulatory practice and ensuring the criteria remain achievable within PRCP timeframes.

The modified benchmarks retain the intent of the BioCondition framework while including additional QBEIS attributes to better reflect rehabilitated site conditions and functional stability on disturbed landforms. In particular, modifications have been informed by the expected rates of vegetation establishment and structural development for woodland ecosystems, recognising that some reference condition attributes represent late-successional characteristics that are unlikely to be achieved within the proposed PRCP timeframes, and therefore do not provide a meaningful indication of rehabilitation stability.

To support the development of modified benchmarks, a targeted literature review was undertaken to examine growth rates, structural development and rehabilitation trajectories for the nominated REs. The findings of this review provide an evidence base for setting realistic, defensible assessment thresholds for the rehabilitated woodland areas.

4.1 Literature Review on Vegetation Growth and Trajectories in the Mining Rehabilitation Context

The assessment of rehabilitated woodland vegetation under the PRCP requires consideration of vegetation growth rates and structural development trajectories, rather than direct equivalence with remnant reference condition at a single point in time. The literature demonstrates that while rehabilitated mine vegetation can establish rapidly and exhibit high stem densities in the short-term, the development of late-successional structural attributes occurs over multi-decadal timescales and is not achievable within typical PRCP timeframes (Neldner & Ngugi, 2014; Ngugi et al., 2015; Spain et al., 2025).

Growth trajectory analyses undertaken for rehabilitated woodland sites in Queensland indicate that attributes such as canopy cover, canopy height, species richness and overall stand occupancy (e.g. basal area) generally increase during the first two decades following establishment, providing reliable and measurable indicators of rehabilitation progress and functional stability (Ngugi et al., 2015). Recent guidance prepared for the Queensland Mine Rehabilitation Commissioner (Spain et al., 2025) further supports the use of attributes that respond directly to rehabilitation inputs and can be monitored consistently through time, noting that effective rehabilitation assessment should prioritise indicators that are measurable, repeatable and diagnostic of rehabilitation success (Spain et al., 2025).

In contrast, attributes associated with late-successional ecosystem development, particularly large tree density and coarse woody debris, are shown to develop over periods exceeding 40–50 years, even under favourable rehabilitation conditions (Neldner & Ngugi, 2014; Spain et al., 2025). Technical reviews of mine rehabilitation assessment methods identify that such attributes often provide limited diagnostic value within regulatory assessment timeframes and may obscure positive rehabilitation trajectories when applied prematurely (Spain et al., 2025). It should however be noted that coarse woody debris should not be ruled out, as it is important to mine rehabilitation, providing habitat features that are pivotal for facilitating colonisation by invertebrate detritivores, soil organisms, some mammals and trophic cascades that depend on them (Cristescu et al., 2012). While coarse woody debris takes a long time to develop naturally in rehabilitation settings, it may be added to rehabilitated areas during soil respreading and/or by direct placement after seeding, either through recovery from approved clearing areas, from stockpiled sources or from salvaged material.

Species composition has also been identified as a key determinant of long-term structural development. Rehabilitated sites dominated by short-lived species, such as *Acacia* spp., commonly exhibit rapid early growth, followed by declines in basal area and canopy cover as these species senesce. In contrast, sites with a higher proportion of long-lived *Eucalypts* demonstrate more stable or increasing basal area over time and a greater likelihood of progressing toward a self-sustaining woodland structure (Ngugi et al., 2015). This supports the assessment of rehabilitation success using trajectory-based indicators rather than static benchmarks derived from mature remnant vegetation (Zedler & Callaway, 1999; Spain et al., 2025). Species composition and basal area are not standard attributes within the BioCondition framework; however, they are



integral components of QBEIS and are considered appropriate supplementary indicators for assessing structural development and rehabilitation trajectories in rehabilitated landscapes.

Based on the literature, reasonable and repeatable site attributes for assessing rehabilitated woodland condition within PRCP timeframes include recruitment, native species richness, canopy height, cover estimates, basal area trends, woody species composition and stem density of abundance, and coarse woody debris where this has been added as part of rehabilitation. These attributes provide tangible, measurable evidence of vegetation establishment, site occupancy and functional stability, and are consistent with best-practice rehabilitation monitoring frameworks (Neldner & Ngugi, 2014; Spain et al., 2025).

Attributes such as large tree abundance are not considered appropriate for inclusion in modified BioCondition assessments for rehabilitated woodland areas due to the lack of tangible, auditable data within the expected PRCP timeframes. Omission of this attribute reflects a trajectory-based application of the BioCondition framework and is consistent with contemporary guidance on mine rehabilitation assessment, rather than a departure from the intent of BioCondition framework (Neldner & Ngugi, 2014; Ngugi et al., 2015; Spain et al., 2025).

4.2 Review of Regeneration Characteristics of Regional Ecosystems nominated for the Project's Rehabilitation

Review of Eucalypt Open Forests to Woodlands on Floodplains (BVG 16)

Eucalypt open forests to woodlands on floodplains (e.g., RE11.3.25) are structurally and functionally distinct from Brigalow and other Eucalypt communities, with regeneration and development strongly influenced by hydrology, soil moisture availability and disturbance regime. These systems are typically dominated by Eucalypt species such as *Eucalyptus tereticornis*, *Eucalyptus camaldulensis* and *Eucalyptus coolabah*, with an open canopy, variable tree spacing and a well-developed grassy understorey.

The literature indicates that regeneration in floodplain eucalypt systems occurs primarily through sexual reproduction, with episodic recruitment often linked to favourable rainfall or flooding events (Williams & Woinarski, 1997). As a result, rehabilitated stands commonly exhibit low initial stem densities, slow early canopy closure, and greater variability in recruitment success across the landscape. Structural development is therefore typically gradual, with canopy height, basal area and large tree attributes increasing steadily over time.

Accordingly, a trajectory-based assessment approach is supported for rehabilitated floodplain eucalypt woodlands, with emphasis on canopy height and cover development, species composition and evidence of ongoing recruitment rather than strict equivalence with mature remnant structure. Where coarse woody debris has been added as part of rehabilitation, its presence and persistence may provide a supplementary indicator of developing habitat complexity, but its absence should not preclude demonstration of functional rehabilitation within PRCP timeframes.

Review of Eucalypt Dry Woodlands on Inland Depositional Plains (BVG 17)

Eucalypt dry woodlands on inland depositional plains (e.g., RE11.5.3) are characterised by open canopies, relatively low to moderate stem densities and a strong grassy ground layer, typically dominated by species such as *Eucalyptus populnea*, *Eucalyptus crebra*, and *Corymbia* spp. These systems are adapted to low and variable rainfall and generally exhibit slower growth rates and structural development than floodplain forests.

Regeneration in these woodlands occurs predominantly through seedling establishment, often following disturbance events that reduce competition and create suitable microsites (Durrrough & Moxham, 2005). Consequently, rehabilitated stands commonly show patchy recruitment, variable stem densities and prolonged periods before canopy cover and basal area approach values observed in remnant systems.

The literature indicates that within rehabilitation assessment timeframes, attributes such as canopy height, canopy cover, stem density and cohort structure, basal area trends and woody species composition provide the most reliable and interpretable indicators of rehabilitation progress. In contrast, late-successional attributes such as large tree abundance and naturally derived coarse woody debris typically develop slowly and are often absent from young to mid-aged regrowth stands.



For this reason, assessment of rehabilitated inland depositional plain woodlands should focus on evidence of stable vegetation establishment, appropriate species composition and positive structural trajectories rather than attainment of mature remnant benchmarks. Where coarse woody debris has been deliberately incorporated into rehabilitation design, it may be assessed as an indicator of developing habitat function; however, its inclusion should be considered supplementary and context-dependent.

5. REVISED BENCHMARKS

Table 3 presents the proposed revised benchmarks for the nominated REs associated with the woodland PMLUs. The revised benchmarks are derived from the BioCondition framework, with proportional adjustments and supplementary QBEIS-informed attributes incorporated where necessary to reflect achievable rehabilitation trajectories within PRCP timeframes.

For each attribute, the table summarises the revised benchmark and provides justification outlining the ecological rationale, reference source and alignment with anticipated structural development. These revised criteria are intended to provide measurable, auditable and trajectory-based indicators of rehabilitation stability consistent with regulatory requirements.

During monitoring of the RAs, the benchmark for each assessable attribute for the nominated RE must be met, rather than the overall BioCondition score, for the BioCondition assessment to demonstrate achievement of the PRCP success criteria.

To develop the revised BioCondition benchmarks, consideration was given to the potential use of staged or interim benchmark thresholds corresponding to different phases of rehabilitation (e.g. post-establishment and later structural development stages). Under such an approach, different benchmark values would apply during early rehabilitation phases compared to benchmarks applied once vegetation has progressed toward a more stable woodland structure.

This approach was not adopted for the PRCP. Introducing multiple benchmark thresholds across different stages of rehabilitation would increase complexity in both monitoring and interpretation of results, potentially creating uncertainty regarding the point at which a site is considered compliant or whether management intervention is required. In particular, the practical management response to failure to meet an interim benchmark is unclear. For example, it may be difficult to determine whether a shortfall represents normal ecological variability during early development or whether additional interventions such as supplementary planting or structural augmentation would be warranted.

Instead, the revised benchmarks have been established as a single set of criteria representing the structural and compositional attributes expected of a stable woodland system within the defined PRCP timeframes. Monitoring results will be interpreted using a trajectory-based assessment approach, whereby successive monitoring events will be used to evaluate whether RAs are progressing toward these benchmarks. This allows early-stage rehabilitation areas to demonstrate positive development without the need for multiple numerical thresholds, while still ensuring that vegetation communities are trending toward the intended woodland structure and function.

This approach aligns with contemporary rehabilitation assessment principles, which emphasise evidence of progressive ecosystem development and structural consolidation over time rather than compliance with fixed interim condition targets.

The finalised BioCondition benchmarks for inclusion in the PRCP are provided in Appendix B.



Table 3
Revised
benchmarks for
the nominated
REs with
justification

Success Criteria Attributes		Methodology	RE11.3.25		RE11.5.3		Justification
			Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
BioCondition Standard Attributes							
Recruitment of woody perennial species in Ecological Dominant Layer (EDL)	of	Recruitment is assessed as the proportion of dominant species present at a site that are regenerating, i.e. having individuals with a diameter at breast height (DBH) <5 centimetres (cm). The recruitment attribute assesses the presence of regeneration of the dominant canopy species in the 100 x 50 m assessment area	100	≥40% ¹	100	≥40% ¹	Included with revised benchmarks Recruitment under the BioCondition Assessment Manual is intended to demonstrate self-replacement of dominant canopy species, that is, evidence of seed-derived regeneration. In rehabilitated landscapes, emergent seedlings or surviving tube stock with DBH <5 cm may be present at high densities during the short- to mid-term establishment phase; however, these individuals do not represent natural self-replacement processes. For the purposes of mine site rehabilitation monitoring, juveniles must therefore be measured cautiously to ensure that recorded recruitment represents a distinct post-establishment cohort. The following recruitment definition has been developed to differentiate naturally recruited individuals from planted stock and to ensure that recruitment scoring reflects genuine regenerative function: <i>A dominant canopy species is recruiting if juveniles (<5 cm DBH) occur in the 100 × 50 m area that are clearly a younger cohort than the planted canopy cohort, based on at least one of the following:</i> • <i>Size-class separation: juveniles are materially smaller than the predominant planted cohort (e.g., clearly in seedling/sapling classes while cohort trees are poles²), and/or</i> • <i>Spatial pattern: juveniles occur outside planting spacing/rows (patchy/natural pattern, microsites, under canopies), and/or</i> • <i>Cohort evidence: individuals show multiple size classes for that species (seedling/sapling + pole), indicating more than one establishment event.</i> <i>Where origin cannot be distinguished with confidence, the individual is to be recorded as ‘uncertain’ and not counted toward the recruitment score.</i> For the revised benchmarks , literature indicates that seed-derived recruitment of dominant woodland species is often episodic and may occur over substantially long timeframes influenced by climatic conditions, disturbance events and attainment of reproductive maturity. Consequently, seed-derived recruitment consistent with remnant benchmarks is unlikely to be expressed within PRCP timeframes. Accordingly, recruitment benchmarks for RE11.3.25 and 11.5.3 need to be revised so that reduced recruitment in early to mid-term rehabilitation is not interpreted as instability where structural development and canopy persistence are otherwise progressing. The revised benchmarks have been informed by available literature regarding reproductive onset in dominant canopy species proposed for rehabilitation in Table 2. For dominant species in RE11.3.25, we know that reproductive maturity of <i>Eucalyptus tereticornis</i> is diverse, with fertility at age seven only being 21% (Kamalakannan et al., 2006) and increased fertility occurring between 10 – 15 years (Botanic Gardens of Sydney, 2026). In contrast, generation time for <i>Eucalyptus camaldulensis</i> may be as short as three years (CAB International, 2000). Williams & Woinarski (2005) also revealed that there was a high variability in recruitment within <i>Eucalypt woodlands on floodplains</i> . Based on this, some canopy species in RE11.3.25 may reliably express recruitment within early monitoring periods (≤10 years), while others may reach reproductive capability later e.g., >15 years. For RE11.5.3, literature suggests similar variability between species. The age of first flowering for <i>Eucalyptus crebra</i> can be between 10 -15 years (Botanic Gardens of Sydney, 2026) while <i>Eucalyptus populnea</i> has been known to flower in its fourth year (Hamilton, 1979). Dorrrough and colleagues (2005) also conveyed patchy recruitment within <i>Eucalypt woodlands on inland depositional plains</i> . Given the expected PRCP timeframe for RE11.3.25 within RA1 (25 years), and the shorter 10-year timeframes for RA8 and RE11.5.3 within RA3, conservative recruitment benchmarks have been adopted. A benchmark of ≥40% of dominant canopy species recruiting is considered reflective of realistic reproductive onset timing and episodic recruitment dynamics and is sufficient to demonstrate evidence of ongoing regeneration and positive structural trajectory within PRCP timeframes, without requiring full cohort replacement or remnant-equivalent recruitment dynamics.
Native plant species richness	Trees	Assessment is based on the number of native tree, shrub, grass and forb/other species observed in the 50 x 10 m plot for each benchmarked life-form group.	4	≥3	3	≥2	Included with revised benchmarks
	Shrubs		4	≥1	6	≥1	Under the BioCondition Assessment Manual, native species richness (trees, shrubs, grasses and forbs) is assessed relative to benchmarks derived from mature remnant regional ecosystems. These benchmarks reflect long-established systems that have developed under natural recruitment processes over extended timeframes.
	Grasses		8	≥1	9	≥1	In contrast, rehabilitated mine landforms are initially established through planting and seeding, followed by progressive natural recruitment, competitive thinning and climatic filtering. As such, species richness trajectories differ from remnant reference systems, particularly within early to mid-term PRCP timeframes (Years 10–20).
	Forbs		13	≥3	11	≥2	Published rehabilitation studies demonstrate that early richness does not necessarily persist and that understorey development often lags behind canopy establishment. Ngugi and colleagues (2015) reported that initial establishment of tree species was highly satisfactory, with a mean of 15 tree species present at Year 1 but Chronosequence analysis showed that survivorship

¹ To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

² A young tree that has progressed beyond the sapling stage and exhibits a single dominant stem with developing canopy structure, typically ≥5 cm DBH and below mature canopy dimensions.



Success Criteria Attributes	Methodology	RE11.3.25		RE11.5.3		Justification
		Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
						declined over time, with six or fewer tree species persisting in regeneration plots older than 20 years. This indicates that early richness may reflect planting design rather than long-term compositional stability and remnant-equivalent tree richness should not be expected to persist uniformly over time. Further, a BioCondition assessment of 25 rehabilitated sites aged from 1 to 26 years old at the Meandu Mine (Neldner & Ngugi, 2014) found tree richness scored relatively well (mean score 4.3/5, representing approximately 80% of the benchmark number species), shrub richness scored lower (mean 1.9/5, representing approximately 20% of the benchmark number of species), grass richness scored lower (mean 1.4/5, representing approximately 15% of the benchmark number of species), and forb richness scored moderately low (mean 2.1/5, representing approximately 20% of the benchmark number of species). These findings demonstrate that tree structural development can progress successfully under rehabilitation in the early to mid-term of rehabilitation (1-26 years) however, understorey richness (shrubs, grasses and forbs) lag behind canopy development. Hence, BioCondition understorey richness in rehabilitated systems may remain below remnant benchmarks for extended periods without indicating instability. Accordingly, revised tree richness benchmarks focus on the persistence of multiple dominant canopy species in the short term (10 year PCRP timeframe). Consistent with the findings from Neldner & Ngugi (2014) the revised tree richness benchmark has been set at 80% of the standard benchmark for both RE11.3.25 and 11.5.3. The Meandu BioCondition results (Neldner & Ngugi, 2014) demonstrate that shrub, grass and forb richness scores commonly remain lower than tree scores, As understorey development is slower and more variable, consistent within the findings from Neldner & Ngugi (2014), and hence has been set accordingly: 20% of the standard benchmark for shrubs, 15% of the standard benchmark for grasses and 20% of the benchmark for forbs. This differentiation in revised benchmarks for trees, shrubs, grasses and forbs reflects the documented lag in understorey development relative to canopy establishment in rehabilitated mine landscapes and provides realistic yet meaningful indicators of compositional development toward the target REs.
Emergent canopy (E) height (m)	Tree canopy height refers to the median canopy height in metres, estimated for the trees in the EDL within the 100 x 50 m assessment area. The median canopy height is the height that has 50% of canopy trees higher and lower than it. The average of emergent, canopy and subcanopy layers is recorded.	NA	NA	NA	NA	Included with revised benchmarks Vegetation structure in Australia is classified using height, cover and life form of the predominant layer (Neldner et al., 2023). Where dominant canopy species consistent with the target RE are established and progressing through size classes, canopy height can reasonably be expected to increase over time, even if full remnant canopy height has not yet been attained. In remnant woodland systems, canopy height reflects long-term growth processes that may take several decades to fully express. Accordingly, remnant-equivalent canopy heights are not expected to be achieved within the proposed PCRP timeframes. Nevertheless, tree height provides a direct and measurable indicator of structural development and canopy maturation toward the nominated RE. Unlike attributes such as large tree abundance or coarse woody debris, which are strongly time-dependent and unlikely to develop within the minimum 10-year PCRP timeframe, tree height responds predictably to establishment success, site productivity and growing conditions. In a mine rehabilitation context, height also serves as an indicator of sustained growth performance and site suitability (soil depth, moisture availability, nutrient status), is a surrogate for biomass accumulation and increasing basal area, evidence that planted cohorts are transitioning from the establishment phase to structural consolidation, and it is also a measurable parameter that can demonstrate progressive attainment of woodland form within PCRP timeframes. Accordingly, tree height provides a consistent trajectory-based metric that should demonstrate steady increase over time in a stable rehabilitated system. Chronosequence analyses of rehabilitated woodland systems in Queensland demonstrate progressive increases in canopy height and structural development over the first decade following establishment (Ngugi et al., 2015). While full remnant canopy height is not attained within this period, canopy development sufficient to form recognisable woodland structure is achievable under favourable conditions. Accordingly, revised tree height benchmarks have been set to reflect proportional structural progression rather than equivalence with remnant systems. For RE11.3.25 and RE11.5.3, canopy height benchmarks have been adjusted to represent achievable development within a minimum 10-year PCRP timeframe, equating to approximately 50% of the standard benchmark for both RE11.3.25 and RE11.5.3. Subcanopy height benchmarks have been set at 50% of the standard benchmark for both REs, reflecting expected stratification and vertical development within a developing woodland system. Retaining tree height as an attribute therefore supports a trajectory-based assessment of woodland development without imposing unrealistic late-successional expectations. Excluding tree height would remove a key structural indicator of woodland formation and reduce the ability to demonstrate progression toward the nominated RE beyond simple cover or richness metrics.
Tree canopy (T1) height (m)		23	≥12	17	≥8	
Tree subcanopy (T2) height (m)		11	≥5	8	≥4	
Emergent canopy (E) cover (%)	The estimation of the percentage canopy cover of the living, native tree layer along the 100 m transect, using the line intercept method. The average of emergent,	NA	NA	NA	NA	Included with revised benchmarks Canopy cover is a key structural attribute in vegetation assessment and is widely recognised as an important ecological indicator of ecosystem development and function (Zine et al., 2021). Plant cover provides a robust measure of vegetation establishment, competitive dynamics and structural consolidation, and is appropriate for repeated annual monitoring in rehabilitation contexts (Herrick et al., 2009). Cover-based assessment methods are considered among the most objective approaches for sampling vegetation condition in rehabilitated landscapes, as they are rapid, repeatable and capable of producing estimates with minimal bias and error when applied consistently (Herrick et al., 2009). Evidence from mine rehabilitation monitoring demonstrates that structural attributes such as canopy cover can establish rapidly under favourable conditions. (Ngugi et al., 2015) reported that tree canopy cover reached 88% by Year 3 at some rehabilitated mine sites. However, their Chronosequence analysis also identified a linear decline in woody species richness over time,
Tree canopy (T1) cover (%)		34	≥27	25	≥20	
Tree subcanopy (T2) cover (%)		12	≥7	5	≥3	



Success Criteria Attributes	Methodology	RE11.3.25		RE11.5.3		Justification
		Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
	canopy and subcanopy layers is recorded.					indicating that rapid canopy closure does not necessarily equate to long-term compositional stability or increasing floristic complexity. This distinction is important: high canopy cover may be achieved early through planted cohort growth, while structural stratification and species diversity continue to develop over longer timeframes. Accordingly, revised canopy cover benchmarks need to recognise that tree canopy closure may occur relatively early in rehabilitation, emergent and subcanopy layers develop progressively as stands stratify, high cover values alone should not be interpreted as full structural maturity, and cover must be interpreted in conjunction with species richness and recruitment metrics. Revised scoring therefore retains strong canopy cover expectations to ensure establishment success and weed suppression, while avoiding assumptions that early high cover equates to remnant structural equivalence. Emergent cover expectations remain modest within the 10 year PRCP timeframe, as development of a distinct emergent layer typically reflects longer-term stand differentiation. This approach ensures canopy cover remains a meaningful, objective and evidence-based indicator of structural development within rehabilitated woodland systems, while aligning expectations with demonstrated mine rehabilitation trajectories. The revised canopy cover benchmarks have been set at 80% of the remnant benchmark for the tree canopy (T1) layer and 60% of the remnant benchmark for the subcanopy (T2) layer for both nominated REs. This proportional approach reflects observed structural development trajectories in mine rehabilitation, where canopy closure can be achieved relatively rapidly under favourable conditions, while subcanopy development typically progresses more gradually. Together, these revised proportional benchmarks provide a realistic yet ecologically robust indicator of progressive woodland structural development in rehabilitated mine landscapes.
Shrub canopy cover (%)	The estimate of the percentage cover of native shrubs recorded along the 100 m transect (similar to the estimation of tree canopy cover using a vertical projection of shrub crowns downwards over the centre line transect).	4		10	5	Included with revised benchmarks Shrub canopy cover is retained as a structural attribute because it contributes directly to vertical stratification, habitat complexity and functional resilience within woodland ecosystems. In Queensland vegetation structural classification, differentiation between woodland structural forms relies not only on canopy height and cover of the dominant layer but also on the presence and development of subordinate strata (Neldner et al., 2023). The shrub layer therefore represents an important component of developing woodland structure. In remnant systems, shrub cover reflects long-term ecological processes including disturbance history, grazing pressure and hydrological variability. In rehabilitated landscapes, shrub development may lag behind tree establishment due to competition for light and moisture, variability in seed supply, and establishment method (direct seeding versus tube stock). Chronosequence studies of Queensland mine rehabilitation have demonstrated that while tree strata often establish successfully, shrub richness and cover can remain comparatively low during the first decade of development (Ngugi et al., 2015). This understorey lag is consistent with broader woodland ecology, where shrub recruitment is frequently patchy and disturbance-dependent. Unlike large tree abundance or coarse woody debris, shrub cover can develop within PRCP timeframes, particularly where appropriate species are included in revegetation design. However, remnant-equivalent shrub cover is not expected within a 10 year PRCP timeframe. Accordingly, revised shrub canopy cover benchmarks have been set proportionally below remnant BioCondition benchmarks to reflect realistic structural development within PRCP timeframes, while still requiring clear evidence of subcanopy establishment and progression toward the nominated RE structure. Benchmarks have been proportionally adjusted (50% of the standard benchmarks for both nominated REs) to represent achievable structural stratification within a minimum 10-year PRCP timeframe while still requiring clear development of a functional subcanopy layer. Note, early dominance by rapidly establishing Acacia species is recognised as a normal successional phase in rehabilitated woodland systems. Assessment of shrub cover therefore should consider species composition and evidence of structural persistence to ensure shrub development reflects stable stratification with species representative of the nominated RE rather than transient pioneer dominance.



Success Criteria Attributes	Methodology	RE11.3.25		RE11.5.3		Justification
		Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
Native grass cover (%)	Percentage cover of native perennial grasses. Ground layer cover attributes are assessed using a series of 1 m × 1 m quadrats positioned systematically along the transect. Cover values are estimated visually within each quadrat and averaged to derive site-level values for each attribute.	35	≥23	26	≥17	Included with revised benchmarks The revised native grass cover benchmarks have been developed to reflect realistic ground layer development trajectories within a 10 year PRCP timeframe, while maintaining alignment with the structural and functional intent of the nominated REs. Native perennial grasses are critical for ecosystem function, contributing to soil stability, nutrient cycling, habitat provision and resistance to weed invasion (Herrick et al., 2009; Zine et al., 2021). Accordingly, meaningful native grass cover remains an essential performance indicator. However, ground layer composition and cover in rehabilitated woodland systems are highly responsive to seasonal rainfall, competition from establishing canopy layers, and early-stage soil development processes. Evidence from mine rehabilitation monitoring indicates that while canopy cover can establish rapidly, understorey strata, including grasses, often develop more gradually and exhibit greater interannual variability (Ngugi et al., 2015). In addition, visual quadrat-based cover estimation, while objective and repeatable captures seasonal expression rather than latent ground layer potential. Native perennial grass cover benchmarks have been revised to 65% of the standard benchmark (≥23% for RE11.3.25 and ≥17% for RE11.5.3) to reflect realistic ground layer development within a 10 year PRCP timeframe. Setting the benchmark at 65% maintains a strong expectation of functional perennial grass dominance sufficient to support erosion control, nutrient cycling and resistance to weed invasion, while accommodating natural climatic variability and successional dynamics. This proportional adjustment ensures native grass cover remains a meaningful indicator of ecosystem function and trajectory toward woodland stability, rather than a direct comparison to remnant-equivalent benchmarks.
Organic litter (%)	Percentage cover of fine and coarse organic litter, including leaves, twigs and small branches. Assessed using the quadrat method defined for Native grass cover.	21	≥10	30	≥15	Included with revised benchmarks Organic litter is an important structural and functional component of woodland ecosystems, contributing to nutrient cycling, soil organic matter accumulation, moisture retention, erosion control and microhabitat provision (Herrick et al., 2009). In woodland systems, litter accumulation is closely linked to canopy biomass production and stand age, increasing progressively as trees mature. In rehabilitated mine landscapes, litter development typically lags behind canopy establishment, as sustained biomass inputs and soil biological processes require time to stabilise (Grant, 2006; Ngugi et al., 2015). Accordingly, revised litter benchmarks have been set at 50% of the standard benchmark for both nominated REs. This approach recognises the progressive nature of litter accumulation in developing stands, the dependency of litter production on canopy maturation, climatic variability influencing litter persistence and decomposition and the 10 year PRCP timeframe, which is insufficient for full remnant-equivalent litter development in most woodland systems. Despite this proportional adjustment, the revised benchmarks still require meaningful organic ground cover sufficient to contribute to soil protection, nutrient cycling and ecosystem function. The revised benchmarks therefore maintain a requirement for meaningful ground surface protection and nutrient cycling function, while recognising realistic litter accumulation trajectories in mine rehabilitation contexts.
Large trees (Eucalypt)	Large trees are defined as the number of living trees per hectare with a DBH greater than the DBH threshold provided in the BioCondition benchmark document. Large trees are counted within the 100 x 50 m assessment area (i.e. 0.5 hectare, this value will need to be doubled to compare with the benchmark value).	19	NA	19	NA	Omitted Large tree density (as defined under the BioCondition Assessment Manual) represents late-stage structural development typically associated with mature woodland systems. The DBH thresholds used to define large trees commonly require several decades of uninterrupted growth to achieve under woodland conditions. Within a 10 year PRCP timeframe, attainment of remnant-equivalent large tree densities is not realistic for rehabilitated areas. Even under favourable growth conditions, dominant woodland eucalypts are unlikely to reach DBH classes consistent with BioCondition large tree criteria within the minimum 10-year PRCP timeframe. Inclusion of this attribute would therefore introduce an inherent and unavoidable scoring limitation unrelated to rehabilitation performance or trajectory. Structural development toward large-tree condition is instead captured through tree height progression, increasing canopy cover, and recruitment and survivorship of dominant canopy species. Given these considerations, the large tree attribute has been omitted from the revised benchmarks for both nominated REs. This omission reflects the temporal constraints of mine rehabilitation assessment rather than a relaxation of structural expectations and ensures that scoring focuses on achievable indicators of progressive woodland development within the defined monitoring period.
Large trees (Non-Eucalypt)		13	NA	1	NA	
Large trees (Eucalypt + Non-Eucalypt)		32	NA	20	NA	



Success Criteria Attributes		RE11.3.25		RE11.5.3		Justification
		Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
Coarse woody debris (CWD) (m/ha)	CWD refers to logs or dead timber on the ground that is >10 cm diameter and >0.5 m in length (and more than 80% in contact with the ground). Assessment is conducted within the 50 x 20 m plot (i.e. 0.1 ha). The total measured value is multiplied by 10 for comparison with the benchmark which is a metre per hectare value).	473	≥142	342	≥103	Conditionally included with revised benchmarks <i>The CWD attribute will be assessed where CWD placement or retention forms part of the approved rehabilitation design for the nominated REs. Where CWD is deliberately incorporated into RAs (e.g. through placement of salvaged logs, habitat structures, or retention of cleared material), the CWD attribute should be included and assessed against revised benchmarks.</i> <i>Where CWD has not been incorporated into the rehabilitation design and is not expected to develop naturally within the 10 year PRCP timeframe, the CWD attribute should be omitted.</i> CWD is widely recognised as a very good indicator of rehabilitation stability, relating directly to nutrient and water cycling, maintenance of soil moisture and retention of plant propagules. In mature woodland systems, CWD contributes to long-term ecosystem function by moderating microclimate, providing habitat complexity, supporting decomposer communities and enhancing soil development processes. However, standard benchmarks for CWD reflect accumulation through natural tree mortality and branch fall over extended timeframes. Such loads are not achievable within a 10- year PRCP timeframe unless woody material is deliberately introduced into rehabilitated areas. In rehabilitated landscapes, CWD is therefore only considered an appropriate indicator where it has been intentionally incorporated as part of the rehabilitation design (e.g. placement of salvaged logs or habitat structures). Where CWD has been deliberately added, revised benchmarks can be applied to reflect realistic placement densities achievable within the PRCP timeframe, ensuring that CWD functions as a meaningful and measurable indicator of structural development and ecosystem stability. Setting the revised benchmark at approximately 30% of the standard benchmark reflects a realistic and achievable structural augmentation target within the minimum 10-year PRCP timeframe. This proportion recognises that placed CWD represents an initial structural input rather than decades of natural accumulation, aligns with expected early- to mid-term stand development prior to significant natural tree mortality, provides sufficient woody material to deliver ecological function (microhabitat, moisture retention, nutrient cycling) without imposing ecologically unrealistic expectations, and maintains a meaningful performance threshold while acknowledging temporal constraints.
Non-native plant cover	Non-native plant cover is the percentage cover of the total vegetation cover that is comprised of exotic and non-indigenous species, assessed within the 50 x 10 m sub-plot. Where there are non- native plants present in more than one layer, such as a grass in the ground layer and shrub in the shrub layer, then the cover in each layer are added together.	0	≤10	0	≤10	Included with revised benchmarks Standard benchmarks for non-native plant cover are set at 0%, reflecting intact native vegetation systems where exotic species are absent or negligible. However, application of a strict 0% benchmark to rehabilitate mine landscapes within a minimum 10-year PRCP timeframe is not realistic. Disturbed systems are inherently more susceptible to colonisation by non-native species due to soil disturbance, altered hydrology, nutrient enrichment and exposure to ongoing propagule pressure from surrounding landscapes (Hobbs & Norton, 1996). Reconstructed landforms in particular may experience transient weed incursions during early establishment phases, even where active weed management programs are implemented. Literature recognises that complete exclusion of non-native species is rarely achievable in post-disturbance systems, and that ecosystem stability is more appropriately assessed by the dominance of native species and the functional integrity of the vegetation community rather than absolute absence of exotics (Suding et al., 2004). In woodland rehabilitation contexts, low levels of incidental or transient non-native species do not necessarily compromise structural development, recruitment processes or long-term trajectory toward the target RE provided native species remain dominant and weed populations are effectively managed (Herrick et al., 2009). Accordingly, revising the benchmark from 0% to a low tolerance threshold of ≤10% for both nominated REs reflects the ecological reality of propagule pressure in disturbed landscapes, the transitional nature of rehabilitated ecosystems, the emphasis on native dominance and functional stability rather than absolute weed exclusion, and practical limitations of long-term weed eradication in open woodland systems.
QBEIS Supplementary Attributes						
Basal Area Trends (m ² /ha)	Basal area is calculated from DBH measurements of all trees within the assessment area and tracked over successive monitoring	14.7 ³	≥7	10.5	≥5	Included with revised benchmarks In rehabilitated mine landscapes, vegetation condition is inherently transitional. Early structural establishment may occur rapidly (e.g. canopy closure), but stand maturation, including DBH growth, biomass accumulation and competitive thinning, continues progressively over time. As such, trajectory toward structural maturity is as important as absolute condition at a given monitoring event. Incorporating basal area trends alongside standard BioCondition attributes provides a quantitative indicator of ongoing structural development and progression toward woodland stability. Basal area trend analysis involves repeated measurement of permanent monitoring plots to determine whether basal area is increasing, stable or declining over time. In the context of rehabilitation assessment, a positive or stable basal area trend indicates continued tree growth, survivorship and biomass accumulation, while a declining trend (in the absence of disturbance) may indicate structural instability or mortality exceeding recruitment.

³ QBEIS attributes (e.g., Basal area trend, woody species composition, stem density) benchmarks taken from the Technical Description for the REs.



Success Criteria Attributes	Methodology	RE11.3.25		RE11.5.3		Justification
		Benchmark	Revised Benchmark	Benchmark	Revised Benchmark	
	periods to assess changes through time. Basal area may be estimated using a Bitterlich stick or basal area gauge (Neldner et al., 2023)					Basal area trend should be included as a supplementary indicator in addition to the standard BioCondition attributes. This inclusion does not replace BioCondition scoring but strengthens interpretation of structural development by demonstrating progressive biomass accumulation, providing evidence of canopy persistence and competitive stand development, supporting interpretation of height, canopy cover and recruitment metrics and distinguishing between static early establishment and advancing structural maturity. Standard benchmarks for basal area have been derived from the Technical Descriptions of each of the nominated REs. Revised benchmarks have been established based on expected woodland growth trajectories within a minimum 10-year PRCP timeframe. These revised benchmarks for the nominated REs have been set at 50% of the standard benchmarks to reflect achievable structural development within a minimum 10-year PRCP timeframe while still requiring demonstrable biomass accumulation. Basal area will be assessed as a trend (stable or increasing) across monitoring events to confirm ongoing structural progression and to distinguish developing, consolidating woodland from stagnant or declining stands.
Woody Species Composition	Assessment of the composition of woody species, including the presence and proportional representation of species consistent with the nominated RE.	Nil	NA	Nil	NA	Contextual monitoring only Woody species composition has been included as a supplementary indicator to assess alignment with the nominated REs and inform interpretation of long-term rehabilitation trajectory. While BioCondition captures native species richness, richness alone does not describe community composition because it does not record the identity and relative contribution of species present. Recording woody species composition therefore provides important context for interpreting whether rehabilitated areas are developing toward the intended assemblage of the nominated RE and supports adaptive management actions such as targeted weed surveillance and control. Accordingly, woody species composition will be recorded for contextual monitoring only and is not assigned a benchmark for comparison.
Stem density measures of abundance (stems/ha)	A stem count total is recorded (by species) in the 50 x 10 m plot by species and strata. The count can be converted to stems/ha using the stem density plot area (Neldner et al., 2023). A subsampling procedure be employed for certain species where total count of all stems across the plot is impractical.	Nil	>500	Nil	>500	Included with a default benchmark Stem density is a fundamental structural metric that informs both current stand condition and future woodland development in rehabilitation. In woodland systems, stem density provides a direct measure of establishment success, mortality rates and structural configuration, all of which are critical to interpreting rehabilitation trajectory. For early-stage rehabilitation, successful establishment and persistence of tree seedlings is a primary indicator that the site is progressing toward a self-sustaining ecosystem. Unlike canopy cover alone, stem density allows quantification of cohort survival and self-thinning dynamics over time. There are no standard stem density benchmarks provided within the Brigalow Belt RE technical descriptions for the nominated REs. Consequently, a default benchmark has been adopted for monitoring purposes. Chronosequence data from rehabilitated mine sites indicate that stem density varies considerably between sites and age classes, with only half of assessed cohorts meeting the regulator's criterion of >900 stems/ha for Eucalypts (Ngugi et al., 2015). This suggests that a benchmark of 900 stems/ha may be aspirational rather than consistently achievable across rehabilitated woodland systems. Accordingly, a default benchmark of ≥500 stems/ha has been adopted. This value reflects a widely spaced woodland configuration, consistent with the open woodland structure of the nominated REs, while remaining sufficient to ensure adequate stocking for long-term canopy development and structural consolidation. The benchmark recognises that self-thinning is an expected ecological process as stands mature and that excessively high initial densities are not required to achieve stable woodland structure. There are no standard stem density benchmarks provided within the Brigalow Belt RE technical descriptions for the nominated REs. Consequently, a default benchmark has been adopted for monitoring purposes. Chronosequence data from rehabilitated mine sites indicate that stem density varies considerably between sites and age classes, with only half of assessed cohorts meeting the regulator's criterion of >900 stems/ha for eucalypts (Ngugi et al., 2015). This suggests that a threshold of 900 stems/ha may be aspirational rather than consistently achievable across rehabilitated woodland systems. Accordingly, a default benchmark of ≥500 stems/ha has been adopted. This value reflects a widely spaced woodland configuration, consistent with the open woodland structure of the nominated REs, while remaining sufficient to ensure adequate stocking for long-term canopy development and structural consolidation. The benchmark recognises that self-thinning is an expected ecological process as stands mature and that excessively high initial densities are not required to achieve stable woodland structure.



6. CONCLUSION

This Technical Memorandum has reviewed the applicability of standard BioCondition benchmarks to the Project's woodland PMLUs and established revised, fit-for-purpose criteria aligned with rehabilitation trajectories and PRCP timeframes. The revised benchmarks retain core BioCondition structural and compositional attributes while incorporating selected QBEIS supplementary indicators to strengthen the trajectory-based assessment.

The resulting framework is ecologically defensible, measurable and auditable, and reflects what is realistically achievable within a minimum 10-year PRCP timeframe. It ensures that rehabilitation performance is assessed against indicators of structural progression, canopy development, regenerative function and ecosystem stability, rather than requiring equivalence with mature remnant systems.

Accordingly, the revised criteria provide an appropriate basis for demonstrating progressive attainment of a stable woodland PMLU under the PRCP, consistent with statutory guidance, evidence based literature and contemporary rehabilitation assessment principles.

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8. CLOSURE

Should you have any queries regarding this Technical Memorandum, please contact the undersigned.

Yours sincerely

Emily Krunes

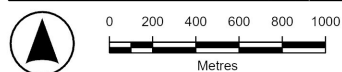
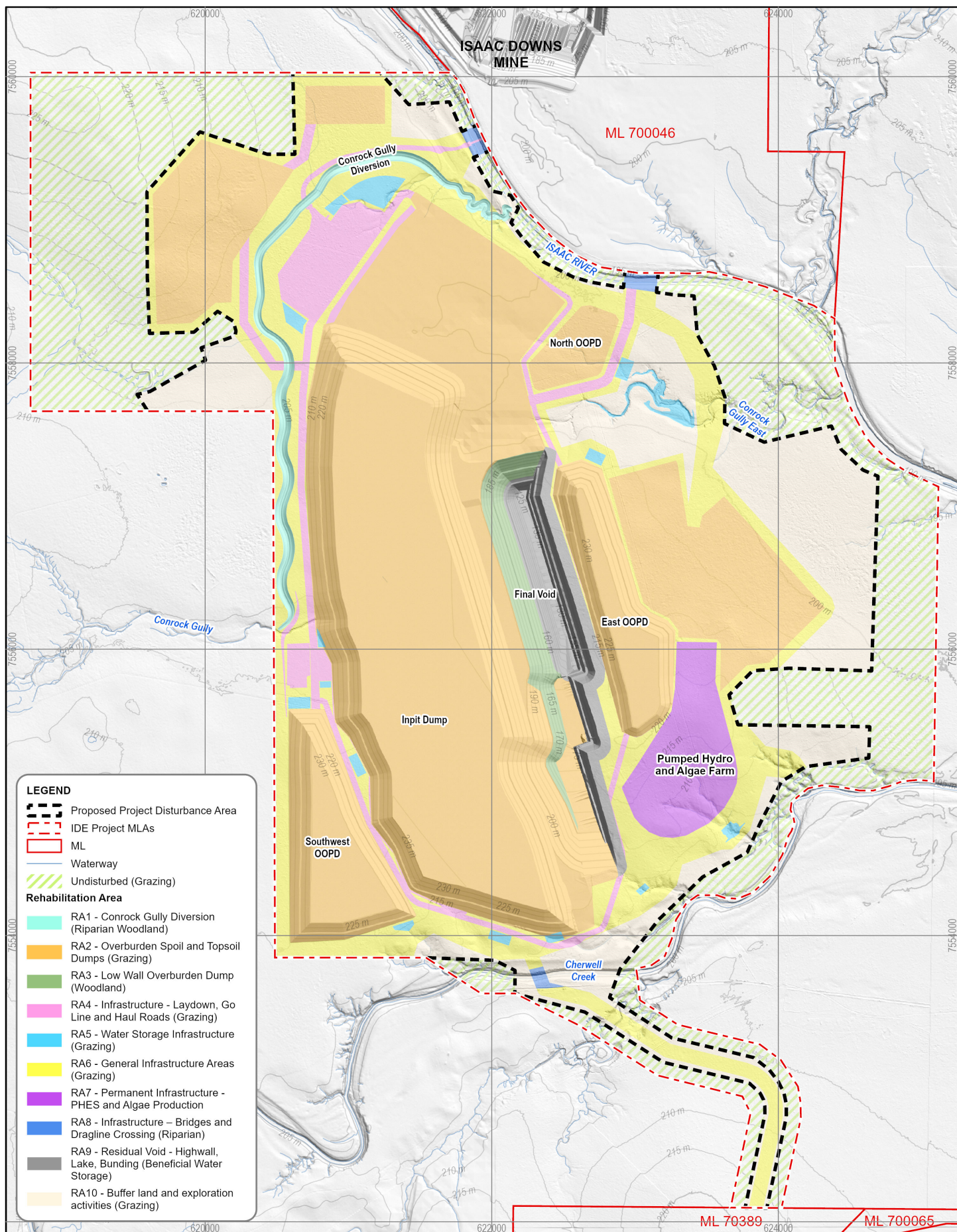
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9. APPENDICES

Appendix A Rehabilitation Areas Map

Appendix B IDE PRCP schedule revised BioCondition table



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 25/05/2026 12:47 PM
 Drawn: Minserv
 Source: Minserv
 File: 20260525 Rehabilitation Areas.aprx

DISCLAIMER: Third party data sources are used in this map compilation.
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ISAAC DOWNS EXTENSION

Rehabilitation Areas

Figure 5-20

**Table:** Representative RE benchmark criteria for Woodland Habitat Rehabilitation at RA1 (Conrock Gully Diversion)

Regional Ecosystem		RE11.3.25 Benchmark	PRCP Benchmark (RE11.3.25 revised)
Short Description		Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	
BioCondition Standard Attributes			
Recruitment		100	≥40% ⁴
Native plant species richness	Trees	4	≥3
	Shrubs	4	≥1
	Grasses	8	≥1
	Forbs	13	≥3
Emergent canopy (E) height (m)		N/A	N/A
Tree canopy (T1) height (m)		23	≥12
Tree subcanopy (T2) height (m)		11	≥5
AVERAGE Canopy height		17	8.5
Emergent canopy (E) cover (%)		NA	NA
Tree canopy (T1) cover (%)		34	≥27
Tree subcanopy (T2) cover (%)		12	≥7
AVERAGE canopy cover		23	17
Shrub canopy cover (%)		7	4
Native grass cover (%)		35	≥23
Organic litter (%)		21	≥10
Coarse woody debris (m/ha)		473	≥142
Non-native plant cover		0	≤10
QBEIS Supplementary Attributes			
Basal Area Trends (m ² /ha)		14.7 ⁵	≥7
Woody Species Composition		Nil	NA ⁶
Stem density measures of abundance (stems/ha)		Nil	>500

⁴ To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

⁵ QBEIS attributes (e.g., Basal area trend, woody species composition, stem density) benchmarks taken from the Technical Description for the REs.

⁶ Woody species composition will be recorded as a contextual monitoring indicator only to help interpret rehabilitation trajectory toward the nominated REs and support adaptive management, but it will not be assessed against a benchmark.

**Table:** Representative RE benchmark criteria for Woodland Habitat Rehabilitation at RA3 (Low Wall - WRD)

Regional Ecosystem		RE11.5.3 Benchmark	PRCP Benchmark (RE11.5.3 revised)
Short Description		<i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces	
BioCondition Standard Attributes			
Recruitment		100	≥40% ⁷
Native plant species richness	Trees	3	≥2
	Shrubs	6	≥1
	Grasses	9	≥1
	Forbs	11	≥2
Emergent canopy (E) height (m)		N/A	N/A
Tree canopy (T1) height (m)		17	≥8
Tree subcanopy (T2) height (m)		8	≥4
AVERAGE Canopy height		12.5	6
Emergent canopy (E) cover (%)		NA	NA
Tree canopy (T1) cover (%)		25	≥20
Tree subcanopy (T2) cover (%)		5	≥3
AVERAGE canopy cover		15	11.5
Shrub canopy cover (%)		10	5
Native grass cover (%)		26	≥17
Organic litter (%)		30	≥15
Coarse woody debris (m/ha)		342	≥103
Non-native plant cover		0	≤10
QBEIS Supplementary Attributes			
Basal Area Trends (m ² /ha)		10.5	≥5
Woody Species Composition		Nil	N/A ⁸
Stem density measures of abundance (stems/ha)		Nil	>500

⁷ To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

⁸ Woody species composition will be recorded as a contextual monitoring indicator only to help interpret rehabilitation trajectory toward the nominated REs and support adaptive management, but it will not be assessed against a benchmark.



Table: Representative RE benchmark criteria for Woodland Habitat Rehabilitation at RA8 (Watercourse Riparian Zone)

Regional Ecosystem		RE11.3.25 Benchmark	PRCP Benchmark (RE11.3.25 revised)
Short Description		Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	
BioCondition Standard Attributes			
Recruitment		100	≥40% ⁹
Native plant species richness	Trees	4	≥3
	Shrubs	4	≥1
	Grasses	8	≥1
	Forbs	13	≥3
Emergent canopy (E) height (m)		N/A	N/A
Tree canopy (T1) height (m)		23	≥12
Tree subcanopy (T2) height (m)		11	≥5
AVERAGE Canopy height		17	8.5
Emergent canopy (E) cover (%)		NA	NA
Tree canopy (T1) cover (%)		34	≥27
Tree subcanopy (T2) cover (%)		12	≥7
AVERAGE canopy cover		23	17
Shrub canopy cover (%)		7	4
Native grass cover (%)		35	≥23
Organic litter (%)		21	≥10
Coarse woody debris (m/ha)		473	≥142
Non-native plant cover		0	≤10
QBEIS Supplementary Attributes			
Basal Area Trends (m ² /ha)		14.7 ¹⁰	≥7
Woody Species Composition		Nil	NA ¹¹
Stem density measures of abundance (stems/ha)		Nil	>500

⁹ To demonstrate stability and avoid reliance on episodic recruitment events, the recruitment benchmark must be achieved in two consecutive monitoring events, unless departure from this pattern can be reasonably attributed to a documented climatic disturbance (e.g. drought, flood, fire) affecting flowering, seed set, establishment or survival of juveniles.

¹⁰ QBEIS attributes (e.g., Basal area trend, woody species composition, stem density) benchmarks taken from the Technical Description for the REs.

¹¹ Woody species composition will be recorded as a contextual monitoring indicator only to help interpret rehabilitation trajectory toward the nominated REs and support adaptive management, but it will not be assessed against a benchmark.

DOCUMENT INFORMATION

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Document Name	Technical Memorandum
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Date	March 2026

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Version	Date	Author	Details
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	20/02/26	Emily Krunes	Document review and finalisation
2	09/03/26	Emily Krunes	Document revised following Stanmore review

CITATION

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PART B – PRCP SCHEDULE

Legislative Requirement

In accordance with section 126D (1) of the EP Act, the PRCP Schedule in the PRCP 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).

See **Appendix AC** for the Project's draft PRCP Schedule.