

Progressive Rehabilitation and Closure Plan

South Walker Creek Mine



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TERMS AND DEFINITIONS

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

KEY TERMS	DEFINITIONS
3P Grasses	Perennial, productive and palatable
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.
ANCOLD	Australian National Committee on Large Dams
AQP	Appropriately Qualified Person
ASC	Australian Soil Classification
bcm	Bank cubic meter. One cubic meter of material as it lies in the natural bank state.
Biodiversity Act	Biodiversity Act 2004 (Queensland)
BoM	Bureau of Meteorology
BTSF	Bidgerley Tailings Storage Facility
CCP	Community Consultation Plan
CEC	Cation exchange capacity
CHPP	Coal handling and preparation plant
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWE	Department of Agriculture, Water and Environment (Australia)
DEM	Digital elevation model
DESI	Department of Environment, Science, and Innovation (Queensland). (The Adminstrating Authority)
DM	Dry matter (with reference to vegetation)
DoR	Department of Resources (Queensland) (previously referred to as the Department of Natural Resources, Mines and Energy)
DSI	Detailed site investigation
DSITI	Department of Science, Information Technology, and Innovation (Queensland)
DTMR	Department of Transport and Main Roads (Queensland)
EA	Environmental Authority (in terms of the Environmental Protection Act 1994, Queensland)
EC	Electrical conductivity
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EV	Environmental Value
EP Act	Environmental Protection Act 1994 (Queensland)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERA	Environmentally relevant activities
ESP	Exchangeable sodium percentage
FCCM	Fort Cooper Coal Measures

KEY TERMS	DEFINITIONS
FoS	Factor of safety
Ha	Hectares
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
IRC	Isaac Regional Council
km	Kilometre
LGA	Local Government Area
LOD	Land outcomes document
LOM	Life-of-mine
LSA	Land suitability assessment
MERFP Act	Mineral and Energy Resources (Financial Provisioning) Act 2018 (Queensland)
Mine Waste	Material comprising overburden, ± coarse/fine reject (dewatered), ± waste coal. Sometimes called 'mineral waste' or 'mining waste'
ML	Mining Lease
MLES	Matter of local environmental significance
MNES	Matter of national environment significance
MCM	Moranbah Coal Measures
MSES	Matter of state environmental significance
NAF	Non-acid forming
NC Act	Nature Conservation Act 1992 (Queensland)
NUMA	Non-use management area
OTD	Old Tailings Dam
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
PRC Plan	Progressive Rehabilitation and Closure Plan (in terms of the Environmental Protection Act 1994 (Queensland))
PRCP Guideline	Progressive Rehabilitation and Closure Plan Guideline (November 2019) (DES, Queensland)
RA	Rehabilitation Area. 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 a rehabilitation milestone for the post-mining use relates
RE	Regional ecosystems
Reject	Waste material produced during coal washing, separated from run-of-mine (ROM) coal in the coal handling and preparation plant (CHPP). Can be separated and

KEY TERMS	DEFINITIONS
	disposed as fine rejects (tailings) and coarse reject, or co-disposed as mixed plant reject which is a mixture of coarse reject and 'dewatered' fine reject
Remnant Coal	In-situ coal that remains exposed on the pit walls (highwall) and/or pit floor. Remnant coal can be ore grade or waste coal. Remnant coal can be fresh, oxidized or coked (heat affected)
REMP	Receiving Environment Monitoring Program
ROM	Run-of-mine
RM	Rehabilitation milestone 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)
RRR	Residual risk rating (with reference to the risk assessment)
Qld	Queensland
sFFA	scaled Flood Frequency Analysis
SMART	Specific, measurable, achievable, reasonable/relevant, time-specific
SMC	Stanmore SMC Pty Ltd
SMU	Soil Mapping Unit
SMR	Stanmore Resources Limited
Spoil	Mine waste comprising non-ore (non-ROM) material such as overburden and waste coal. Within this report, unless stated otherwise, spoil is assessed as a whole (bulk material) with no distinction made between carbonaceous and non-carbonaceous overburden
SPR	Source-pathway-receptor
SQP	Suitably Qualified Person
SWC	South Walker Creek
TDS	Total dissolved solids
TEC	Threatened ecological communities
TSF	Tailings Storage Facility
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

1 INTRODUCTION

This transitional Progressive Rehabilitation and Closure Plan (PRC Plan) has been prepared for South Walker Creek Mine (SWC) in accordance with the requirements of the Mineral and Energy Resources (Financial Provisioning) Act 2018 (MERFP Act). This PRC Plan has been developed to meet the requirements of the Environmental Protection Act 1994 (EP Act) and the Progressive Rehabilitation and Closure Plan Guideline (PRCP Guideline) (DES, 2023).

Environmental Authority Holder:	Stanmore SMC Pty Ltd
Environmental Authority Number:	EPML00712313
Land Description	ML4750 and ML70131

Environmentally relevant activities at SWC are chemical storage, waste disposal, sewage treatment, mineral processing, mining black coal and exploration activities. They are undertaken under the conditions of the site's Environment Authority (EA) EPML00712313 (Appendix 1). For the purposes of this PRC Plan, the EA is considered the land outcome document (LOD) for this transitional PRC Plan.

This PRC Plan comprises two parts:

- Section A: Rehabilitation Planning - providing information about the site, the rehabilitation plans, and evidence and justification to support the development of the proposed PRCP Schedule.
- Section B: PRCP Schedule - including maps of rehabilitation and closure outcomes for the site, and tables of time-based rehabilitation milestones.

This PRC Plan also includes Appendices (Section C), providing key information and technical studies used to support development of this plan.

2 TRANSITIONAL PROVISIONS

Part 27, Chapter 13 of the EP Act sets out the transitional provisions following the commencement of the MERFP Act. In particular, SMC is a 'mining EA holder' for the purposes of the transitional provisions on the basis that, on commencement of the MERFP Act, there was an EA holder of an environmental authority (EPML00712313) for a mining activity relating to a mining lease authorising operations at SWC (section 750, EP Act).

Furthermore, Section 6 of the PRCP Guideline makes provision for "existing EA holders who must transition into the new PRC Plan framework" (DES, 2023). As SWC had an approved EA at the time of commencement of the MERFP Act, the site falls under the ambit of the requirements of a transitional PRC Plan.

Based on the requirements of Section 6 of the PRCP Guideline, the following underpin this PRC Plan:

- A Transition Notice for SWC was issued to the former EA holder BHP Mitsui Coal Pty Limited (BMC) by the Adminstrating Authority (DES), dated 27 May 2021. This Transitional Notice requires submission of the SWC PRC Plan and PRCP Schedule by 1 March 2024.
- The Notice transitioned to Stanmore following acquisition of the BMC assets on 4 May 2022.
- In accordance with transitional provisions (Section 750, EP Act), the SWC EA is an approved LOD.
- Prior to the PRC Plan submission, a pre-lodgement meeting between the Adminstrating Authority and BMC was held on 12/7/2023. This was arranged to discuss the key content of the site's draft plan, aimed at identifying any notable gaps or refinements needing to be addressed prior to the final submission.

Aligned to the above, and the PRCP Guideline requirements¹, the following process for transitioning rehabilitation and closure outcomes from the SWC EA into the site's PRCP Schedule has been followed:

- Identifying rehabilitation and closure outcomes in the LOD (EA EPML00712313 and Environmental Rehabilitation Management, Version 4 (2012))
- Identifying post-mine land uses (PMLUs) and non-use management areas (NUMAs)
- Defining rehabilitation or improvement areas within the PMLUs and NUMAs
- Identifying milestones
- Identifying milestone criteria
- Identifying when the first milestone must commence and completion dates for the milestones.

¹ As per Section 6.4 (Transitioning rehabilitation and closure outcomes into PRCP Schedule) of the PRCP Guideline

3 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 PRC Plan must include a description of:

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

PRCP Guideline

The following spatial information must be submitted as part of the PRC Plan:

- the location and maximum extent of disturbance footprint for the mine life;
- the PMLUs and NUMAs for the area within the resource tenures;
- any sensitive receptors.

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

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

3.1 Project Planning

3.1.1 Project Description

3.1.1.1 Geographic Location

South Walker Creek (SWC) Mine is an open-cut coal mine that is owned and operated by Stanmore SMC Pty Ltd (SMC), a subsidiary of Stanmore Resources Ltd (Stanmore). It is situated in the Bowen Basin geological formation, approximately 135 kilometres (km) south-west of Mackay within the Queensland Isaac Regional Council Local Government Area.

Figure 3-1 shows the regional location of the SWC Mine.

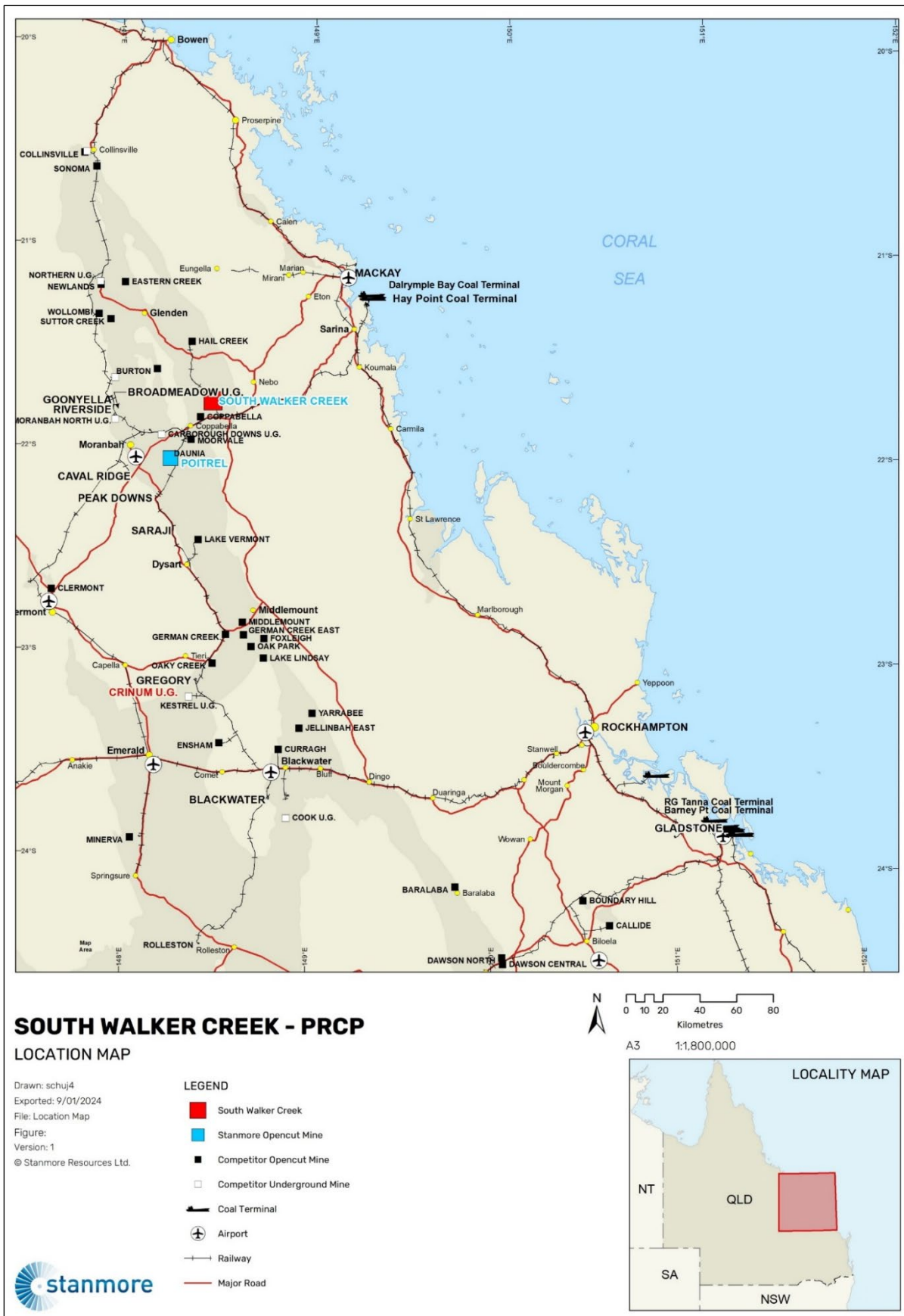


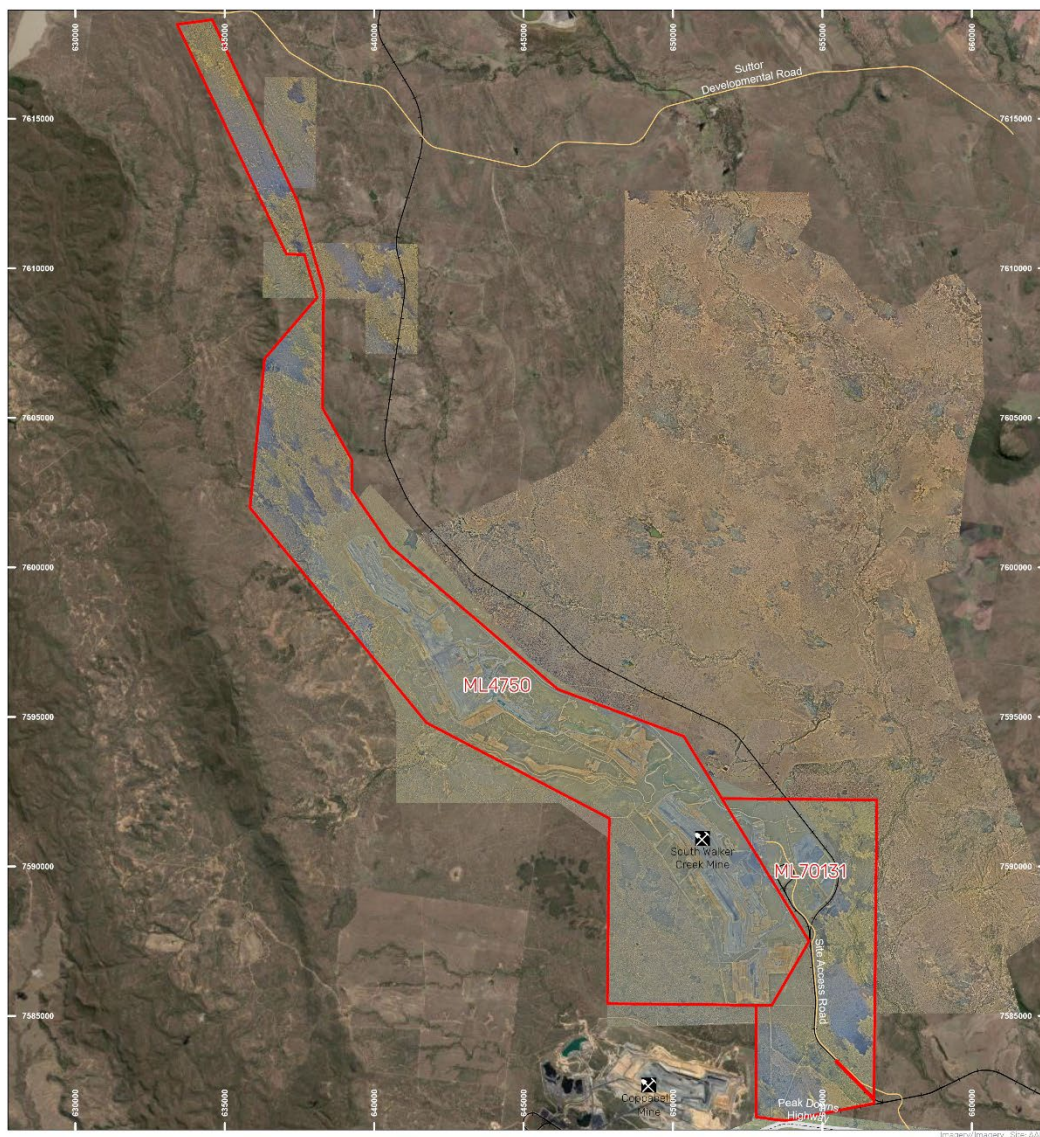
Figure 3-1 SWC Location Map

3.1.1.2 Mining Tenements

SWC operates under EA EPML00712313 for activities on mining lease (ML) ML4750 and ML70131. The area of the SWC MLs are provided in Table 3-1 and location presented in Figure 3-2.

Table 3-1 SWC Mining Tenements

Lease Number	Name	Date Granted	Area (ha)
ML4750	Kemmis Walker	13 July 1978	11,390
ML70131	Tootoolah	19 September 1996	3,789



SOUTH WALKER CREEK MINE - PRC PLAN SWC TENEMENTS

Drawn: moonbr
Exported: 20/11/2025
File: 20251120-1_SWM_PROCP_Maps
Figure:
Version: 1
© Stanmore Resources Ltd.

LEGEND
 Mining Lease
 Mine Site
 Highway
 Secondary Road
 Railways

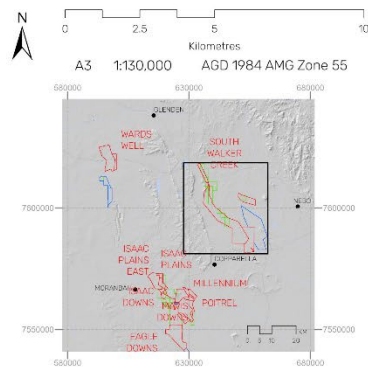


Figure 3-2 SWC Tenements

3.1.1.3 Environmentally Relevant Activities

Table 3-2 outlines the environmentally relevant activities (ERAs) that are approved under EPML00712313.

Table 3-2 Environmentally Relevant Activities and Location Details

Environmentally Relevant Activities	Location(s)
Schedule 3 09: A mining activity involving drilling, containing, pitting, or carrying out geological surveys causing significant disturbance	ML70131, ML4750
Schedule 3 13: Mining black coal	ML70131, ML4750
Ancillary 08 - Chemical Storage 3 - Storing more than 500 cubic meters of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	ML70131, ML 4750
Ancillary 31 - Mineral processing 2: Processing, in a year, the following quantities of mineral products, other than coke (b) more than 100,000t	ML70131, ML4750
Ancillary 60 - Waste disposal 1(a) - Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a) - less than 50,000t	ML70131, ML4750
Ancillary 62 - Resource recovery and transfer facility operation 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	ML70131, ML4750
Ancillary 63 - Sewage Treatment 1(b-i) - Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	ML70131, ML4750

3.1.1.4 Primary Mine Features and Infrastructure

Infrastructure associated with mining is located on the MLs, including a mine industrial area (MIA), tailings storage facility (TSF), roads, power supply, creek diversion and water management infrastructure.

The primary features and infrastructure approved within the EA for SWC are summarised in Table 3-3. The current site layout and infrastructure is shown in Figure 3-3.

Table 3-3 Primary Mine Features and Infrastructure at SWC

Mine Domain	Mine Feature Name
Processing Infrastructure	- Coal handling and preparation plan (CHPP) - Mine industrial area (MIA)
Pits and Ramps	- Kemmis 2N (consisting of Kemmis 1 and 2 - KN, KS, IN, LS/IS) - Mulgrave EN (consisting of Mulgrave GN, FN, FS, EN) - Carborough/Walker/Toolah (C/W/T) (consisting of Carborough - DN, CN; Walker – BS; and Toolah – BN/ZN) - Toolah South (YS)
Stockpiles	- Run-of-mine (ROM) coal stockpiles - Product coal stockpiles - In-pit spoil and out-of-pit spoil dumps, including co-disposal (coarse rejects and dewatered fine rejects)
Dams	- Tailings Storage Facilities (TSF) - Water storage dams

Mine Domain	Mine Feature Name
Creek Diversions / Drainage Feature Realignments	• Walker Pit Diversion • MRA Walker Creek Diversion (Stage 2A) • MRA Walker Creek Diversion (Stage 2C) • Realignment of the unnamed tributary of Bee Creek (not a defined watercourse under the <i>Water Act 2000</i>)
Rail	• Loading bin and facilities • Conveyors
General Infrastructure	• Administration • Workshop • Fuel, oil, and chemical storage • Fuel and wash bays • Pipes and pumps • Power lines • Switchyard and substations • Communications towers • Fences
General Disturbance	• Laydown areas • Access roads • Haul roads • Drains • Topsoil stockpiles
Undisturbed Area	• Land that has not been impacted by mining operations

3.1.1.5 Type of Mining Operation

SWC comprises a series of open-cut pits, which target the metallurgical coal seams of the Rangal Coal Measure. Seven pits are mined at SWC: Toolah (BN), Walker (BS), Carborough (DN, CN), Toolah South (YS) Mulgrave/MRA2C (GN, FN, FS and EN), Kemmis 1 (1N and LS) and Kemmis 2 (KN and KS).

Mining at SWC uses open cut strip mining techniques. Overburden is drilled and blasted, before being removed with truck and excavator, dragline, or dozer fleets then coal is mined using trucks and excavators. The coal forms part of the Permian-age Rangal Coal Measures. The Rangal Coal Measures dip towards the west and as such, pit migration is also moving towards the west. Mining is to occur with mining leases (MLs) ML4750 and ML70131. ROM coal is transported to CHPP for washing. Product coal is transported from SWC's train load out (TLO) for railing to the Dalrymple Bay Coal Terminal (DBCT) for export. Rejects and tailings from the CHPP are deposited within overburden dumps and TSF respectively in accordance with authorised EA conditions. Fine rejects from the CHPP are disposed in the TSF and course rejects are disposed within spoil or old ramp voids.

3.1.1.6 Proposed Duration

Mining operations at SWC commenced in 1995, with the first coal produced in 1996. Current approved areas are planned to be mined until 2050. The current long-term mine plan outlines that mining operations have a life-of-asset (LoA) of more than 50 years.

3.1.2 Baseline Information

PRCP Guideline (Section 3.1)

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

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

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

3.1.2.1 Site Topography

Topography at SWC slopes gradually to the southeast (SE) in the direction of Bee Creek. Elevations at the mine range from approximately 205 metres Australia Height Datum (m AHD) near Toolah pit to approximately 260 m AHD near the Kemmis 2 pit. To the west of SWC elevations increase up to approximately 530 m AHD

associated with the north-northwest (NNW) to south-southeast (SSE) trending incline towards the Carborough Range (see Figure 3-4 and Figure 3-5). At a regional scale, SWC is located within a sub-catchment of the Fitzroy Basin, which includes the major tributaries of the Isaac, Connors, and Comet Rivers. The catchment is flanked by the Denham and Peak Downs ranges in the west and the Connor Ranges in the east. These form the prominent topographic features in an otherwise generally low landscape.



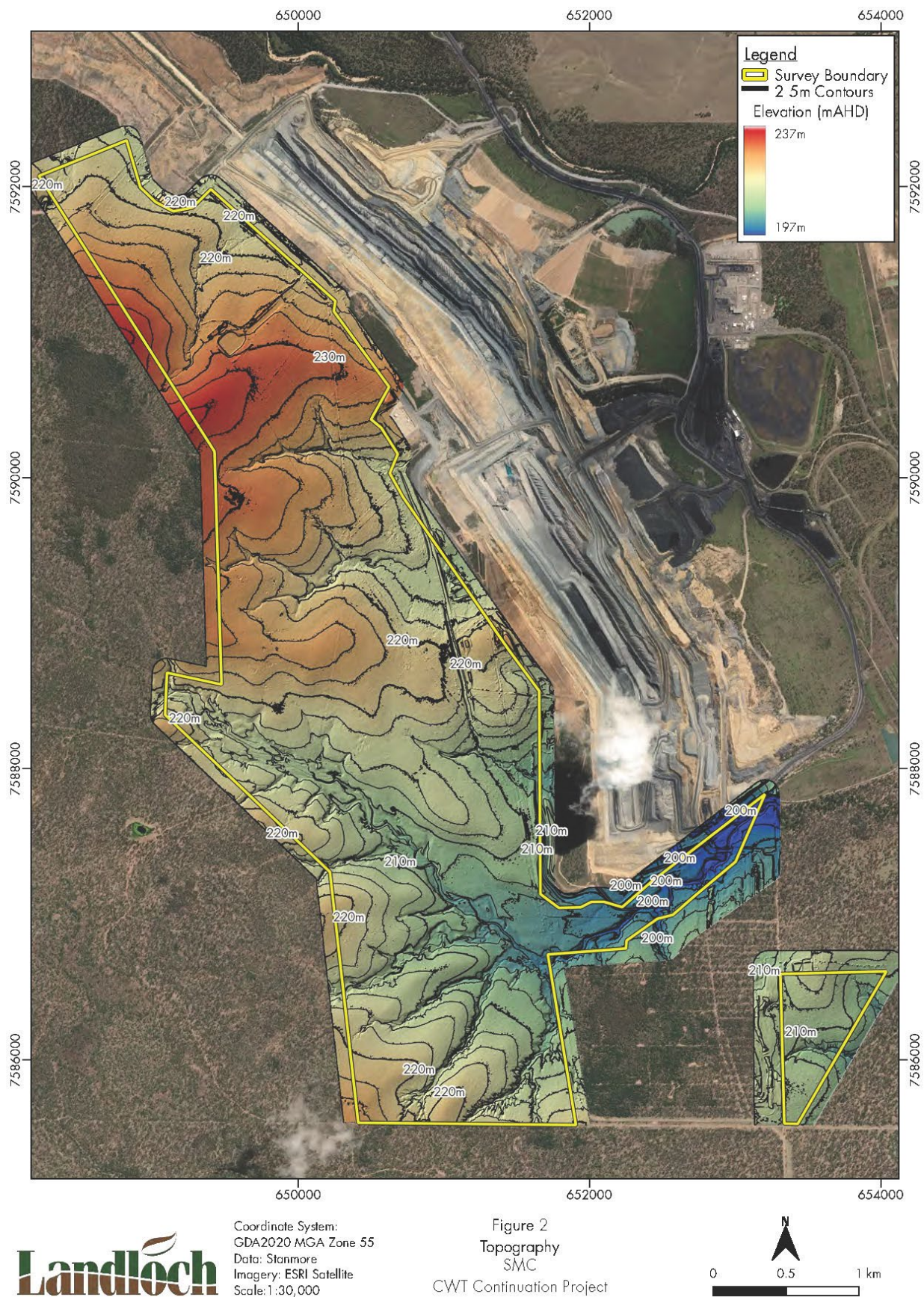


Figure 3-5 SWC CWT Topography at the C/W/T area

3.1.2.2 Climate

SWC is situated in a Queensland's sub-tropical climatic zone, marked by elevated summer temperatures, warm dry winters, and distinct wet and dry seasons. Central Queensland experiences notable fluctuations in rainfall, temperature, and evaporation. The Bureau of Meteorology (BoM) maintains two data stations in proximity to SWC. Weather data spanning from 1972 to 2012 was collected at the Moranbah Water Treatment Plant (Station No. 034038), with data collection relocating to the Moranbah Airport (Station No. 034035) from 2012. These weather stations are located approximately 55km south-west of SWC, and are considered the most representative weather stations in proximity to SWC. Temperature

Maximum average temperatures range from 24°C in June-July to 35°C in December-January, with minimum average temperatures ranging from 9°C in July to 22°C in January^{2,3}.

3.1.2.2.1 Rainfall

Although rainfall occurs throughout the year, it is more prevalent in the summer months (December, January, and February) as presented in Table 3-4.

Table 3-4 Moranbah Monthly Average Rainfall for Station No. 034038 and 034035

Month	Station No. 034038 (mm)	Station No. 034035 (mm)
January	103.8	88.0
February	100.7	100.5
March	55.4	92.6
April	36.4	23.8
May	34.5	30.1
June	22.1	16.7
July	18.0	28.0
August	25.0	9.0
September	9.1	8.3
October	35.7	24.0
November	69.3	38.3
December	103.9	55.3
Annual	614.2	514.6

3.1.2.2.2 Evaporation

Based on information obtained from the BoM, the annual average evaporation rate is 2,372.5mm, significantly surpassing the annual rainfall which is an atypical trait of semi-arid environments. The highest evaporation rate occurs during summer, with a mean daily rate of 8.2mm in January, while the lowest rate is observed in cooler months, with a mean daily rate of 3.6mm in June. The average monthly evaporation rate is 78mm.

3.1.2.2.3 Wind

Wind records for Moranbah for January-April show an easterly predominance of moderate strength (1-20km/h), with easterlies continuing to dominate for remainder of the year but with some south-easterly influence during May-July and north to north-easterly influences from October to December.

² Accessed from the Bureau of Meteorology (1972-2012)

³ Accessed from www.willyweather.com.au (2012-2020)

3.1.2.2.4 Climate Variability and Long-Term Projections

The 2020 State of the Climate Report by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the BoM underscores the high variability of Australian rainfall, posing challenges in identifying consistent trends. Since 1900, the average annual rainfall in Northern Australia has risen, primarily attributed to heightened precipitation from October to April each year.

The report affirms that Australia's weather and climate are responding to a warming global climate system, with a temperature increase of approximately 1.44°C (+/-0.24 C) since 1910. The majority of this warming occurred post-1950, and each successive decade since then has been warmer than its predecessor. Warming is evident across Australia in all months, affecting both daytime and nighttime temperatures and contributing to a rise in extreme heat events. The warmest year on record was 2019, and from 2013 to 2019, seven out of nine years rank among the warmest.

This warming trend occurs amidst year-to-year climate variability, notably associated with El Niño and La Niña in the tropical Pacific Ocean. Rainfall and streamflow have increased in parts of northern Australia since the 1970s, with heavy rainfall events expected to intensify as the climate warms.

Australia's shift to a warmer climate is accompanied by an increase in extreme heat events on daily, multi-day, and seasonal scales. Models predict more intense short-duration heavy rainfall events nationwide, a decrease in tropical cyclones, but a higher proportion of high-intensity cyclones, subject to significant year-to-year variations.

Since the 1950s, there has been an increase in extreme fire weather and the duration of the fire season across large parts of Australia. Specifically, the Bowen Basin region has experienced a notable rise in dangerous fire weather days.

3.1.2.3 Geological Setting

From a regional perspective, SWC is located on the eastern margin of the northern Permian-age Bowen Basin within the Nebo Syncline. The Bowen Basin is a northwest (NW) to SE trending sedimentary basin that contains Australia's largest coal reserves. The geological setting regional to SWC is a result of the post-deposition compressional tectonic phase during the Triassic. In this period, the lithified sediments were deformed into a series of north-west to south-east trending anticlinal and synclinal structures.

The Permian-Age Rangal Coal Measures (RCM) of the Blackwater Group host the coal seams mined at SWC. The mined coal seams comprise the Main Top (MT) seam and the Main Bottom (MB) seam that are separated by siltstone, mudstone, and sandstone interburden.

The RCM are overlain by sedimentary rocks of the Triassic-age Rewan Formation and Quaternary to Tertiary-age alluvial deposits. The Fort Cooper Coal Measures (FCCM) underlie the RCM.

The main stratigraphic units present within the SWC mine leases are summarised in Table 3-5 and shown in Figure 3-10.

Table 3-5 SWC Stratigraphy

Period	Group	Sub-Group/Formation	Dominant Lithology	Occurrence
Quaternary / Tertiary	-	Surficial	Unconsolidated sand, gravel, and clay	Typically localised, occurring near watercourses or palaeo-channels and laterally limited in extent.
Triassic	Mimosa Group	Rewan Formation	Mudstone, siltstone, and sandstone	Outcrops in the NW portion of the mining leases and subcrops to the southwest of SWC.

Period	Group	Sub-Group/Formation	Dominant Lithology	Occurrence
				Weathered and fractured rocks form shallow regolith in the southern portion of SWC.
Permian	Blackwater Group	Rangal Coal Measures	Coal with sandstone, siltstone, and mudstone	Outcrops as an approximately 1 km-wide NW-SE trending strip along the eastern edge of the SWC mining leases. Dips steeply to the west.
		Fort Cooper Coal Measures	Coal with sandstone, siltstone, mudstone, and tuff	Outcrops to the east of SWC and subcrops in the southern portion of the mining leases. Dips steeply to the west.
		Moranbah Coal Measures	Coal with sandstone, siltstone, mudstone, and tuff	Outcrops to the SE of the mining leases.

Sources: (CDM Smith, 2016)

Conceptual cross-sections of SWC and the target seams is provided in Figure 3-6.

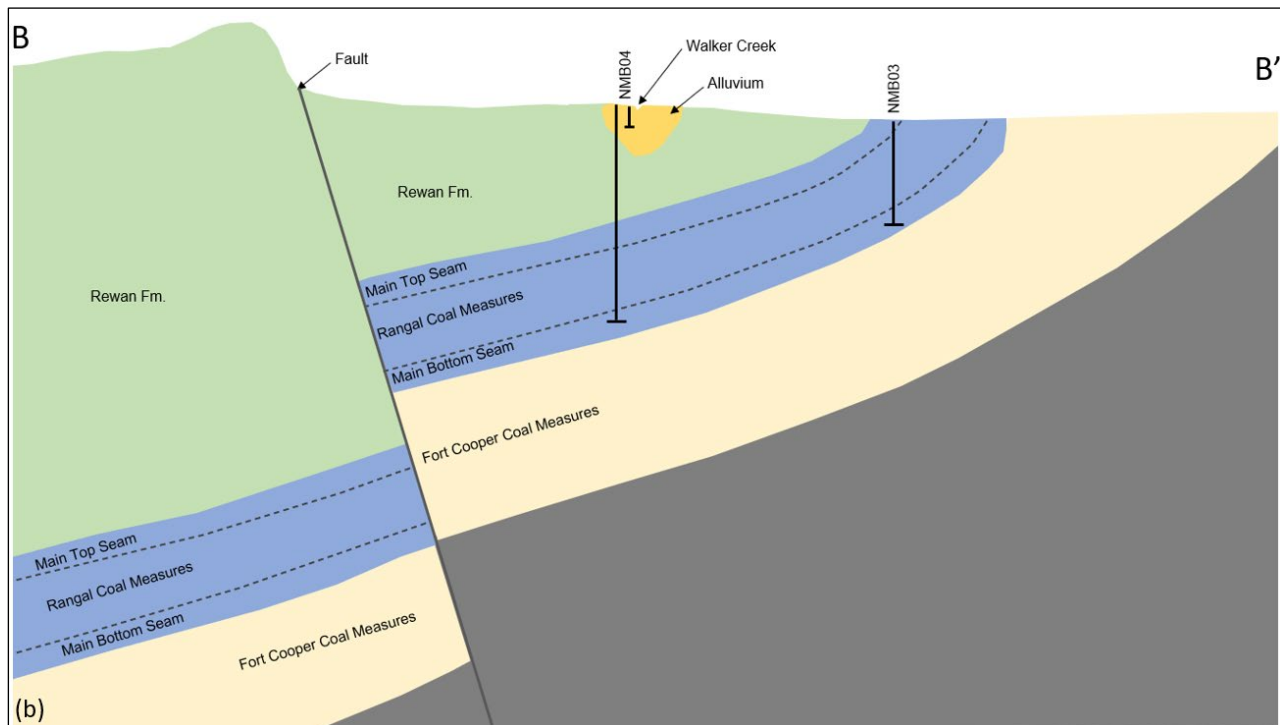


Figure 3-6 Conceptual Geological Cross-Sections Showing Key Stratigraphic Units at SWC

3.1.2.4 Site Hydrology and Fluvial Networks

The SWC mine is situated in the Central Tributaries sub-catchment within the broader Connors River catchment of the Fitzroy River Basin (Figure 3-7). The Connor River is a major tributary to the Fitzroy River, which covers a catchment area of over 140,000 square kilometres (km²). The main surface water features identified within and proximal to the SWC mining leases include the ephemeral Kemmis Creek, Carborough Creek, Walker Creek, and Bee Creek (Table 3-6, Figure 3-8 and Figure 3-9).

Table 3-7 provides details on key waterways surrounding the SWC site. Walker Creek traverses the site in a northwest to southeast direction. Several reaches of Walker Creek have been historically diverted to accommodate SWC mine operations (Section 3.5.2). Carborough Creek converges with Walker Creek near the western lease boundary before flowing through the lease. Downstream of the eastern lease boundary, Walker Creek joins Bee Creek, which then flows southward adjacent to the eastern lease boundary. A minor tributary to Bee Creek, is located at the southern end of Toolah Pit and flows from west to east. Fluvial networks within and surrounding the SWC Mine are depicted in Figure 3-8 and Figure 3-9.

The surface water environmental values (EVs) and water quality objectives (WQO) for the region are specified under the Queensland Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP Water and Wetland Biodiversity (EPPWWB)) and within the Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (Part) including all waters of the Isaac River Sub-basin (including Connors River) (DEHP, 2011). The site is located within the Central Tributaries zone. Relevant environmental values for receiving waters are displayed in Table 3-8.

Surface water sampling at SWC is undertaken in accordance with EA conditions. Water sampling locations nominated in the EA are provided in Table 3-9.

Table 3-6 South Walker Creek Catchment Areas (Source: South Walker Creek Mine Hydrology and Geomorphology Assessment, Alluvium 2018)

Sub-Catchment Level 1	Sub-Catchment Level 2
Bee Creek to Dipperu National Park: 1,945.4km ²	Walker Creek to the confluence with Bee Creek (excluding Carborough Creek) 185.9km ²
	Carborough Creek 163.6km ²

Table 3-7 Waterways Within and Immediately Surrounding the SWC Site

Watercourse	Perennially	Hierarchy	Stream Order
Bee Creek	Non-Perennial	Minor	5/6
Walker Creek	Non-Perennial	Minor	4/5
Carborough Creek	Non-Perennial	Minor	4
Unnamed tributary of Bee Creek (not a defined watercourse under the <i>Water Act 2000</i>)	Non-Perennial	Minor	3

Table 3-8 Environmental Values of Receiving Waters (EPP Water and Wetland Biodiversity, 2019)

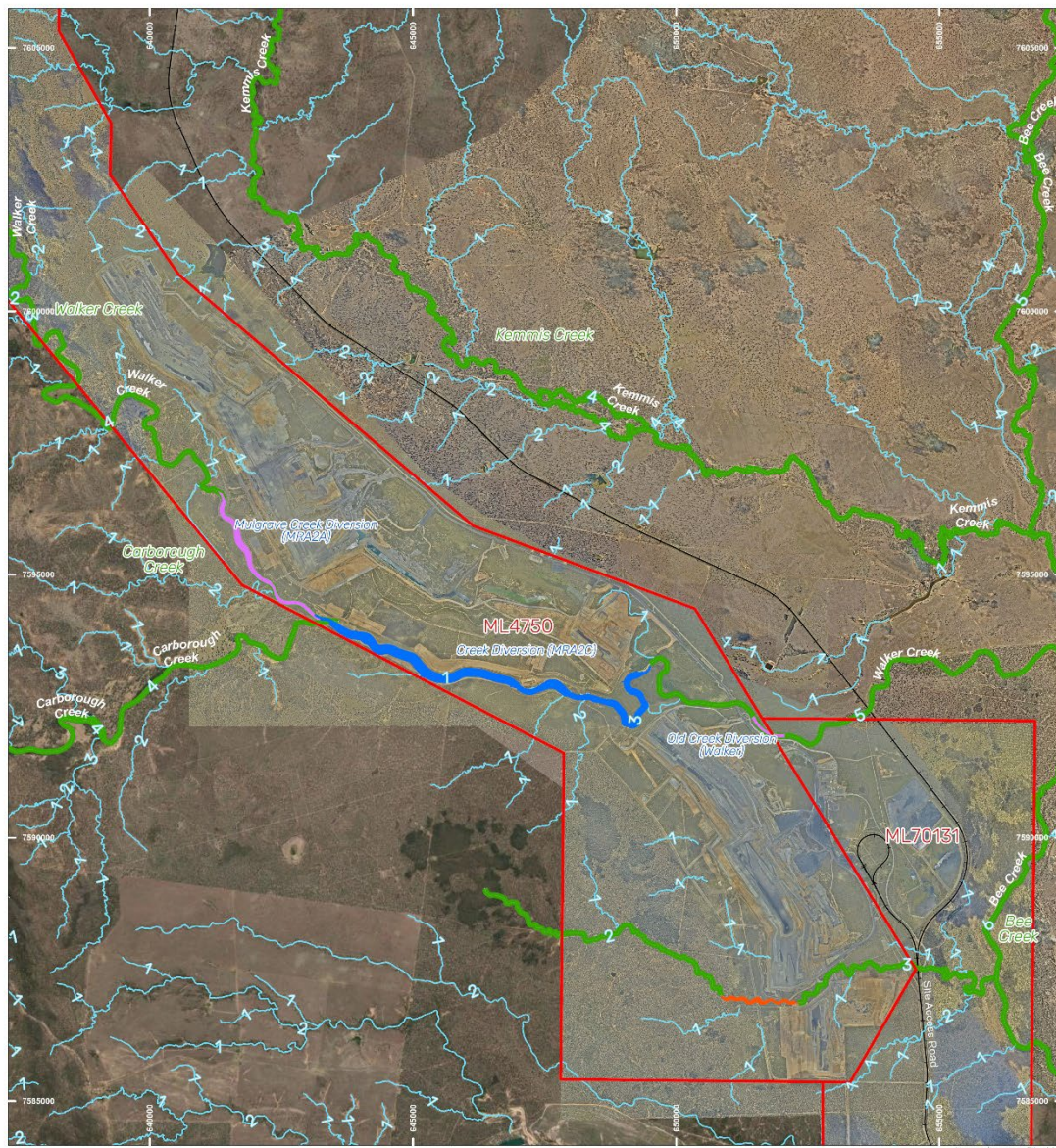
Environmental Value	Applicable to SWC
Protection of aquatic ecosystems	✓
Suitability for crop irrigation	✓
Suitability for farm supply / use	✓
Suitability for stock water	✓

Environmental Value	Applicable to SWC
Suitability for aquaculture	x
Suitability for human consumers	✓
Suitability for primary recreation	✓
Suitability for secondary recreation	✓
Suitability for visual recreation	✓
Suitability for drinking water	✓
Suitability for industrial use	✓
Protection of cultural and spiritual values	✓

Table 3-9 SWC Surface Water Monitoring Locations

Monitoring Point	Receiving Waters Location Description	Easting (GDA94)	Northing (GDA94)
Upstream Background Monitoring Points			
MP1*	Walker Creek – 4280m upstream of the confluence of Walker Creek and Carborough Creek	641120	7597269
MP4	Bee Creek – 1500m upstream of the confluence of Bee Creek and Walker Creek	657731	7594944
Downstream Monitoring Points			
MP7*	Walker Creek – 130m upstream from Hail Creek Mine railway spur	653664	7592524
MP8*	Unnamed tributary of Bee Creek – 1350m upstream of the confluence of the unnamed tributary of Bee Creek and Bee Creek	655726	7587589
MP9	Bee Creek – 3600m downstream of the confluence of Bee Creek and the unnamed tributary of Bee Creek	657687	7584892

* Data obtained from MP1, MP7 and MP8 are for information purposes only.



SOUTH WALKER CREEK MINE - PRC PLAN

CURRENT FLUVIAL NETWORKS & CREEK DIVERSIONS

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 File: 20251120-1_SWM_PRC_Plan_Maps
 Figure:
 Version: 1
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LEGEND

- Mining Lease
- MRA2C Creek Diversion
- Walker Creek Diversion
- Drainage Feature Realignment
- Local Hydrology - Catchments
- Watercourse - Stream Order
- Railways
- Highway

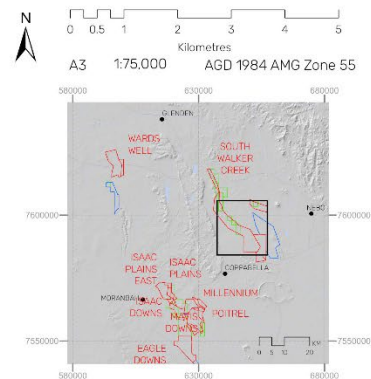
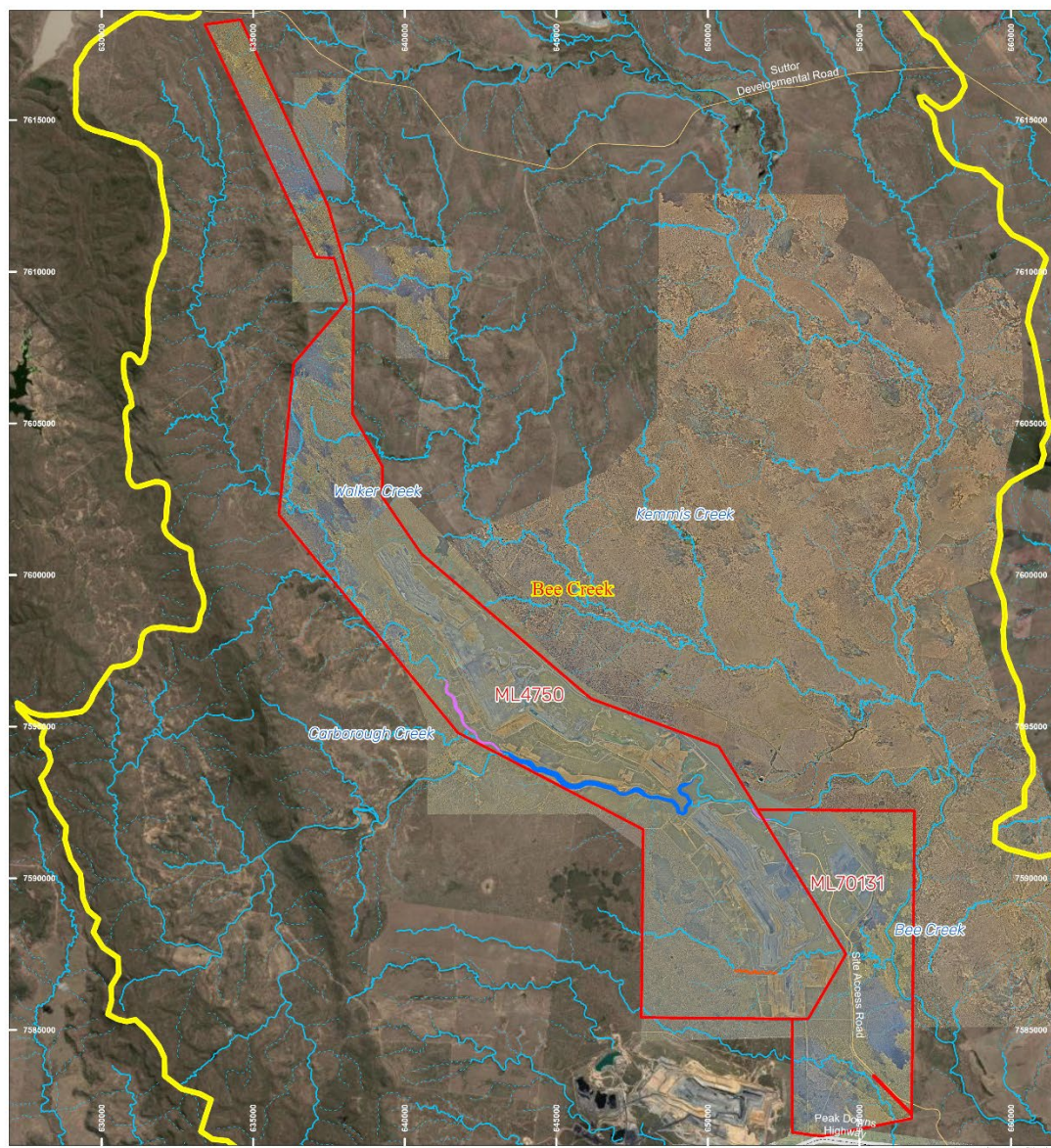


Figure 3-8 SWC Fluvial Networks and Creek Diversions



SOUTH WALKER CREEK MINE - PRC PLAN

LOCAL HYDROLOGY

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 Figure:
 Version: 1

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LEGEND

- Mining Lease
- Bee Creek Drainage Basin
- MRA2C Creek Diversion
- Walker Creek Diversion
- Drainage Feature Realignment
- Creek
- Gully
- Highway
- Secondary Road

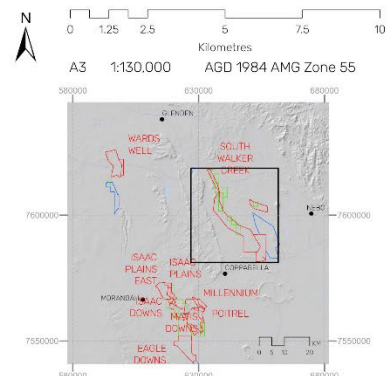


Figure 3-9 Local Hydrology

3.1.2.5 Groundwater Levels and Properties

The baseline hydrogeological model and the key hydrogeological units at SWC are summarised below and displayed in Figure 3-10.

- Shallow, unconfined aquifer units, encompassing quaternary/tertiary alluvium and the upper weathered/fractured zone of bedrock (regolith), serve as localized unconfined aquifers at SWC. The quaternary deposits are primarily situated along Bee Creek and Kemmis Creek, with a saturated thickness typically ranging from 5 to 10 m across SWC. Regolith is generally unsaturated, with groundwater likely present in localized zones, including perched water tables usually within the top 40 m of exposed rock. Recharge occurs through direct rainfall infiltration and infiltration from ephemeral streams during high rainfall periods. Groundwater flow in the alluvium predominantly follows topography, moving from areas of higher elevation to Bee Creek.
- Overburden, comprising sandstones, siltstone, and mudstones from the Rewan Formation and RCM, is classified as a tight to leaky aquitard, expected to exhibit significant vertical resistance to groundwater flow.
- Permian aquifers, including coal seams of the RCM and FCCM, function as confined aquifers with limited vertical hydraulic interaction with interbedded leaky aquitards. Coal seams dip westward and remain continuous. At shallower depths, coal seams exhibit relatively high permeability with groundwater flow associated with fractures. Permeability decreases with depth due to lithostatic pressure. Recharge occurs via direct rainfall infiltration in outcrop areas, with vertical leakage from overlying units unlikely due to overburden beneath the regolith. Similar to shallow aquifers, groundwater flows broadly to the southeast. Dewatering at SWC involves passive groundwater inflows into mine pits, influencing groundwater levels in the proximity of SWC.

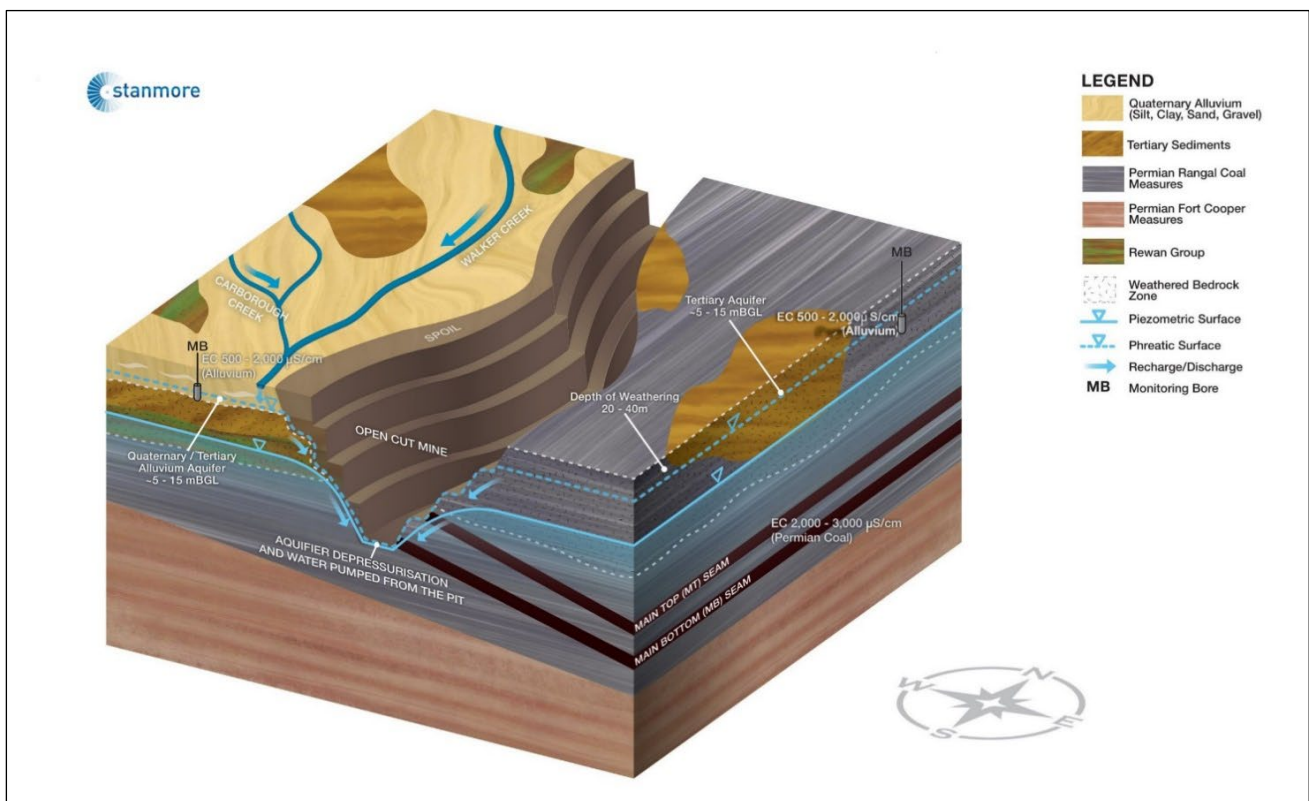


Figure 3-10 SWC Baseline Hydrogeological Conceptual Model

3.1.2.5.1 Groundwater Bores and Levels

In SWC and surrounding areas, 44 out of 62 monitoring bores provided groundwater level measurements. These bores were categorized into 12 in alluvium, 17 in regolith, 4 in overburden, and 11 in coal seams. Depths varied across strata, with alluvium ranging from 4.6 to 14.4 m bgl and regolith from 2.5 to 28.5 m bgl.

Overburden depths were generally between 6.8 and 27.3m bgl, while coal seam bores exhibited variable depths from 7.1 to 47.4m bgl, increasing towards the south-west.

Monitored groundwater levels revealed trends, such as a steady decline in alluvium since 2014, with slight increases during the 2021-2022 wet season. Regolith levels remained relatively stable between 2014 and 2024, experiencing a <1m decline until late 2021, after which levels began to rise in response to increasing rainfall trends. Stable to slightly decreasing trends were evident between 2020 and 2022, with a notable raise in 2023 (>2 m), followed by a decrease (>2 m) between 2023 and 2024, coinciding with rainfall trends. Coal seam bore levels showed a slight decline in 2021 to 2024 (<3m), with MB20SWC10P increasing (>4 m) over the same period.

A groundwater contour map for SWC's main aquifers was created based on data from a period with an abundance of data, representing the end of a dry period (Appendix 3). Table 3-10 lists bores considered in developing potentiometric surface maps, with the first monitoring data for coal seams to minimize interference from pit dewatering (WSP, 2024).

Table 3-10 Bores Considered in the Potentiometric Maps for Groundwater Levels at SWC

Bore No	Easting	Northing	Screen Elevation (m AHD)		Water Level (m AHD)	Reference Data	HSU
			From	To			
Bore7	639925	7598198	NA	NA	232.5	Jun 15	Alluvium
Bore9	641636	7593910	NA	NA	226.5	Jun 15	Alluvium
MB10	639782	7598073	230.6	220.6	227.5	Jan 16	Alluvium
MB11	641513	7593749	216.8	213.8	221.5	Jan 16	Alluvium
MB13	656766	7591177	176.7	167.7	178.7	Jan 16	Alluvium
MB14	657528	7584673	170.8	162.2	172.8	Jan 16	Alluvium
MB20SWC01A	656060	7587638	177.7	171.7	175.2	Mar 21	Alluvium
MB20SWC03P	655430	7587752	174.9	168.9	180.3	Mar 21	Alluvium
MB20SWC13T	642118	7595856	219.1	213.1	217.8	Mar 21	Alluvium
SWCMB15_01	636195	7602246	247.6	244.6	245.9	Mar 21	Alluvium
Bore1	644260	7598204	NA	NA	228.1	Jun 15	Regolith
Bore12	639752	7596163	NA	NA	231.1	Jun 15	Regolith
Bore2	639895	7600690	NA	NA	234.9	Jun 15	Regolith
Bore8	643363	7596208	NA	NA	211.8	Jun 15	Regolith
Kiss Bore	642842	7596717	NA	NA	215.1	Jun 15	Regolith
MB12	652709	7592123	197.2	191.2	195.4	Dec 15	Regolith
MB20SWC12T	641624	7596535	217.9	214.9	222.5	Mar 21	Regolith
MB3A	640860	7597291	213.2	210.2	222.9	Dec 15	Regolith
MB3B	640866	7597282	219.6	216.6	222.7	Dec 15	Regolith
MB6	644044	7595070	213.3	207.3	209.8	Dec 15	Regolith
MB7	641965	7596654	216.2	198.2	219.6	Dec 15	Regolith
Mitchells Bore	640530	7598384	NA	NA	227.5	Jun 15	Regolith
OBS1	653011	7587001	177.9	173.9	178.2	Jun 03	Regolith
OBS2	655845	7590019	168.4	159.4	177.4	Jun 03	Regolith
CB01	640774	7597645	106.8	100.8	222.3	Apr 14	Coal Seam

Bore No	Easting	Northing	Screen Elevation (m AHD)		Water Level (m AHD)	Reference Data	HSU
			From	To			
Gas2_MB3	640781	7597648	NA	NA	226.5	Dec 12	Coal Seam
MB20SWC04P	651811	7585831	138.7	134.7	172.6	Mar 21	Coal Seam
MB20SWC06P	649801	7587879	106.6	100.6	201.8	Mar 21	Coal Seam
MB20SWC08P	649229	7590886	85.9	80.9	192.6	Mar 21	Coal Seam
MB4	646166	7595932	176.1	164.1	209.4	Nov 12	Coal Seam
SWCMB16_01	638943	7601990	231.9	228.9	248.0	Mar 21	Coal Seam

3.1.2.5.2 Groundwater Properties and Values

Potential surface expression Groundwater Dependant Ecosystems (GDE) mapped in the SWC area within the GDE Atlas include wetlands and Walker Creek. These potential GDEs tend to be associated with sandstone and basalt plateaus and lower rolling country on sedimentary and volcanic rocks (WSP, 2024). The surface expression GDEs range from moderate to high potential for interaction with groundwater, based on regional studies.

The potential surface expression GDEs associated with Walker Creek are restricted to the channels of the creek itself. The riverine wetlands are found around the main streams of the SWC area including Walker Creek and the unnamed tributary of Bee Creek. They are all classified as high potential GDEs. However, aquatic ecologists (frc environmental, 2022a) have determined that, whilst mapped as potentially occurring, there are no actual surface expression GDEs within the SWC area. This is based on a review of aerial imagery and field assessment by the aquatic ecologists that indicates that these waterways are mostly ephemeral with no sustained groundwater flows. Additionally, some of the mapped wetlands in the mining lease are mine water dams, or farm dams and are therefore not associated with groundwater (frc environmental, 2022a), (frc environmental, 2022b). Groundwater depths and flow direction presented in the hydrogeological conceptual model further support this.

Terrestrial GDEs mapped in the GDE Atlas as potentially occurring include terrestrial vegetation which depends on groundwater on a seasonal, episodic, or permanent basis. However, terrestrial ecologists have confirmed the absence of water or the dominance of halophytic or swamp flora species on the creek bed, which are characteristics associated with terrestrial GDEs (Eco Logical Australia, 2022). Additionally, the depth to groundwater was recorded at approximately 8.0 to 9.0 mbgl, below the root zone of most species. This is further supported by the lack of baseflow present in the streams in the SWC area, indicating that there is no connectivity between the surface water and groundwater. Therefore, it is determined that there are no actual terrestrial GDEs within the assessment area.

According to the Fitzroy Basin Groundwater Chemistry Zones (Basin 130; Environmental Protection (Water) Policy 2009), SWC is located within the Connors Groundwater Zone and is mapped as 'saline', with an ionic balance dominated by sodium (Na⁺) and chloride (Cl⁻) ions. The following EVs for Connors Groundwater are identified under EPP Water and Wetland Biodiversity (2019) and within the Isaac River Sub-basin Environmental Values and Water Quality Objectives (DEHP, 2011). These are outlined in and displayed in Table 3-11 and Figure 3-11.

However, in terms of groundwater users, dissolved metal concentrations in both shallow and deep aquifers exceeded guidelines for various metals in upgradient and downgradient locations, indicating unsuitability for most users and GDEs. Similarly, when compared against ADWG guidelines, dissolved metal concentrations exceeded guidelines for certain metals in both aquifers, with some exceedances only in upgradient locations.

Table 3-11 Summary of Groundwater Environmental Values for Connors Groundwater Zone (DEHP, 2011)

Environmental Value	Applicable to SWC
Aquatic Ecosystem	✓
Irrigation	✓
Farm Supply/Use	✓
Stock Water	✓
Aquaculture	x
Human Consumer	x
Primary Recreation	✓
Secondary Recreation	x
Visual Recreation	x
Drinking Water	✓
Industrial Use	✓
Cultural and Spiritual Values	✓

3.1.2.6 Soil Types, Properties and Productivity

3.1.2.6.1 Soil Context

A comprehensive survey of topsoil at SWC was conducted in 1999 by Global Soil Systems, covering an extensive 1,500ha area in the Mulgrave region of ML4750 (see Figure 3-12). This topsoil survey adhered to the guidelines specified in Gunn et al. (1998) and included 26 detailed site descriptions along with an additional 15 check sites. The survey identified six distinct soil types, and selected sites underwent evaluation for salinity, sodicity, and pH. Findings from the 1999 report were summarised by Landloch (2022) and Landloch (2023). Table 3-12 presents the results for these soil types, while Table 3-13 outlines the chemical properties and potential productivity of the soil types within SWC.

Table 3-12 Soil Mapping Units (SMU) and Australian Soil Classification of Soils at SWC (Landloch, 2022; Global Soil Systems, 1999, Landloch, 2023)

SMU Code	Australian Soil Classification	SMU Concept	Area on Site at Time of 1999 Study (ha)
A1	Recent Alluvia	Flood plains of Walker Creek. Deep, neutral, loamy course and overlaying sandy loam to medium clays. Well drained. Vegetation: Moreton Bay Ash, River Red Gum, and Poplar Box.	360 ha
B1	Soils Developed from Unconsolidated Gravels and Volcanics	Undulating plains and rises up to 3% slope. Dark brown cracking clays overlaying unconsolidated gravels. Vegetation: open grassland with scattered Mountain Coolibah and Narrow Leaf Ironbark.	110 ha
B2	Soils Developed from Unconsolidated Gravels and Volcanics	Undulating ridges and slopes to 3%. Sandy clay to clay loam with hard setting surface. Sub soils are alkaline. Vegetation: Narrow Leafed Ironbark, Bloodwood, Ghost Gum, Poplar Box and <i>Cassia brewsteri</i> .	344 ha
B3	Soils Developed from Unconsolidated Gravels and Volcanics	Depositional areas and drainage lines from soil B1 and B2. Include deep cracking medium clays and non-cracking light to medium clays on Brigalow and Poplar Box.	112 ha
B4	Soils Developed from Unconsolidated Gravels and Volcanics	Crusting sandy brigalow clays – not gilgaied. Often occurs as small areas within Poplar Box woodlands. A thin crusting sandy surface overlies brown to grey sandy clay subsoils which become quite hard and mottled at depth.	-
B5	Soils Developed from Unconsolidated Gravels and Volcanics	Thick brigalow clays with melon holes. Occurs on lower lying areas above the alluvial plains in association with B4. Dark, cracking medium clays in depressions and lighter sandy non-cracking uniform clays along mounds.	-

SMU Code	Australian Soil Classification	SMU Concept	Area on Site at Time of 1999 Study (ha)
C1	Soils on older alluvial plains and terraces	Higher alluvial terraces that rarely flood. Hard setting sandy loam surface. Vegetation Poplar Box, Narrow Leaf Ironbark and Moreton Bay Ash.	393 ha
D1	Soils of Reworked Tertiary Sediments	Flat to gently undulating up to 1% slope. Neutral to hard setting surface layer. Vegetation stunted Poplar Box and Sandalwood.	68 ha

Table 3-13 Chemical Properties and Productivity Potential of Soil Types Identified Within the SWC Locality

Analysis (Unit)	SMU Codes							
	A1	B1	B2	B3	B4	B5	C1	D1
Soil pH (H2O)	8.4 (0-20cm)	8.5 (0-20cm)	7.1 (0-20cm)	7.3 (0-20cm)	8.2	8.3	6.0 (0-20cm)	6.5 (0-5cm)
Soil EC (dS/m)	0.08 (0-20cm)	No samples taken	0.15 (0-20cm)	0.18 (0-20cm)	0.13	0.06	0.04 (0-20cm)	0.08 (0-5cm)
Emerson Dispersion (%)	38 (0-20cm)	No samples taken	21 (0-20cm)	20 (0-20cm)	n/a	n/a	56 (0-20cm)	36 (0-5cm)
Preferred Use	Quality grazing land with minor restrictions from nutrient deficiencies	Good quality grazing land suited to improved pastures, but potential for erosion if overgrazed	Grazing land with some restrictions with possible compaction and susceptible to severe erosion if overgrazed	Good grazing land.	Suitable grazing land with minor restrictions from water logging and surface crusting.	Suitable grazing land with restrictions from salinity below 20cm	Good grazing lands but susceptible to degradation from erosion and surface sealing if overgrazed	Marginal grazing due to ability to sustain adequate pasture
Productivity	Soil properties sufficient to support grasses and native trees							

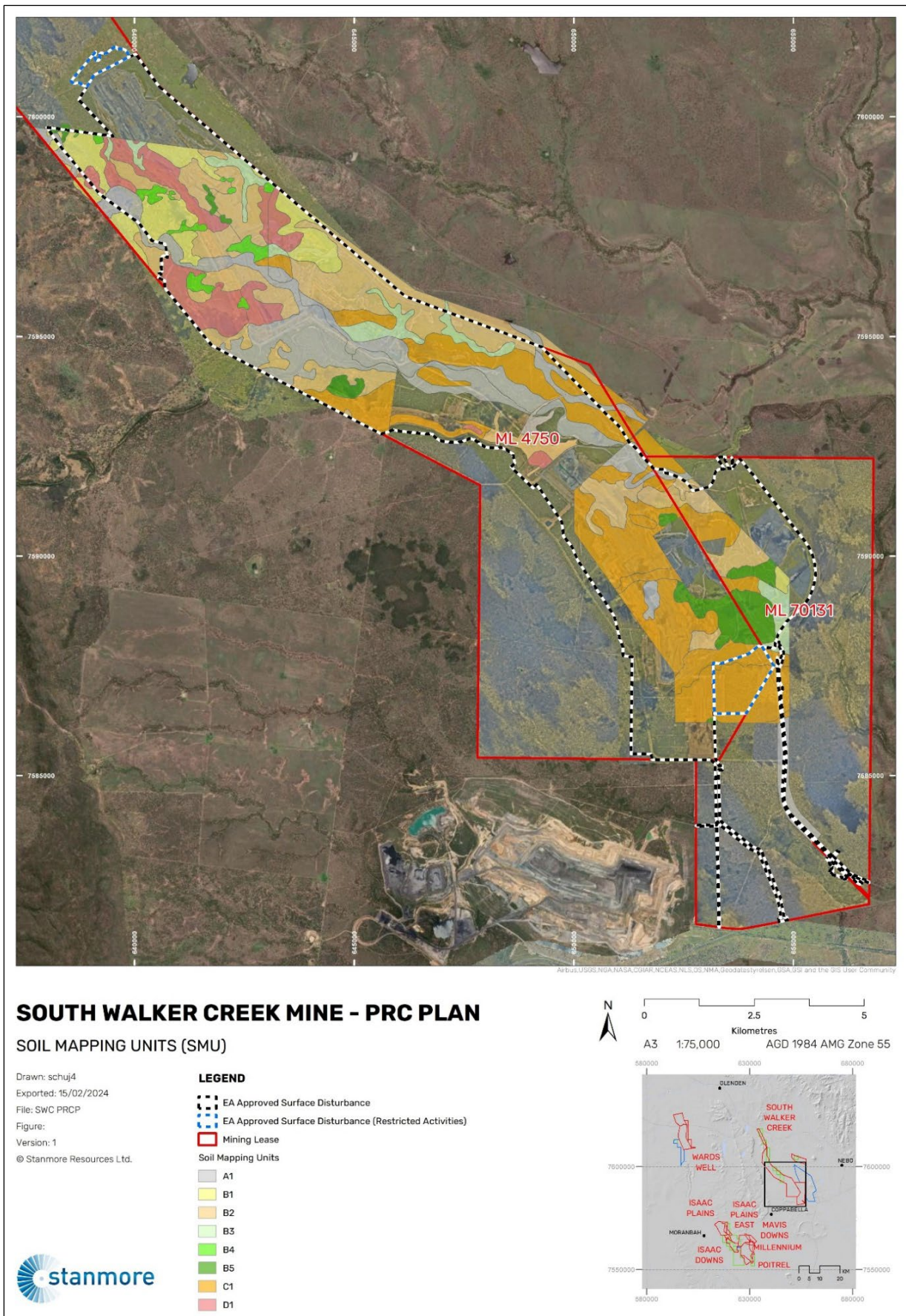


Figure 3-12 Soil Mapping Units Within SWC MLs

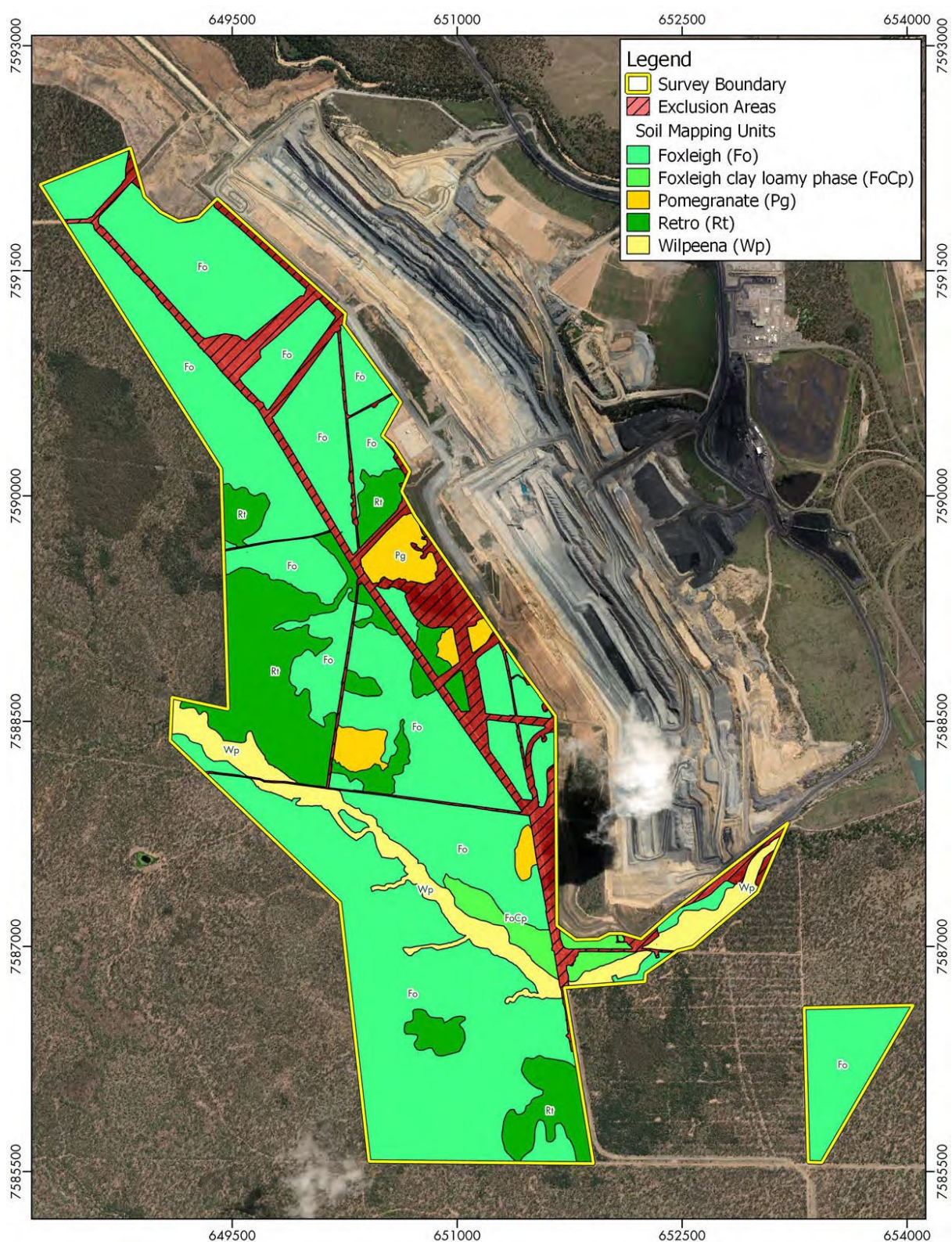
An addendum to the existing SWC material characterisation assessment *South Walker Creek (SWC) – material Characterisation Study* (Landloch 2025) was prepared by Landloch (2025b) to assess the quality of materials within the C/W/T continuation area for their use as growth media and rehabilitation. The addendum (Landloch 2025b) determined that the assessment area is dominated by four soil management units (SMUs), comprising four dominant and one minor soil profile class (SPC) (refer to Table 3-14 and Figure 3-13). Chemical Properties for the identified SMUs is presented in Table 3-15.

Table 3-14 SMUs and its SPCs for SWC C/W/T continuation

SMU and SPCs	Code	Description	Total land Area (ha)*	Portion of Survey Area (%)	Grazing Class	Preferred use
Foxleigh (dominant)	Fx	Sandy surfaced, sodic, texture contrast soil on level to gently undulating plains and low rises in sedimentary landscapes and eucalypt vegetation	727	65	4	Marginal grazing due to low fertility limiting ability to sustain adequate pasture.
Foxleigh Clay Loamy Phase (minor)	FxLp	Hard-setting loamy or clay loamy surfaced, sodic texture contrast soil situated as Fx.	20	2		
Retro	Rt	Thin sandy or sandy loam surfaced, sodic, texture contrast soil in eucalypt or brigalow vegetation.	155	14	3	Suitable grazing land with minor restrictions from subsoil erosion and hard setting surfaces.
Wilpeena	Wi	Structureless red to yellow-brown, acid to neutral, frequently containing ironstone gravels, on alluvial materials in eucalypt vegetation.	68	6	5	Marginal grazing due to low water storage limiting ability to sustain adequate pasture.
Pomegranate	Pg	Hard-setting, gravelly, sodic, cracking or non-cracking clay, frequently with gilgai, on valley floors and pediments in sedimentary landscapes and brigalow vegetation.	33	3	3	Suitable grazing land with minor restrictions from subsoil erosion and hard setting surfaces.

Table 3-15 Summary of Chemical Properties of Soil Types Identified Within the C/W/T continuation area

Analysis (Unit)	SMU Codes					
	Foxleigh, Wilpeena	SWC Topsoil Stockpiles^	Foxleigh CL Phase, Retro	SWC Topsoil Stockpiles^	Pomegranate	SWC Topsoil Stockpiles^
Soil pH (H2O)	Slightly acidic to slightly alkaline (5.8–7.5)	Neutral to strongly alkaline (6.9–8.8)	Slightly acidic to moderately alkaline (5.9–8.5)	Neutral to strongly Alkaline (7.0–8.7)	Moderately acidic to strongly alkaline (5.8–8.9)	Moderately to strongly Alkaline (8.0–9.2)
Soil EC _{1:5} (dS/m)	Low (<0.2)	Low (<0.10)	Low (<0.2)	Low (<0.2)	Low (<0.1)	Low to high (0.2–0.6)
ESP (%)	Non-sodic to sodic (1.0–17)	Non-sodic to sodic (1–10)	Non-sodic to sodic (0.6–13)	Non-sodic to sodic (3.5–9.4)	Non-sodic to sodic (1.0– 7.0)	Non-sodic to sodic (2.7–14)



Coordinate System:
GDA2020 MGA Zone 55
Imagery: ESRI Satellite
Scale: 1:30,000

Soil Mapping Units
Stanmore
CWT Continuation Project

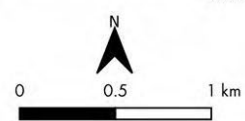


Figure 3-13 SMUs for CWT area

3.1.2.6.2 Pre-mining Land Suitability

The pre-mining land suitability surveys completed during 1999 in the Mulgrave area of ML4750 utilised the class system for assessing pre-mining land suitability for grazing and cropping which considers physical and chemical factors for the specific land uses. The survey reported that the pre-mining land use at SWC was grazing on native and improved pastures. The survey also found that significant proportion of the survey area was well suited for rangeland grazing, comprising of deep, well drained uniform clays. Results for the pre-mine land capabilities are reproduced in Table 3-16.

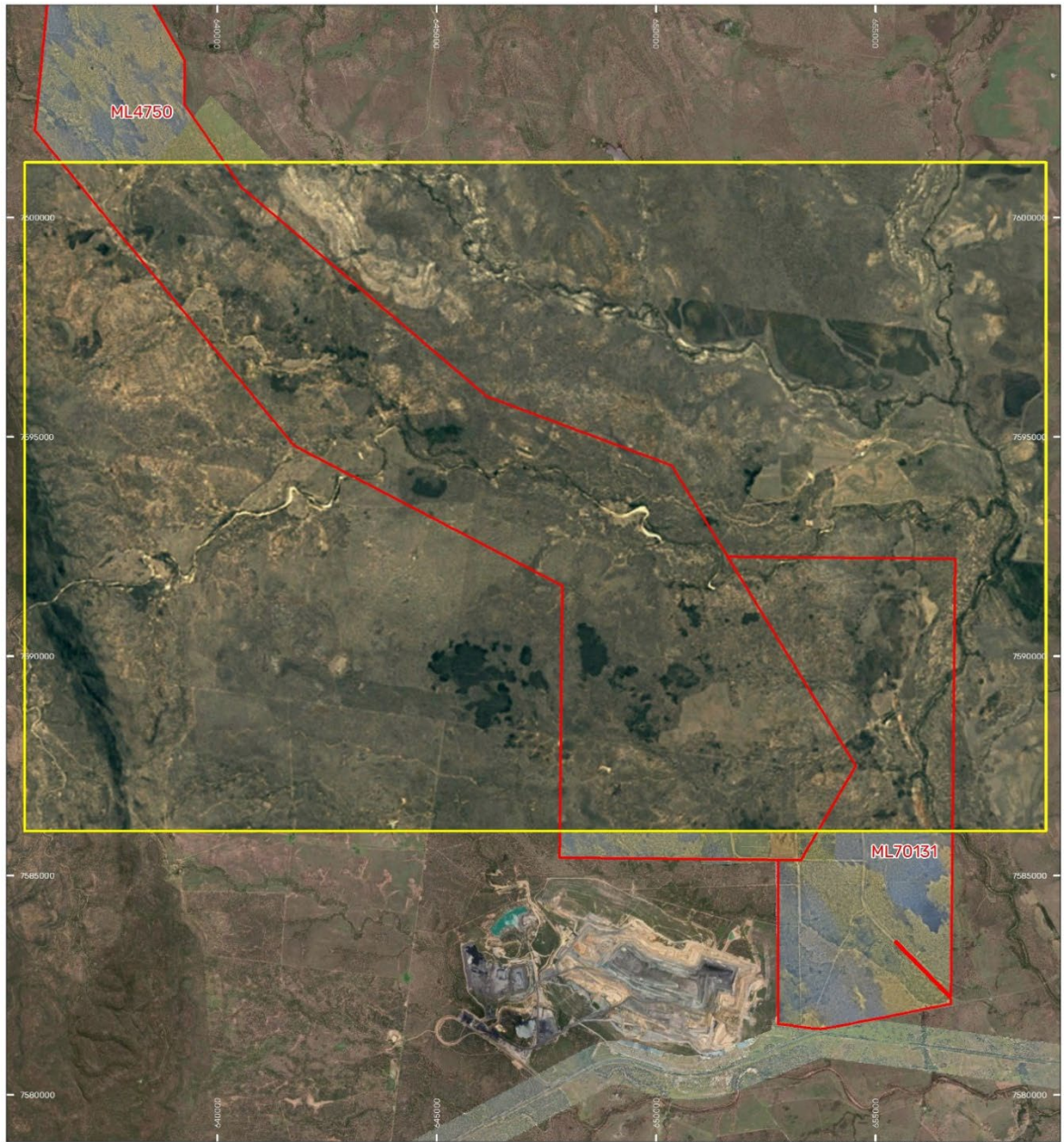
Figure 3-14 depicts a historical pre-mining aerial photo of SWC.

Other assessments at SWC include the Nebo Project Environmental Study (Gutteridge, Haskins & Davey, 1975) and land capability surveys conducted in February and June 1995 (ELP 1995) and in 1998 by Emmerton (1998). These assessments, utilising the Rosser et al. (1974) system, primarily classified the pre-mining agricultural suitability of the SWC mine site area as Class VII, with smaller areas designated as Class VIII, VI, and IV.

Despite the identification of limiting factors such as the soil's potential for water erosion, moisture holding capacity, low and variable rainfall, available phosphorus, and workability (flood frequency) (BHP Coal Pty Ltd, 1998), the soil properties of all SMU's (except D1) (Landloch, 2022) exhibit sufficient capacity to support both grasses and native trees, making it moderately productive for grazing on native pastures.

Table 3-16 Pre-Mining Land Suitability of SMUs for Cattle Grazing

SMU Code	SMU Concept	Land Suitability Class (Grazing)	Land Suitability Class (Cropping)
A1	Deep, neutral, loamy course and overlaying sandy loam to medium clays.	2	5
B1	Dark brown cracking clays overlaying unconsolidated gravels.	3	3
B2	Sandy clay to clay loam with hard setting surface.	3	4
B3	Deep cracking medium clays and non-cracking light to medium clays on Brigalow and Poplar Box.	3	4
B4	Crusting sandy brigalow clays – not gilgaied. Often occurs as small areas within Poplar Box woodlands.	3	-
B5	Thick brigalow clays with melon holes. Occurs on lower lying areas above the alluvial plains in association with B4.	3	-
C1	Hard setting sandy loam surface. Vegetation Poplar Box, Narrow Leaf Ironbark and Moreton Bay Ash.	3	5
D1	Neutral to hard setting surface layer. Vegetation stunted Poplar Box and Sandlewood.	4	5



SOUTH WALKER CREEK - PRCP

PRE-MINING AERIAL PHOTO

Drawn: schuj4

Exported: 19/02/2024

File: SWC Pre-Mining Aerial

Figure:

Version: 1

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LEGEND

- Mining Lease
- Pre-Mining Aerial Photo

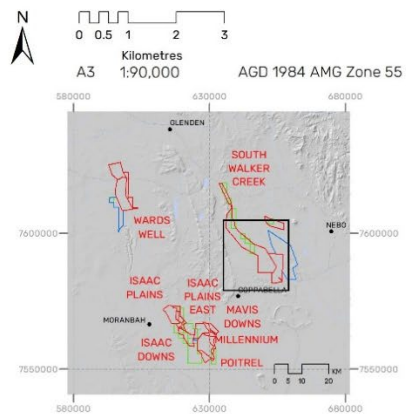


Figure 3-14 Pre-Mining Aerial Photo of SWC

3.1.2.7 Land Stability

The pre-mining topography at SWC exhibited predominantly flat to undulating characteristics, aligning with the regional landscape. Non-mined areas in proximity to SWC and within the Bowen Basin indicate that surface erosion is prevalent following soil and vegetation disturbance from activities such as cattle grazing and other land uses.

Undisturbed soils at SWC, as detailed by the soils assessment (Appendix 4), include outcomes related to erosion. The existing soil types are classified into clays, loams, and sands/light loams. Approximately 80% of the assessed samples consist of clay and loam soils, which are identified as prone to slaking and dispersion. The remaining 20% of sands/light loams also exhibit susceptibility to erosion, characterised by physical limitations as outlined in Table 3-17.

Table 3-17 Physical Limitations of Soils at SWC

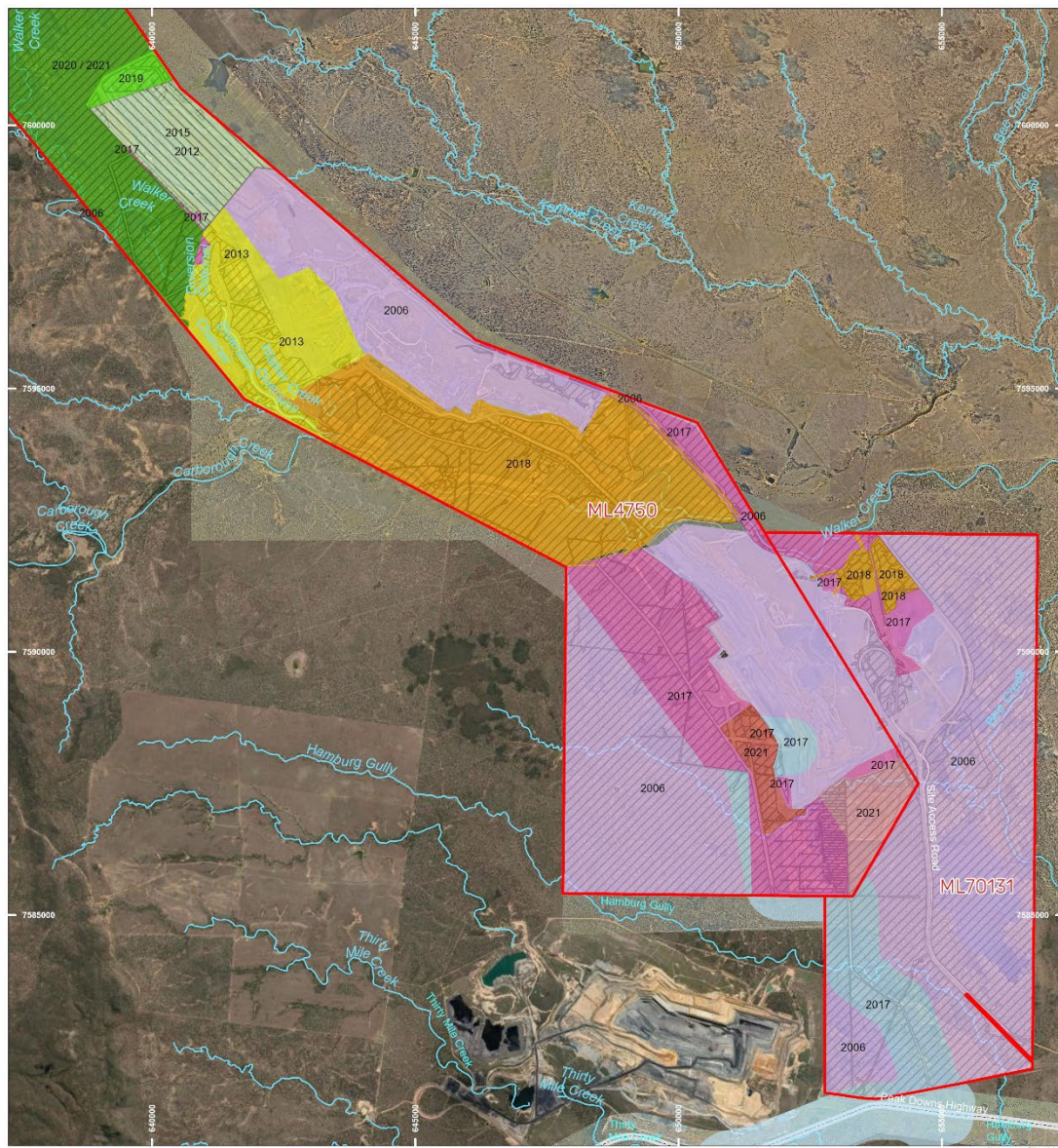
Materials	Stability Limitations
Clay Soils	Often sodic and occasionally dispersive
Loam Soils	Often sodic and occasionally dispersive
Sand and Light Loam Soils	Sometimes sodic and occasionally dispersive

3.1.2.8 Vegetation Communities and Regional Ecosystems

SWC is situated within the Northern Bowen Basin of the Brigalow Belt Bioregion. The regional landscape exhibits a mix of cleared land, natural grasslands, and savannah woodlands. Some sections of SWC are situated in intact bushland areas, creek lines, and brigalow habitats, all of which offer habitat for a diverse range of fauna species (Section 3.6.1.8). Landscape connectivity in the area primarily relies on existing vegetation along riparian corridors of waterways and river systems.

A desktop assessment and review of previous ground-truthed ecological studies, environmental databases, maps, and associated literature was conducted by Ecological Australia in 2020 (Eco Logical, 2020). The study area for this assessment focused on undisturbed areas within the EA approved surface disturbance footprint Figure 3-15.

These assessments identified 32 Regional Ecosystems (REs) within the MLs Table 3-18 and Figure 3-16.



SOUTH WALKER CREEK MINE - PRC PLAN ECOLOGICAL SURVEYS (2006 TO 2021)

Drawn: mconbr
Exported: 20/11/2025
File: 2025\120-1_SWM_PRC_P_Maps
Figure:
Version: 1
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LEGEND		Ground Truthed RE Surveys
 	Mining Lease	
 	Desktop Survey	2006
 		2012
 		2013
 		2015
 		2017
 		2018
 		2019
 		2020-2021
 		2021
 		2021

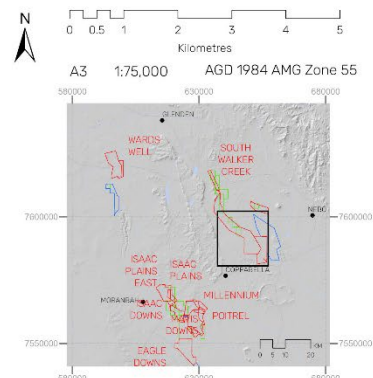


Figure 3-15 Ecological Surveys (2006 - 2021)

Table 3-18 Regional Ecosystems in SWC MLs

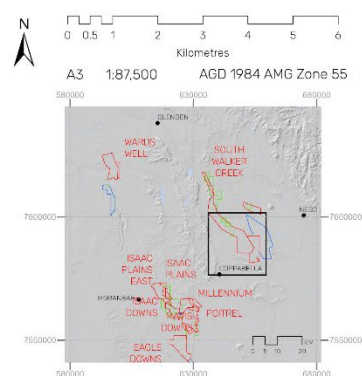
RE Code	Short Description	BD Status ¹	VM Act Status ²
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains.	E	E
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains.	OC	OC
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	OC	OC
11.3.4a	<i>Corymbia tessellaris</i> woodland. On alluvial sandridges to elevated levees and level terraces adjacent to larger stream channels which are irregularly flooded or possibly relict.	OC	OC
11.3.9	<i>Eucalyptus platyphylla</i> , <i>Corymbia</i> spp. woodland on alluvial plains.	NC	LC
11.3.25	<i>Eucalyptus tereticornis</i> or <i>Eucalyptus camaldulensis</i> open forest and woodland.	OC	LC
11.3.25a	<i>Eucalyptus raveretiana</i> (sometimes emergent), <i>Melaleuca fluviatilis</i> woodland.	OC	LC
11.3.27	Freshwater wetlands	OC	LC
11.3.27f	<i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps.	OC	LC
11.3.27i	<i>Eucalyptus camaldulensis</i> or <i>E. tereticornis</i> woodland to open woodland with sedgeland ground layer.	OC	LC
11.4.2	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. grassy or shrubby woodland on Cainozoic clay plains.	OC	OC
11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. rgyrodendron</i> on Cainozoic clay plains	E	E
11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains.	E	E
11.4.11	<i>Dichanthium sericeum</i> and <i>Astrebla</i> spp. grassland with patchy <i>Acacia harpophylla</i> or	OC	OC

RE Code	Short Description	BD Status ¹	VM Act Status ²
	<i>Eucalyptus coolabah</i> on Cainozoic clay plains		
11.4.13	<i>Eucalyptus orgadophila</i> open woodland on Cainozoic clay plains	OC	LC
11.5.2	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> on lower slopes of Cainozoic sand plains/remnant surfaces.	NC	LC
11.5.2a	<i>Allocasuarina luehmannii</i> low tree layer with or without emergent woodland.	NC	LC
11.5.3	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>E. chloroclada</i> , <i>Angophora leiocarpa</i> on Cainozoic sand plains/remnant surfaces.	NC	LC
11.5.8c	<i>Eucalyptus platyphylla</i> woodland on white-yellow weathered sands, with grassy ground layer. Occurs on Quaternary sediments	NC	LC
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. Woodland on Cainozoic sand plains and/or remnant surfaces	NC	LC
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	NC	LC
11.9.2	<i>Eucalyptus melanophloia</i> ± <i>E. orgadophila</i> woodland on fine-grained sedimentary rocks.	NC	LC
11.9.3	<i>Dichanthium</i> spp., <i>Astrelba</i> spp. grassland on fine-grained sedimentary rocks.	NC	LC
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks.	E	E
11.9.7	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	OC	OC
11.9.7a	<i>Eucalyptus populnea</i> predominates forming a distinct but discontinuous canopy (10-15 m high). Other trees may be scattered throughout the canopy.	OC	OC

RE Code	Short Description	BD Status ¹	VM Act Status ²
11.9.9	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks	NC	LC
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	NC	LC
11.10.12	<i>Eucalyptus populnea</i> woodland on medium to coarse-grained sedimentary rocks	NC	LC

¹E = endangered, OC = of concern, NC = no concern

²E= endangered, OC = of concern, LC = least concern.



3.1.2.8.1 Species of Conservation Significance

Species of conservation significance are identified in Table 3-20. Areas adjoining undisturbed 'Endangered' or 'Of Concern' regional ecosystems or threatened species habitats will be rehabilitated to a woodland habitat PMLU wherever possible. This approach will provide connectivity between rehabilitated areas and existing vegetation and habitat values. Similarly, areas rehabilitated to a watercourse PMLU will connect existing riparian habitat values for several conservation significant species.

3.1.2.8.2 Environmentally Sensitive Areas

The current Queensland ESA map shows significant patches of Category B ESA to the south of the surface study area, within both ML4750 and ML70131. Additionally, numerous small patches are dispersed throughout the surface disturbance area. Category B ESAs, defined in the Environmental Protection Regulation 2019, are mapped as REs with an endangered Biodiversity status. Notably, there are no Category A or C ESAs present in the surface disturbance area

3.1.2.8.3 Threatened Ecological Communities

Threatened Ecological Communities (TECs) that are known or have the potential to occur at SWC are presented in Table 3-19.

Table 3-19 Threatened Ecological Community Likelihood of Occurrence

Threatened Ecological Community	EPBC Act	Likelihood of Occurrence	Comments
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Known	Brigalow TEC was ground-truthed in 2016 within RE11.4.9 and RE11.3.1, and potentially occurs in RE11.4.8 and RE11.9.5.
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Potential	Suitable habitat is potentially available within the surface disturbance area, associated with RE11.4.11 and RE11.9.3.
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Potential	Suitable habitat is potentially available within the surface disturbance area, associated with RE11.3.2.

3.1.2.8.4 Weed Species

Weed surveys conducted at SWC identified several weed species as being present on the MLs and the surrounding areas. Weeds have the potential to impact on the ecological values of the rehabilitated areas. The surveys identified five dominant weed species on site including:

- Parthenium (*Parthenium hysterophorus*);
- Harrisia cactus (*Harrisia martinii*, *Harrisia tortuosa* and *Harrisia pomanensis*);
- Prickly pear (*Opuntia stricta*);
- Prickly Acacia (*Vachellia nilotica* subsp. *Indica*); and
- Lantana (*Lantana camara*) – Class 3 Pest Plant.

All weeds listed above are classified as 'Restricted Invasive Plants' under the Biosecurity Act 2014. The Act requires that all reasonable and practical steps be taken to minimise the risks associated with invasive plants.

3.1.2.9 Fauna

The approved disturbance area and areas with the tenements generally consist of a mosaic of woodlands, pastures, and areas disturbed by mining.

Conservation significant fauna (based on current legislation) that have been recorded within or adjacent to SWC MLs or that were assessed as likely to occur, are given in Table 3-20. Other species that have the potential to occur include a range of reptiles, birds, amphibians, and mammals (EcoServe (2005); Melzer et al. (1996); Houston and Melzer (1996); Tucker et al. (1999)), and these species, if present, may benefit from rehabilitation activities in general.

Table 3-20 Conservation Significant Fauna Recorded or Likely to Occur Within or Adjacent to SWC MLs

Species	EPBC Act Status	NC Act Status	Likelihood of Occurrence
Squatter pigeon <i>Geophaps scripta scripta</i>	Vulnerable	Vulnerable	Known
Koala <i>Phascolarctos cinerea</i>	Endangered	Endangered	Known
Ornamental Snake <i>Denisonia maculata</i>	Vulnerable	Vulnerable	Likely
Greater glider <i>Petauroides volans</i>	Endangered	Vulnerable	Known

3.1.2.9.1 Fauna Corridors and Connectivity

The SWC locality consists of a mosaic of land uses and landscapes, including pastoral activities, mining, natural grasslands, and native woodlands. The primary connectivity across this landscape is maintained by existing vegetation along riparian corridors associated with waterways and rivers, which are essential for wildlife movement.

Given the importance of these riparian corridors, the rehabilitation strategy prioritises the rehabilitation of native woodland habitats along creeks and drainage lines. This focus is intended to enhance ecological connectivity and provide improved opportunities for wildlife movement compared to other potential post-mining land use (PMLU) options such as grazing.

Prioritising the restoration of native woodland habitats in these key areas will strengthen the ecological network of the region by supporting connectivity, biodiversity and ecosystem resilience.

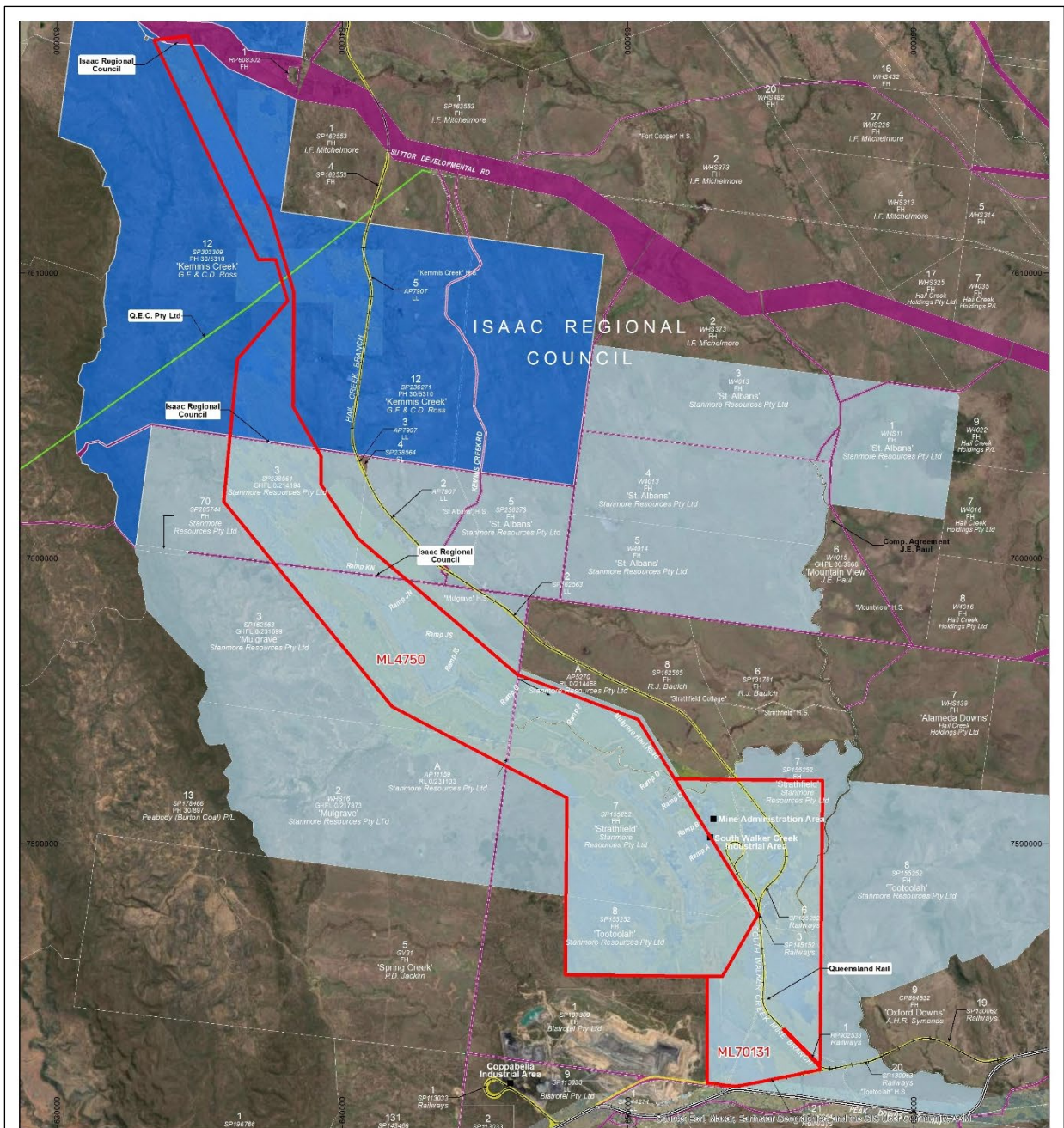
No state or regional corridors have been mapped on SWC.

3.1.2.10 Pre-Mining Land Use

The pre-mining land use consisted of light cattle grazing on native and improved pastures. Agricultural and industry development within the region has fragmented the landscape. Current surrounding land uses include grazing, cropping, and coal mining.

3.1.2.11 Underlying Landholders

SMR are the majority landowner for areas within the approved surface disturbance (Figure 3-17). Queensland rail owns the land and infrastructure associated with train load out and rail corridor.



SOUTH WALKER CREEK - PRCP

LAND OWNERSHIP

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File: Land Ownership
Figure:
Version: 1
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LEGEND

- Mining Lease
- Stanmore Resources Properties**
- Stanmore Resources Pty Ltd
- Other Property Owners**
- Q.E.C. Pty Ltd
- Queensland Rail
- G.F. and C.D. Ross (Kemmis Creek)
- Road Reserve - Isaac Regional Council
- Mine, Industrial and Administration Sites
- Highway
- Public Road
- Railway
- Easement
- Property Boundary



0 1 2 4 6 8
Kilometres

A3 1:135,000 AGD 1984 AMG Zone 55



Figure 3-17 SWC Land Ownership

3.1.3 Design for Closure

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

3.1.4 Rehabilitation and Improvement Planning

Legislative Requirement

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

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

PRCP Guideline (Section 3.1)

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

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

3.1.5 Relevant Activities Requiring Rehabilitation

The rehabilitation areas (RA) included in the PRCP Schedule for SWC are referred to throughout this PRC Plan.

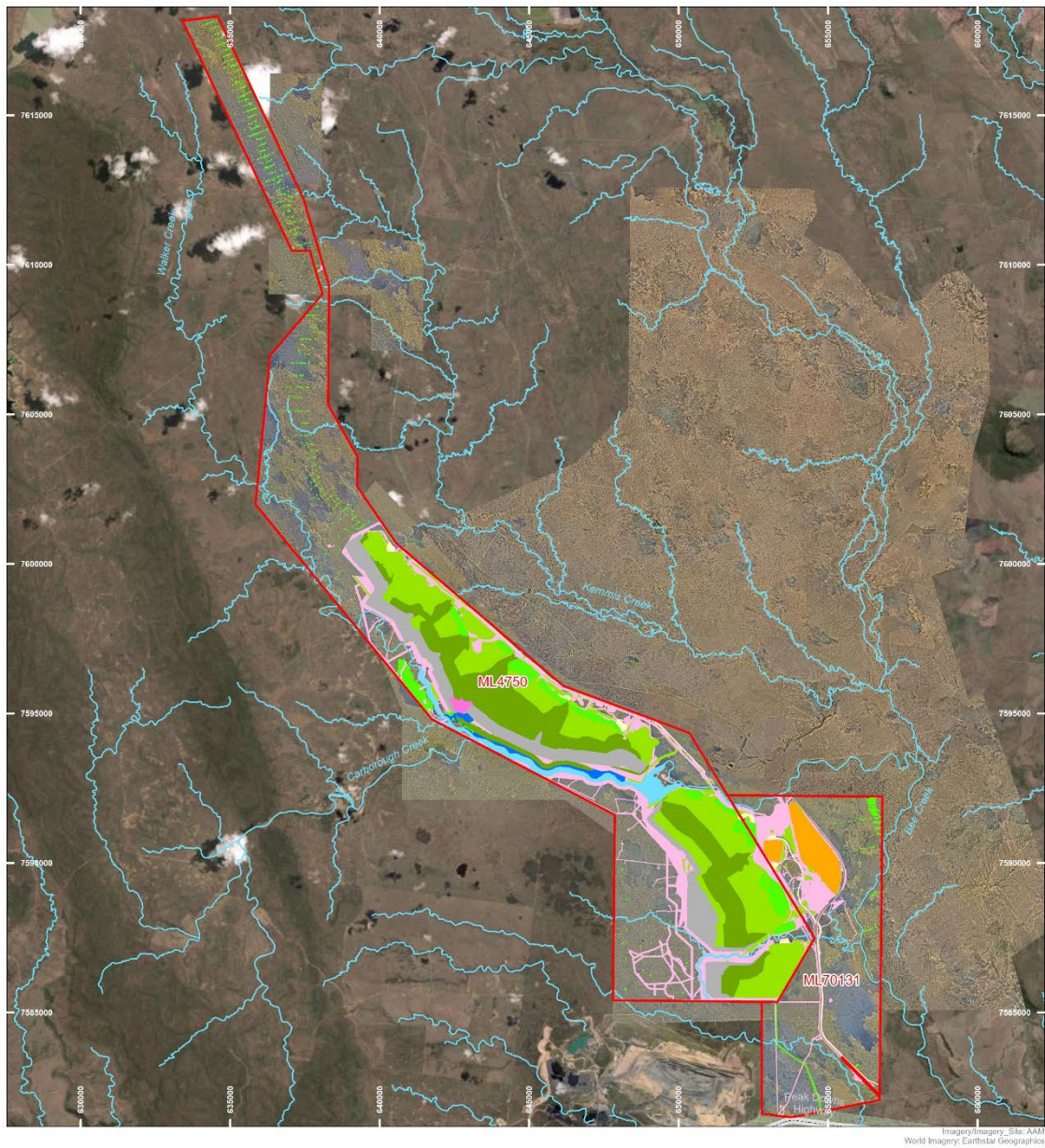
A RA is defined in the PRCP Guideline (DES, 2021) as an area of land in the post-mine land use to which a rehabilitation milestone for the post-mining use relates.

The SWC RAs and their relevant activities at SWC that will require rehabilitation are provided in Table 3-21 along with their PMLUs, predicted duration (until completion of last rehabilitation milestone), area and availability for progressive rehabilitation. Any infrastructure that is beneficial to the PMLU on SMR land tenure may be retained and will not be available for rehabilitation. RAs are shown in Figure 3-18.

Table 3-21 Relevant Activities Requiring Rehabilitation at SWC and Associated PMLUs

Rehabilitation Area (RA)	PMLU	Relevant Activity	Predicted Duration	Size (ha)	Availability for Progressive Rehabilitation
RA1 Existing Rehabilitation	Grazing	Existing Rehabilitation	2045	505.7	N/A
RA2 Infrastructure for Decommissioning	Grazing	- CHPP and associated infrastructure - Administration, crib, and general buildings; workshop; fuel, oil, and chemical storage - Roads, laydown, and general disturbance areas - ROM coal stockpile; product coal stockpile - Water storages (not on Stanmore land tenure) - Topsoil stockpiles	2095	1488.5	Required for the life of the project. Depending on the location, will be available either at the end of mining, coal processing or final rehabilitation.
RA3 Infrastructure to be Retained	Grazing	- Access road, car park, water storages on Stanmore land tenure - Dams	2095	63.3	Generally required for the life of the project. Depending on the location, will be available either at the end of mining, coal processing or final rehabilitation
RA4 Tailings Storage Facility	Grassland	Tailings Storage Facilities	2095	259.0	Available for progressive rehabilitation capacities as reached
RA5	Woodland	Waste rock dumps and topsoil dumps	2090	1508.0	Available for progressive rehabilitation as areas reach final position

Rehabilitation Area (RA)	PMLU	Relevant Activity	Predicted Duration	Size (ha)	Availability for Progressive Rehabilitation
Waste Rock Dumps and Topsoil Dumps					
RA6 Waste Rock Dumps and Topsoil Dumps	Grazing	Waste rock dumps and topsoil dumps	2080	1744.5	Available for progressive rehabilitation as areas reach final position
RA7 Creek Diversion	Watercourse / Riparian Vegetation	Watercourse diversions	2060	249.1	Depending on diversion, either tracking towards rehabilitation milestones currently or will commence after construction is complete.
RA8 Waste Rock Dumps (Biodiversity Bridge)	Woodland	Waste rock dumps and topsoil dumps (Biodiversity corridor)	2080	23.6	Available for progressive rehabilitation as areas reach final position
RA9 Riparian Link Habitat (Highwall Infrastructure Areas)	Woodland	Riparian link (infrastructure areas)	2080	58.7	Available for progressive rehabilitation as areas reach final position



SOUTH WALKER CREEK MINE - PRC PLAN

REFERENCE MAP

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Exported: 2/06/2026

File: 20260602-1_SWM_PRC_Plan_Maps

Figure: 2

Version: 1

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LEGEND

Rehabilitation Area (RA)

- RA1 - Existing Rehabilitation
- RA2 - Infrastructure for Decommissioning
- RA3 - Infrastructure to be Retained
- RA4 - Tailings Storage Facility
- RA5 - WRD and T/S (Woodland)
- RA6 - WRD and T/S (Grazing)

- RA7 - Permanent Watercourse
- RA8 - WRD (Biodiversity Corridor)
- RA9 - Riparian Link (Infrastructure Areas)
- IA1
- Mining Lease
- Highway
- Creek

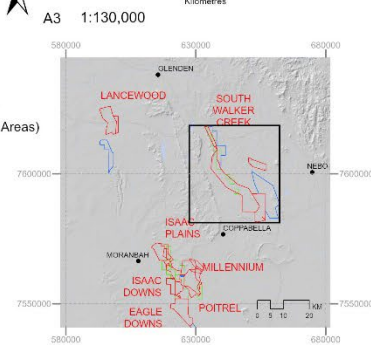
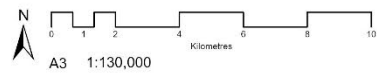


Figure 3-18 Reference Map - Schematic Illustration of SWCs Rehabilitation Areas

3.1.6 Rehabilitation Areas and Milestones

The rehabilitation milestones (RM) included in the PRCP Schedule for SWC are referred to throughout this PRC Plan. A RM is each significant event or step necessary to rehabilitate the land to a stable condition (section 112 of the EP Act).

The RMs are detailed in Table 3-22. As required by the PRCP Guideline, only PMLU areas where disturbance has occurred or will occur, are mapped as a RA. Areas of undisturbed creek areas and other minor areas are expected to remain undisturbed through the mine life and are therefore not mapped as a RA. To support ongoing operations, exploration and minor ancillary activities may be required in areas not mapped as a RA. Minor ancillary activities can occur without a PRCP amendment and may include roads, access tracks and culverts, fences, underground services, low-impact telecommunication facilities, electrical sub-stations and switch yards, transmission grid works and supply network works, storage depots, pipelines and pumps, groundwater bores, gas drainage bores, monitoring and investigation works and exploration activities. Disturbance must be rehabilitated in accordance with the provisions detailed in the Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP, 2016) or its successor, with the exception that land must be rehabilitated to a stable condition and achieve the proposed PMLU.

Table 3-22 Rehabilitation Milestones for SWC

Rehabilitation Milestone (RM)	
RM1	Infrastructure decommissioning and removal
RM2	Identification and remediation of contaminated land
RM3	Landform establishment (excluding TSF and RA4)
RM4	Landform establishment (TSF RA4 only)
RM5	Surface preparation
RM6	Revegetation
RM7	Achievement of surface requirements
RM8	Achievement of stable condition – All PMLU (unless specified)

3.1.7 Improvement Areas and Milestones

The improvement areas (IA) and management milestones (MM) included in the PRCP Schedule for SWC are referred to throughout this PRC Plan.

An IA is defined in the PRCP Guideline as, for a NUMA, an area of land in the NUMA to which a management milestone for the NUMA relates and a MM is each significant event or step necessary to achieve best practice management of the area and to minimise risks to the environment (section 112 of the EP Act).

Based on the initial closure state topography, the seven mining pits at SWC have been consolidated as part of SWC's mine closure landform into four residual voids (NUMAs), as follows:

- Kemmis 2N (KN/KS/IN/IS)
- Mulgrave EN (GN/FN/FS/EN)
- Carborough/Walker/Toolah (C/W/T)
- Toolah South (YS)

Refer to Section 3.4 for more information on the assessment of NUMAs for SWC.

The SWC residual voids have various closure timeframes based on the current mine plan, which is subjective to change in the future.

Due to the long-term closure timeframes, exploration drilling, coal quality and future coal prices will influence the final pits and hence the final mine closure landform. The order in which pits will be mined and

subsequently managed as NUMAs is highly dependent on the mine plan evolution and as the order cannot be accurately planned for the purposes of this PRCP, one IA has been assigned to the four residual voids. Based on the areas proposed to be disturbed during mining operations and considering the existing mine features, the determination of IAs relevant to the nominated NUMAs are provided in Table 3-23. The SWC IA (NUMAs) are also shown on Figure 3-18.

Table 3-23 Improvement Areas (IAs) for SWC

Improvement Area (IA)	NUMA	Relevant Activity	Area (ha)
IA1	No Use	Final Void	942.1

The proposed management milestones are provided in Table 3-24.

Table 3-24 Management Milestones for SWC

Management Milestone	
MM1	Achievement of structural stability
MM2	Achievement of surface requirements
MM3	Achievement of sufficient improvement

3.1.8 Existing Rehabilitation

SWC has commenced approximately 505.7 ha of progressive rehabilitation between 2003 and 2025. These areas have been seeded to achieve grazing and woodland PMLUs with the majority being grazing.

A total of 13 rehabilitation monitoring sites have historically been established and monitored at SWC which encompass initial and majoring monitoring events as per the site's rehabilitation monitoring plan (Section 3.8). This existing rehabilitation was completed between the years 2003-2025.

3.1.8.1 Progressive Rehabilitation

No rehabilitation areas at SWC have been applied for progressive certification under the EP Act.

3.2 Community Consultation

Legislative Requirement

- In accordance with section 126C(1)(c)(iii) and (iv) of the EP Act, the rehabilitation planning part of the PRC Plan must include:
- details of the consultation undertaken by the applicant in developing the proposed PRC Plan, and
- details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.

PRCP Guideline (Section 3.5)

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

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

PRCP Guideline (Section 3.5)

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

3.2.1 Community and Stakeholder and Engagement Plan

This Community and Stakeholder Engagement Plan (CSE Plan) provides an overview of community and stakeholder engagement activities for South Walker Creek as they relate to the PRCP, to help guide the organisation in its engagement approach. Following the acquisition of the BHP Mitsui Coal Pty Ltd (BMC) joint venture, Stanmore has recognised an opportunity to formally revisit its stakeholder engagement approach to ensure it aligns with best practice, and to achieve both synergies and efficiencies across the organisation.

The purpose of this CSE Plan is to ensure Stanmore's stakeholder engagement function supports the organisation in delivering on its vision:

- To be a leading resources company in Australia, creating value to our stakeholders through sustainable development.

The CSE Plan is designed to tell a compelling benefits story for Stanmore. Stanmore is a facilitator of regional employment, economic growth, and future opportunities, while being a responsible steward of the environment. Stanmore drives positive engagement with its critical stakeholders and the community, in relation to key operational, exploration, development and production milestones and projects. Critical stakeholder groups identified and discussed in this Plan include Federal and State governments, industry groups and businesses, local community, and Traditional Owners of the land on which Stanmore operates.

The Plan provides a comprehensive overview of the environment in which communication and stakeholder engagement will occur, and includes:

- Identifying a clear and realistic goal and objectives that determine Stanmore's position;
- Analysis of challenges to provide a thorough understanding of potential 'pain points', as well as strategies to help mitigate/manage potential risks/issues;
- Analysis of opportunities, including strategies to leverage those opportunities during stakeholder engagement;
- Identification of stakeholders classified according to their level of interest and influence in Stanmore's operations;
- A strategic approach to engagement and tactical plan for implementation, including how and when communication and stakeholder engagement will be undertaken in relation to Stanmore's operations and role in the community; and
- Key messages to position Stanmore among its stakeholders, ensuring alignment of communication activities across the organisation.

It is recommended this CSE Plan is reviewed and updated as required to reflect emerging issues and opportunities, and any changes to Stanmore or South Walker Creek's strategic priorities.

This CSE Plan is positioned as a site-specific Community and Stakeholder Engagement Plan, developed in line with local requirements and projects (e.g., Environmental Impact Assessment public consultation activities).

A corporate-level document for business-as-usual engagement has been developed and is currently being reviewed for incorporation into Stanmore's newly developed Social Performance Strategy.

3.2.2 Consultation to Date

Engagement with affected landowners for SWC Mine was undertaken to develop compensation, leasing and agistment agreements, based on the assumption that land disturbed for mining will be rehabilitated to be suitable for its previous use (grazing) after SMC's use of the land has ceased. SMC continues to engage with

underlying and neighbouring landholders regularly on land management including lease/license issues; and on operational matters (such as air quality monitoring) as required.

Stanmore (formerly BMC) also provided PRC Planning briefings to Isaac Regional Council (IRC) (December 2020, April 2021, and February 2024).

Consultation undertaken by Stanmore as part of PRC Plan preparation for SWC included:

- A letter to IRC regarding the SWC PRC Plan, and an invitation for further discussion with Council about their involvement in PRC Plan consultations;
- Letters to landowners whose properties are adjacent to SWC and two landholders who are affected by or adjacent to South Walker Creek Mine;
- A letter to utility owners/operators and the owners of overlapping tenures (gas exploration) within and adjacent to ML4750 and ML70131, including Aurizon, Queensland Rail, Powerlink, and Ergon;
- A letter to the owners of adjacent mining operations which include Glencore Australia (Hail Creek Mine), Peabody Coppabella Pty Ltd (Coppabella Mine), and New Hope (adjacent EPC's); and
- A letter to the Department of Natural Resources Mines and Energy (DNRME) Deputy Director-General Georesources and Manager Native Title Services and Coal Hub.

3.2.3 Community Consultation Register

A community consultation register has been provided as part of the PRC Plan in compliance with section 126C(1)(c)(iii) of the EP Act and includes:

- Identification of each community member/stakeholder;
- Previous engagements with the community;
- Consultation date(s);
- Description of consultation type;
- Information provided to the community;
- Issues raised/discussed by the community;
- How issues have been considered;
- Decisions/ outcomes of engagement; and
- Commitments made by SMR.

The stakeholders identified as part of this register are considered as having a genuine, demonstrable, and legitimate interest in SWC's ongoing rehabilitation and closure planning. Given that the predominant landholder at SWC is SMC, there has been minimal need for extensive landholder consultation. However, compensation agreements have been established and maintained with all other landholders. With SMC being the majority underlying landholder for SWC, the principal external stakeholders for SWC are the Traditional Owners.

The community consultation register will be a live instrument for recording future consultation on SWC's PRC Plan. The community consultation register, and the community and stakeholder register are provided in Table 3-25 and Table 3-26 respectively.

Table 3-25 SWC Community Consultation Register

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
Issac Regional Council (IRC)							
December 2020	Isaac Regional Council	Briefing	As per meeting agenda: Environment – PRCP Environment - Land use Community - Consultation/ engagement.	No issues raised.	No issues raised.	Engagement for information purposes.	Agreement in place
April 2021	Isaac Regional Council	Briefing	As per meeting agenda: Environment – PRCP Environment - Land use Community - Consultation/ engagement.	No issues raised.	No issues raised.	Engagement for information purposes.	Agreement in place
November 2021	Isaac Regional Council	Briefing	As per meeting agenda: Environment – PRCP Environment - Land use Community - Consultation/ engagement.	No issues raised.	No issues raised.	Engagement for information purposes.	Agreement in place

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
Feb 2024	Isaac Regional Council	Letter	An invitation for further discussion with the Council about their involvement into the PRC Plan.	No issues raised.	No issues raised.	Engagement for information purposes.	Agreement in place
Traditional Owner Groups							
2012	Barada Barna Aboriginal Corporation (BBAC)	CHMP	Environment - Land use Indigenous - Cultural heritage Indigenous Land Use Agreement Indigenous - Native title Community - Consultation/engagement	No issues raised.	No issues raised.	Continue to engage and meet as required	Cultural Heritage Management Plan (CHMP)
2022	Barada Barna Aboriginal Corporation (BBAC)	ILUA	Environment - Land use Environment - PRCP Indigenous - Cultural heritage Indigenous Land Use Agreement. Indigenous - Native title Community - Consultation/engagement.	No issues raised.	No issues raised.	Continue to engage and meet as required.	Individual Land Use Agreement (ILUA) in place.

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
2022	Gangali Narra Widi Aboriginal Corporation (GNWAC)	ILUA	Environment - Land use Environment – PRCP Indigenous - Cultural heritage Indigenous Land Use Agreement Indigenous - Native title Community - Consultation/engagement	No issues raised.	No issues raised.	Continue to engage and meet as required.	Individual Land Use Agreement (ILUA) in place.
17/03/2023	Gangali Narra Widi Aboriginal Corporation (GNWAC)	Relationship committee meeting.	Workforce - Employment opportunities Social impacts - Employment/training Social impacts - Local business and industry procurement Environment - Land use Environment – PRCP Indigenous - Cultural heritage; Indigenous Land Use Agreement	As per meeting agenda; Contracting Activities; and Employment opportunities.	Continue to engage and meet as required	Continue to engage and meet as required.	Individual Land Use Agreement (ILUA) in place.

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
			Indigenous - Native title Community – Consultation / engagement.				
Other Tenure Holders							
Feb 2024	Peabody Coppabella Pty Ltd – Coppabella Mine	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	No rehabilitation/ closure commitments made.	N/A
Feb 2024	Glencore Australia – Hail Creek Mine	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	No rehabilitation/ closure commitments made.	N/A
Utility Owners							
Feb 2024	Ergon Energy	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	As per agreement	Agreement in place.
Feb 2024	Queensland Rail	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	As per agreement	Agreement in place.
Feb 2024	Aurizon	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	As per agreement	Agreement in place.
Feb 2024	Powerlink	Letter	Advice on change of ownership / PRCP	No response to date.	Engagement for information purposes.	As per agreement	Agreement in place.

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
Adjacent Property Owners and Agistment License Holders							
16/01/2023	Property Owner – Strathfield and Agistment License Holder – Mulgrave.	Adhoc Interaction - Email	MRA2C Creek Diversion fencing and access requirements - fencing stops erosion and assists with establishing revegetation which will support the watercourse PMLU.	No issues raised.	No issues raised	Access granted.	Agistment License in place.
16/03/2023	Agistment License Holder – St Albans.	Scheduled Interaction – In Person	Agistment agreement for St Albans. Establishing and maintaining of agistment agreements supports the future grazing PMLU.	Access to Kemmis Creek (future mining area – Kemmis 3). Access to Bee Creek and Nebo West (Stanmore Resources tenements).	Access to Kemmis Creek (future mining area – Kemmis 3). Access to Bee Creek and Nebo West (Stanmore Resources tenements).	Agreed conditions as per the agistment License.	Agistment License in place.
13/11/2023	Agistment License Holder – Tootoolah.	Scheduled Interaction – In Person	Meeting with Licensee for Y South area. Maintaining agistment agreements supports the future grazing PMLU. Described area required for mining	Nominated an area for a holding paddock that will enable ongoing use of the paddock to the west of the proposed pit area.	Nominated an area for a holding paddock that will enable ongoing use of the paddock to the west of the proposed pit area.	Date to be determined to remove cattle from area.	Agistment License in place.

Consultation Date	Community Member / Stakeholder	Consultation Type	Information Provided	Issues Raised by Community	How Issues Were Considered	Decisions and Outcomes	Commitments
			and discussed fencing and water point requirements. General business update. Exploration work plan and timeline.				

Table 3-26 Relevant Community and Stakeholder Register

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
Government (Federal, State and Local)			
Federal Government	Commonwealth Department of Climate Change, Energy, the Environment and Water	• Matters of National Environmental Significance (MNES). • Post Mine Land Use. • Compliance with Approvals (i.e., EPBC). • Impacts to local industry.	Inform
State Government: • DoR • DES • Member for Burdekin • Office of the Minister for Environment, Great Barrier Reef, Science, and the Arts	Stanmore Corporate team conducts as-needed engagement with Ministers and Members of Parliament and will provide briefings on PRC Planning as part of regular engagements. DoR's Deputy Director- General Georesources and Director Native Title Services and Coal Hub have been kept informed on PRC Planning.	• Matters of State Environmental Significance (MSES) • Legislative compliance. • Resource development. • Employment opportunities. • Public interest. • Environmental management. • Economic transformation (towards post-mining). • Financial assurance. • Environmental risk management. • Future land use and landform.	Inform

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
Local Government Isaac Regional Council (IRC)	SMC has a long established and cooperative relationship with IRC. SMC and IRC meet at least six monthly. BMC previously had three recent briefings with Council regarding PRC Plan requirements (December 2020, April 2021, and November 2021). As noted above, IRC has agreements for road reserves (an unused 'paper road') within the SWC ML.	- Local employment and business opportunities. - Stock routes. - Effects on Council services and infrastructure. - Environmental management. - Rehabilitation progress. - Post-mining landforms. - Management of closure impacts on employment and businesses. - Alignment of rehabilitation plans with local/regional planning goals. - Economic transformation (towards post-mining) and community sustainability.	Inform
Traditional Owner Groups			
- Barada Barna Aboriginal Corporation (BBAC) - Gangali Narra Widi Aboriginal Corporation (GNWAC)	Barada Barna people were engaged in the management of Aboriginal cultural heritage through a Cultural Heritage Management Plan for SWC originally signed in 2012. BBAC Bidgerley Learning Centre Agreement License (Pink Lily). ILUA's were developed with the BBAC and GNWAC in 2022. Stanmore regularly meet with representatives of the respective Aboriginal Corporations to keep track of the ILUA commitments.	- Cultural heritage impacts and management. - Impacts on Native Title (e.g., within stock routes or associated with Carborough Creek and Walker Creek). - Bidgerley Learning Centre (Pink Lily), traditional owner training centre. - Post-mining land use and landform/landscape. - Future access to and ownership of land. - Environmental management/stewardship. - Employment and business opportunities in exploration, environmental management and monitoring, rehabilitation. - Supply chain opportunities. - Indigenous Land Use Agreements (ILUA).	Inform and consult
Adjacent and Affected Property Owners and License Holder			

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
- Strathfield - Mulgrave - Tootoolah - Kemmis Creek - Harrybrandt - Oxford Downs - St Albans - Alameda Downs	There are seven (7) landowners whose properties are adjacent to SWC, and one (1) landholder whose property is not adjacent. Kemmis Creek is located on the northern end of SWC and Strathfield and Mountain View properties are to the east. The access road to SWC is adjacent to parts of Harrybrandt and Oxford Downs. SMC has constructive working relationships with all underlying and adjacent landowners.	- Water access – underground and surface water allocations. - Environmental management/stewardship. - Post-mining land use and landform/landscape. - Rehabilitation schedule. - Future access to and ownership of land.	Inform and consult
Underlying and Adjacent Property Owners – South Walker Creek and Bee Creek (adjacent ML)			
- Mountain View - Strathfield - Fort Cooper - Landsborough - Alameda Downs	SWC have compensation agreements with two landowners whose properties are affected by mining / exploration. The two properties include Mountain View and Strathfield. Adjacent landholders to SWC include the owner of Fort Cooper, Landsborough, and Alameda Downs.	- Environmental management/stewardship. - Post-mining land use and landform/landscape. - Rehabilitation schedule. - Future access to and ownership of land.	Inform
Utility Owners			
- Aurizon - Powerlink - Ergon - Isaac Regional Council (IRC)	Aurizon operates the TLO and rail loop which are owned by Queensland Rail. Powerlink owns an overhead power line which crosses the ML. Ergon own the overhead power lines which supply the mine, rail, and nearby homesteads. IRC has areas of road reserve (unused 'paper roads') within the ML.	- Impact on assets/asset value. - Rehabilitation of impacts on assets. - Service disruptions and mitigations. - Crossing/interface agreements. - Decommissioning of utilities (TLO etc.).	Inform

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
	SMC engages with utility owners as required, i.e., issue-specific, or transactional engagement.		
Adjacent Mine Sites and Mining Tenure			
Adjacent Mine Sites: • Coppabella Mine • Hail Creek Mine	SWC Mine is adjacent to Coppabella Mine. Stanmore has a water transfer agreement in place with Coppabella Mine. Hail Creek Mine is also adjacent to SWC to the north and the Hail Creek rail spur traverses the SWC ML.	• Any impacts on the use of land within overlapping tenures. • Water sharing. • Stakeholder (including employee/contractor) perceptions about closure.	Inform
Adjacent Mining Tenure: • Coppabella Mine Peabody Coppabella Pty Ltd. • Hail Creek Mine, Glencore Australia. • Bee Creek Coal Project, New Hope Group	Peabody Coppabella Pty Ltd owns and operates Coppabella Mine Peabody Coppabella Pty Ltd also hold tenements to the south and the west of SWC. Glencore Australia's operates the Hail Creek Mine north of the Stanmore assets. Glencore Australia also hold tenements to the north of SWC. The New Hope Group hold exploration tenements to the northeast and east.	• Water sharing • Land and rail access • Access to rail corridor land • Future land use and ownership.	Inform
Overlapping Tenure Holders			
• Arrow Energy • Blue Energy • Eureka Petroleum	Arrow Energy, Blue Energy, and Eureka Petroleum hold Petroleum Commercial Areas (PCA's) which overlap the SWC MLs.	• Future land use and tenure.	Inform
Stanmore Employees and Contractors			

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
Stanmore Resources Employees and Contractors	HSE Mining has operated at SWC since 2018, using a contract workforce. SMR communicates regularly with its personnel through various means. Information on PRC Planning and its relevance to SWC has been provided on-site by managers and through regular communications.	• Job opportunities. • Timing of closure. • Loss of jobs with closure. • Closure planning in context with other mining industry changes e.g., autonomous haulage. • Workers' conditions. • Sustainability of communities that are dependent on mining.	Inform and consult
Local Business			
Local Business	SMC's procurement team have relationships with an extensive network of small business suppliers, including Indigenous businesses. As there is no likelihood of SWC's PRC Planning having a significant effect on businesses during the next ten years, business is considered interested rather than affected stakeholders at this point.	• Opportunities to participate in supply chain (e.g., exploration, environmental management, rehabilitation). • Economic transformation (towards a post-mining landscape). • Economic and community sustainability. • Loss of supply opportunities with closure.	Inform
	There is potential to engage Traditional Owner Groups and other Indigenous businesses in e.g., rehabilitation services as part of a broader portfolio-wide or business-wide program.	• Opportunities to participate in environmental management or rehabilitation.	Inform
Community Members and Other Local Groups			
• Nebo Community • Coppabella Community • Moranbah Community	The Nebo community is the closest to SWC, at approximately 20kms ENE of the mining leases. Community members and groups in Nebo, Coppabella, Moranbah and throughout the Bowen Basin have been provided with	• Local employment and business opportunities. • With closure, loss of jobs and supply opportunities. • Community and regional sustainability. • Environmental management.	Inform

Stakeholders	Details	Key Interests	Level of Participation
Affected Stakeholders			
	information about PRC Planning through Community consultation processes.		
Fitzroy Basin Association (FBA)	Participation in workshops and meetings	- Impact on water resources - Environmental impact - Post mine land uses	Inform
Queensland Museum	Excavation of megafauna fossils Participation in workshops	Megafauna fossil digs sponsored by SMC.	Inform

3.2.4 Ongoing Consultation

3.2.4.1 Consultation Objectives, Engagement Type and Frequency

Table 3-27 identifies stakeholders and details the current SMC relationships and potential planning areas of interest. A dedicated Community Consultation Plan (CCP) has been compiled for SWCs PRC planning (Table 3-28). This plan documents the iterative consultation process to be followed to enable ongoing PRCP-related engagement with the relevant stakeholders.

Table 3-27 Identified Stakeholders and Details on Current SMR Relationships and Potential PRCP Planning Areas of Interest

Stakeholders	Details and Current Relationships	Interests
Traditional Owner Groups		
Barada Barna Aboriginal Corporation (BBAC)	- Barada Barna people were engaged in the management of Aboriginal cultural heritage through a Cultural Heritage Management Plan for SWC to achieve its duty of care obligation under the <i>Aboriginal Cultural Heritage Act 2003</i>. - Barada Barna people's native title to areas of land within the Isaac, Central Highlands and Mackay LGAs was determined by the Native Title Tribunal in June 2016. - Barada Barna People are represented by BBAC.	- Cultural heritage impacts. - Impacts on Native Title (e.g., within stock routes or associated areas such the Bidgerley Pink Lily Lagoon). - Post-mining land use and landform/landscape. - Future access to and ownership of land. - Environmental management/stewardship. - Employment and business opportunities in exploration, environmental management and monitoring, rehabilitation.

Stakeholders	Details and Current Relationships	Interests
	- Stanmore is in regular communication and has as constructive working relationship with BBAC. - An ILUA was developed with the BBAC in 2022.	
Gangali Narra Widi Aboriginal Corporation (GNWAC)	- Gangali Narra Widi people are represented by GNWAC. - Stanmore is in regular communication and has as constructive working relationship with GNWAC. - An ILUA was developed with the BBAC in 2022.	- Cultural heritage impacts. - Impacts on Native Title (e.g., within stock routes or associated areas). - Post-mining land use and landform/landscape. - Future access to and ownership of land. - Environmental management/stewardship. - Employment and business opportunities in exploration, environmental management and monitoring, rehabilitation.
Adjacent Property Owners and License Agreement Holders		
Adjacent and Affected Property Owners	- There are two landowners whose properties are adjacent to SWC. - Kemmis Creek is located to the northern end of ML4750. - Strathmore is located eastern side of ML4750 and ML70131. - SMR has constructive working relationships with all underlying and adjacent landowners.	- Water access – underground and surface water allocations. - Environmental management/stewardship. - Post-mining land use and landform/landscape. - Rehabilitation schedule. - Future access to and ownership of land.
Underlying and Adjacent Property Owners and Properties	SWC has a compensation agreement with one landowner whose property is located near the adjacent Stanmore ML4751 (Bee Creek).	- Water access – groundwater and surface water allocations. - Environmental management/stewardship. - Post-mining land use and landform/landscape. - Rehabilitation schedule. - Future access to and ownership of land.

Stakeholders	Details and Current Relationships	Interests
Utility Owners		
Utility Owners:	Aurizon operates the TLO and rail loop which are owned by Queensland Rail and are located on land excised from SMR.	Impact on assets/asset value.
- Aurizon - Powerlink - Ergon - Isaac Regional Council (IRC)	- Powerlink owns the SWC overhead and underground power lines. - IRC have road reserves within ML4750. - SMC engages with utility owners as required, i.e., issue-specific, or transactional engagement.	- Rehabilitation of impacts on assets. - Service disruptions and mitigations. - Crossing/interface agreements.
Adjacent and Overlapping Tenure		
Adjacent Tenure Holders:	Peabody is the operator of Coppabella Mine located south of ML4750 and east of ML70131.	An agreement is currently in place to transfer water from Coppabella Mine to SWC.
Coppabella Mine Peabody	Stanmore liaises with Peabody on a as needed basis.	
Hail Creek Mine	The Glencore Hail Creek Mine is located to north of ML4750.	- Future land use and ownership. - Access to rail corridor land.
Bee Creek Coal Project, New Hope Group	The New Hope Group hold exploration tenements to the northeast and east.	- Land access. - Future land use and tenure.
Overlapping Tenure Holders:	Arrow Energy, Blue Energy and Eureka Petroleum hold an Authority to Prospect which overlaps the SWC MLs.	Future land use and tenure.
- Arrow Energy - Blue Energy - Eureka Petroleum		
Local Government	- SMR has a long established and cooperative relationship with IRC. SMC and IRC meet at least six monthly. - SMR (formerly BMC) previously had three recent briefings with Council regarding PRC Plan requirements (December 2020, April 2021, and November 2021). - IRC has three road reserves located within ML4750.	- Local employment. - Stock route (Suttor Developmental Road). - Effects on Council services and infrastructure. - Environmental management. - Rehabilitation progress. - Post-mining landforms.

	• Compensation agreements are in place with IRC.	• Management of closure impacts on employment and businesses. • Alignment of rehabilitation plans with local/regional planning goals. • Economic transformation (towards post-mining) and community sustainability.
SWC Operators/Workforce	• HSE Mining has operated at SWC since 2018, using a contract workforce.	• Timing of closure. • Rehabilitation obligations. • Employment continuity. • Loss of employment/contracting opportunities at closure.
Interested Stakeholders		
Stanmore Resources Employees and Contractors	• Stanmore Resources communicates regularly with its personnel through various means. • Information on PRC Planning and its relevance to SWC has been provided on-site by managers and through regular communications.	• Job opportunities. • Loss of jobs with closure. • Closure planning in context with other mining industry changes e.g., autonomous haulage. • Workers' conditions. • Sustainability of communities that are dependent on mining.
Businesses	• SMC's procurement team have relationships with an extensive network of small business suppliers, including Indigenous businesses. As there is no likelihood of SWC's PRC Planning having a significant effect on businesses during the next ten years, business is considered interested rather than affected stakeholders at this point. • There is potential to engage Traditional Owners and other Indigenous businesses in e.g., rehabilitation services as part of a broader portfolio-wide or business-wide program.	• Opportunities to participate in supply chain (e.g., exploration, environmental management, rehabilitation). • Economic transformation (towards a post-mining landscape). • Economic and community sustainability. • Loss of supply opportunities with closure.
Community Members and Groups	• The Nebo community is the closest community to SWC and is located approximately 20kms ENE of the mine lease. • Community members and groups in Nebo and throughout the Bowen Basin have been provided with information about • PRC Planning through Community consultation processes.	• Local employment and business opportunities. • With closure, loss of jobs and supply opportunities. • Community and regional sustainability. • Environmental management.

State Government:

- DoR
 - DES
 - Office of the Minister for Environment, Great Barrier Reef, Science, and the Arts
 - Conduct as-needed engagement with Ministers and Members of Parliament and will provide briefings on PRC Planning as part of regular engagements. DoR's Deputy Director- General Georesources and
 - Director Native Title Services and Coal Hub have been kept informed on PRC Planning.
 - Legislative compliance.
 - Resource development.
 - Employment opportunities.
 - Public interest.
 - Environmental management.
 - Economic transformation (towards post-mining).
 - Financial assurance.
 - Environmental risk management.
 - Future land use and landform.
-

Table 3-28 Community Consultation Plan

Community Member	Engagement Type	Proposed Consultation Frequency	Information to be Provided	How Feedback / Comments are Considered
Consultation Objective	Engage Key Stakeholders in Identifying Community Objectives and Aspirations for Post-Mining Land Use and Landform, and Social Value Opportunities			
Landowners, Traditional Owner Groups, and Agreement Holders Within and Adjacent to SWC				
• Barada Barna People (BBAC) • Gangali Narra Widi Aboriginal Corporation (GNWAC) • Isaac Regional Council (IRC) • Local Community Members	Advise landowners, lessees, Traditional Owners, and IRC in writing when the PRC Plan is approved.	Once-off	• Provide a copy of the approved PRC Plan for their information.	As per the Community and Stakeholder Engagement Plan.
	Meet with directly affected and adjacent landholders, BBAC and IRC to provide an update on the PRC Plan and progress with rehabilitation and invite their inputs and feedback for the following: • The approved PMLUs and post-mining landforms. • Any values or opportunities in specific disturbed areas. • Rehabilitation methods which would optimise future grazing opportunities, land management or water storage. • Shared value initiatives, e.g., infrastructure retention, capacity building, environmental management, research, or delivery partnerships. • Rehabilitation methods, schedule, and progress towards milestones.	As requested, or as agreed with individual representatives / agencies.	• Provide a copy of the approved PRC Plan for their information.	As per the Community and Stakeholder Engagement Plan.

	Meetings with IRC	Bi-annually, or as agreed with IRC.	• Provide an update on the status of the PRC Plans and rehabilitation. • Forecast upcoming PRC Plan consultation for other SMC assets. • Seek to understand Council's strategic analysis and planning for Isaac LGA and the SWC project area.	As per the Community and Stakeholder Engagement Plan.
	Participate in Council, community or industry led initiatives which aim to harness social value from mine closure and rehabilitation planning, and/or work towards from economic transformation/transition.	As invited.	• Community and Stakeholder Engagement Plan.	As per the Community and Stakeholder Engagement Plan.
	In cooperation with BBAC and other First Nations within Isaac LGA, and on a portfolio-wide basis.	Once-off process.	• Communicate the pipeline of opportunities relating to rehabilitation work and land management.	As per the Community and Stakeholder Engagement Plan.
	Develop a shared understanding of business capabilities relevant to closure and rehabilitation works. Plan and implement an Indigenous business capability development program to match rehabilitation opportunities, if this is required.	Once-off process.		As per the Community and Stakeholder Engagement Plan.
	PRC Plan-specific workshops or focus groups, seek the involvement of community members and groups in articulating community aspirations for rehabilitation, PMLUs and economic transformation.	Once-off, portfolio-wide process.		As per the Community and Stakeholder Engagement Plan.
Engagement Objective	Demonstrate Transparency Regarding SWC's PRCP Intentions and Timeframes to Stanmore Personnel and Local Communities			
SMC Employees and Contractors	Keep the SWC workforce updated (via intranet news and Website, emails, and newsletters to personnel) if there are changes to the PRC Plan.	Ongoing engagement process.	• Project description. • Life of mine schedule. • Workplace transition.	As per the Community and Stakeholder Engagement Plan.

Moranbah, Nebo, and Coppabella Community Members and Groups	Using community forums such as interagency meetings, partnership meetings and community and business networks, provide community updates on PRC Planning (SWC-specific as relevant and portfolio wide).	Ongoing engagement process.	• Project description. • Life of mine schedule. • Rehabilitation success. • How to provide feedback.	As per the Community and Stakeholder Engagement Plan.
Local Businesses and SMC Suppliers	Provide information about the plan for closure of SWC and potential future supply opportunities as part of closure and rehabilitation.	Two (2) years prior to closure; subsequent consultation to be agreed.	• Project description. • Life of mine schedule.	As per the Community and Stakeholder Engagement Plan.
Elected Representatives and Government Agencies	Provide updates via letters and/or meetings on PRC Planning to: • Office of the Minister for Resources (Queensland). • Office of the Minister for Environment, Great Barrier Reef, Science and Youth Affairs (Queensland). • Shadow Minister for Resources. • Shadow Minister for Environment, Great Barrier Reef, Science and Youth Affairs Resources. • Member for Burdekin (Queensland Parliament). • DES PRCP Team and Business Centre Coal. • Director, Native Title Services and Coal Hub, Department of Resources. • Deputy Director-General Georesources, Department of Resources. • Assistant Secretary Assessments and Governance Branch, DAWE.	As requested, or as agreed with individual representatives / agencies.	• Project description. • Life of mine schedule. • Existing rehabilitation tours. • Rehabilitation success. • Post-mining land uses.	As per the Community and Stakeholder Engagement Plan.

Engagement Objective

Cooperate with IRC, Utility Owners and Adjacent Mining and Energy Tenement Owners as Part of PRC Planning

Adjacent Tenement Holders: • Coppabella Mine (Peabody) • Hail Creek Mine (Glencore)	Advise (letter) adjacent and overlapping tenement holders of any substantive changes to SWC's closure or rehabilitation schedule.	As requested, or as agreed with company representatives.	• Project description. • Life of mine schedule.	As per the Community and Stakeholder Engagement Plan.
Overlapping Tenement Holders: • Arrow Energy • Blue Energy	Consult with overlapping tenement holders regarding their interests in areas of overlapping tenure within SWC.	As requested, or as agreed with company representatives.	• Project description. • Life of mine schedule.	As per the Community and Stakeholder Engagement Plan.
Utility Owners: • Queensland Rail • Aurizon • Powerlink • Ergon Energy	Maintain correspondence with Queensland Rail and Aurizon regarding progressive rehabilitation activities. Engagement regarding the decommissioning of the train load-out facility/rail interface.	As requested, or as agreed with individual representatives / agencies.	• Project description. • Life of mine schedule.	As per the Community and Stakeholder Engagement Plan.

3.2.4.2 Community Consultation Information Sharing

Information to be released as part of ongoing community consultation will include:

- Rationale and scope for the PRC Plan and PRCP Schedule
- Approved activities and PMLUs for SWC
- On-site activities and areas of disturbance
- Proposed rehabilitation methods, schedule, and milestones
- Opportunities for community consultation as part of the PRCP Plan's implementation

Where required, communication tools could include:

- A holding statement for general enquiries.
- Frequently asked questions and answers (FAQs) and a PRC Planning fact sheet available to support consultation activities.
- Face-to-face and virtual meetings.

3.2.4.3 Addressing Feedback/Comments

As noted in the PRCP Guideline (DES, 2021), in addition to the annual return requirements that relate to the approved EA, if a PRC Plan applies to the activities, the annual return must also include an evaluation of the effectiveness of the PRC Plan, including the environmental management carried out under the PRCP Schedule, for the year to which the annual return relates.

Stanmore SMC will monitor and report on the progress and outcomes of progressive rehabilitation activities against rehabilitation milestones provided in the PRCP Schedule. This monitoring will aim to demonstrate a successful rehabilitation trajectory towards achievement of the approved PMLU, and/or to inform corrective action where required, which will be reported as part of annual returns.

Information about rehabilitation progress will also be delivered as part of the consultation methods detailed in and any feedback will be considered in subsequent updates of this PRC Plan.

The PRC Plan Community Consultation Register will also be updated as community consultation activities outlined are completed. Feedback recorded in the Community Consultation Register will be considered in framing and detailing future PRC Plan amendments for SWC.

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

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

- a description of the use of the land.
- if applicable, the specific vegetation types (e.g., RE 13.2.9) or land suitability classification (e.g., Class 4).
- identification of any permanent or essential management infrastructure to be included as part of the PMLU.

PRCP Guideline (Section 3.2)

- completion criteria for measuring whether the PMLU has been successfully achieved.

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

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

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

Legislative Requirement

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

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

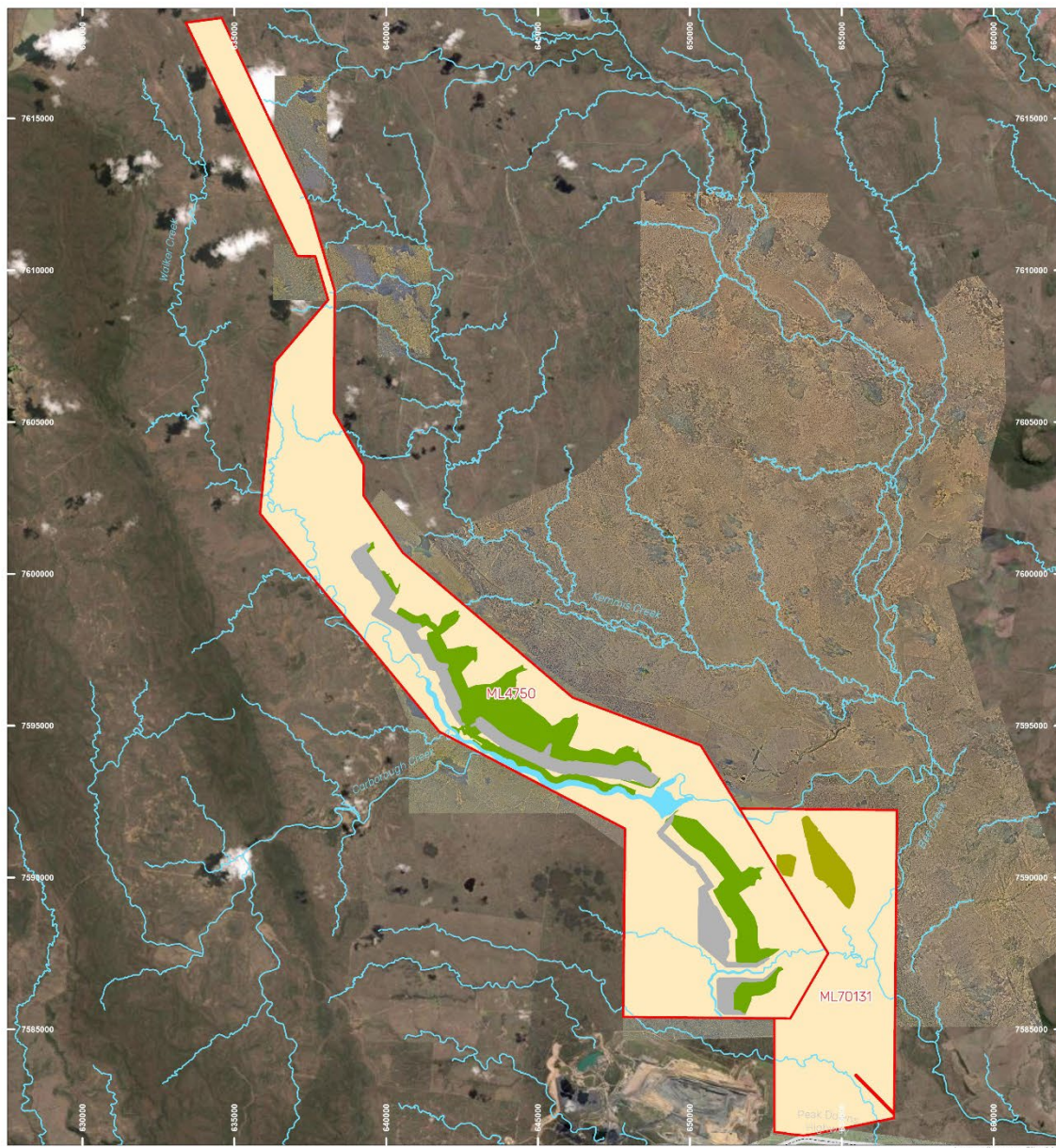
3.3.1 Nominated PMLUs

The post-mining land uses proposed in this PRCP are outlined below and displayed in Figure 3-19:

- Grazing;
- Woodland;
- Grassland; and
- Watercourse / Riparian vegetation.

In addition to the adhering to transitional provisions, the proposed PMLUs have been assessed and deemed to be appropriate based on:

- Rehabilitation objectives that focus on achieving a safe, stable, non-polluting, and sustainable post-mining land use;
- Rehabilitation and closure technical assessments and investigations which underpin this PRCP. These include closure landform design, existing and pre-existing vegetation, existing and pre-existing ecological values, pre-mining land uses and the outcomes of the rehabilitation and closure studies supporting this PRCP.



SOUTH WALKER CREEK MINE - PRC PLAN **POST MINE LAND USE (PMLU) AND NON-USE MANAGEMENT AREA (NUMA)**

Drawn: moonbr
 Exported: 2/06/2026
 File: 20260602-1_SWM_PRCP_Maps
 Figure: 1
 Version: 1
 © Stanmore Resources Ltd.

LEGEND
 Mining Lease
 Creek
 Highway
PMLU
 Grassland
 Grazing
 Woodland
 Watercourse
Non-Use Management Area (NUMA)
 NUMA

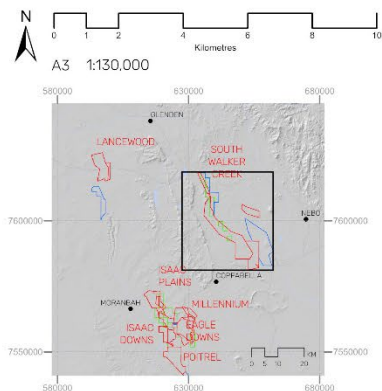


Figure 3-19 SWC Post-Mining Land Uses

3.3.2 Rehabilitation Milestones

The proposed rehabilitation milestones and milestone criteria are provided in Table 3-29. Within this table, the source of the milestone criteria has also been provided to show evidence of which milestone criteria has been transitioned from the existing LOD however given the EA amendment (Table E1 of the EA) in 2018 many of the outcomes from the 2012 RMP are considered superseded in cases where land outcomes were not transitioned. SMART principles have been applied where possible, with consideration given to the following parameters:

- Milestone criteria have been transitioned from the LOD.
- Milestone criteria development has considered understanding of best practice.

Table 3-29 Milestone Criteria

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
RM1	Infrastructure decommissioning and removal	Other than as required by this schedule or agreed to be retained by the landholder (as evidenced by a signed landholder agreement): a) All services are disconnected and decommissioned. b) All buildings are demolished and/or removed. c) All hardstand and concrete areas are removed. d) All mine roads, access tracks and fences are removed. e) All pipelines are drained and removed. f) All waste is removed. g) All dams are dewatered and desilted, and any liners present are removed, before being decommissioned. h) All exploration drill holes are rehabilitated in accordance with the eligibility criteria and standard conditions for exploration and mineral development projects – V2 (EHP, 2016). i) All machinery and equipment are removed.	Bespoke milestone criteria to ensure: 1. Land available for rehabilitation to safe, stable outcome. 2. Waste removal from site to ensure land achieves safe, stable, non-polluting state. 3. Best practice. 4. Achieves SMART principals. 5. Best practice and consistent with standard conditions outlined in current version of the eligibility criteria and standard conditions for exploration and mineral development projects – V2 (EHP, 2016).
RM2	Identification and remediation of contaminated land	A contaminated land investigation is completed by a suitably qualified person (SQP) in accordance with the EP Act, including: a) Contaminated and hazardous material has been remediated in situ or removed/transported to an approved landfill for disposal, with waste tracking information recorded and submitted. b) Validation testing confirms that contaminated and hazardous materials have been removed or remediated successfully.	Bespoke milestone criteria to ensure: 1. Investigation and remediation of potentially contaminated land ensure safe, stable, non-polluting state is achieved. 2. Achieves SMART principles. 3. References EP Act (1994) 4. Best practice.

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		c) A contaminated land assessment indicates that no contamination unsuitable for the PMLUs for the site remains or is occurring. d) If required, a site investigation report including a site suitability statement has been prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act. e) Where RM2(d) applies, a site suitability statement from a SQP confirms the uses or activities for which the land is suitable and aligns with the approved PMLUs for the site	
RM3	Landform Establishment (excluding TSF and RA4)	All Rehabilitated Areas a) Engineering and design plans (including drainage, where required) are developed and finalised by an appropriately qualified person (AQP). b) Bulk earthworks are completed in accordance with the AQP-developed design plans to achieve the required slope gradients and lengths. c) Erosion and sediment control systems are designed by an AQP, installed where required, and demonstrated to be fit for purpose. d) Landforms are shaped to achieve free-draining surfaces. e) An AQP has assessed the landforms and confirmed that criteria RM3(a) to (q) have been achieved. Grazing PMLU (RA2, RA3, RA6) f) Landforms are shaped to achieve a maximum overall slope gradient of 15%. g) Outward facing slopes have maximum slope lengths of 700m and predicted erosion rates below 5 t/ha/yr.	All Rehabilitated Areas a) to e) Considered best practice. Grazing Note: EA requirement of 70% slopes <20% removed to achieve best practice and sustainable land use f) Transitioned from Table E1 of EPML00712313 g) Aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report h) Aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report i) Considered best practice. Woodland Habitat j) Consistent with the objective of Table E1 of EPML00712313 to achieve stable and sustainable woodland habitat PMLU and aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report. k) Aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		h) Inward facing slopes have maximum slope lengths of 400m and predicted erosion rates below 12 t/ha/yr. i) Landforms are assessed as being geotechnically stable with a minimum factor of safety of 1.5. Woodland Habitat PMLU (RA5, RA8, and RA9) and Grassland (RA4) j) Landforms are reshaped to achieve a maximum overall slope gradient of 25% on outward facing slopes and 15% on inward facing slopes. k) Outward facing slopes have maximum slope lengths of 700m and predicted erosion rates below 5 t/ha/yr. l) Inward facing slopes have maximum slope lengths of 400m and predicted erosion rates below 12 t/ha/yr. m) Slopes with overall gradients above 15% have stabilisation measures such as rock mulch or other treatments applied as recommended by an AQP. n) Landforms are assessed as being geotechnically stable with a minimum factor of safety 1.35. Watercourse (RA7) o) Diversion is constructed in accordance with AQP-developed design plans. p) Updated hydraulic flood modelling, incorporating drainage, is completed. q) A Hazard Assessment is completed to verify that safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use.	l) Aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report m) Considered best practice and consistent with the objective of Table E1 of EPML00712313 to achieve stable and sustainable woodland habitat PMLU. n) Considered best practice and therefore transitioned from Table E1 of EPML00712313. Watercourse o) Considered best practice p) Considered best practice. q) Transitioned from Table E1 of EPML00712313.

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
RM4	Landform Establishment (TSF only)	a) A decommissioning plan for the TSF is developed and finalised by an AQP. b) Installation of a cover on the TSF as per the design specified in the AQP-developed decommissioning plan. c) Installation of an appropriate drainage system on the TSF, including a closure spillway, as per the design specified in the AQP-developed decommissioning plan. d) The TSF has been assessed by an AQP as being geotechnically stable with a minimum factor of safety of 1.35. e) Confirmation from an AQP that all cover materials are not capable of generating acid mine drainage, non-acidic metalliferous drainage or saline mine drainage.	Considered proactive and best practice based on industry standards to ensure safe, stable non-polluting and sustainable land use.
RM5	Surface preparation	a) An AQP has completed an assessment of growth media characteristics, identifying amelioration or other treatments required to achieve: 1. The following primary growth media quality targets^: i. pH 6.0-9.0 in root zone (0- 0.3m); ii. Salinity (EC 1:5): ≤0.75 dS/m in root zone (0- 0.3m); iii. Sodidity (ESP): ≤6%; and iv. CEC and major macronutrient (N, P, K, and organic C) concentrations in root zone (0–0.3m) at least 80% of those measured at comparable reference sites; OR 2. Alternative growth media targets, as determined by the AQP to be suitable for establishing the vegetation required under the designated PMLU.	Considered SMART, proactive, and best practice. Criteria has been informed by soil and cover assessments for SWC.

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		b) Primary growth media quality targets listed in RM5(a) are achieved based on a number of representative samples, as determined by an AQP. c) Growth media placed at a minimum overall depth of 150mm on all RAs except RA1. d) Growth media placed at a minimum overall depth of 150mm on all RAs except RA1. e) Ripping along contours is completed prior to seeding, if required. f) The surface and groundwater monitoring network, including, but not limited to, those location identified in Table 3-84 SWC Surface Water Monitoring Locations, Table 3-86 Groundwater Monitoring Locations, is installed. <i>^Primary growth media quality targets: criteria provided as a post-ameliorant target. Initial soil analysis values may be outside of these ranges; however, they must be achieved where that is a requirement of this PRCP schedule.</i>	
RM6	Revegetation	Grazing PMLU (RA2, RA3, RA6) a) Seeding is completed using a selection of species and sowing rates from Table 3-48 Recommended Species to be Established in the Grazing PMLU (RA2, RA3, and RA6), or other species/rates as advised by an AQP. Woodland Habitat PMLU (RA4, RA5, RA8, and RA9) b) Seeding is completed using a selection of species from Table 3-49 Recommended Species to be Established in the Woodland PMLU (RA5, RA8	Grazing - Productive and sustainable grazing PMLU. Woodland Habitat - Woodland habitat species have been selected on that basis that they are known to occur with the SWC region and are typically located on hilly, rocky terrain and/or substrates with poorer soils. - Ensures successful rehabilitation to a sustainable ecosystem that has habitat values. Grassland

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		and RA9), or other species/rates as advised by an AQP c) Seeding is completed in accordance with the recommended sowing rates for individual species where possible, and the total recommended sowing rates for dominant tree species (5kg/ha), mid-storey species (5kg/ha), and groundcover species (5kg/ha). Grassland (RA4) d) Seeding completed using a selection of species from Table 3-50 Recommended Species to be Established in the Grassland PMLU (RA4) at a combined sowing rate of 8kg/ha, or other species/rates as advised by an AQP. Watercourse (RA7) e) Seeding completed using a selection of species from Table 3-51 Recommended Species to be Established in the Watercourse PMLU (RA7), or other species/rates as advised by an AQP. f) Seeding completed in accordance with the recommended sowing rates for individual species where possible, and total recommended seeding rates for upper bank (5kg/ha), mid bank (5kg/ha), and lower bank (5kg/ha).	- Grass species have been selected on that basis that they are combination of native and desirable 3P grasses (palatable, perennial and productive). Watercourse - Watercourse riparian (woodland habitat) species selection based on pre-mining flora and subsequent ecological surveys undertaken at SWC. The target RE for RA7 is 11.3.25 and BVG is 16a. - Ensures successful rehabilitation to a sustainable ecosystem that has habitat values. - Re-instates landscape connectivity in the area primarily relies on existing vegetation along riparian corridors of waterways and river systems.
RM7	Achievement of surface requirements	a) Weed presence is less than 10% of total vegetative groundcover. b) Restricted matter (as defined in the <i>Biosecurity Act 2014</i>) comprises less than 5% of total vegetation groundcover.	- Transitioned from Table E1 of EPML00712313 with modifications to ensure safe, stable, and non-polluting landform. - Vegetation groundcover criteria are aligned with the <i>Rehabilitation Landform Design: South Walker Creek Mine</i> report.

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		c) Vegetative groundcover is at least 70% on outward facing slopes and at least 30% on inward facing slopes. d) With respect to erosion: i. There is no evidence of erosion classified as 'moderate' or 'severe' as defined by Table 3-80 Erosion classification framework; ii. Any erosion present will not compromise the ability of a PMLU to achieve a stable condition; and iii. The Index of Diversion Condition method is used to verify that RA7 is erosionally stable. e) An AQP has assessed the landforms and confirmed that criteria RM7(a) to (d) have been achieved.	
RM8	Achievement of stable condition – All PMLU (unless specified)	All Rehabilitation Areas a) Maintenance of the criteria for weeds, groundcover and erosion from RM7(a), (b), (c) and (d). b) Groundwater and surface water monitoring is completed in accordance with PRCP7 to PRCP11. Grazing (RA1, RA2, RA3, RA6) c) Confirmation from an AQP that the final landform is geotechnically stable with a minimum factor of safety of 1.5 and a maximum overall slope gradient of 15%. d) A Pasture Condition Assessment is completed by an AQP, demonstrating that the final landform achieves a pasture condition rating of Class 1, 2 or 3 in accordance with the criteria in Table 3-82 Pasture Condition Assessment Table.	Transitioned from Table E1 of EPML00712313 with modifications to ensure productive and sustainable land use. The resulting milestone criteria are considered best practice and aligned to industry standards. Incorporation of Pasture condition assessment is considered best practice and ensures a Grazing habitat with sustainable ecological values Incorporation of BioCondition framework is considered best practice and ensures woodland and watercourse habitat with sustainable ecological values

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		Woodland Habitat (RA5, RA8, and RA9)	
		e) Confirmation from an AQP that the final landform is geotechnically stable with a minimum factor of safety of 1.35 and a maximum overall slope gradient of 25%.	
		f) A BioCondition Assessment is completed by an AQP using the methodology outlined in the latest version of the Queensland Herbarium's BioCondition Assessment Manual, demonstrating that the final landform achieves the "Revised PRCP Benchmark" criteria in Table 3-55 Representative RE Benchmark Criteria for Woodland Rehabilitation (>15% Slope) at RA5, RA8 and RA9.	
		Grassland (RA4)	
		g) Confirmation from an AQP that the final landform is geotechnically stable.	
		h) Vegetative groundcover is at least 10%, with no bare areas greater than 10m ² .	
		i) At least four native grass species are present.	
		Watercourse (RA7)	
		j) Confirmation from an AQP that the final landform is performing in accordance with the DNRME Guideline: Works that interfere with water in a watercourse for a resource activity watercourse diversions under the Water Act 2000 (OSW/2019/4599, or a later version), and is in a stable condition.	
		k) A BioCondition Assessment is completed by an AQP using the methodology outlined in the latest version of the Queensland Herbarium's BioCondition Assessment Manual, demonstrating that the final landform achieves the "Revised PRCP Benchmark"	

Milestone Reference	Rehabilitation Milestone	Milestone Criteria	Justification for Transition and Proposed PMLU Milestone Criteria
		criteria in Table 3-56 Representative RE Benchmark Criteria for Watercourse Habitat Rehabilitation at RA7 .	

¹ Vegetative groundcover means plants, plant litter, tree leaf litter, twigs and woody debris capable of protecting the soil surface from erosion.

3.3.2.1 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, i.e., haul and pit roads, active mine face access.
- The land contains infrastructure to be handed over to a third-party post mining.

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

- Coal market drivers have major implications for areas of the mine becoming available for rehabilitation due to the need to keep multiple pits 'open' for extended periods of time to provide variable grades of ore to blend to meet customer specifications. 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 years of clearing and this has been applied in the PRCP schedule.
- As recognised in the EP Act definition above, there is a standing requirement to maintain roads accessing mining areas and active mine face offsets in mining areas. An allowance of 20% of cleared areas are assumed to be unavailable for rehabilitation until the end of end of mine life to accommodate such operational requirements.

An array of additional infrastructure is required to support mining operations, including processing infrastructure such as the CHPPs and TSFs, communication networks, water, sewage and electrical services, fuel storage, mechanical workshops and more. Following cessation of mining, the schedule for decommissioning, demolition and/or removal of these facilities 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.
- It is likely that coal processing will continue for 6-12 months following cessation of mining to exhaust any ROM or other ore stockpiles.
- Many facilities will be required to support closure operations while the mining areas are subject to rehabilitation activities (e.g., requiring fleet) which may take upward of 5-10 years to complete rehabilitation execution works for whole mine areas.

For PRCP scheduling purposes, a general allowance of 10 years is provided for most infrastructure and TSFs to be available for rehabilitation. Naturally, given the opportunity, areas no longer required to support closure activities will be rehabilitated.

In addition to this, there is a subset of buildings and other infrastructure which will not be decommissioned or rehabilitated (therefore not made available for 'rehabilitation'), but rather have potential to be utilised for:

- Post-closure maintenance and monitoring activities; and/or
- Post-closure community benefit and are thus assumed to be made safe and transitioned in a condition agreed with relevant third party/s.

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 3.7). The nominated timeframes and respective justifications are detailed in Table 3-30. These timeframes have been used to develop the milestone schedule in the PRCP Schedule.

Table 3-30 Timeframe Justification for Rehabilitation Milestones

Rehabilitation Milestone	Nominated Timeframe	Justification
RM1 – Infrastructure decommissioning and removal	5	A five-year timeframe is considered appropriate to ensure that all relevant decommissioning and demolition works can be undertaken safely, considering that there are very few specialist demolition service providers in the market and factoring in the forecasted high demand for demolition services in the next few decades. Given the significant size of the coal processing and load out facilities, make safe activities prior to decommissioning, include de-energisation, structural integrity assessments and HAZMAT investigations, take considerable time given inherent safety risks associated with demolition.
RM2 – Identification and remediation of contaminated land	5	A five-year timeframe is considered appropriate to investigate and remediate contamination. This timeframe accounts for the investigation, potential remediation works (typically involving excavators and trucks), engagement of SQPs and site auditor in line with EP Act requirements. Soil remediation projects typically extend for multiple years owing to the iterative nature of confirming that residual contamination meets the intended land use EILs/HILs through validation sampling
RM3 – Landform establishment (excluding TSF and RA4)	5	Five years is justified as a sufficient time to complete this milestone considering that this milestone requires 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
RM4 – Landform Establishment (TSF RA4 only)	10	Ten years is considered appropriate for the establishment of a TSF landform given the typical high-water content within tailings and the requirement to actively dewater to facilitate safe access by Heavy Mining Equipment. Fundamental to dewatering is the installation of drainage systems and operation of decants. The actual time taken to dewater TSFs is dependent on a range of factors that aren't always known until deposition of tailings ceases. A conservative 10-year timeframe is advocated to account for uncertainty
RM5 – Surface Preparation	3	As this milestone requires verification from an AQP that growth medium is suitable to sustain vegetation, a 3-year timeframe is considered appropriate to account for investigations and development of appropriate amelioration strategies that require trials over multiple seasons.
RM6 – Revegetation	3	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, 3 years is deemed appropriate. This nominated timeframe is also justified on the basis of reducing risks associated with seed supply chain issues, that are known to naturally occur (i.e., and late/early seeding and unavailability of seed species to meet the required seed mix).
RM7 - Achievement of stable condition	10	A ten-year timeframe is considered appropriate to achieve this milestone, as it allows sufficient time for vegetation to establish, stabilise soils, and outcompete weeds under Queensland climatic conditions. Within this period, successive wet and dry seasons provide natural cycles essential for meeting the required vegetative groundcover targets,

Rehabilitation Milestone	Nominated Timeframe	Justification
		supporting rehabilitation measures to progress towards stable landforms and reducing erosion risk.
RM8 – Achievement of Stable condition	5	Achievement of stable condition relies on extensive monitoring by AQPs to demonstrate that the planned rehabilitation measures can successfully sustain the nominated PMLU. This requires monitoring across large domains, with frequent sampling, and in some instances, rehabilitation intervention. A five-year timeframe is considered appropriate to account for natural variation in water quality and potential remediation works if erosion beyond tolerable limits occurs. This timeframe also allows for poor growing seasons and extreme events such as droughts or storms that may negatively impact vegetation establishment and require intervention. Given these factors, and noting that the establishment of some species requires years to reach maturity, the assigned timeframe is 5 years.

3.3.3 Exploration

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

3.3.4 Community Consultation

Achievement of the PMLUs of grazing, woodland, grassland and watercourse are consistent with LoDs, consultation and respective agreements completed to date (refer to Section 3.2).

3.3.5 Regional Planning Integration

The PMLUs at SWC consider the pre-mining land use, adjacent land uses and approved EA conditions. Existing land use in the area is primarily cattle grazing and coal mining.

Under the Isaac Regional Planning Scheme (February 2021), SWC is located in 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, and
- Includes boundary realignments where used to align with mining or petroleum tenements.

Concurrently, the Queensland Government, via its Mackay, Isaac, and Whitsunday Regional Plan (February 2012), maps SWC 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 SWC.

3.4 Non-use Management Areas

Legislative Requirement

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

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

PRCP Guideline (Section 3.3)

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

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

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

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

The proposed PRC Plan 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 PRC Plan, the applicant must include all of the requirements identified in this section.

As outlined in section 754 (3) of the EP Act and section 6.3.2 of the PRC plan guideline 'a NUMA will be taken to be pre-approved if a land outcome, the same or substantially similar to a NUMA, is contained in a 'land outcome document'. This is the case for SWC due to the residual voids being authorised under Schedule E (Condition E6 and E7) of the EA and addressed in BHP PRCP Landform and Rehabilitation DES memo Final 28082020. The proposed NUMAs are inclusive of the low wall, high wall, and end walls.

As per the PRC plan guideline, if a NUMA has already been identified in a LOD document the applicant is not required to comply with sections 126C(1)(g) or (h), or section 126D (2) or (3) of the EP Act and is not required to complete the information requirements under section 126C(1)(j) of the EP Act for the approved NUMAs. SWC is still required to meet the legislative requirements under section 126C(1)(d) of the EP Act.

The EA does not state the area or location of the proposed NUMAs, therefore this section of the PRC plan will include detail on how the total area of the land will be minimised and how the location of the proposed NUMAs will minimise risk to the environment.

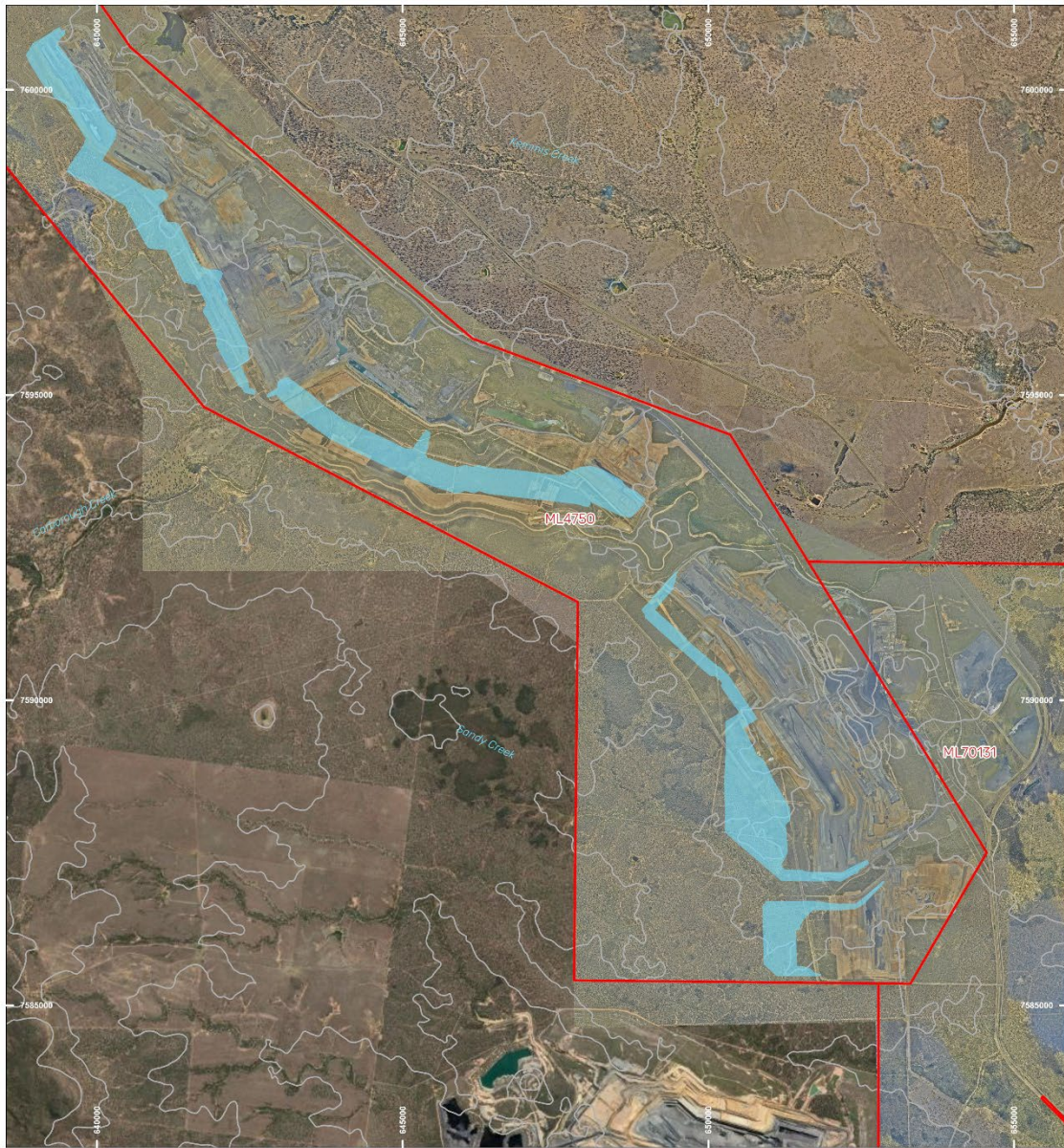
3.4.1 Nominated NUMAs

There are four (4) NUMAs that make up the proposed IA at SWC. The NUMAs have a total area of 942.1 ha. The NUMAs are pit voids and are shown in Figure 3-20. The NUMA extents and key details are summarised in Table 3-31.

The extent and number of residual voids the NUMAs has considered the SWC Rehabilitation Management Plan which depicts the Kemmis 2N and Mulgrave EN residual voids as distinct and not contiguous voids. In order to achieve this geometry a biodiversity bridge landform is proposed to be retained between the two residual voids. This bridge and the associated riparian link habitat associated with the highwall areas on either side are proposed to sustain a woodland habitat PMLU.

Relevant safety features of the NUMAs are incorporated into the MMs (Section 3.1.7) and include:

- Safety bund is constructed around the perimeter of the final voids in accordance with set design specifications and set-back distances.
- Fencing erected around perimeter of safety bund, where required.
- Warning signage placed along fence line, where required.



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SOUTH WALKER CREEK MINE - PRC PLAN NON-USE MANAGEMENT AREA (NUMA)

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LEGEND

- ▬ Mining Lease
- ▬ Creek
- ▬ Highway
- ▬ 20m Contours
- Non-Use Management Area (NUMA)

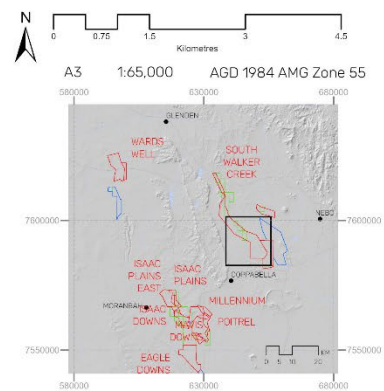


Figure 3-20 SWC Proposed NUMAs

Table 3-31 Proposed NUMAs Extent

Proposed NUMA	Mining Tenement	Area (ha)	Factor of Safety (FoS)	Indicative Maximum Depth (m)	Indicative Maximum Length (m)
Kemmis 2N	ML4750	942.1	Minimum FoS of >1.25 as determined by an AQP	122	6,760
Mulgrave EN	ML4750			123	6,730
Carborough / Walker / Toolah	ML4750			162	5,300
Toolah South	ML4750			146	1,100

3.4.2 Minimising Environmental Impacts

A number of studies have been undertaken as part of this PRCP to assess and refine the location and extent of the SWC NUMAs, with the objective of minimising potential environmental harm. The studies followed an adaptive management approach, resulting in the iterative refinement of the final landform.

The initial location and extent of the SWC NUMAs were based on full resource extraction within the EA-authorized disturbance limits and informed the following void studies:

- Void in floodplain modelling.
- Initial void water balance modelling.
- Initial hydrogeological modelling
- Initial void geotechnical assessment.
- Geochemical stability.

As discussed in the preceding section, the location and extent of the SWC NUMAs was considered in the context of the SWC Rehabilitation Management Plan, which depicts the Kemmis 2N and Mulgrave EN voids as distinct, non-contiguous features. This depiction is reflected in the final landform through the inclusion of a woodland habitat PMLU – RA8 and RA9 – between the Kemmis and Mulgrave voids. This not only reduces the extent of the NUMAs, but also facilitates habitat connectivity by providing a corridor for species movement.

To further demonstrate that potential environmental harm has been minimised, three landform design options were assessed, with their merits outlined below.

3.4.2.1 Options Assessment for Minimising Final Void

Since mining commenced at SWC in 1996, operations have relied on draglines supported by truck and shovel fleets, for pre-stripping, overburden removal, and coal seam exposure. This methodology has remained in place throughout the mine's life due to its efficiency and cost-effectiveness. However, the use of draglines necessitates long, and continuous strike lengths to maintain suitable pit geometry, which reduces flexibility in the sequencing of pit advancement.

Initial mine planning under the PRCP adopted a linear pit progression strategy. This resulted in voids advancing evenly along the entire strike of the mine, extending to the EA-authorized disturbance limits. This configuration because the baseline scenario and is referred to as Option 1.

3.4.2.1.1 Option 1: Full Strike Length Void

Option 1 proposes the continuous development of voids along the full strike length of the mine, resulting in a total combined void length of approximately 21 km (refer to Figure 3-21).

This configuration provides the highest level of operational flexibility, allowing pit advancement to be optimised based on factors such as strip ratios, geological complexity, coal quality, and water management requirements, including catchment diversion strategies.

However, Option 1 presents a significant limitation in that it does not allow for concurrent backfilling of voids. As all pits progress in a down-dip direction, truck and shovel pre-strip spoil from the advancing face is typically

placed behind the dragline spoil, generally within the same pit (see Figure 3-22). Consequently, there is no spoil available for in-pit backfilling during operations.

Any backfilling under this option would therefore require rehandling of spoil material after mining is complete. This approach is both financially prohibitive and operationally inefficient. Furthermore, the 10% ramps down to the pit floor prevent any backfilling until coal removal is complete. This eliminates the possibility of progressive rehabilitation – an important factor in minimising long-term environmental impact.

Option 1 was presented to DESI on 12 July 2023. Following that engagement, SMR committed to investigating alternative final landform configurations aimed at reducing the size and extent of NUMAs, where feasible from technical, operational, and economic perspectives.

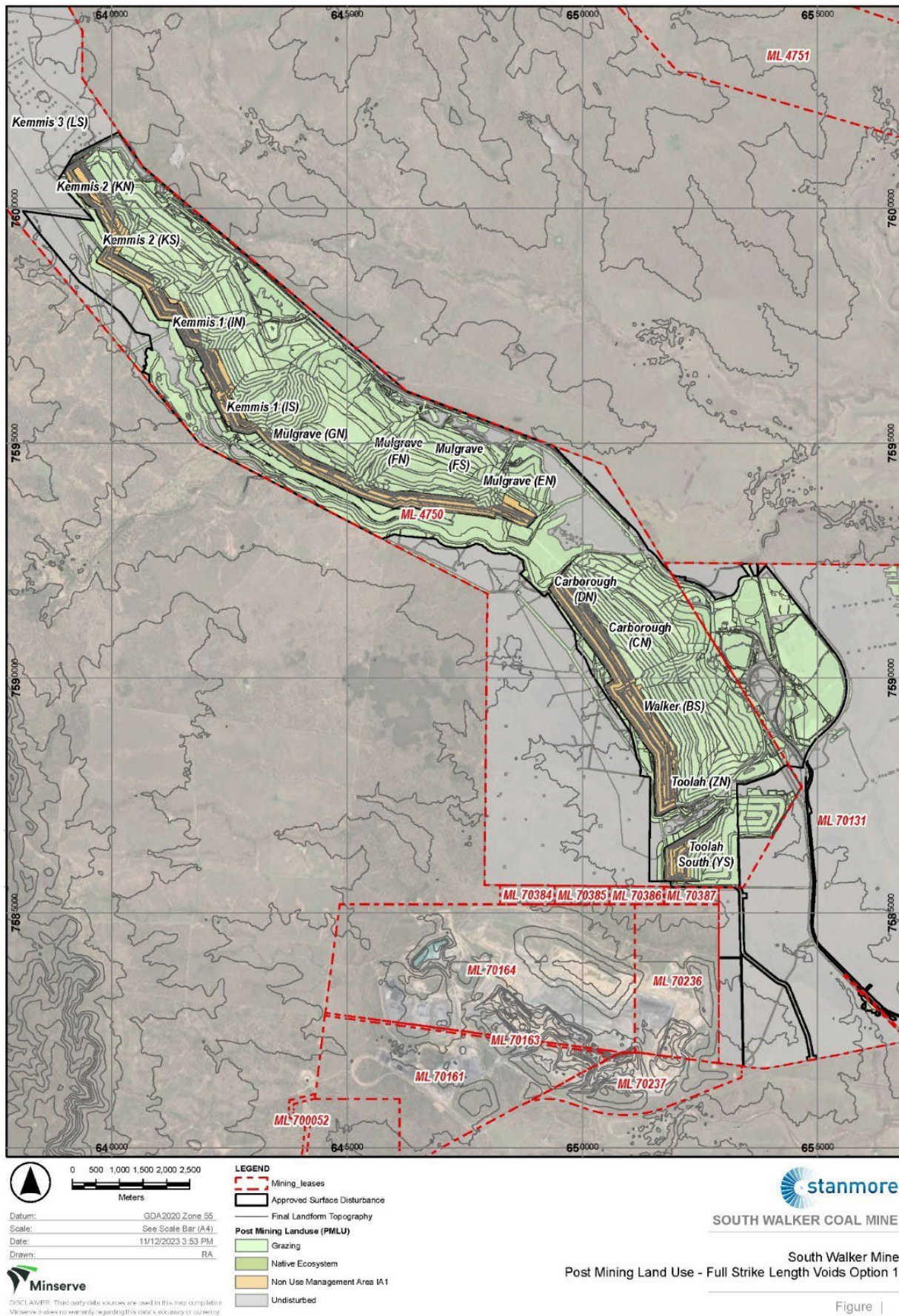


Figure 3-21 Full Strike Length Void (Option 1)

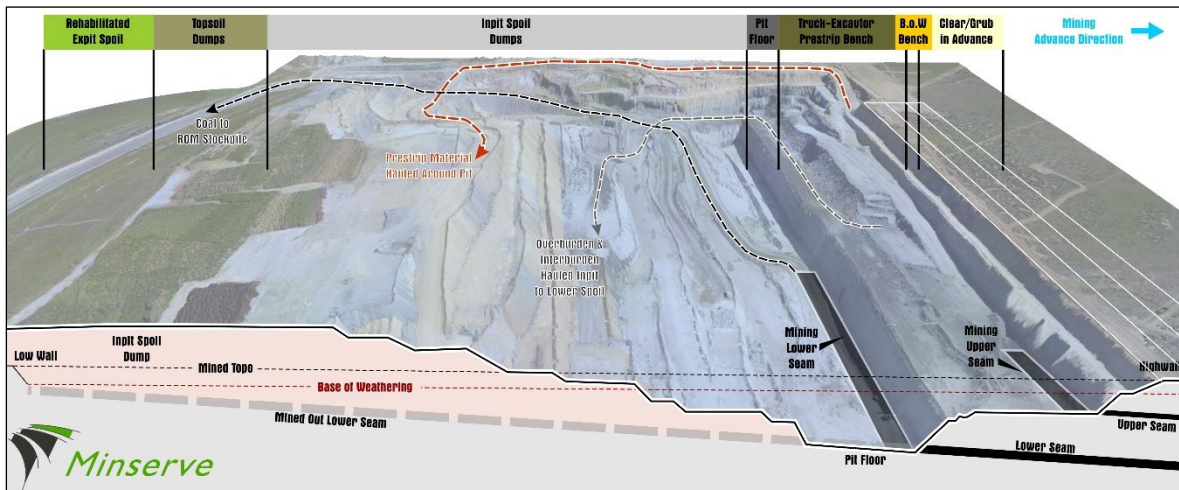


Figure 3-22 Strip Mining Methodology

3.4.2.1.2 Option 2: Partial Void Backfill

In response to concerns regarding the extent of the final voids, SMR investigated partial backfilling scenarios as a means of reducing the size of the NUMAs. A full backfill of voids was deemed unviable due to the significant cost and environmental impacts associated with rehandling hundreds of millions of cubic metres of spoil material, particularly if undertaken post-closure.

Option 2 proposes a staggered advancement of adjacent pits, allowing truck and shovel pre-strip spoil to be directed into completed voids for partial backfilling (see Figure 3-23). This approach eliminates the need for post-mining rehandling and facilitates progressive rehabilitation during operations. Additionally, the resulting backfilled areas – characterised by relatively flat slopes of approximately 1% – may provide opportunities for additional pasture land as part of the proposed PMLU (see Figure 3-24).

A key constraint of Option 2 relates to long-term pit water recovery levels. Even when all available truck and shovel spoil is used to partially backfill the Kemmis 1 void, the spoil surface remains below the predicted long-term water recovery level of RL 172 m (see Figure 3-25). It is noted that the backfill levels in Figure 3-25 were estimated based on available spoil volumes without the benefit of final water balance modelling, however they still highlight the challenge of achieving backfill levels sufficient to avoid water accumulation in voids post-closure.

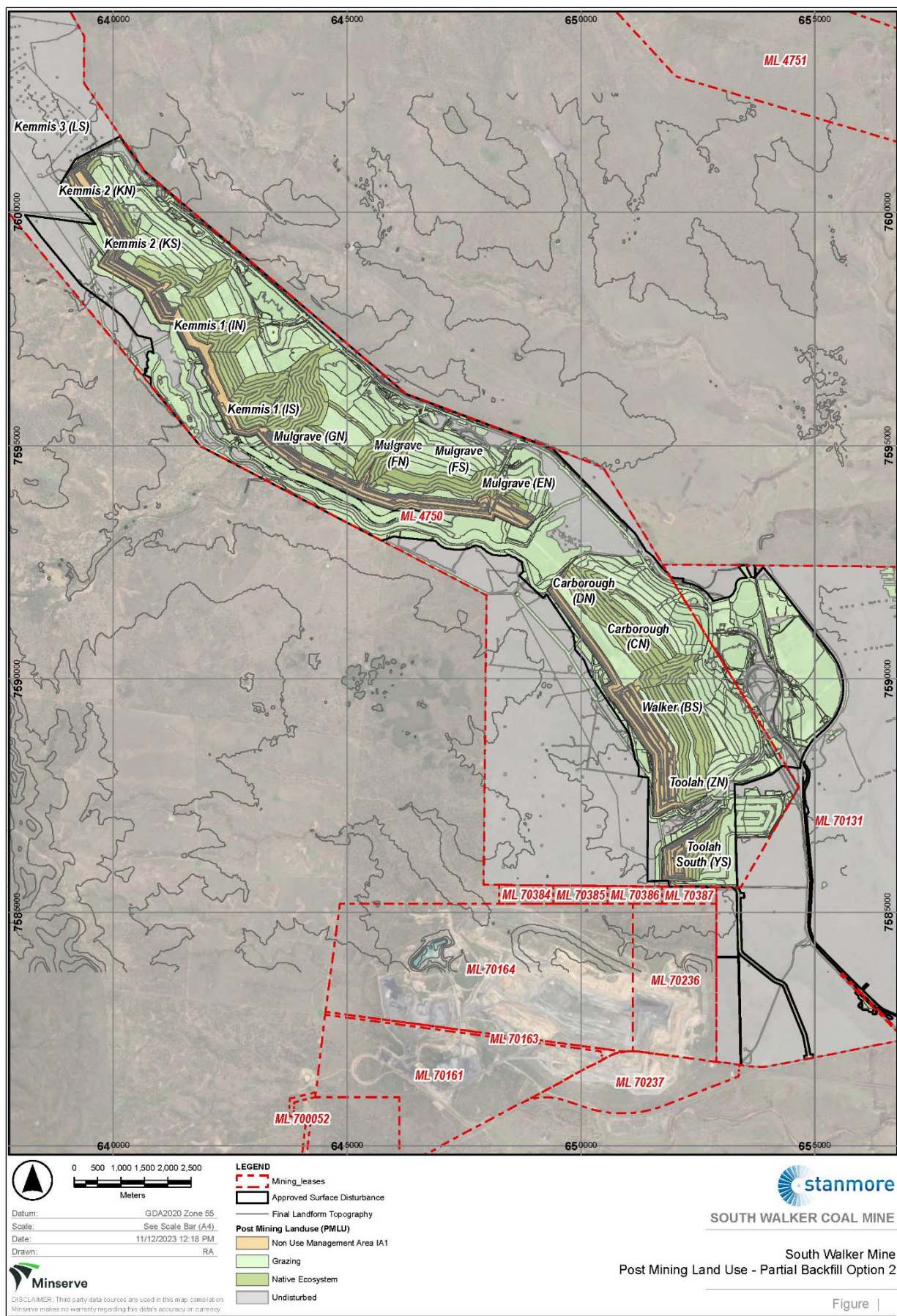


Figure 3-23 Partial Backfill Voids (Option 2)



Figure 3-24 3D Representation of Final Landform and Partial Backfill at Carborough (DN/CN) Pit

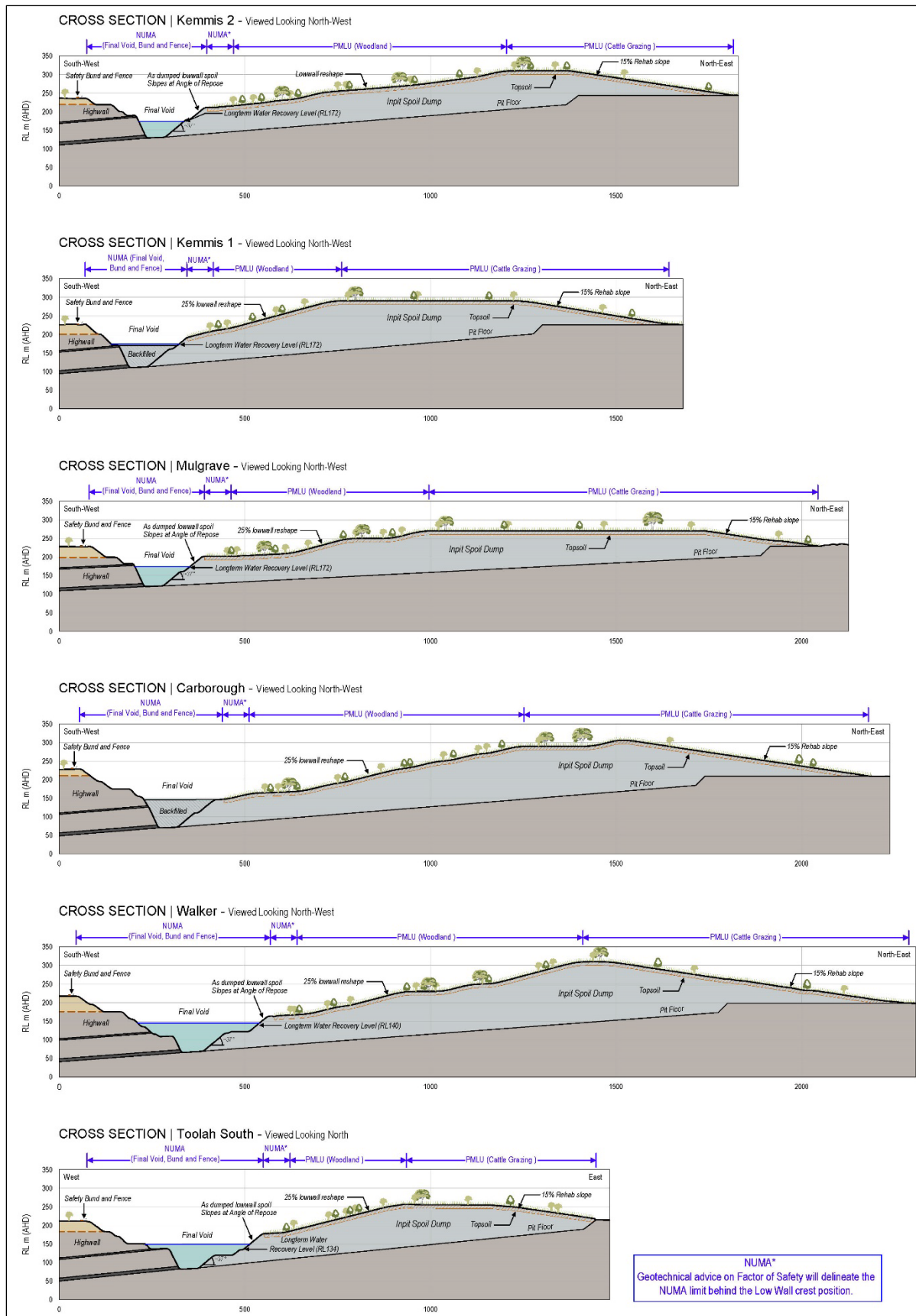


Figure 3-25 Final Void Representative Sections

3.4.2.1.3 Option 3: Biodiversity Corridor

Option 3 builds upon the partial backfill strategy of Option 2 by incorporating a woodland habitat PMLU – RA8 and RA9 – between the Kemmis and Mulgrave voids (see Figure 3-26). Unlike Option 2, there would be no partial backfilling of the Kemmis or Mulgrave voids. Instead, any available truck-and-shovel pre-strip spoil would be used to construct the proposed PMLU.

This PMLU is consistent with the intent of the SWC Rehabilitation Management Plan. It reduces the extent of the NUMAs, avoids the risk of spoil inundation in the Kemmis void observed in Option 2, and also facilitates habitat connectivity by providing a corridor for species movement.

Biodiversity Corridor Design Features

The biodiversity corridor has been carefully designed to ensure landform stability and promote long-term ecological functionality. Key design elements include:

- **Slope Geometries:** Slopes have been designed with appropriate gradients and lengths to ensure geotechnical stability and facilitate safe, sustainable landform development.
- **Erosional Stability:** Groundcover targets have been established to minimise erosion risk and support soil retention across both inward- and outward-facing slopes.
- **Vegetation Types:** Seeding will incorporate a diverse mix of native species suited to local conditions, guided by regional ecosystem benchmarks and recommended sowing rates to promote resilient vegetation communities.
- **Ecological Function:** The corridor is intended to support woodland habitat values, in line with the broader PMLU objectives for the site.
- **Soil Management Practices:** A suitable growth medium will be applied across the corridor, with surface treatments – such as rock placement – used where needed to enhance slope stability and support vegetation establishment. Underlying materials will be selected to ensure geochemical suitability and long-term landform integrity.
- **Water Management:** The corridor layout has been designed to avoid areas at risk of flooding or spoil inundation. Importantly, the biodiversity corridor avoids the risk of spoil inundation in the Kemmis void observed in Option 2.

Construction Timing and Methodology

The corridor is intended to be constructed iteratively during active mining operations, rather than post-closure. The corridor landform will be shaped using standard spoil placement techniques guided by digital terrain models and environmental design criteria.

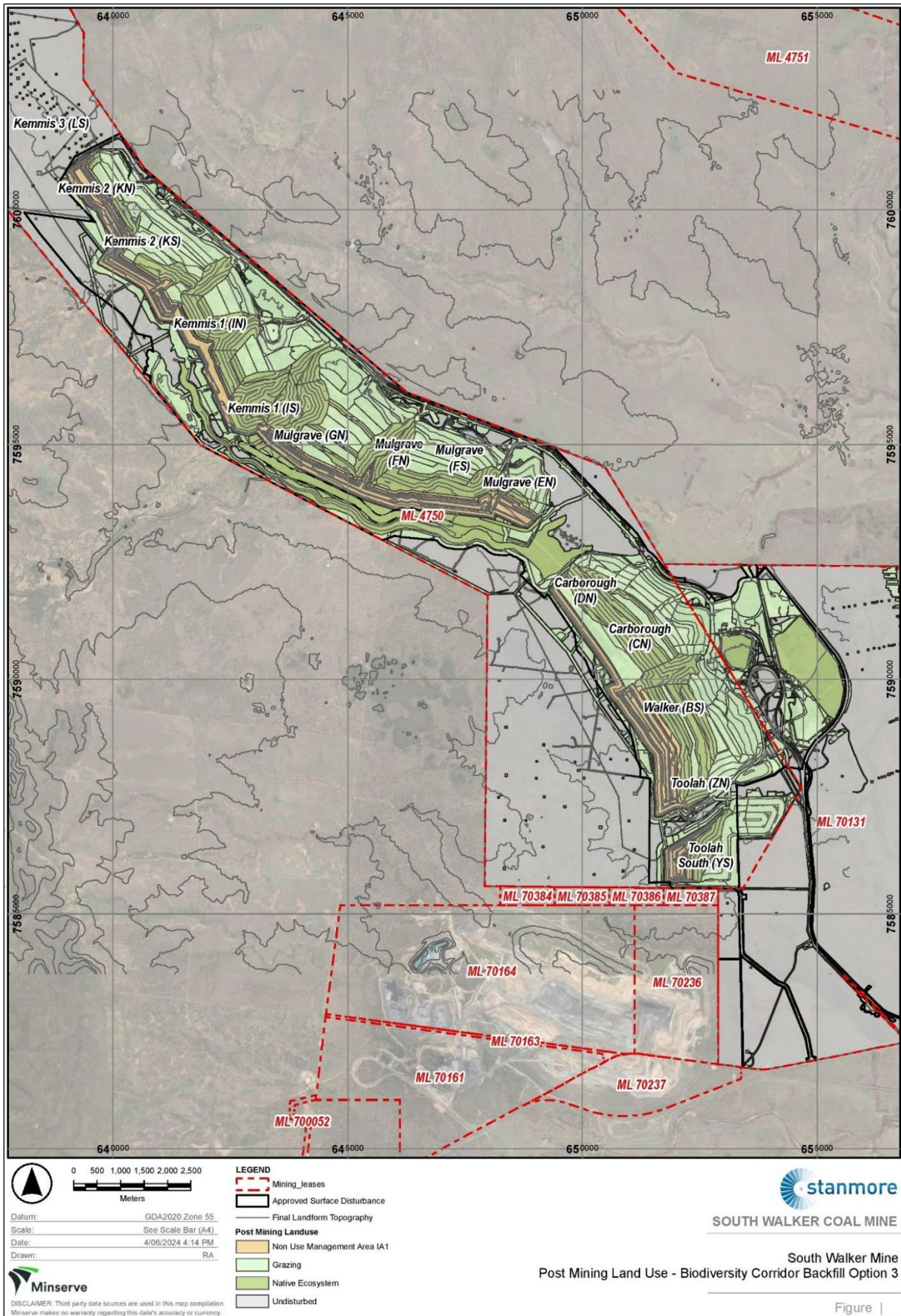


Figure 3-26 Biodiversity Corridor Backfill (Option 3)

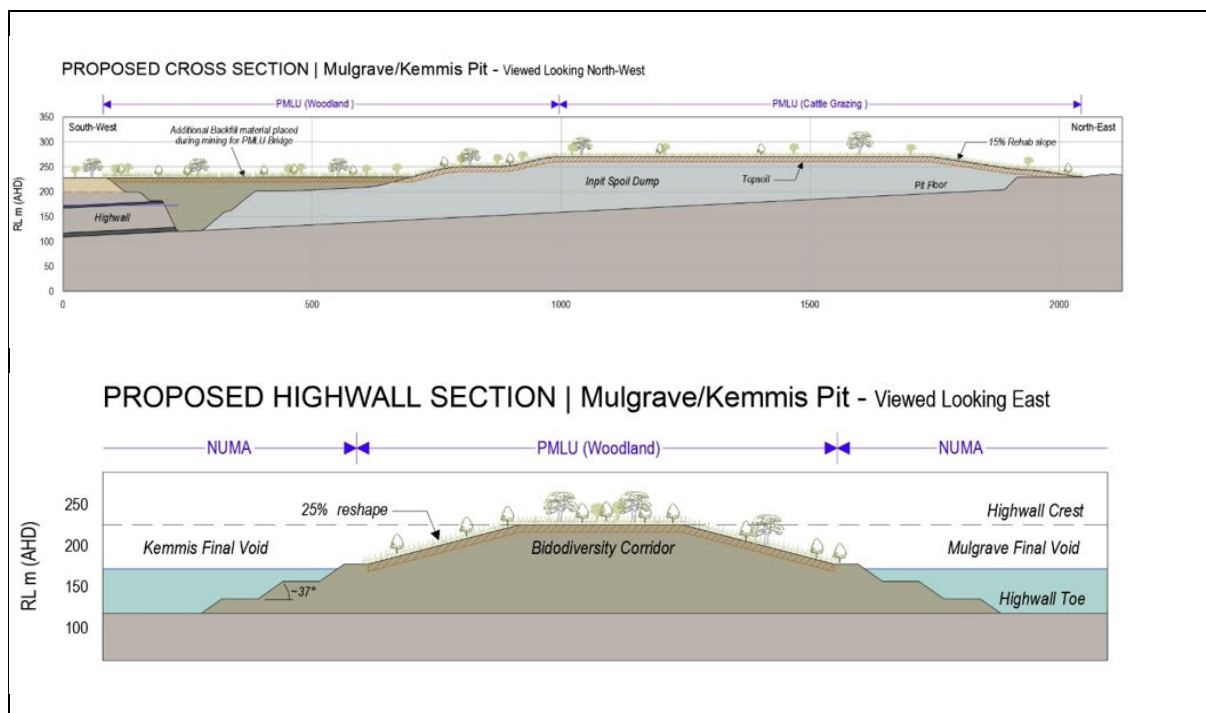


Figure 3-27 Option 3 – Biodiversity Corridor Sections

Option 3 has been adopted as the preferred final landform design for this PRCP, as it best aligns with the objectives of the SWC Rehabilitation Management Plan. This option delivers multiple environmental and operational benefits, including:

- Minimising environmental harm by reducing the overall extent of NUMAs.
- Avoiding the risk of spoil inundation in the Kemmis void observed in Option 2.
- Establishing a dedicated woodland habitat corridor to support species movement and ecological connectivity.
- Enabling progressive rehabilitation during mining operations, without incurring the cost and environmental impacts associated with post-closure spoil rehandling.
- Achieving safe, stable, and non-polluting final void outcomes.

Table 3-32 presents a comparative summary of the outcomes associated with each landform option. While Option 2 yielded a marginal increase of 0.4% in PMLU area relative to Option 1, Option 3 offers a more balanced and sustainable approach. It integrates biodiversity values without introducing environmental risk, and ensures compliance with closure objectives.

Accordingly, Option 3 has been selected to support this PRCP submission and will inform future detailed mine planning activities.

Table 3-32 Options Analysis Outcomes

Category	Full Voids Option 1 (ha)	Area of Total Disturbance (%)	Partial Backfill Option 2 (ha)	Area of Total Disturbance (%)	Biodiversity Corridor Backfill Option 3 (ha)	Area of Total Disturbance (%)
NUMA	972	6.4%	874	5.8%	866 ¹	5.7%
PMLU – Grazing	4456	29.4%	4135	27.3%	3480	22.9%

Category	Full Voids Option 1 (ha)	Area of Total Disturbance (%)	Partial Backfill Option 2 (ha)	Area of Total Disturbance (%)	Biodiversity Corridor Backfill Option 3 (ha)	Area of Total Disturbance (%)
PMLU – Woodland Habitat	850	5.6%	1269	8.4%	1969	11.6%
Undisturbed	8894	58.6%	8894	58.6%	8856	58.4%
Total	15172	100.0%	15172	100.0%	15172	100%

¹It is noted that, since completion of the options assessment, adjustments to safety bund setback distances have resulted in a slight increase to the total NUMA area.

3.4.2.2 Minimising Size and Area

Drawing on the outcomes of the options assessment and associated technical studies, the extent of the NUMAs has been further reduced through targeted redesign of high-wall and end-wall profiles. These design refinements increase the setback distances from EA-authorised disturbance limits and nearby watercourses, thereby enhancing geotechnical stability and reducing the potential for interaction with the floodplain.

The revised NUMA configurations informed updates to several key technical assessments, as mentioned in Section 3.4.2, including:

- Updated void water balance modelling.
- Updated void water quality modelling.
- Updated void geotechnical assessment.
- Updated hydrogeological modelling.
- Rehabilitation flood modelling.

Collectively, these refinements ensure that each NUMA footprint is reduced to the smallest extent reasonably practicable, while maintaining compliance with safety, stability, and environmental requirements.

3.4.2.3 Minimising Environmental Harm

An adaptive and iterative approach has been applied throughout the PRCP technical studies so that the final landform design is safe, stable, and non-polluting. This approach has informed progressive refinements, leading to the following key outcomes:

- **Water level management:** All residual void water levels are predicted to remain below the recovered groundwater levels and well below each voids' spill point.
- **Infiltration capture:** Rainfall infiltration through spoil, tailings, and other disturbed areas is predicted to be contained within the residual voids, minimising the potential for off-tenure groundwater migration.
- **Long-term groundwater sink behaviour:** Due to evaporative losses, residual voids are expected to function as long-term groundwater sinks, maintaining inward hydraulic gradients and containing impacted water within the mine footprint.
- **Internalised minor outflows:** Any minor groundwater discharges are expected to remain within the mining lease, with the modelled hydraulic gradient directing flow toward the central C/W/T residual void.
- **Protection of sensitive receptors:** Predictive hydrographs indicate that potential aquatic GDEs near SWC will not experience significant drawdown post-closure.

- **Floodwater exclusion:** Engineering controls, including designed drainage and landform shaping, will ensure that floodwaters are excluded from entering residual voids.

Each NUMA will be governed by a dedicated Void Closure Plan, with associated management measures (MMs) incorporated into the PRCP Schedule. For example, certification from an Approved Qualified Person (AQP) will be required to confirm that voids do not pose an unacceptable risk to land, surface water, or groundwater resources.

3.4.3 Management Milestones

For each NUMA, MMs must be supported by milestone criteria that:

- Are the most appropriate for achieving the milestone.
- Facilitate achieving subsequent management milestones.
- Have regard to the technical knowledge available when the PRCP objective assessment is being conducted about managing risks of the NUMA to the environment.
- Achieve the prevention of the production and release of contaminants or, if prevention is not possible, minimise the impact of the release of contaminants.

The PRCP Guideline states that management of a NUMA must be done in a way that achieves best practice management of the area and minimises risks to the environment.

The proposed MMs and associated justification are provided in Table 3-33.

Table 3-33 Management Milestones for SWC

Milestone Reference	Management Milestone	Milestone Criteria	Justification for Transition and Proposed NUMA Milestone Criteria
MM1	Achievement of structural stability	a) Confirmation from an AQP that the final void highwalls and end walls (where not backfilled) have achieved an overall slope gradient of: i. 65° in competent (unweathered) material. ii. 45° highwall in less competent (weathered) material. b) Predictive modelling undertaken by an AQP confirms that the final voids will: i. Not be subject to inundation from floodwaters up to and including the 0.1% AEP; ii. Not overtop; iii. Act as groundwater sinks iv. Be geotechnically stable, with the final void walls achieving a minimum factor of safety of 1.25 above the maximum predicted water level.	Outcomes of the Void Closure Plan. Standard design parameters used by Stanmore mine planners.
MM2	Achievement of surface requirements	a) Safety bunds are constructed around the perimeters of the final voids in accordance with the following design specifications: i. Constructed from non-weathered dumped rockfill, where possible; ii. Minimum height of 2 m; iii. Minimum base width of 7 m; and iv. Batters no steeper than 1(V):1.5(H). b) Safety bund set-back distances from pit crests are in accordance with a minimum factor of safety of 1.25. c) Fencing and warning signage is in place around the perimeters of the safety bunds to limit human and livestock access.	Considered best practice to adequately prevent human and livestock access to voids. Standard design parameters used by Stanmore mine planners. Outcomes of the Void Closure Plan. Considered best practice to warn humans of potential risks.

Milestone Reference	Management Milestone	Milestone Criteria	Justification for Transition and Proposed NUMA Milestone Criteria
MM3	Achievement of sufficient improvement	a) Confirmation from an AQP that: i. The final voids are safe to humans and livestock; ii. The final voids geotechnically stable; iii. Erosion within the NUMA boundary will not result in instability outside the NUMA boundary; iv. The water level and quality within the final voids will not cause environmental harm to receiving surface waters or groundwaters, as demonstrated by surface water and groundwater modelling and monitoring.	PRCP Spatial Data Outcomes of Void Closure Plan.

3.4.3.1 Management Milestone Timeframes

Given the dynamic nature of life of mine planning there is inherent uncertainty when planning for the achievement of management milestones. Timeframes associated with the milestones for the IA were developed by considering the requirements of each management milestone as outlined in previous sections and the associated risks identified through the risk assessment. The nominated timeframes and respective justifications are detailed in Table 3-34. These timeframes have been used to develop the milestone schedule in the PRCP Schedule.

Table 3-34 Timeframe Justification for Management Milestones for IA1

Management Milestone	Nominated Timeframe	Justification
MM1 – Achievement of structural stability	5	To validate that stable batters are achieved, geotechnical investigations may be required, and modelling undertaken to quantify stability. Sufficient time has been accounted for these activities, which factor in the availability of geotechnical drill rigs. Considering that this milestone requires validation that the void is performing as per the design intent, five years is considered a sufficient time to complete this milestone.
MM2 - Achievement of surface requirements	5	Considering the large spatial extent of the voids, designing, and constructing the required bunds and fencing, five years is considered a sufficient time to complete this milestone.
MM3 - Achievement of sufficient improvement	5	Sufficient time must be factored into this milestone timeframe to allow for detailed analysis of data by an AQP to certify that the residual voids won't cause harm to the environment, humans, and livestock. A five-year timeframe is considered sufficient to facilitate meaningful trend analysis.

3.4.4 Community Consultation

The final land use encompassing NUMAs is consistent with the outcomes of community consultation as outlined in Section 3.2.

3.4.5 Regional Planning Integration

The extent to which the NUMAs are consistent with Local, State and National strategies and plans is outlined in Table 3-35 below.

Table 3-35 Consistency of the NUMA with Local, State, and Commonwealth Strategies and Plans

Strategy or Plan	Purpose	NUMA Consistency
Local/ Regional		
Isaac Regional Planning Scheme 2021 (Isaac Regional Council, 2021)	The Isaac Regional Council planning scheme has been prepared in accordance with the Planning Act 2016 as a framework for managing developing in a way that advances the purpose of the Act.	The region has a long history of mining and the Town Plan and urban areas of the Isaac region act as a gateway for supporting major mining activities. Final voids are a common occurrence with open cut mining activities. As such the existing of a final void (i.e., NUMA) is not inconsistent with the planning scheme
Mackay, Isaac and Whitsunday Regional Plan	The Mackay, Isaac and Whitsunday Regional Plan establishes a vision and direction for the regional to 2031. It provides certainty about where the region	Mineral and extractive resource industries are significant components of the region's economy, in particular, coal and coal seam gas, as detailed in the desired regional

Strategy or Plan	Purpose	NUMA Consistency
	is heading and provides a framework to respond to challenges and opportunities that may arise.	outcomes in the regional plan. Final voids are a common occurrence with open cut mining activities. As such the existing of a final void (i.e., NUMA) is not inconsistent with the regional plan.
State		
State Planning Policy (SPP) (Department of Infrastructure, Local Government and Planning, 2017)	The SPP expresses the states interests in land use planning and development. A state interest is defined under the Planning Act as an interest that the Planning Minister considers affects an economic or environmental interest of the state or a part of the state, or affects the interest of ensuring that the purpose of the Act is achieved. Under the Planning Act, local governments must integrate relevant state interests into the planning scheme for their local government area.	The inclusion of the final void (i.e., NUMA) does not compromise the SPP overlays that apply to SWC: • Bushfire hazard, • Natural environment, • Regional infrastructure.
A Strategic Blueprint for Queensland's Northwest Minerals Province (The Strategic blueprint) (Queensland Government, 2017)	A strategic Blueprint for Queensland's Northwest Minerals Province contains a suite of actions to secure the long-term future of Northwest Queensland. It will facilitate a strong and prosperous future by building on existing economic and community strengths in collaboration with industry, business, and community leaders.	The Strategic Blueprint acknowledges that mining industry has been the primary driver for regional employment and economic growth in the province. The Strategic Blueprint also notes that a Northwest Minerals Province Taskforce has been established to identify issues affecting the Province's mining industry and to help plan a strategic way forward. The Queensland Government has also committed, through the blueprint, to facilitating a smooth economic and social transition towards a strong and more diversified economy, building on existing economic and community strengths, includes mining. A final void is typical for open cut mining operations and therefore a NUMA is not inconsistent with the Strategic Blueprint.
Mackay-Whitsunday Regional Action Plan	As part of the Queensland Budget for 2021 – 2022 a regional action plan for the Mackay Whitsunday area was established. The regional plan outlines how the Queensland Budget will directly support Mackay-Whitsunday.	A new \$7 million Resources Centre of Excellence to be built in Mackay. The centre is a one of the kind in Queensland. The Region remains one of the world's best sources of mining expertise and innovation in the mining equipment, technology, and services (METs) sector. The centre features a simulated underground coal mine. A final void is typical for open cut mining operations and therefore a NUMA is not inconsistent with the Mackay-Whitsunday Regional Action Plan.
Commonwealth		

Strategy or Plan	Purpose	NUMA Consistency
Our North, Our Future: White Paper on Developing Northern Australia (The White Paper) (Australian Government, 2015)	The White Paper sets out how the Commonwealth Government will address challenges to development in northern Australia by: • Making it easier to use natural assets, in close consultation with, and the support of indigenous communities. • Providing a more welcoming investment environment. • Investing in infrastructure to lower business and household costs. • Reducing barriers to employing people. • Improving governance.	The White Paper identified the Australian Government's aspirations for resources as a diverse portfolio of mining across the north including existing large-scale resources such as iron ore, base metals and gold, and new mines for strategic minerals such as rare earths. A final void is typical for open cut mining operations and therefore a NUMA is not inconsistent with the White Paper aspirations.

3.5 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 PRC Plan must include how the proposed location of the void minimises risks to the environment. Therefore, the flood plain modelling is required to support the assessment of the proposed location of the void.

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

There are seven mining pits at SWC which have been consolidated as part of SWC's mine closure landform into four residual voids, as follows:

- Kemmis 2N (KN/KS/IN/IS)
- Mulgrave EN (GN/FN/FS/EN)
- Carborough/Walker/Toolah (C/W/T)
- Toolah South (YS)

A dedicated voids in floodplain report was undertaken to inform this PRC Plan (Appendix 5), however Section 3.6.1.2 should be referred to for the assessment on flooding interactions with the final landform.

3.5.1 Background

SWC is proposing to transition NUMAs as part of this PRCP and its landform. Therefore, a voids in flood plain assessment has been completed by Engeny (Appendix 5) addressing the EP Act, EP Regulation and specifically Section 3.4 of the PRCP Guideline and the DES Information Sheet – Voids in Floods Plains (DES, 2020). The assessment was undertaken in accordance with the requirements of the Australian Rainfall and Runoff (ARR2019) Guidelines and was accomplished by appropriately qualified persons.

3.5.2 Watercourses

As outlined within DES (2020) for the purpose of a Voids in Flood Plain assessment, a 'Relevant watercourse' is defined as:

- A watercourse classified as stream order 4 or higher under the Strahler stream order classification system.
- 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.

The below watercourses are located within the vicinity of SWC mine, have a Strahler stream order of four or greater and were considered relevant in the SWC voids in flood plain assessment (Figure 3-8).

- Walker Creek
- Carborough Creek

Various reaches of Walker Creek have been historically permanently diverted to accommodate SWC mine operations (MRA2A and Walker Pit). The approved diversion reaches are relevant to the voids in flood plain assessment and are therefore their diverted alignments have been incorporated into the relevant watercourse for Walker Creek. The relevant approval of the SWC diversions is discussed within Section 3.6.1.7.

3.5.3 Data and Limitations

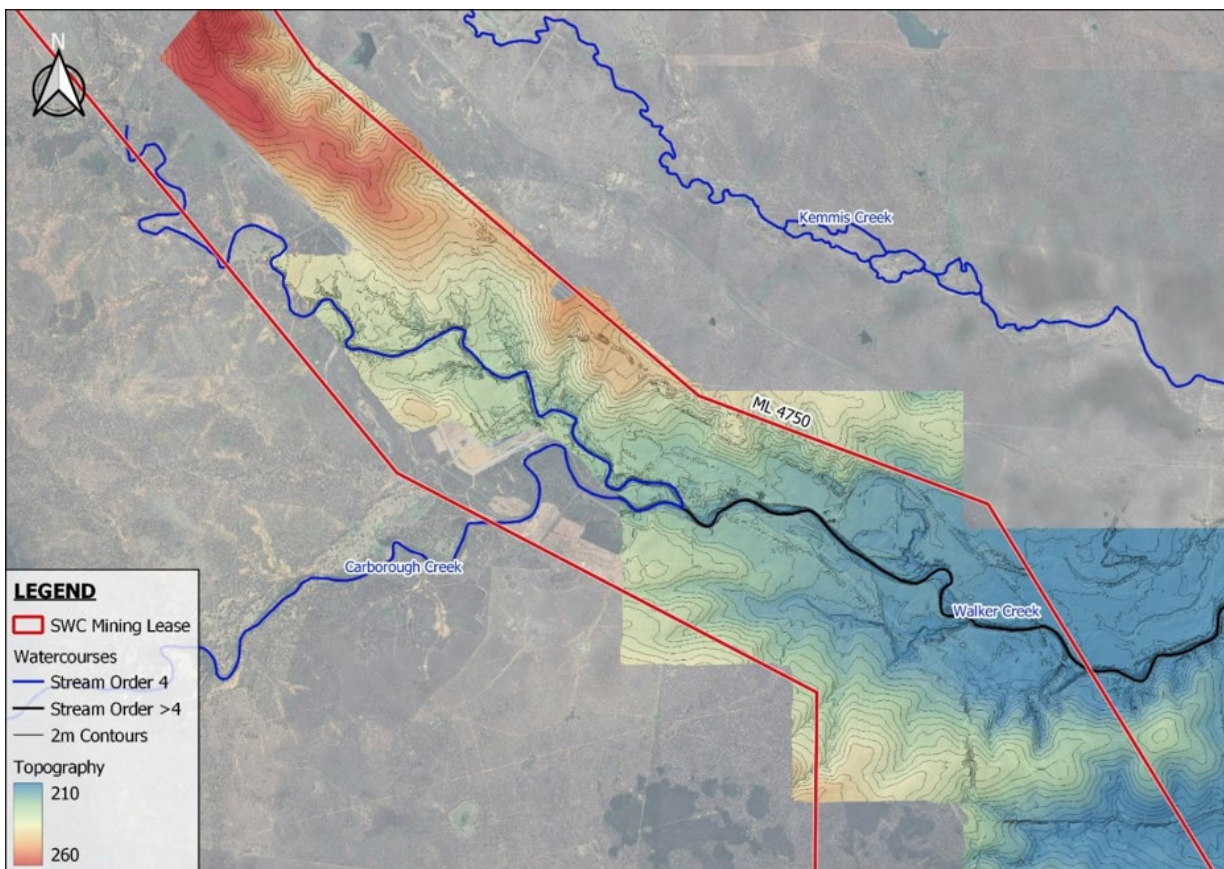
In accordance with the DES Information Sheet – Voids in Floods Plains, the voids in floodplain modelling have excluded artificial features within the SWC tenure boundary (i.e., such that the topography is representative of pre-mining conditions and does not include mining operational landform). However, as described above, Walker Creek has been diverted under water licenses to facilitate mining. These diversions are considered to be permanent and have therefore been integrated with the pre-mining topography.

The available pre-mining topographic information is generally poor in quality and coverage, which is to be expected for the period when mining commenced. The topographical surface used in the assessment has been artificially generated using multiple LiDAR datasets and assumptions applied to generate the best estimate of topography prior to mining, without artificial features. Topography for areas outside disturbed areas, but still relevant for inclusion in the hydraulic modelling have been taken from PRCP final landform topography data as first preference then Shuttle Radar Topographic Mission (SRTM) LiDAR for the remaining external catchment. Figure 3-28 (top) show the pre-mine topography developed for the voids in floodplain assessment. Some limitations exist in the quality of the topography used in the assessment due to the combination of these data sources.

Diversions were then spliced into the pre-mining topography from the PRCP final landform surface. Figure 3-28 (bottom) shows the topography developed for the voids in floodplain assessment with the permanent diversions integrated. The integration of the diversion alignments caused the catchment configuration to change from the pre-mining conditions. A total catchment area of 24km² would no longer contribute directly to the Walker Creek watercourse without manual manipulation. To account for this limitation, four sensitivity cases were proposed to analyse the impact of this additional catchment and where it is applied, which are as follows:

- SENS1: The 24km² area catchment which Walker Creek is now diverted around, will have its inflows applied as per the existing topography.
- SENS2: The 24km² area catchment which Walker Creek is now diverted around, will have its inflows translated to the Walker Creek diversion, therefore conservatively representing the flow through the diversion.
- SENS3: The 24km² area catchment which Walker Creek is now diverted around, will have its combined flow applied directly at the confluence of the existing and diverted Walker Creek watercourses.
- SENS4: The SENS2 case, but with a 20% increase in all inflows applied. This has been included to simulate the potential for increases in peak flows due to a variety of reasons including, base flow (i.e., influence of groundwater, although not considered likely) or climate change.

The placement of inflow locations is presented in Appendix 5 to further inform how the sensitivity scenarios were developed.



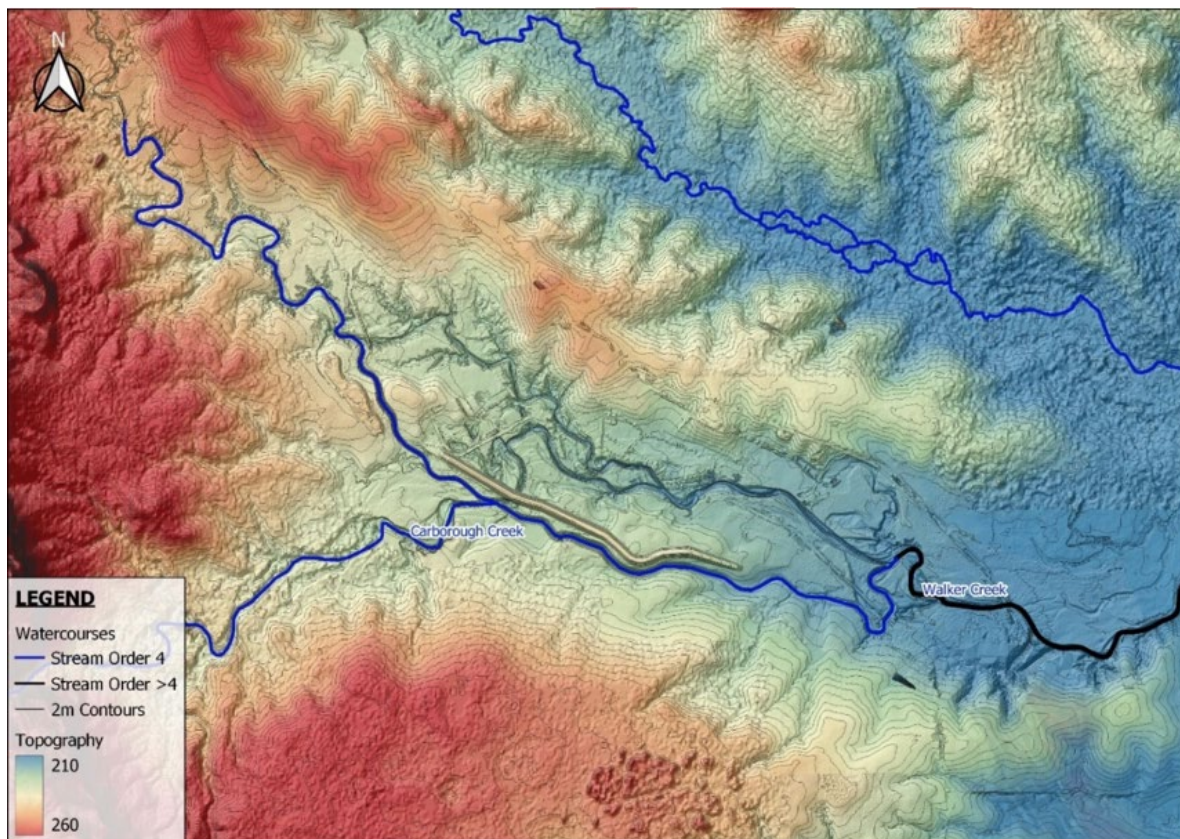


Figure 3-28 Pre-Mine Topography (top) and Adopted Topography Integrating Permanent Diversions (bottom)

3.5.4 Artificial Features

Existing and proposed artificial features within the model domain were identified based on the available information at the time of the assessment. A summary of the identified artificial features and relevant details are provided in Table 3-36. Consideration was made for each artificial feature to determine if the feature was necessary to include in the hydrologic and hydraulic models, based on the feature's location and respective influence on 0.1% AEP flooding conditions in the vicinity of the voids.

Table 3-36 Artificial Features within SWC

Artificial Feature/ Description	Source	Hydraulic Model Inclusion Status
On-Tenure		
Mine Pits	PRCP landform DEM (SWC)	All on lease artificial features not included in model as per EP Regulation requirements.
Spoil Dumps	PRCP landform DEM (SWC)	
Mine Infrastructure	PRCP landform DEM (SWC)	
Diversions	PRCP landform DEM (SWC)	Considered permanent integrated with the pre-mining topography.
Off-Tenure		
Peak Downs Highway	Department of Resources	Not included – no effect on 0.1% AEP flood levels in the vicinity of SWC.

3.5.5 Hydrological Model

A runoff routing hydrological model was developed using the Watershed Bounded Network Model (WBNM). Total catchment for the SWC model was 1985km². WBNM hydrological inputs were gathered in accordance with the ARR2019 Guidelines. The 0.1% AEP (1000yr) design rainfall depths were sourced using the Australian Rainfall and Runoff 2019 IFD generation tool available on the Bureau of Meteorology (BoM) website (www.bom.gov.au), at Latitude 21.7237, Longitude 148.4367. Areal Reduction Factors (ARF) have been applied for the design event, and pre-burst depths have been applied for the 0.1% AEP event. Further detail on input data and assumptions can be found in Appendix 5.

Due to the lack of nearby gauging stations with suitable data, calibration of peak flows was not performed however, the 0.1% AEP peak flow for the SWC model was validated using a scaled Flood Frequency Analysis (sFFA). The FFA provides peak flow estimates for different AEPs by developing a fitted distribution from recorded peak flows from historical flood events. The sFFA assessment was undertaken using the Connors River Pink Lagoon Gauge (13040A), available through the Water Monitoring Information Portal (WMIP), the closest gauge downstream of the site. Gauge 13040A has been in operation since 11/12/1965. The validation confirmed the WBNM Peak flows to be reasonably close to the Scaled FFA Peak Flow Estimate analysis.

For the purposes of identifying the critical hydrologic events (AEP, Duration and Temporal Pattern) for simulation in the hydraulic model as part of the study, the catchment closest to the mine lease boundary (C_29) along Walker Creek has been selected for study. The peak flow, critical duration, and temporal pattern for this catchment for the 0.1% AEP event are outlined in Appendix 5.

3.5.6 Hydraulic Model

A two-dimensional hydraulic model was developed using TUFLOW for the purpose of assessing the 0.1% AEP flood plain. The model boundary and inflow locations are shown in Figure 3-29. Hydraulic model inputs and assumptions can be found in Appendix 5.

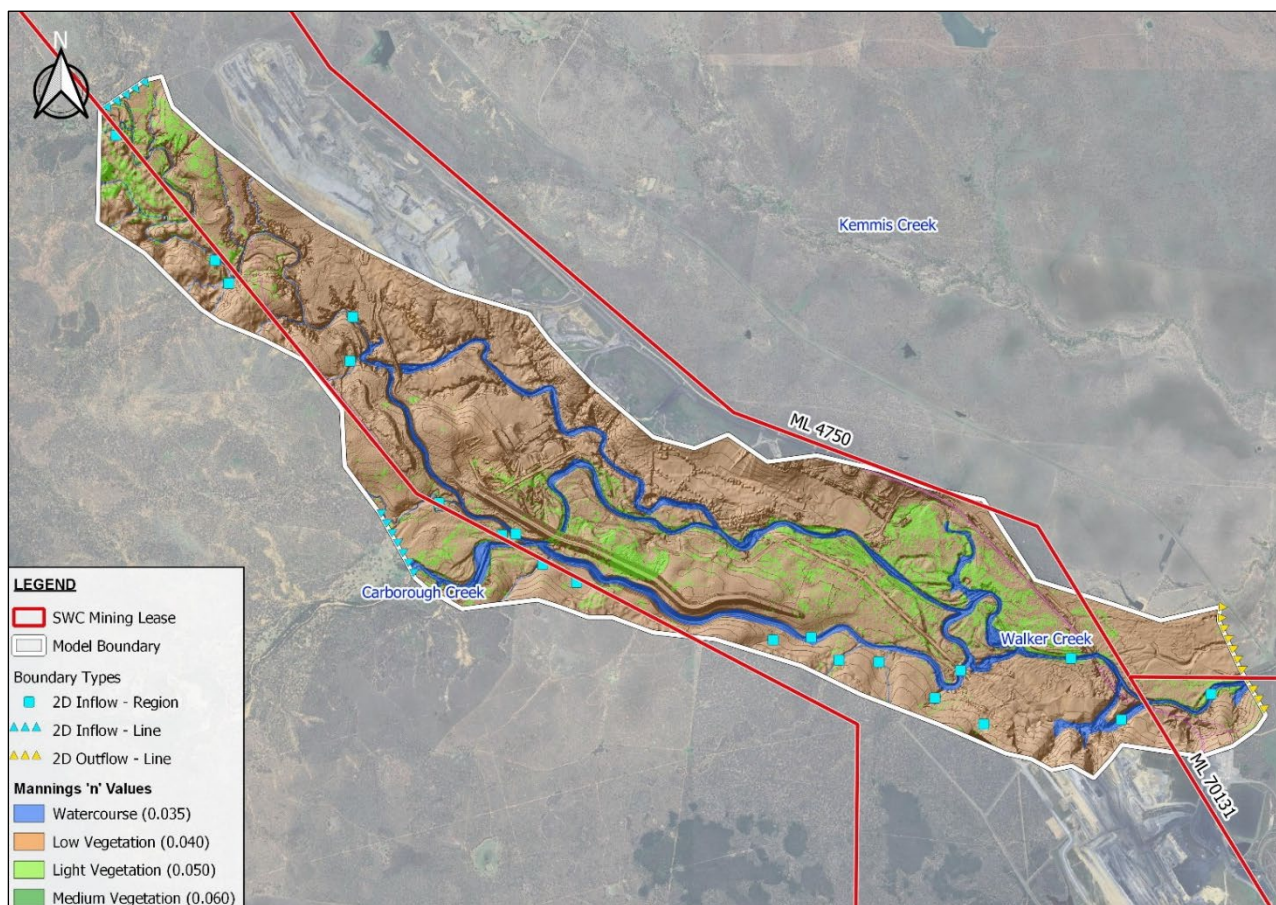


Figure 3-29 TUFLOW Model Build and Boundaries

3.5.7 Results

The flood extent and depth results for each of the four simulated flood scenarios has been summarised below:

- SENS1 results in flooding along the entirety of the original Walker Creek alignment and intersects at several locations with the SWC residual voids. Both SENS2 and SENS3, which do not directly apply flows along the original alignment predict back flow up the pre-mine Walker Creek alignment, resulting in intersections with the residual voids at several locations.
- Flooding shown within the Kemmis, Mulgrave and Carborough voids.
- SENS2 results show the deepest potential flood levels along the diverted reaches of Walker Creek upstream of the confluence with the pre-mine Walker Creek alignment that meandered through site.
- Flooding shown within the Mulgrave and Carborough voids.
- SENS3 scenario resulted in the deepest flooding results at the downstream confluence location (at the tail end of MRA2C and confluence with Walker Creek).
- Flooding shown within the Mulgrave and Carborough voids.
- SENS4 scenario resulted in a minimal increase in flood extent both along the diverted Walker Creek reaches and at the downstream confluence point with the pre-mine Walker Creek watercourse alignment. This suggests the increase to flow creates minimal change to the flooding extent.
- Flooding shown within the Mulgrave and Carborough voids.

The C/W/T and Toolah South continuation pits do not encroach on the modelled floodplain of Walker Creek.

Figure 3-30 provides the SENS2 flood depth and extent results. SENS2 results are considered the most representative scenario for the voids in floodplain assessment regarding the integration of the pre-mining flood extent with the diversion alignments and catchment inflows.

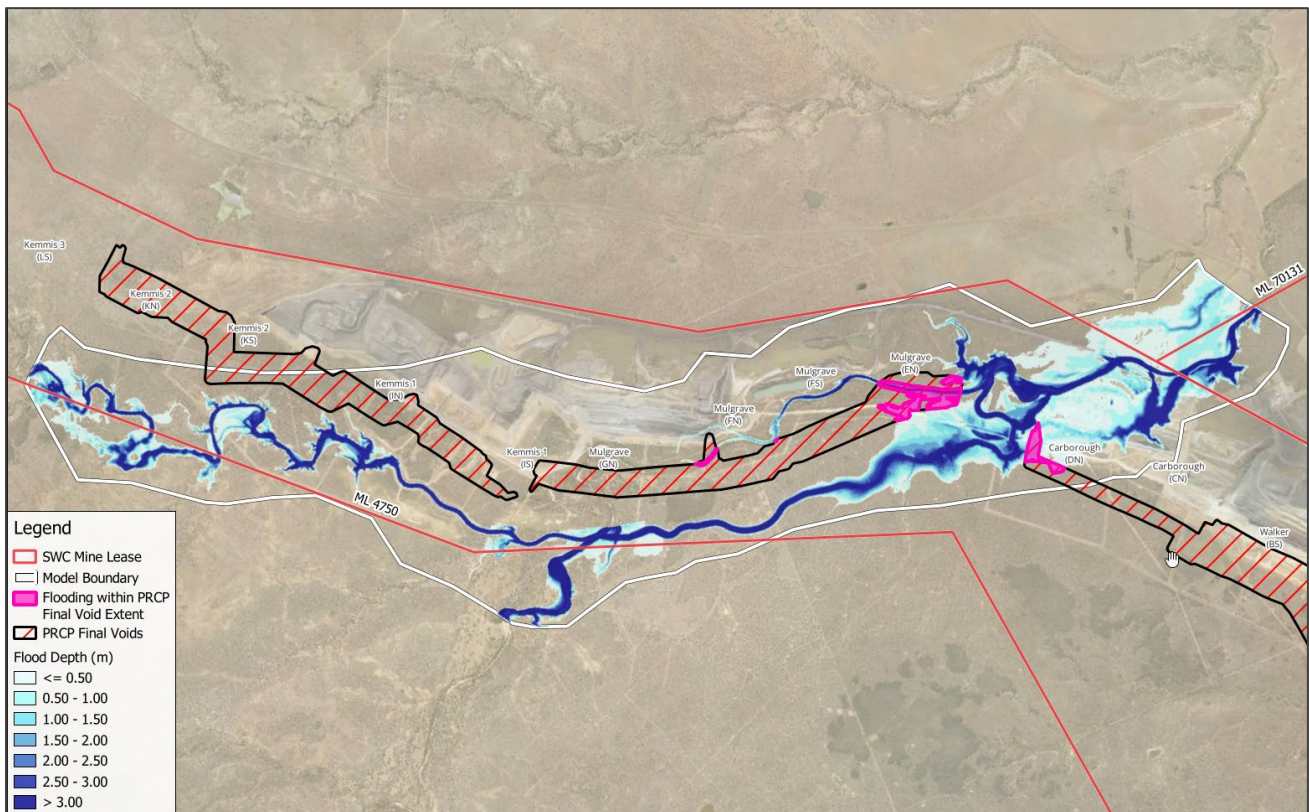


Figure 3-30 SENS2 - SWC Peak Flood Inundation Extent and Depths - 0.1% AEP

3.5.8 Minimising Environmental Impacts

The voids in flood plain modelling have simulated some overlap between residual voids and the 0.1% AEP floodplain extent, however this extent is minimal, the majority of residual voids remain outside the 0.1% AEP floodplain extent. In addition, as described in Section 3.2 the SWC NUMAs have pre-approval under Schedule E (Condition E6 and E7) of the EA and are inclusive of the low wall, high wall, and end walls. The NUMA size and extent has also been iteratively minimised through hydraulic, geotechnical, and hydrogeological modelling (Section 3.6.1.1).

3.6 Rehabilitation and Management Methodology

Legislative Requirement

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

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

PRCP Guideline (Section 3.6)

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

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

3.6.1 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.

3.6.1.1 Hydrogeology

PRCP Guideline (Section 3.6.1)

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

A hydrogeological assessment has been undertaken to support the development of this PRC Plan. The detailed report – Post-Closure Hydrogeological Assessment: South Walker Creek Mine is provided in Appendix 3. This report represented the post-closure hydrogeological assessment for SWC and is an initial deliverable for the technical studies for void closure; it's content was then used to inform the development of the void closure plan for SWC. The objectives of the Post-Closure Hydrogeological Assessment are outlined below:

The objective of this hydrogeological assessment are as follows:

- Assess the hydrogeology of the site and all connected strata

- Develop a conceptual model of the mine site's groundwater systems at the end of mining and post-closure
- Determine the groundwater occurrence including the existence of, and depth to, aquifers and aquitards
- Identify groundwater recharge and discharge locations locally and regionally
- Present groundwater quality within each of the aquifers and from surface expressions (if relevant)
- Identify current and potential future uses of groundwater including existing groundwater extraction bores
- Identify groundwater flow direction and velocity
- Undertake groundwater modelling to determine potential changes to long-term groundwater levels post-closure
- Undertake groundwater modelling to determine potential for contaminant transport post-closure.

To achieve the above objectives, the following scope of work was completed:

- Review of available data, the existing geological model and the existing hydrogeological conceptual model to understand the hydrogeological regime and potential human and environmental receptors.
- Review of the current (operational) numerical groundwater model design, methodology, assumptions, data inputs, parameters and boundary conditions to assess adequacy in modelling post-closure hydrogeological conditions.
- Update the current (operational) numerical groundwater model based on the closure scenario. The update will include changes to the following where applicable:
 - Boundary conditions
 - Approach used in boundary application
 - Representation of the voids to reflect the post-closure landform and improve the simulation of residual void behaviour post-closure.
 - Complete predictive groundwater modelling for the closure scenario using inputs from the post-closure void water balance model.
 - Complete particle tracking to understand potential for contaminant migration to and from the residual voids and other potential contaminant sources.
 - Incorporate climate scenarios as identified in the water balance model.
 - Include limited sensitivity analysis of individual numerical model parameters.

3.6.1.1.1 *Hydrostratigraphy*

The key hydrogeological units present within and immediately surrounding SWC are summarised and detailed in Table 3-37. Conceptual geological cross-sections showing key stratigraphic units at SWC are shown in Figure 3-31.

Table 3-37 Hydrostratigraphic Units at SWC

Age	Stratigraphy	Lithology	Hydrostratigraphy	HSU Delegation	Occurrence and Characteristics
Quaternary	Alluvium	Unconsolidated sand, gravel, and clay	Unconfined local aquifer	HSU1	Associated with present-day drainage associated with Bee Creek, Walker Creek, Kemmis Creek, and the unnamed tributary of Bee Creek as well as paleochannels. Laterally discontinuous. The Quaternary and Tertiary-age sediments in the vicinity of SWC form highly localised water-bearing zones or occasionally local aquifers. In these instances where there is a higher degree of more permeable, interconnected, coarse-grained material, saturation is maintained year-round. Saturated thicknesses of the alluvium across SWC are generally between 5 and 10 m (CDM Smith, 2016). At the mine-scale, it has been observed that water supplies targeting the alluvium have generally proven unreliable owing to their fragmented distribution. (Douglas Partners, 2014b), variability in permeability and temporal variability in recharge from ephemeral creeks.
Quaternary – Tertiary	Regolith	Unconsolidated sand, gravel, and clay, fractured and weathered bedrock.	Unconfined local aquifer	HSU2	Fractured and weathered rock associated with the Rewan Formation and RCM. associated with the Rewan Formation and RCM. Secondary weathering and secondary porosity features have been developed post-deposition resulting in higher permeabilities than the lower primary porosity bedrock. Drilling and hydraulic testing suggests the water table and a zone of enhanced hydraulic conductivity generally occur within the top 40 m of exposed bedrock (CDM Smith, 2016). Drilling activity throughout the mine footprint has shown that the regolith is often unsaturated, with groundwater likely to be present in discontinuous, isolated, and localised zones including perched water tables.

Age	Stratigraphy	Lithology	Hydrostratigraphy	HSU Delegation	Occurrence and Characteristics
Triassic	Rewan Formation	Mudstone, siltstone, and sandstone	Aquitard	HSU3	The Rewan Formation is expected to act as a tight aquitard and confine groundwater in the underlying coal seams. The RCM overburden is expected to exhibit vertical resistance to groundwater flow because of the combined thicknesses of the finer-grained mudstone and siltstone beds.
Permian	RCM – Overburden				
	RCM – Coal Seams			HSU4	Along the western side of the SWC mine the coal seams are expected to act as stagnant flow zones with very low intrinsic permeability. Hydraulic conductivity is expected to decrease significantly with depth. At depth within the coal measures and towards the axis of the syncline, groundwater flow is mostly associated with fractures and cleats, with the adjoining sandstone and siltstone interbeds forming confining units. At shallow depths, the coal seams are relatively permeable and groundwater flow is mostly associated with fractures and cleats. As observed throughout the Surat and Bowen Basins (OGIA, 2019), the permeability of the coal seams decreases with depth as fractures and cleats are compressed by lithostatic pressure. The adjoining sandstone and siltstone interbeds throughout SWC typically represent leaky aquitards and confine groundwater within the coal seams away from outcrop areas.
	FCCM – Coal Measures				
	RCM – Interburden and Under Burden	Mudstone, siltstone, and sandstone	Aquitard	HSU5	Locally variable, acting as a leaky aquitard (where sandstone is present and permeable) or a tight aquitard (where siltstone and mudstone dominate, or the unit becomes deeper to the west). Interburden may locally limit hydraulic connectivity between the Main Top and Main Bottom seams of the RCM. Under burden considered to form a regionally significant aquitard.

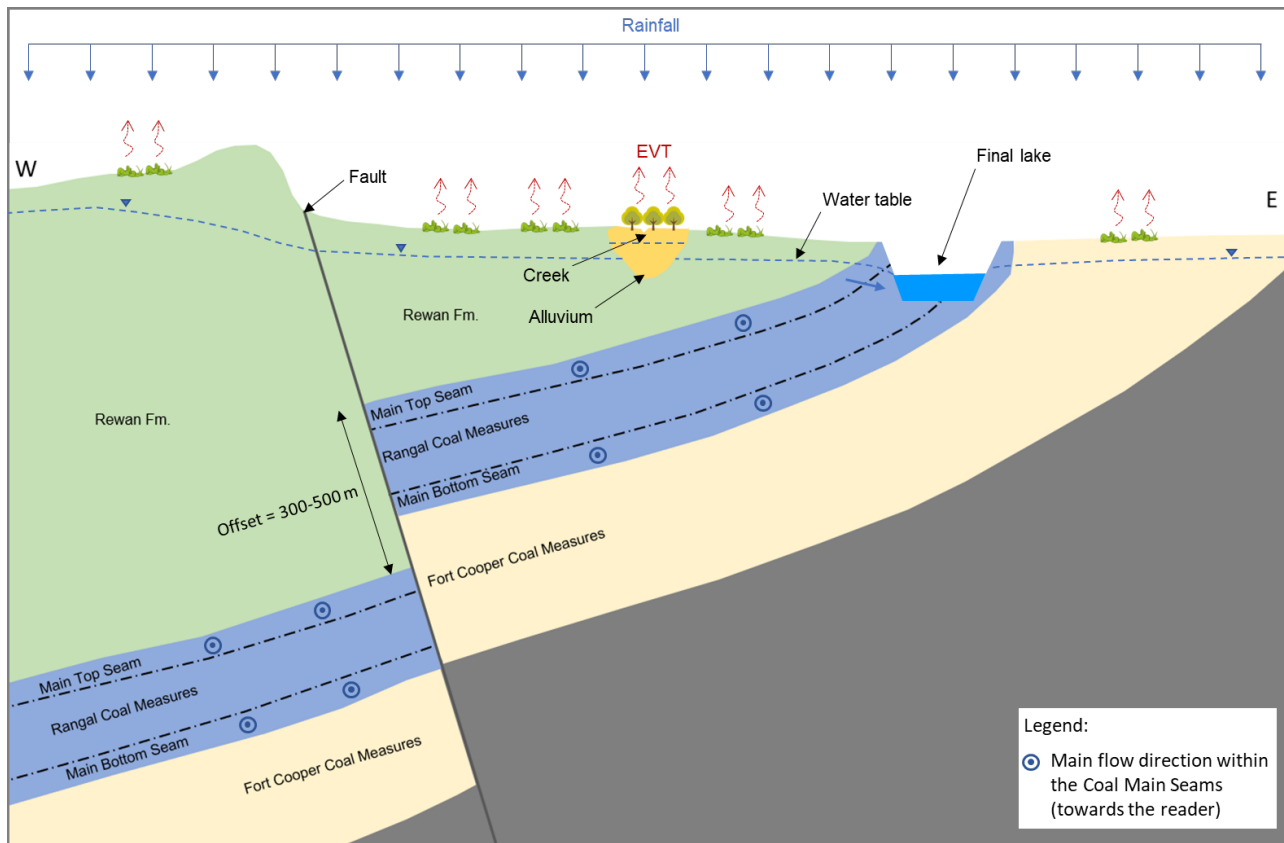


Figure 3-31 Conceptual Cross Section West to East for Post Closure Conditions

3.6.1.1.2 Groundwater Modelling

To support the assessment of potential groundwater impacts, numerical groundwater modelling was undertaken. Full details of this numerical model are included within the SWC Post-Closure Hydrogeological Assessment technical report (WSP, 2024) (Appendix 3). The groundwater modelling has been undertaken in a manner consistent with the Australian Groundwater Modelling Guidelines (Barnett et al., 2012) and in accordance with the IESC explanatory notes on uncertainty analysis (Middlemis & Peeters, 2018). The objectives of the modelling were to:

- Assess the potential impacts of the final mine closure landform on the groundwater regime including private supply bores and GDEs following cessation of active mining. This includes identifying potential risk areas that may require groundwater impact mitigation/control measures, post-closure.
- Assess groundwater interactions with the residual voids including simulation of the residual void lake level and rate of groundwater recovery.
- Model the level and rate of recovery of mining-related groundwater drawdown in the groundwater system surrounding the residual voids and estimate the long-term groundwater behaviour post-closure.
- Assess the potential for migration/flow pathways for contaminants and residual void water through particle tracking.

The SWC numerical groundwater model was developed to assess the potential impacts on the groundwater system from operational changes. This model was utilised in this assessment with some adjustments required to assess the post-closure conditions. The post-closure condition considers the approved area, the accumulation of water within the residual voids and the rebound of the regional groundwater level.

3.6.1.1.3 *Environmental values and benefits groundwater use*

The EPP WWB states the relevant EVs and WQOs for water, and the relevant water quality guidelines and indicators for protecting these values. EVs of specific waters to be protected or enhanced, such as those within the vicinity of SWC, are defined in Schedule 1 of the EPP WWB.

These values encompass direct uses including water supply for drinking water, irrigation, and stock watering, as well as recreational, aesthetic uses and the inherent cultural and spiritual values of waterways and referred detailed in Section 3.1.2.4.

An assessment of bores within a 5km radius of mining leases. Unregistered landholder bores identified through a groundwater census in April 2014 were mostly registered, except for two. Additional bores were installed in 2019, outside mine monitoring bores. Most bores are SWC monitoring bores, owned by Stanmore, or covered by existing Agistment/Compensation agreements. Potential impacts on these bores from mining operations have been considered, with compensation measures established. Monitoring bores related to Coppabella Mine are 3km southwest.

Bores serve various purposes, including mine monitoring, water supply, or stock watering. However, none have associated groundwater licenses, except for mine dewatering allocations, indicating groundwater isn't used for water supply. Surface water allocations for stock watering and irrigation in the same area suggest a preference for local creeks and rivers over groundwater for water supply.

3.6.1.1.4 *Groundwater dependant ecosystems*

GDEs rely on constant or intermittent access to groundwater to sustain aquatic and/or terrestrial ecosystems, encompassing vegetation, springs, wetlands, and rivers. Ephemeral waterways and wetlands in the study area are potentially linked to GDEs. As detailed in Section 3.1.2.4:

- There is no actual surface expression GDEs within the SWC area.
- There are no actual terrestrial GDEs within the SWC area.

Despite a high degree of local variability in stygofauna occurrence, the presence of stygofauna within both the alluvium and regolith aquifers indicates that there is an aquatic GDE within the SWC area (Appendix 3).

3.6.1.1.5 *Recharge*

Recharge to the shallow water bearing units (i.e., alluvium and regolith) at and in the vicinity of SWC occurs via two mechanisms:

- (i) direct infiltration of rainfall, and
- (ii) infiltration of surface water from ephemeral streams during wet periods with high rainfall. These two processes are linked, with streamflow present only during periods of high rainfall and runoff.

A qualitative review of rainfall and surface water discharge in Bee Creek during the dry season (Golder, 2018a) suggests groundwater recharge may only occur during and after storm events that generate greater than about 90 mm rainfall in a short period, typically less than three days. Groundwater recharge though may be more frequent during wet months when the ground is already saturated and sustained rainfall events occur.

Evaporative losses by evapotranspiration are expected to be low given the depth of groundwater, which is often beyond the vegetation roots as previously conceptualised by Golder (Golder, 2018a). The long-term climate averages presented in Section 3.1.2.2 indicate evapotranspiration exceeds rainfall in most months. Only during the very wet summer months is there potential for rainfall to exceed evapotranspiration. This indicates rainfall recharge potential to local aquifers and water bearing units is likely to be limited.

3.6.1.1.6 *Groundwater Quality*

Groundwater salinity throughout the SWC area ranges from fresh (typically electrical conductivity (EC) lower than 1,500 $\mu\text{S}/\text{cm}$ to saline (greater than 20,000 $\mu\text{S}/\text{cm}$) and is generally considered to be unsuitable for

drinking. However both the shallow (<30 m) and deep (>30 m) groundwater quality does meet, with only a few exceptions, the 80th percentile WQO for chemistry zone 34 of the Isaac groundwaters zone under the plan Isaac River Sub Basin Environmental Values and Water Quality Objectives – Basin No. 130 (part), including all waters of the Isaac River Sub basin (including Connors River) (WSP, 2024).

Groundwater salinity throughout the SWC area ranges from fresh (typically lower than 1,500 $\mu\text{S/cm}$) to saline (greater than 20,000 $\mu\text{S/cm}$) and is generally considered to be unsuitable for drinking, this supports there being no local ground water values for drinking water. Figure 3-32 and presents a boxplot showing the EC distribution in each HSU.

Groundwater salinity in the alluvium bores varies from fresh (576 to 1,650 $\mu\text{S/cm}$) in bores MB10, MB11, MB13, and MB14, to saline (26,500 to 29,900 $\mu\text{S/cm}$) measured in the bore MB20SWC03P. Groundwater in bores MB20SWC01A and MB20SWC13T is brackish, with mean EC concentrations of 2,227 and 8,457 $\mu\text{S/cm}$ respectively.

Groundwater salinity in the regolith bores is generally fresh to saline with EC concentrations varying between 640 and 33,300 $\mu\text{S/cm}$ (Figure 3-32). Lower concentrations of EC ranging 640 to 2,860 $\mu\text{S/cm}$ are observed in monitoring bores MB20SWC12T, MB3A, MB3B, MB6, and MB7 whilst higher EC concentrations are observed in SWC bores OBS1 and OBS2, varying from 12,500 to 33,300 $\mu\text{S/cm}$.

The overburden has only three measurements, with EC concentrations varying between 1,770 and 15,000 $\mu\text{S/cm}$ indicating groundwater is brackish to saline. MB20SWC14T and SWCMB15_02 indicate brackish groundwater and MB20SWC05A indicates a saline water.

The coal seams bores are also generally brackish with concentrations of EC generally varying between 4,020 and 7,995 $\mu\text{S/cm}$, with a minimum of 70 $\mu\text{S/cm}$ and a maximum of 16,700 $\mu\text{S/cm}$.

When compared to the WQOs, the existing groundwater quality statistical data for EC in each HSU consistently exceeds the 20th and 50th percentile WQOs, but does meet the 80th percentile WQO, with only a few exceptions.

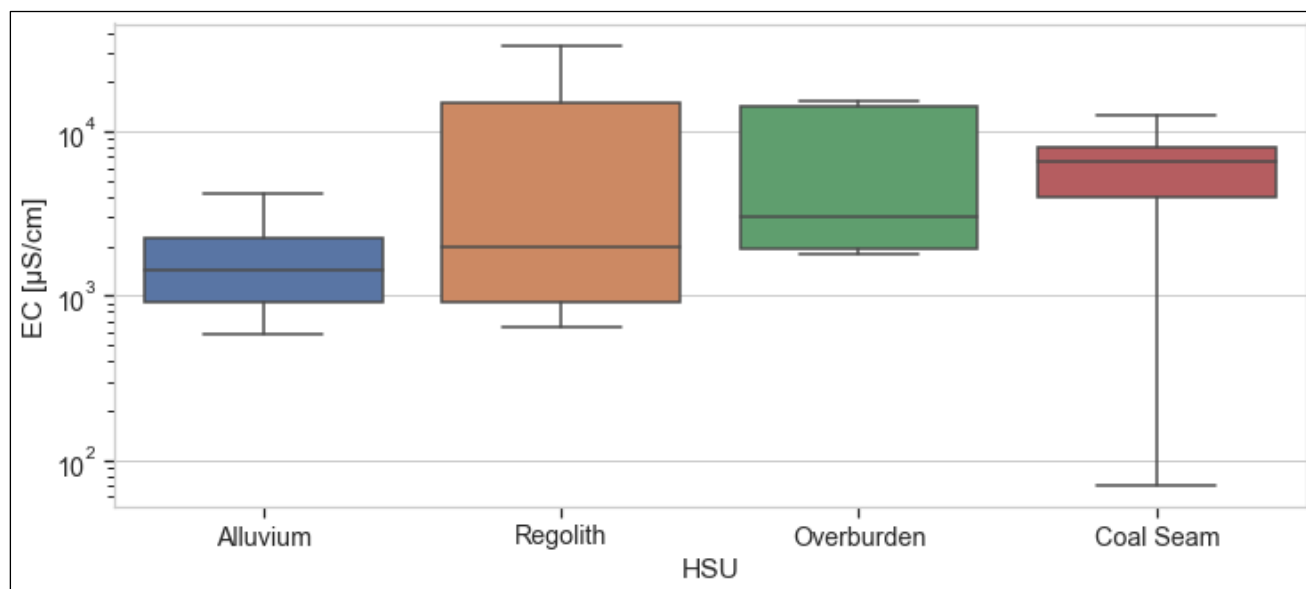


Figure 3-32 EC Distribution Across HSUs in SWC Monitoring Bores

Figure 3-33 presents a Piper plot of major ion chemistry with symbology reflecting each HSU. This plot shows that the major cations in groundwater hosted in both the alluvium and regolith are sodium and potassium, whilst major anions are chloride and bicarbonate. Major ion ratios of groundwater in these units are distinctly similar, and often overlapping. The plot also shows that groundwater in the alluvium tends to have more calcium and magnesium than groundwater in the regolith. This may reflect active evapotranspiration effects within the alluvium groundwater that increase the concentration of cations, such as calcium and magnesium. Groundwater from the coal seams and overburden is sodium, potassium, chloride, and bicarbonate dominant

and tends to have higher sodium and lower calcium and magnesium concentrations than the groundwater in the alluvium and regolith.

The observed pH range reported a 5th percentile of 7.10, a 95th percentile of 8.53, an average of 7.81 and a median of 7.77. Therefore, the pH of groundwater is typically slightly alkaline to alkaline and is not anticipated to mobilise metals.

For dissolved metals, the groundwater flow directions were used to determine upgradient and downgradient monitoring locations for assessment of dissolved metal concentrations in the shallow and deep aquifers around the SWC mine. The dissolved metal concentrations in the shallow and deep aquifer are consistent between these two groups of monitoring locations (upgradient and downgradient areas), with some exceedances in upgradient locations only. This indicates that the concentrations of these parameters reflect pre-existing groundwater quality conditions around the SWC mine area which is considered unsuitable for most groundwater users and GDEs.

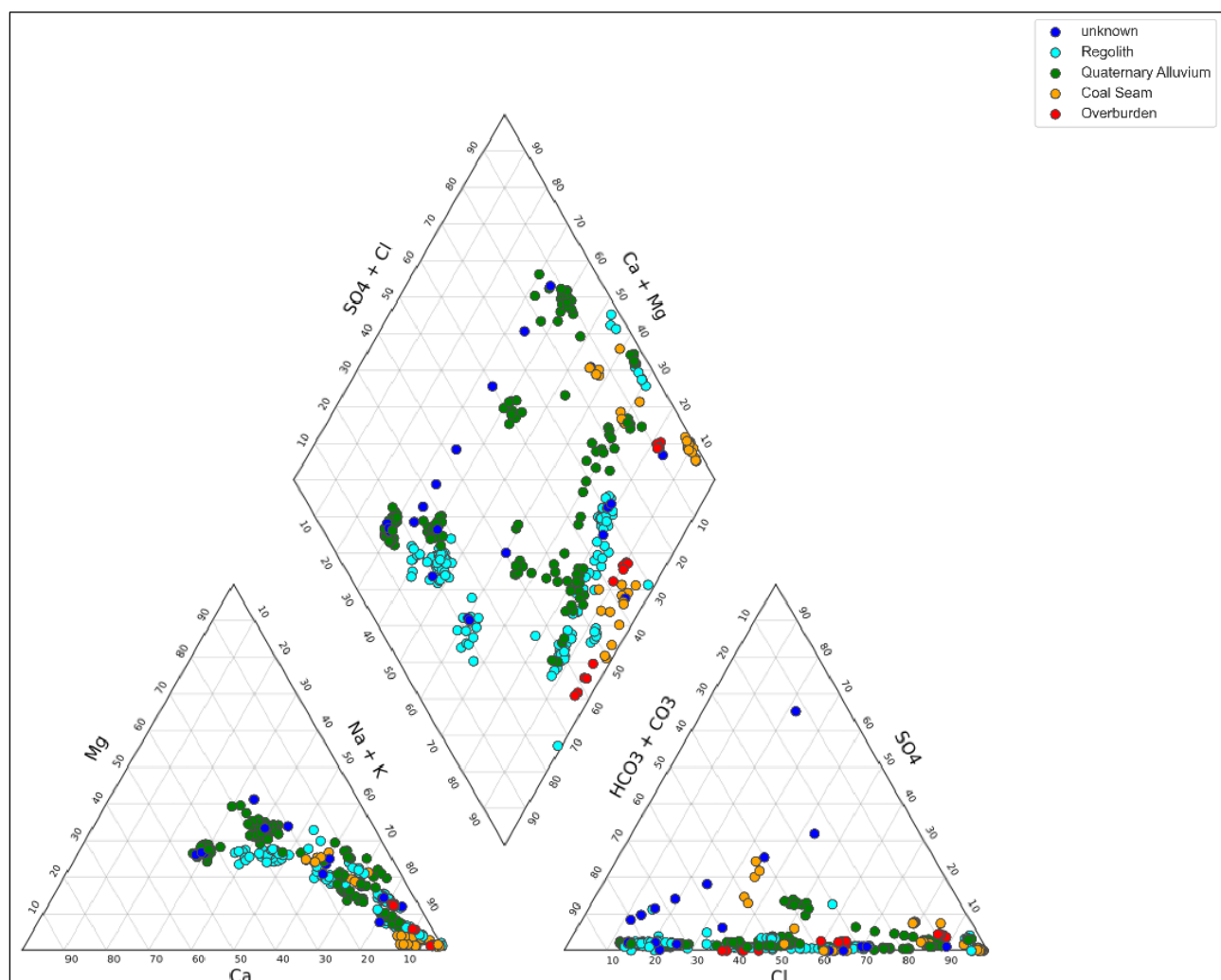


Figure 3-33 Piper Plot of Major Ion Groundwater Chemistry at SWC with Symbology Reflecting HSU

3.6.1.1.7 Groundwater Flow

The water table both in the alluvium and regolith form a subdued reflection of topography, with groundwater flowing from areas of higher elevation – including the Carborough Range NW of SWC – to the SE towards Bee Creek.

Regionally, hydraulic gradients in the shallow aquifers are low, typically in the order of 0.002 to 0.003. They are thought likely to be higher closer to the SWC pits.

Flow directions in the coal seams are similar to those in the alluvium and regolith. Groundwater modelling undertaken for MRA2A by Douglas Partners (2014a) indicates similar groundwater flow directions in the coal seams (CDM Smith, 2016) with groundwater flowing to the southeast.

A regional potentiometric study undertaken by Arrow Energy (2014a) corroborates the main groundwater flow directions conceptualised for the SWC area. The study shows, at a larger regional scale, similar flow processes to the main aquifers with groundwater flowing from NW to SE.

Seismic interpretation of the unnamed major SSE-NNW fault suggests offsets vary between 200 and 580 m and juxtapose the upper Permian coal seams to the east against the younger, low permeability Rewan Formation aquitard to the west. Given the minimum throw on the fault, compressive stress regime and expected high shale gauge ratios, the unnamed major SSE-NNW fault is likely to act as a barrier to horizontal groundwater flow, thereby restricting the westward flow of groundwater within the coal seams of the RCM. As described by Arrow Energy (2014a), the fault has an important role in defining the regional hydrogeological system and groundwater behaviour to the west of the SWC area.

Density dependent flow is not a likely factor for groundwater flow conditions at the site. This is based on the limited variation in the median electrical conductivity (1,440 to 6,505 $\mu\text{S}/\text{cm}$) and temperature measurements (typically between 23°C and 28°C) in the groundwater across site. There are localised occurrences of elevated electrical conductivity; however, these are not thought to be significant enough to impact density dependent flow throughout the site.

3.6.1.1.8 Hydraulic Testing

The hydraulic conductivity (K) for the main HSUs at SWC have been evaluated through multiple previous hydrogeological investigations (CDM Smith, 2016), (AGE, 2014a), (Douglas Partners, 2014a), and (Golder, 2018a)] and estimated from:

- falling and rising head slug tests.
- constant rate pumping tests.
- injection falloff tests.

These tests were mostly carried out in previous studies and are summarised below. This includes estimates of hydraulic conductivity from the newly installed monitoring bores (circa 2020/2021). The alluvium, regolith, overburden, and coal seams have been extensively tested across the SWC mine area. These site-wide statistics are presented in Table 3-38.

- AGE hydraulically tested five monitoring bores screened in the regolith by rapidly injecting 8 to 200 L of water into these bores and monitoring the recovery (fall) of the groundwater level towards the static (pre-test) level.
- Douglas Partners estimated the hydraulic conductivity of the confined coal seam from the analysis of injection falloff tests carried out in four exploration holes drilled into the main bottom seam of the RCM.
- In June 2015, both step-rate and constant-rate pumping tests were carried out on seven unregistered landholder bores screened both in the alluvium and regolith. The transmissivity (T) and K of the test intervals in these wells were then estimated using the Cooper-Jacob and Theis analytical solutions.
- In May 2016, falling and rising-head slug tests were conducted on three monitoring bores screened in the alluvium.
- In October and November 2020, falling and rising-head slug tests were conducted on 15 monitoring bores.

Table 3-38 Summary of Hydraulic Conductivity Estimates from Testing Across SWC (CDM Smith, 2016)

HSU	Slug Tests			Pumping Tests			Injection Falloff Tests	
	No. Tests	Minimum K (m/day)	Maximum K (m/day)	No. Tests	Minimum K (m/day)	Maximum K (m/day)	No. Tests	Mean K (m/day)
Alluvium	7	0.002	63	2	3.8(2)	10(2)	No tests carried out	
Regolith	6	0.05(1)	0.5	5	0.01(2)	1.9(2)		
Overburden	3	0.2	5	No tests carried out				
Coal Seams	7	0.0005	0.5				4	0.02

- Based on analysis undertaken by AGE (2014a) (2014b)
- Hydraulic conductivity is calculated from T assuming saturated thickness is equal to standing water column height.

The following interpretations are based on both site-wide and local hydraulic testing of each HSU:

- Alluvium: The wide range of K values demonstrates the lithological variability in the unconsolidated deposits. Lower estimates are reflective of the finer grained silts and clays, while higher estimates of K are attributable to coarser grained sands and gravels. This demonstrates the bi modal nature of the alluvium: namely either very low permeability fine grained sediments, or moderate to high permeability coarser grained sediments.
- Regolith: K estimates reflect moderate permeability in this water bearing unit
- Overburden: High K values likely reflect the more permeable part of the sequence tested (sandstones) and are therefore considered to be upper estimates only. Much of the sequence comprises siltstone and mudstone which are expected to have considerably lower K values. What is important from a groundwater movement perspective is the vertical hydraulic resistance of this aquitard. The lower permeability formations (siltstones and mudstones) will dominate the overall vertical K for this unit, while the sandstones will dominate lateral flow. Sandstones though may not be regionally extensive though as suggested by the general lack of water supply bores targeting this formation in this part of the Bowen Basin.
- Coal seams: K estimates reflect coal permeability in the outcrop/subcrop areas. To the west of SWC mine, the coal seams are at depths more than 200 to 300 m and are expected to have K values less than these values, and possibly several orders of magnitude less.

3.6.1.1.9 Predicted Groundwater Levels

Numerical modelling predicts the recovery of groundwater levels at SWC post-closure, however a groundwater hydraulic gradient is maintained towards the residual voids for the simulation period for all water bearing HSUs. This gradient is driven by the recharges to the broader areas and subsequent groundwater inflows to the residual voids. The hydraulic gradient towards the voids is then maintained by the modelled evaporative losses from the lake surface (WSP, 2024, 2025).

For the SWC residual voids, the long-term mean void water levels modelled by the WBM reach a maximum level of 182 m AHD for Kemmis 2N, 180 m for Mulgrave EN, 141 m AHD for C/W/T and 132 m AHD for Toolah South by the end of the WBM simulation period (WSP, 2025). These residual void lake levels are below the surrounding modelled groundwater recovery levels for all water bearing HSUs, indicating that the hydraulic gradient towards the voids will remain following residual void lake level recovery.

The modelled groundwater hydraulic gradient centred on the SWC residual voids indicates that the modelled minor outflows of water from the voids to groundwater will be directed to the C/W/T residual void and hence remain within the mining lease area post closure.

To assess the potential for ongoing groundwater level changes post-closure, predictive hydrographs have been derived from the groundwater model at identified potential groundwater receptor locations. Hydrographs aid in assessing the potential for additional drawdown impacts to the potential receptors in the period of post-mining, i.e., identify additional potential impacts beyond those that have occurred during the mining operations that may be attributable to the PRCP proposed mine closure landform.

Predictive hydrographs for the alluvium water table have been generated at Kemmis Creek, Walker Creek and the unnamed tributary of Bee Creek, the locations of potential GDE sites identified near to SWC.

Predictive hydrographs generated for the water table at locations of potential GDE sites identified near to SWC indicate that no lowering of groundwater levels is predicted to occur or peak lowering is predicted to occur at the end of SWC mining with minimal ongoing drawdown occurring in the post-closure environment while groundwater levels recover and stabilise:

- The hydrograph site on the unnamed tributary of Bee Creek (GDE1) is located in between the C/W/T and Toolah South residual voids. It is expected that both the CWT and Toolah South residual void lake levels represented in the groundwater model are controlling the water table responses presented in the hydrograph. The hydrograph indicates that peak lowering of groundwater levels is predicted to occur at the end of SWC mining with minimal ongoing drawdown while groundwater levels recover and stabilise.
- The water table hydrographs indicate that for the potential GDE sites along the Kemmis Creek (GDE2 and GDE3), no lowering of groundwater levels is predicted to occur at the end of mining or post-closure.
- The hydrograph site at the Walker Creek location (GDE4) identifies very minor (0.1 m) ongoing lowering of groundwater levels over the SWC post-closure period. It is considered that this ongoing drawdown is representative of the peak water table drawdown at the end of SWC mining with minimal ongoing drawdown while groundwater levels recover and stabilise.

The minor lowering of groundwater levels over the SWC post-closure period when compared with mining related drawdown is not expected to further impact stygofauna that may be present within the alluvium.

The hydrographs at Plum Tree Creek and Bore 10 do not show any additional post-closure lowering of groundwater levels within these bores that are installed within the alluvium aquifer.

Within the regolith, the Bore 1 hydrograph identifies some ongoing lowering of groundwater levels post-closure before the water levels recover and return to the approximate water levels at the end of mining. This is likely a result of a lag in mining related drawdown while the modelled residual void lake levels and groundwater levels recover, rather than drawdown associated with the mine closure landform.

Hydrographs for Bore 4 and Good Bore, installed in the HSU representative of the Rewan formation and RCM overburden, identify a steady lowering of groundwater levels over the simulation period. This could be a result of the establishment of the hydraulic gradient towards the voids post-closure. However, lowering of the groundwater levels in these locations prior to mining ceasing is not evident which would be more prevalent while the voids are being kept dewatered for operations. The predicted groundwater lowering could also be a result of the applied groundwater modelling parameters, including the modelled residual void lake levels. Revised modelling of residual void lake levels and groundwater should be carried out as the site draws nearer to closure.

The recovery of groundwater levels over the SWC post-closure period when compared with mining related drawdown is not expected to further impact stygofauna that may be present within the regolith as indicated by the hydrograph for Bore 1 that intercepts the regolith.

3.6.1.1.10 Particle Tracking

To assess the fate and movement of water particles within the mine closure landform, including the residual voids, particle tracking using MODPATH was undertaken. Particle tracking simulates the potential pathways and destinations of water and any contaminants that may be carried by the source water during the post-closure simulation period.

The flow path lines generated from the particle tracking modelling identify potential particle migration pathways through the model simulation period and the predicted distances the particles travel by the end of the 500-year simulation period. The various colouring along the segments of the particle traces presented indicate the HSU layer that the particle travels through during the simulation.

All water particles tracked through the post-closure simulation followed the hydraulic gradient towards the SWC residual voids. The particles placed outside the voids traverse through all HSUs into the residual voids, with a predominance of specific HSU sources for each void. For the Kemmis 2N and Mulgrave EN voids, particles travelling into the eastern side of the void predominantly originate from the underburden HSU (layer 9), with a smaller contribution from the Regolith (layer 3). On the western side of these voids, particles primarily travel through the Regolith (layer 3). The southern residual voids, C/W/T and Toolah South, receive particles predominantly from the Regolith (layer 3), with a partial contribution from the underburden HSU (layer 9).

The spacing between the arrows represents the particle flow time intervals. To improve visualisation, the spacing between the arrows along the particle pathways represent particle displacement:

- Every 1,000 years on the eastern side of the residual voids where most of the particle movement is within the underburden (layer 9).
- Every 100 years on the western side where most of the particle movement is within the Regolith (layer 3).

More frequent arrows depict slower particle movement. This distinction reflects the slower movement of particles through the underburden compared to the regolith. The underburden is a leaky aquitard with significantly lower permeability than the regolith. As a result, it is expected to restrict groundwater flow, leading to slower particle movement towards the residual voids.

The particle placed within the TSF area showed no discernible movement through the simulation period. Water particles placed within the voids themselves do not track outside of the voids, hence supporting the finding that the minor modelled outflows of groundwater from the voids do not move off the mining leases.

The particle tracking simulation predicts that the migration of water particles within the mining leases from potential contaminant source areas will occur towards the residual voids and/or remain on the mining leases post-closure.

To validate the flow path simulation model results, RM2 includes contaminated land investigations at the completion of mining activities to assess the suitability of the site for the nominated PMLUs. These contaminated land investigations will provide additional definition and, where required, remediation around potential source areas and preferential pathways than can be provided by the more regional flow path simulation.

3.6.1.1.11 Residual Void Groundwater Flow

By the end of the post closure, it is predicted that groundwater inflows and outflows to/from the residual voids reach equilibrium (i.e., have stabilised to a constant value), with net inflows occurring throughout the simulation period. Minor outflows from the Kemmis 2N (1 ML/yr), Mulgrave EN (3 ML/yr), and C/W/T (6 ML/year) residual voids to the surrounding spoil hydrostratigraphic units (HSU) are modelled at the end of the post-closure simulation period. As demonstrated by the particle tracking modelling, these outflows do not move beyond the spoil or mining leases, effectively saturating the spoil initially before returning to the SWC residual voids as indicated by the positive net groundwater inflows throughout the simulation period.

3.6.1.1.12 Post-mining - Conceptual Site Model Summary

As described by the modelling outcomes above, by the end of the post-closure simulation, groundwater inflows and outflows to/from all the SWC residual voids reach equilibrium with net positive inflows occurring throughout the simulation period. Groundwater levels recover with a groundwater hydraulic gradient maintained towards the SWC residual voids in all water bearing HSUs. The hydraulic gradient is driven by the recharges to the broader areas and subsequent groundwater inflows to the residual voids that is then maintained by evaporative losses from the residual void lake surface.

The minor modelled outflows from the Kemmis 2N, Mulgrave EN and C/W/T residual voids to the surrounding spoil do not move beyond the spoil or mining leases as a result of the modelled hydraulic gradient centred on the SWC residual voids.

Predictive hydrographs generated for the water table at locations of potential GDE sites identified near to SWC indicate that no lowering of groundwater levels is predicted to occur or peak lowering is predicted to occur at the end of SWC mining with minimal ongoing drawdown occurring in the post-closure environment while groundwater levels recover and stabilise.

Predictive hydrographs generated for the water table at locations of potential groundwater users identified near to SWC indicate no additional post-closure lowering of groundwater levels within the alluvium aquifer bores. Within the regolith, some ongoing lowering of groundwater levels post-closure occurs before the water levels recover and return to the approximate water levels at the end of mining. This is likely a result of a lag in mining related drawdown rather than drawdown associated with the mine closure landform.

The RCM overburden/Rewan formation hydrographs identify a steady lowering of groundwater levels over the simulation period. This could be a result of the establishment of the hydraulic gradient towards the voids post-closure, or a result of the applied groundwater modelling parameters, including the modelled residual void lake levels. Revised modelling of residual void lake levels and groundwater should be carried out as the site draws nearer to closure.

The particle tracking simulation predicts that the water particles within the potential contaminant source areas of the mining leases will migrate towards the residual voids and remain on the mining leases post-closure.

Based on the above groundwater modelling outcomes of the Void Closure Plan (WSP 2024; WSP, 2025), in combination with the void water balance modelling (Section 3.6.3), and void geochemical assessment (Appendix 12), the residual voids at SWC are expected to act as sinks post-closure. A conceptual site model is presented in Figure 3-34.

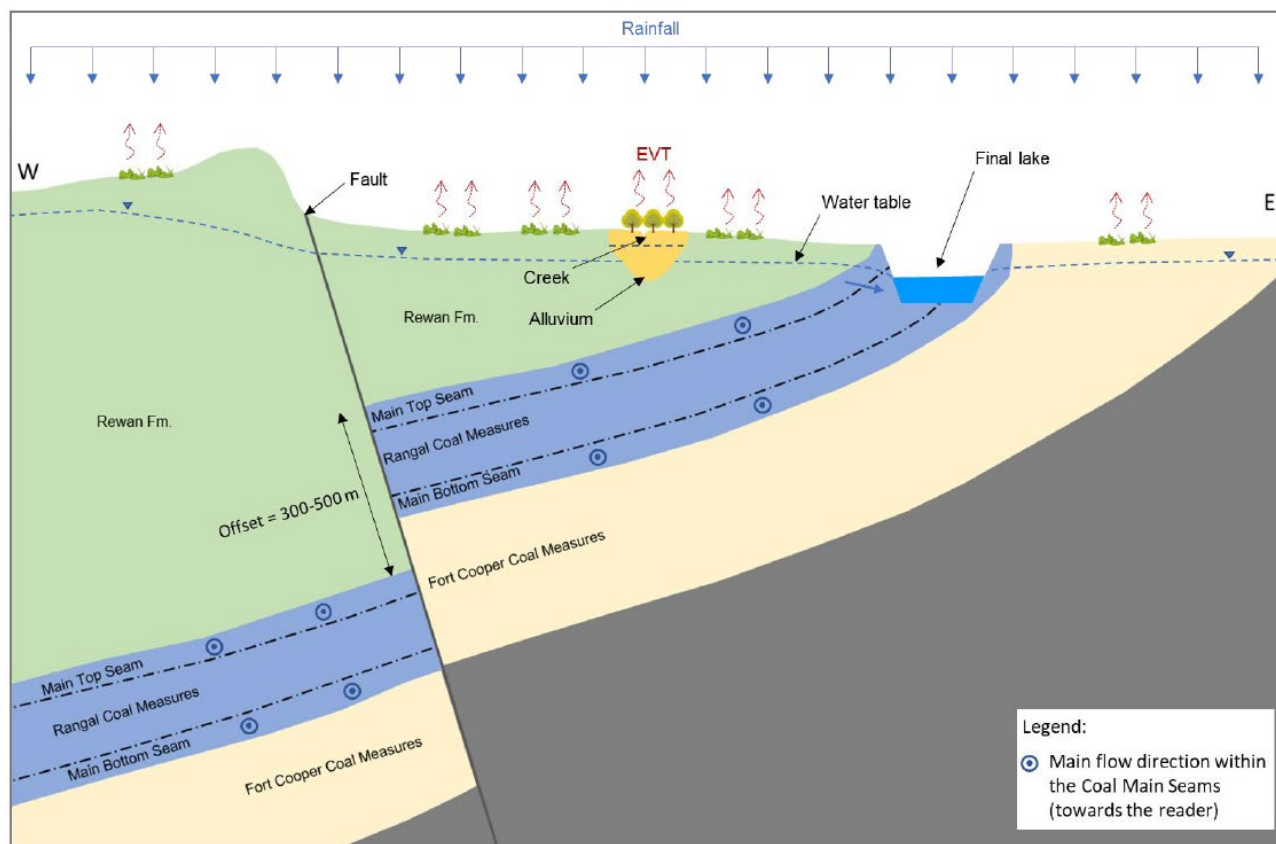


Figure 3-34 Hydrogeological Post Closure Conceptual Site Model

3.6.1.2 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.

In accordance with the DES *PRCP Guideline* transitional provisions, an assessment of voids in flood plains for the pre-approved NUMAs of SWC was undertaken (Engeny, 2024a) (Section 3.5).

In addition, rehabilitation flooding assessments were completed (Engeny, 2024, 2025; Hydrobalance, 2025) to model the drainage and flooding behaviour of surface water in the vicinity of the four SWC residual voids (Kemmis2N, Mulgrave EN, C/W/T and Toolah South). This section presents the assessment findings, as relevant to void closure at SWC.

The complete flooding assessment reports - including details of the model set-up and results are provided as Appendix 6. This section summarises the relevant context from the flooding assessment reports relevant to required rehabilitation and management approaches to achieve safe and stable residual voids at closure.

The proposed final landform for SWC mine will include seven mining pits, consolidated as part of SWC's mine closure landform into four residual voids and out of pit dumps that are intended to be rehabilitated. A Flood Rehabilitation Assessment, involving hydrological and hydraulic modelling, to inform a flooding risk profile has been conducted to support the development of this PRC Plan (Appendix 6; Engeny, 2024).

A runoff routing hydrological model was created using Watershed Bounded Network Model (WBNM), and HEC-HMS software to assess the local and greater region for the South Walker Creek final landform topography (total area of approximately 1984km² modelled). For the purposes of identifying the critical hydrologic events (Annual Exceedance Probability (AEP), Duration and Temporal Pattern), three critical domains were identified: the conjunction of Bee Creek and Walker Creek (SWC214); the catchments reporting to the Walker Creek (SWC204b); the catchments reporting to the unnamed tributary of Bee Creek (SWC134).

A two-dimensional hydraulic model was developed using TUFLOW and simulated for a range of events including the 1%, 0.1% AEP and Probable Maximum Precipitation (PMP). The model boundary was sufficiently large enough to account for the potential alteration of flows upstream and downstream. The redirection of runoff away from voids and towards waterways has been achieved within the hydraulic model by assuming the implementation of flood protection bunds and drainage channels/diversions, which will be completed as part of landform establishment (RM3). These topographic modifications are only conceptual and will undergo further investigation as part of RM3 to identify the optimal design suitable for the final landform post closure. The intention of this drainage infrastructure is to convey the voids' natural catchment post closure towards Bee Creek. This approach minimises the natural catchment reporting to the pits.

The hydraulic results have been interpreted to assess the flooding risk profile of the proposed final landform. A summary of the outcomes shown in the flood maps (Figure 3-35, Figure 3-36 and Appendix 6) are described below.

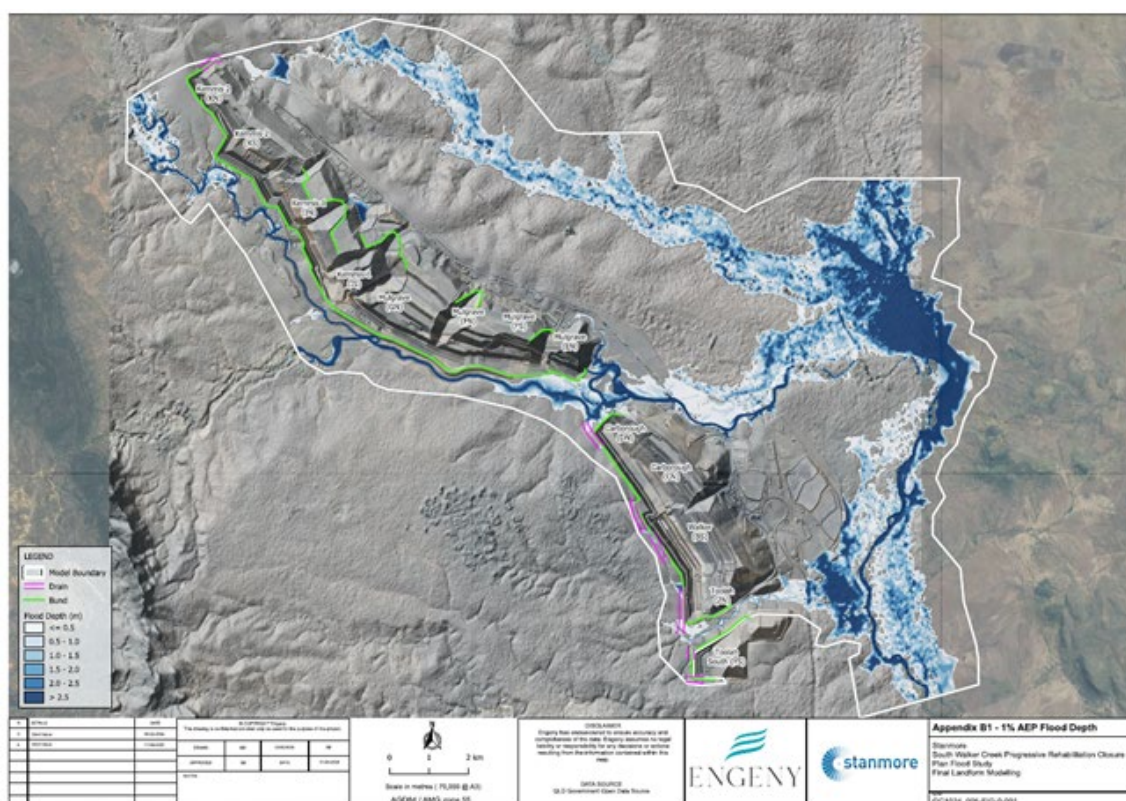
Diversions

- Permanent and stable diversions are intended to meet the criteria provided by 'Guideline: Works that interfere with water in a watercourse for a resource activity— watercourse diversions authorised under the Water Act 2000' (DNRME, 2019). Of particular note of the guideline is for the PRCP diversions to achieve velocities <2.5m/s in the 0.1% AEP event and to successfully contain the 0.1% AEP event. The current PRCP includes the MRA2A, Walker Creek, MRA2C and realignment of the unnamed tributary of Bee Creek. The proposed drainage infrastructure, including the highwall drains and realignment of the unnamed tributary of Bee Creek, have sufficient capacity to convey the 0.1% AEP flood event (Hydrobalance, 2025).
- During the flooding assessment, several minor catchments were found to directly drain to the residual voids if there was no proposed drainage in place. Concept drains have been included to

capture these catchments and direct them to either Sandy, Kemmis or Walker Creek. These modifications represent the intent of the relevant PRCP rehabilitation milestone, which will involve the design of this drainage outcome. The model results (with this concept drainage) prevent flood ingress to residual voids. Whilst only at a concept level and requiring further design work as part of RM3, all concept drains currently report velocities less than 2.5m/s in the 0.1% AEP event and contain the flood event.

Final Landform

- The flood model results (with concept drainage) prevent flood ingress to residual voids.
- The Walker Creek watercourse between the Carborough DN and Mulgrave EN landforms resulted in breakout (although not to voids) and engagement with the wider floodplain, resulting in flooding engagement with the two landforms. The 0.1% AEP event engages each final landform, with ponded waters against the designed embankment, however peak velocities against constructed final landforms remain generally less than 0.5 m/s and are therefore expected to have low erosion potential (i.e., low risk to impacting ability for landform to achieve intended PMLU).
- Some minor catchments were found to interact directly with the final landform for SWC and would have either directly flowed into residual voids or ponded against landforms. Where this was identified, concept drains were introduced to represent the intent of the relevant PRCP rehabilitation milestone, which will involve the design of this drainage outcome.
- Modelling of the unnamed tributary of Bee Creek flood behaviour indicates that the proposed drainage infrastructure (Hydrobalance, 2025), including highwall drains and the creek realignment, can accommodate the 0.1% AEP flood event. Runoff from local catchments will be diverted around the YS Pit towards the realignment of the unnamed tributary of Bee Creek. Both the YS and C/W/T pits will remain protected from the 0.1% AEP flood. Predicted 1% AEP flood depths near the pits range from 1.0–3.8 m, while 0.1% AEP floods reach 3.0–5.0 m depths (Refer to Figure 3-37 and Figure 3-38).



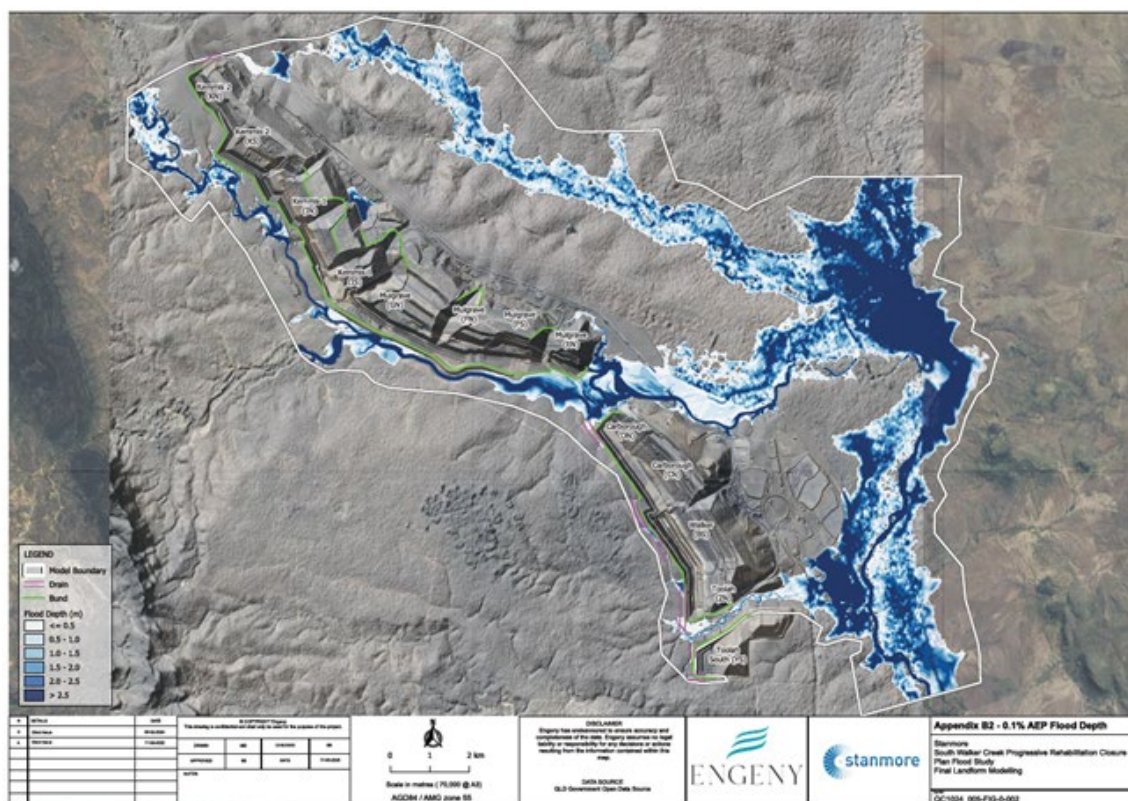


Figure 3-36 0.1% AEP Flood Depths

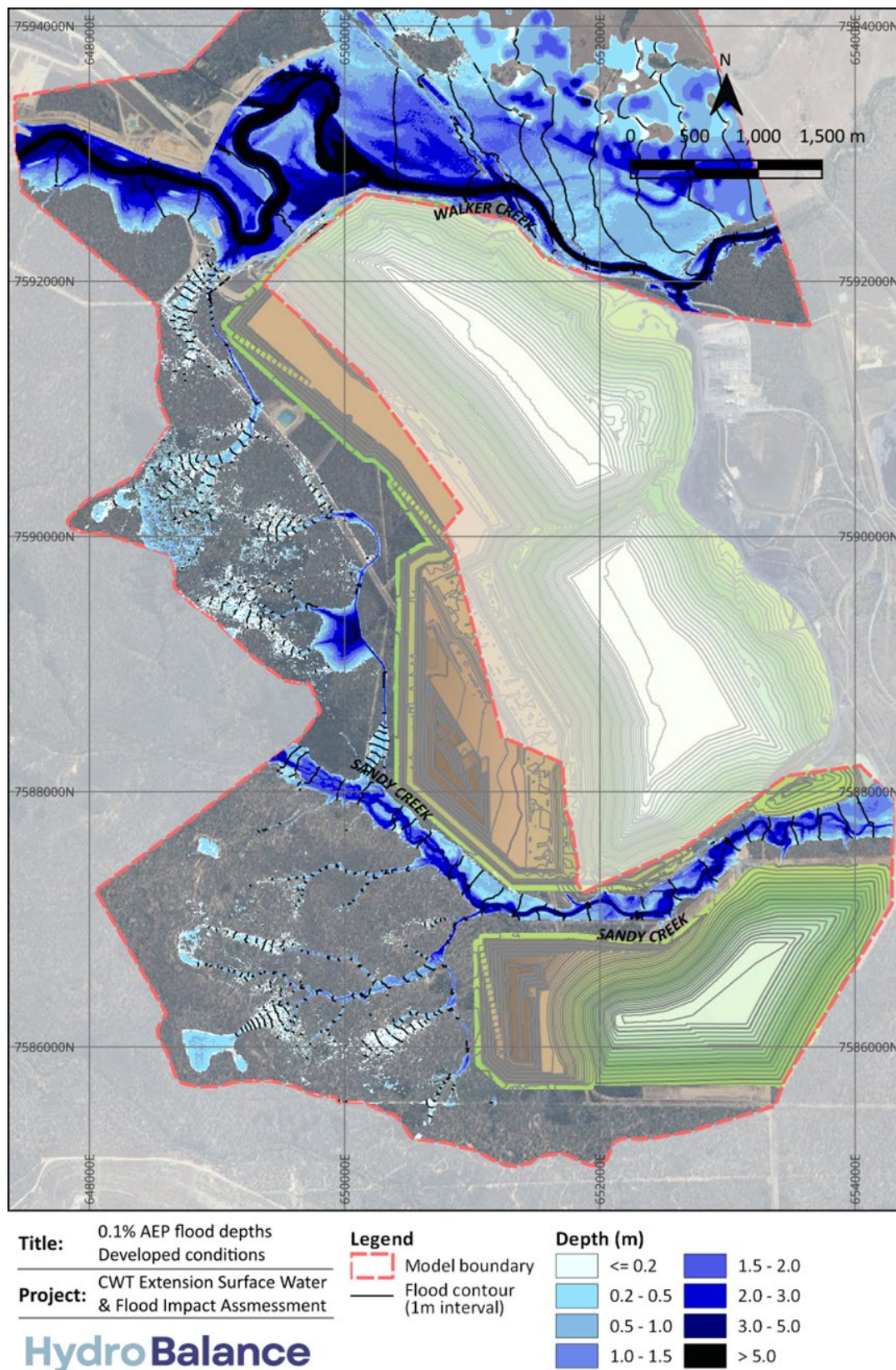
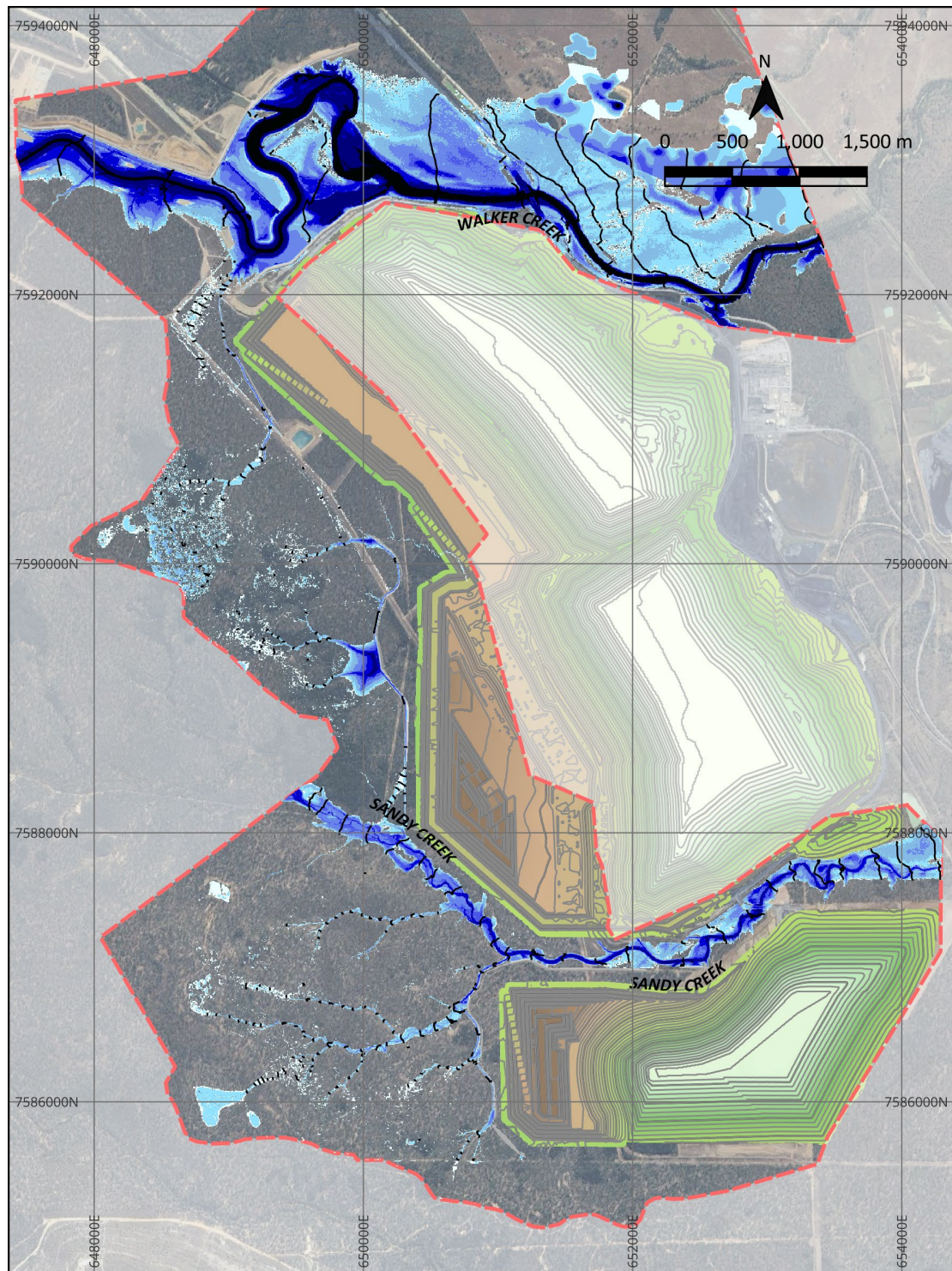


Figure 3-37 C/W/T Area 0.1% AEP Flood Depths



Title: 1% AEP flood depths
Developed conditions

Project: CWT Extension Surface Water
& Flood Impact Assessment

HydroBalance

Legend

- Model boundary
- Flood contour (1m interval)

Depth (m)

- | | |
|--|--|
| <= 0.2 | 1.5 - 2.0 |
| 0.2 - 0.5 | 2.0 - 3.0 |
| 0.5 - 1.0 | 3.0 - 5.0 |
| 1.0 - 1.5 | > 5.0 |

Figure 3-38 C/W/T Area 1% AEP Flood Depths

3.6.1.3 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.

A geochemical assessment of potential mineral waste generated at SWC has been undertaken (Terrenus, 2021) which evaluated the geochemical nature of mine and processing wastes likely to be produced from the site, identifying environmental risks that may be associated with mining, handling, and storing of the materials. The report is provided in Appendix 7 with a summary of key findings provided in this PRCP. The assessment of soil and spoil material for use in rehabilitation is discussed in Section 3.6.1.

At SWC, the key mine domains that potential sources of AMD, salinity, and dispersion at SWC, and having a are residual voids, spoil dumps and TSFs. Currently SWC has 1 active TSF and 1 inactive TSF (Section 3.6.2).

The lithology within SWC and the study area is characterised by sedimentary geologic materials, comprising mudstone, claystone, siltstone, sandstone (typically fine- to medium-grained), carbonaceous sediments and coal seams.

Three (3) types of mineral waste generated at SWC, consist of:

Spoil (Overburden and Interburden):

- Spoil comprises approximately 97% of all mineral waste at SWC and includes weathered waste (Tertiary and Permian-age – in approximately equal proportions) and fresh (unweathered) waste (all Permian-age). Approximately 95% of spoil is fresh and the remaining (approximately 5%) is weathered/oxidised.
- Spoil comprises several subtypes of material, the most relevant from a geochemical perspective being carbonaceous spoil (approximately 5% of all present and future spoil) and non-carbonaceous spoil (approximately 95% of all present and future spoil) subgroups.

Tailings:

- Tailings typically represent the clay, silt and fine sand fractions of ROM coal waste generated at the CHPP. This waste type represents approximately 0.5% of all mineral waste at SWC.
- Coal from several seams and plys at SWC are currently processed at the coal handling and preparation plant (CHPP) located on site. Tailings are pumped (as a slurry) to an above-ground tailings storage facility (TSF) for permanent disposal. Water from the slurry drains to a low point in the TSF (decant zone) and is returned into the site's water management system for reuse. The solids remain in the TSF and, at closure, the TSF will be appropriately capped and rehabilitated.

Rejects:

- Rejects are generated at the CHPP through processing ROM coal, and typically represents coarser and rockier coal seam roof, partings, and floor material. Rejects are expected to represent 2.4% of all mineral waste generated at SWC for the remaining life-of-mine.
- Rejects are trucked to spoil dumps and co-disposed (buried) within spoil.

Coal is generally not considered mineral waste, with the exception of small quantities of sub-economic seams or coal loss through mining that may report to the spoil dumps, and remnant coal exposed on pit highwalls (such as in residual voids).

Rejects samples for the assessment were sourced from the CHPP and historic landforms, representing both fresh and aged material. Similarly, tailings samples were sourced from the CHPP and TSFs, representing

fresh and aged material, respectively. Spoil material was represented by samples sourced from three drillholes.

3.6.1.3.1 Sample Data

The geochemical assessment included 137 samples from the three drill-holes, comprising samples of each mineral waste type (where intersected) – grouped as follows:

- Weathered spoil, non-carbonaceous - 25 samples
- Fresh spoil, non-carbonaceous - 95 samples
- Fresh spoil, carbonaceous - 9 samples
- Fresh spoil, coal - 8 samples.

The sample rates for tailings and rejects were as follows:

- Tailings – 44 samples
- Combined mid and course rejects – 9 samples.

3.6.1.3.2 Static Geochemical Analysis

Mineral waste samples have undergone geochemical characterisation and assessment to determine the potential to generate acid and metalliferous drainage (AMD), which comprises acid drainage (AD), neutral and metalliferous drainage (NMD) and/or saline drainage (SD). Additionally, samples have been assessed with regard to their potential to generate salinity (non-oxidative) and, for spoil materials, their sodicity and dispersion potential.

A summary of the geochemical test program, and samples of each analysis are included in Table 3-39.

Table 3-39 Summary of Geochemical Test Program

Analytical Samples	Drill Hole Samples	Coal Reject Samples
pH and EC on 1:5 Water Extracts	137 samples	50 samples
Total Sulfur (S)	137 samples	53 samples
ANC	137 samples	53 samples
Sulfide (Scr)	137 samples	53 samples
Sulfate (SO ₄)	-	48 samples
Total Carbon (C)	10	23
Total Inorganic Carbon (TIC) and Total Organic Carbon (TOC)	10	18
NAG	-	9
NAG Extended	6	-
ABCC	27	7
QXRD	12	7
OxCon	-	1 (composite sample)
Total Elements in Solids	32	19
Soluble Elements and Major Ions in 1:5 Deionised Water Extract	30	42
Soluble Elements and Major Ions in 1:5 'Saline' Water Extract	-	10

Analytical Samples	Drill Hole Samples	Coal Reject Samples
Exchangeable Cations	27	-
Emerson Aggregate Class	27	-

The results of static geochemical analysis were used to classify the AMD potential mineral waste as either potentially acid forming (PAF) or non-acid forming (NAF) or uncertain (UC). The geochemical test-work program for SWC included screening tests of pH, Electrical Conductivity (EC), and Net Acid Production Potential (NAPP), including total Sulfur content and Acid Neutralising Capacity (Terrenus Earth Sciences, 2021). If sufficient risk of generating AMD was identified in the assessment, samples were further analysed using kinetic geochemical methods.

When results are found to be UC, there is usually a conflict between NAPP and NAG results and additional analysis is required to gain more certainty of the geochemical characteristics of specific samples. Kinetic geochemical characterisation (i.e., column leach tests, humidity cells, oxygen consumption analysis) of mineral waste materials quantifies the rate at which AMD reaction products will be generated can be used to provide estimates of the annual acidity generation rate of a material, the potential lag time until AMD discharge occurs, the indicative longevity of the issue and most importantly, inform appropriate management measures (BHP, 2020).

3.6.1.3.3 Geochemical Classification of Mineral Waste

The ABA results presented in this section have been used to classify the acid forming nature of the spoil samples as shown in Table 3-40. The results show that all except one sample was classified as NAF, meaning the samples (and spoil material represented by these samples) have very low sulfur concentration, significant excess ANC (relative to the MPA) and clearly have negligible capacity to generate acidity or sulfate salinity (i.e., negligible capacity to generate AMD or SD from sulfide oxidation). One coal sample was classified as PAF-LC.

Table 3-40 Geochemical Classification of Potential Soil (Terrenus, 2021)

Waste Group	NAF	NAF-S	Uncertain	PAF-LC	PAF
	Number and Percentage of Samples for Each Geochemical Characterisation				
Permian, weathered, non-carb. (n=25)	25 (100%)	0	0	0	0
Permian, fresh, non-carb. (n=95)	95 (100%)	0	0	0	0
Permian, fresh, carb. (n=9)	9 (100%)	0	0	0	0
Permian, fresh, coal (n=8)	7 (87.5%)	0	0	1	0
All samples (n=137)	136 (99%)	0	0	1	0

3.6.1.3.4 Spoil

Spoil has a negligible potential to generate AMD or SD (Terrenus Earth Sciences, 2021). This is supported by a geochemical assessment undertaken on spoil samples, which indicated:

- Spoils contains low concentrations of soluble metals and metalloids.
- The total S concentration soils is low, with a 90th percentile value of 0.12 %. Combined with moderate ANC (median = 17 H₂SO₄/t) and very low MPA values (median = 1.2 H₂SO₄/t), all samples were classified as NAF.

- As a bulk material, spoil is expected to generate pH-alkaline run-off.

Non-carbonaceous overburden/interburden has EC values ranging from 127 to 631 $\mu\text{S}/\text{cm}$, with median and 90th percentile values of 265 and 383 $\mu\text{S}/\text{cm}$. On this basis, non-carbonaceous overburden/interburden is expected to be non-saline, either as a result of dissolution of geogenic salts and/or from sulfide oxidation (sulfate salinity). Carbonaceous overburden and interburden has similar EC values to non-carbonaceous materials, ranging from 126 to 374 $\mu\text{S}/\text{cm}$, with median and 90th percentile values of 270 and 312 $\mu\text{S}/\text{cm}$. On this basis, and consistent with non-carbonaceous spoil, carbonaceous spoil is expected to be non-saline.

Non-carbonaceous overburden/interburden samples ($n=25$) had high cation exchange capacity (CEC) values and high exchangeable sodium percentage (ESP) values, resulting in all except one sample being classified as 'strongly sodic'. The CEC and ESP values suggest this material type would be subject to dispersion, with weathered samples generally having higher CEC values and lower ESP values compared to the fresh (unweathered) samples.

Emerson Aggregate Class testing on spoils found that all samples were dispersive or displayed 'some dispersion'. Similarly, Carbonaceous overburden/interburden samples ($n=3$) had CEC and ESP values comparable to non-carbonaceous samples, resulting in all three samples being classified as 'strongly sodic'.

The results suggest that most of the spoil is expected to be sodic to strongly sodic, and dispersive to varying degrees, with little distinction between lithology or degree of weathering.

3.6.1.3.5 *Rejects and Tailings*

Terrenus Earth Sciences (2021), analysed 41 tailings samples and 9 coal reject samples. It was found that:

- Tailings and rejects are expected to generate pH-alkaline contact water (run-off and seepage), with pH1:5 values ranging from pH 8.1 to 9.8, with a median pH1:5 of 9.3 indicating a clear lack of readily soluble acidity.
- Coal tailings and rejects are expected to be non-saline, either as a result of dissolution of geogenic salts and/or from sulfide oxidation (sulfate salinity), given EC values were similar to spoil materials, with median and 90th percentile EC values of 254 and 410 $\mu\text{S}/\text{cm}$, respectively.
- Coal tailings and rejects are generally NAF.
- Two tailings' samples were classified as NAF-S, meaning they are NAF but with total S greater than 1 %, and thus have potential for NMD/SD. One tailings sample had an uncertain (UC) classification, however, is expected to be 'potentially acid forming' (PAF) and has been tentatively sub-classified as UC(PAF).
- The total S concentration of rejects and tailings ranges from low to high, but is generally low to moderate, with a median of 0.39 and a 90th percentile value of 0.73 per cent.
- Tailings have a greater total S range (0.16 to 1.63 %) compared to coarse reject samples (0.11 to 0.20).
- The proportion of total S as sulfide (Scr) was highly varied in the tailing's samples, ranging from 9 to 79% of total S, as was the proportion of organic sulfur (Org S), ranging from 19 to 88% of total S.
- Reject samples had much higher proportions of Org S (compared to Scr), compared to tailings samples.
- The ANC of samples spanned a wide range, from 15 to 93 kg $\text{H}_2\text{SO}_4/\text{t}$. The median ANC was approximately four times the median MPA, suggesting excess ANC in the system.
- The ANC is expected to be mostly (at least 75 %) available under field conditions. In tailings, ankerite (dolomite), calcite and siderite are the dominant carbonate minerals.
- The dominant carbonate mineral in the reject samples was siderite, with lesser proportions of calcite and ankerite (dolomite).
- This suggests that tailings material can provide more buffering capacity compared to rejects, under field conditions.

Coal reject samples have not undergone assessment for sodicity and dispersion as these materials will not be used in the near surface of final landforms.

3.6.1.3.6 Kinetic Testing

An oxygen consumption and carbon dioxide (CO₂) generation test (OxCon test) were undertaken on a composite tailings sample, as part of a geochemical assessment program undertaken by BHP in 2020. OxCon is a laboratory-scale kinetic geochemical test for the estimation of sulfide oxidation rates, acidity generation rates and carbonate neutralisation rates for sulfidic geological materials.

The composite tailings sample subject to the OxCon test was characterised by static geochemical testing methods comprising ABA, NAG tests, elemental concentrations of the NAG leachate and elemental assay of the solid. The sample was classified as NAF-S, which was consistent with the acid classification of the component samples used to create the composite, and these component samples were selected for OxCon testing because they had high(er) total and sulfide (Scr) concentrations compared to the broader tailings dataset.

The composite tailings sample that underwent OxCon testing was not capable of generating acid conditions, confirming the static test results, and despite the sample having a moderate pyrite oxidation rate. However, based on the analysis of the NAG leachate and the post-OxCon leachate, the sample has generated moderate sulfate concentration – and this finding is consistent with oxidation of sulfide into sulfate (and subsequent mobilising of salt during leaching). The result confirms that SD is plausible from materials represented by this composite tailing sample.

This composite sample represents tailings materials at the upper end of the total S range (greater than 90th percentile total S concentration). This sample was chosen for test-work to assess the potential for AMD in high sulfur materials to introduce a level of conservatism in the assessment (understanding that high sulfur tailings represent a very small proportion of the tailings output).

3.6.1.3.7 Management and Rehabilitation Measures

Spoil

The management of spoil materials generated at SWC will be consistent with the current approved mine waste management strategy, that is, in-pit disposal within waste dumps, then progressively rehabilitating with landform shaping directing run-off to the void.

No specific management measures are proposed or required for the spoil to manage risk of AMD, SD, or ND.

Where highly sodic and/or dispersive spoil is identified it should, wherever practicable, not be placed at the surface of final landform and should not be used in construction activities. However, it may not be practical to selectively handle and preferentially emplace highly sodic and dispersive spoil during operation. Therefore, in the absence of such selective handling, spoil landforms will be constructed to ensure they are stable, and progressively rehabilitated to minimise erosion, as per the SMR Landform Design Guideline (SMR, 2024).

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

Surface water run-off and seepage from waste rock emplacements, including any rehabilitated areas, should be monitored for water quality parameters.

Rejects and Tailings

Reject materials generated at SWC will continue to be managed in accordance with the current approved coal reject management strategy - comprising the disposal (burial) of dewatered tailings and rejects within low-wall spoil at designated disposal areas. Coal reject areas will also undergo monitoring for AMD and related environmental impacts.

Based on the current assessment, coal reject materials are regarded as posing a low AMD hazard with respect to generation of acidity and/or sulfate. However, to further reduce AMD risks and to assist rehabilitation, rejects will be disposed into low-wall spoil piles and be buried by at least 10 m of spoil. Seepage would be confined within, and drain to, the footprint of residual voids.

Management of tailings is discussed in the tailings section of the PRCP (Section 3.6.2).

Validation of Mineral Waste Characteristics

SWC will continue to undertake analysis of mineral samples throughout mining to manage the risk of AMD, SD, or ND. Progressive sampling would, at minimum, comprise a broad suite of environmental geochemical parameters, such as pH, EC (salinity), static geochemical suites and total and soluble metals/metalloids. This data will be recorded and managed within the site's environmental management system and integrated into the mine planning process for appropriate management commensurate with the risk presented.

Waste placement and management strategies should continue to be refined as mining progresses.

3.6.1.4 Soil and Capping Material

PRCP Guideline (Section 3.6.1)

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

A material characterisation study has been conducted for SWC to assess the quality of material available for rehabilitation (Landloch, 2025, 2025b; Appendix 4). The objectives of the study included:

- Develop an inventory of materials available for rehabilitation and assess the suitability of materials as growth media in rehabilitation; and,
- Interpret available data to characterise materials for use as growth media to support vegetation required to meet the PMLU.
- Assess the volume of materials available for use in rehabilitation activities.

The results of the study and suitability of the respective soils and spoils for use in rehabilitation at SWC is described below.

3.6.1.4.1 Quality and Quantity of Available Resources

Both soils and spoils were assessed for use as growth media for SWC rehabilitation activities. The soil assessment included field surveys and testing on stockpiled topsoil at SWC. Characterisation of spoils was undertaken as part of assessments for landform design (Section 3.6.1.5), in addition to the existing spoil data from previous assessments.

It is estimated that the volume of existing stockpiles of topsoil at SWC is approximately 4,841,839 m³, with the locations of these stockpiles shown below.

The topsoils materials were categorised into three management groups based on texture (Landloch, 2023, 2025b);

- Clays
- Loams
- Sands and light loams.

3.6.1.4.2 *Topsoil Resources*

The location of stockpiled topsoil resources at SWC are shown in Figure 3-39, Figure 3-40 and Figure 3-41. Details on the sampling program density, collection methods and laboratory analytical suites are outlined in Appendix 4.

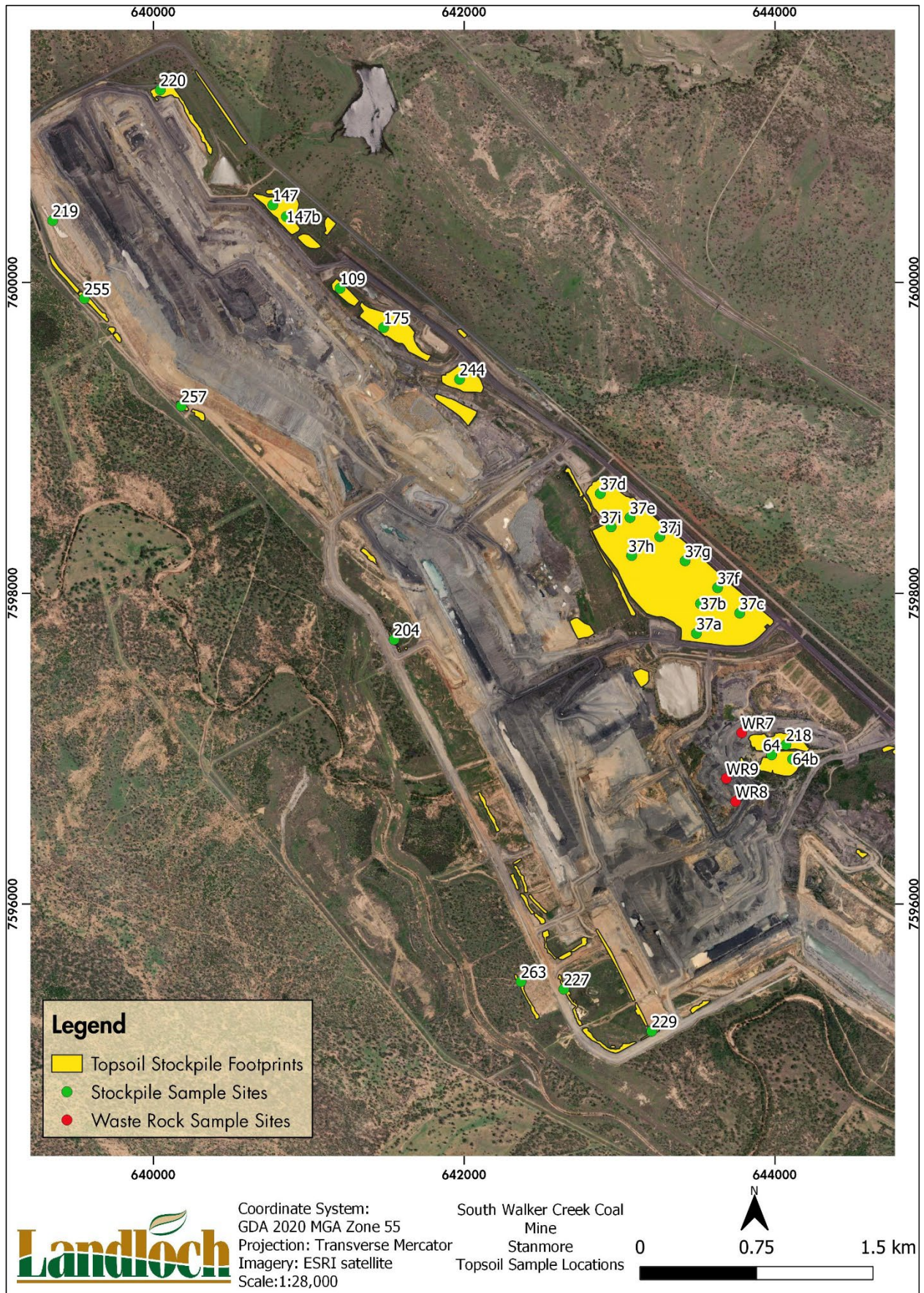


Figure 3-39 Stockpiled Topsoil Materials Across the SWC and Sampling Locations (Northern)

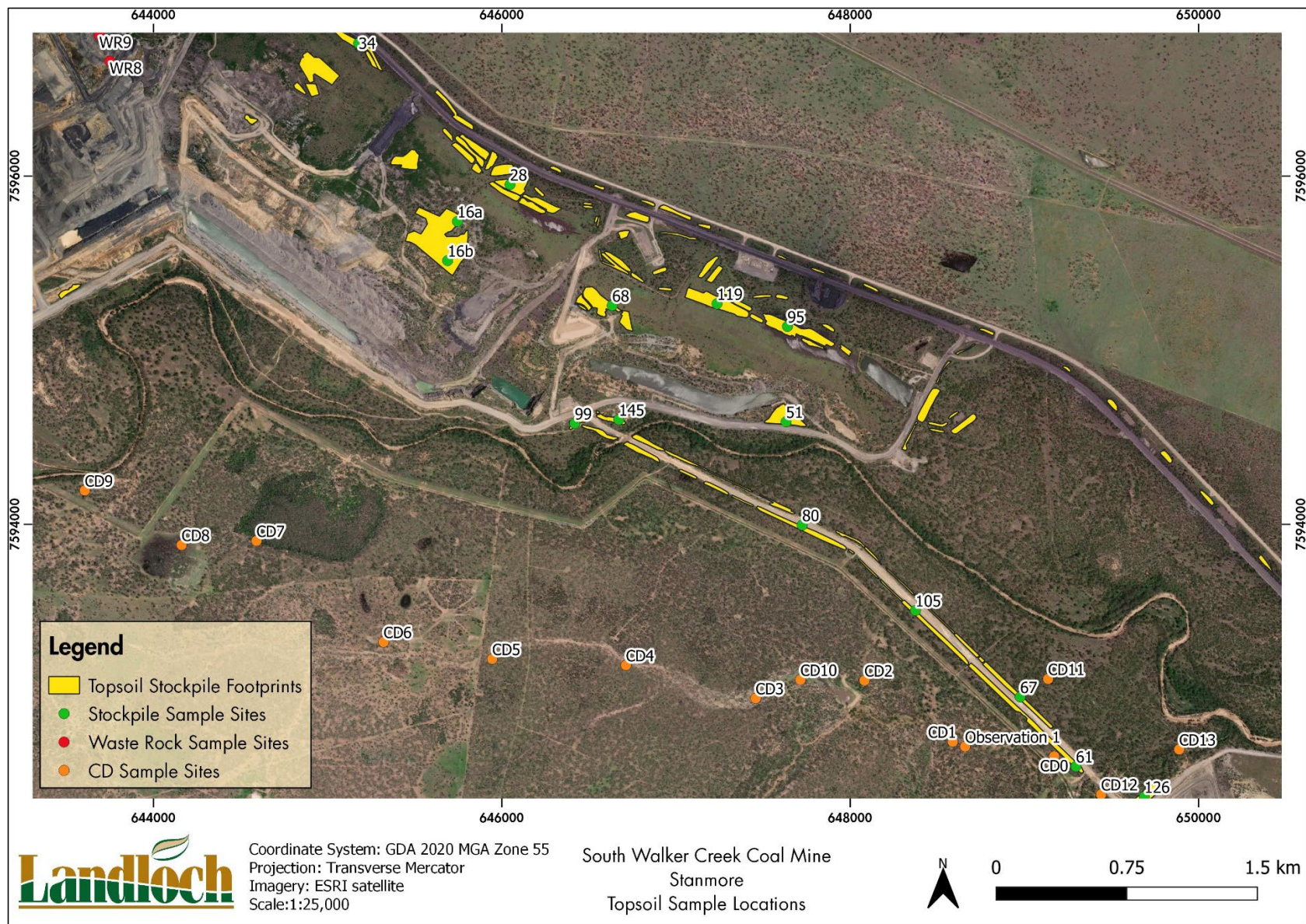


Figure 3-40 Stockpiled Topsoil Materials Across the SWC and Sampling Locations (Central)

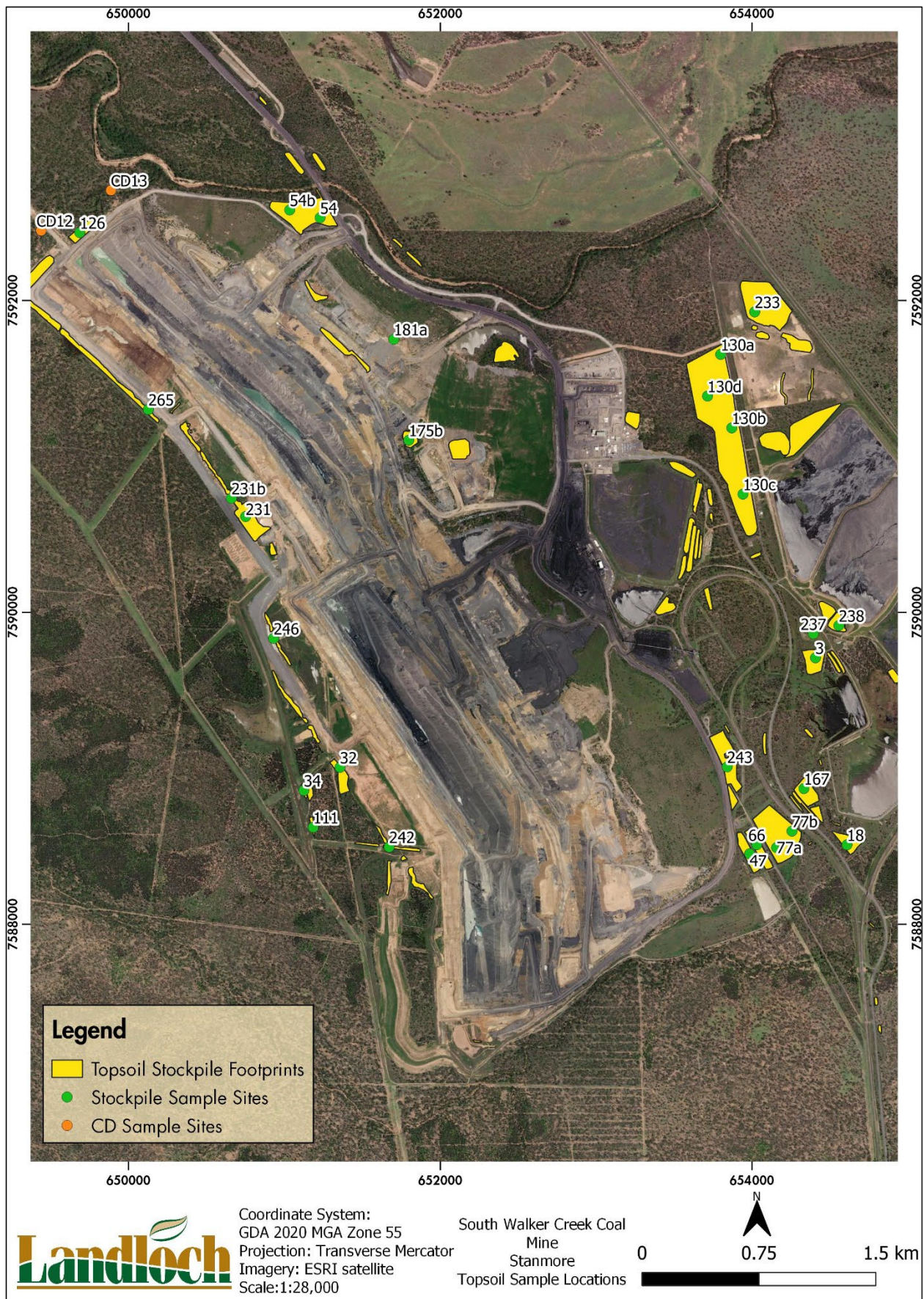


Figure 3-41 Stockpiled Topsoil Materials Across the SWC and Sampling Locations (Southern)

A total of 284 topsoil samples were collected across 71 locations across SWC, representing the existing stockpiled topsoils. These were categorised based on texture to clays, loams, and sands/light loams. A summary of the analysis and results based on texture classes is shown in Table 3-41.

Table 3-41 SWC Stockpiled Topsoil Quality, per Management Groups Based on Texture (Landloch, 2025)

Analysis (Unit)	Chemical Properties		
	Clays	Loams	Sands and Light Loams
Soil pH (H ₂ O)	(8.0-9.2)	(7.0-8.7)	(6.9-8.8)
pH Rating	Moderately to strongly alkaline	Neutral to strongly alkaline	Neutral to strongly alkaline
Soil EC (dS/m)	(0.2-0.6)	(<0.2)	(<0.1)
EC Rating	Low to High	Low	Low
Soil Cl [mg/kg])	(29-627)	(<70)	(<50)
Cl Rating	Low to High	Low	Low
ECEC (meq/100g)	(14-28)	(8.3-16.8)	(<10)
ECEC Rating	Moderate to High	Low to Moderate	Low
ESP (%Na/CEC)	(2.7-14)	(3.5-9.4)	(1.5-10)
ESP Rating	Non-sodic to Sodic	Non-sodic to Sodic	Non-sodic to Sodic
Ca/Mg (ratio)	(1.2-3.9)	(1.3-2.6)	(1.6-3.7)
Ca/Mg Rating	Moderately imbalanced	Moderately imbalanced	Moderately imbalanced
Tot Organic Carbon (%)	(0.4-1.3)	(<0.9)	(<0.6)
TOC Rating	Low	Low	Very Low
P (mg/kg) (Colwell)	(5.4-18)	<14)	(5.0-20)
P Rating	Low to Moderate	Low	Low to Moderate
Total Nitrogen (%)	(<1,150)	(<850)	(<520)
TN Rating	Low	Low	Low

Clay textured soils are the dominant topsoil stockpiled at SWC. Together clay and loam soils account for ~80% of the sample sites. Both clay and loam soils are susceptible to slaking and dispersion and as a result pose an increased risk of erosion. The primary mitigation measure for these soils is therefore to ensure that their chemical fertility is managed to promote vigorous vegetation establishment and growth in the initial stage of rehabilitation, as described in Section 3.6.1.4.

The risk of dispersion and limiting the impacts of sodicity will need to be managed through the use of gypsum prior to revegetation. It should be noted that despite some stockpiles with clay soils having elevated salinity levels, once vegetation is established, regional vegetation appears to be tolerant of elevated salinity levels.

Sand and light loams account for the remaining 20% of stockpiled topsoils at SWC. Similarly, with the exception of one stockpile, these soils are susceptible to slaking and dispersion and as a result pose an increased risk of erosion. Unlike the clays and loams, both physical and chemical limitations of sands/light loams need to be managed for use in rehabilitation. Chemical limitations would be addressed similar to other topsoils but to manage physical limitations, it is recommended these soils are mixed with a soil containing a higher clay content or pairing the topsoil with a quality subsoil/spoil material to increase the depth of soil available for vegetation roots.

Despite the limiting factors described above, as described in Section 3.1.2, the soil properties of all SMU's (except D1) mapped onsite exhibit sufficient capacity to support both grasses and native trees, making it moderately productive for grazing on native pastures. Despite this, all growth media will be assessed by an AQP as part of surface preparation (RM5) to identify amelioration and other treatments required to achieve the following primary growth media quality targets.

3.6.1.4.3 Spoil Resources

The spoils at SWC have been previously assessed in several studies. These studies characterised the soils in terms of their use in rehabilitation, noting:

- Both Carbonaceous and non-carbonaceous overburden and interburden is expected to be non-saline.
- Both Carbonaceous and non-carbonaceous overburden are a risk of dispersion based on CEC and ESP results.
- For dispersion risk, the finer textured materials are higher risk especially in the clay and silt sized fraction. The finer materials found on site are the Tertiary alluvial/colluvials and the weathered upper Permian.
- Both Carbonaceous and non-carbonaceous overburden are a low risk of acid generation as described in section 3.6.1.3.

Based on the above characterisation, it was identified that the hierarchy of risk management was:

- Fresh Permian spoil free of carbonaceous inclusions is considered the most suitable option for placement at surface prior to application of the growth media.
- Placement of the weathered Permian and tertiary spoils close to surface should be avoided.

Due to the rocky nature of the fresh Permian spoil, it should be used in conjunction with topsoil as grazing on a rocky surface. Other studies have shown that suitably competent rocky Permian over time will reduce in salinity and sodicity and can support native woodlands, and therefore could be suitable for inner facing slopes. The rocky Permian has also been shown to be more erosionally resistant compared to non-rocky/topsoiled areas and could also be employed on higher relief parts of the site (Emmerton, 2018).

3.6.1.4.4 Amelioration and Surface Treatment

To increase the chemical fertility of the available soils are low and so a balanced NPK fertiliser should be applied during rehabilitation to provide a starter source of nutrients for initial vegetation growth (Landloch, 2023). An amelioration program is to be developed to address the potential limitations of topsoils and spoils at SWC as per Table 3-42.

As part of surface preparation, an assessment of growth media characteristics will be completed by an AQP (RM5) that identifies amelioration and other treatments required to achieve the primary growth media quality targets (Section 3.8.2).

As shown in Table 3-42, the primary growth media can consist of topsoils and fresh Permian spoil however topsoil will be used as preference for topsoil depth placement where available (RM5).

Table 3-42 Potential Limitations of Topsoil and Spoil at SWC

Material	Potential Limitations	Amendments	Suitability
Topsoil – Clay Soils	• Moderately to Strongly Alkaline • Often sodic and dispersive • Low N, P, K, S, Ca, B, Zn, P and TOC	• Gypsum • Balanced NPK Fertilizer	Primary Growth Media

Material	Potential Limitations	Amendments	Suitability
Topsoil – Loam Soils	- Moderately to Strongly Alkaline - Often sodic and dispersive - Low N, P, K, Ca, B, Zn, P and TOC	- Gypsum - Balanced NPK Fertilizer	Primary Growth Media
Topsoil – Sand and Light Loam Soils	- Moderately to Strongly Alkaline - Often sodic and dispersive - Low N, P, K, S, Ca, B, Zn, P and TOC	- Gypsum - Balanced NPK Fertilizer	Primary Growth Media
Fresh Permian Spoil	- Moderately to Strongly Alkaline - Often sodic and dispersive - Low N, P, K, S, Ca, B, Zn, P and TOC	Balanced NPK Fertilizer	Primary Growth Media
Weathered Permian Spoil	- Strongly Alkaline - Moderate to high salinity - Sodic to strongly sodic and dispersive - Potential elevated metals - Rock susceptible to weathering - Low N, P, K, S, Ca, B, Zn, P and TOC	Gypsum	Secondary Growth Media
Tertiary Spoil	- Strongly Alkaline - Moderate to high salinity - Sodic to strongly sodic and dispersive - Potential elevated metals - Rock susceptible to weathering - Low N, P, K, S, Ca, B, Zn, P and TOC	Gypsum	Potential Secondary Growth Media

3.6.1.4.5 Surface Treatment

The depth of topsoil that will be applied over the PMLU treatment areas is 150mm. The Materials Characterisation study determined that amelioration products and application rates should be assessed by a suitable qualified professional prior to use for rehabilitation and to complement the desired PMLU (Landloch, 2023).

3.6.1.5 Landform Design

PRCP Guideline (Section 3.6.1)

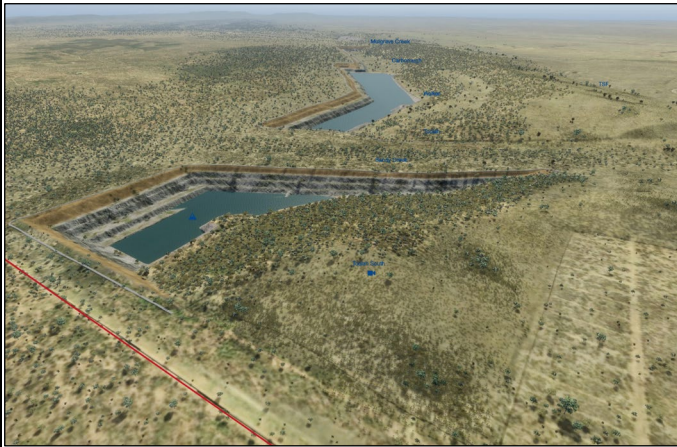
The final landform design must be based on the proposed PMLUs and NUMAs and demonstrate that the land will be safe and structurally stable.

The final landform design considers the landform development and reshape of all relevant areas within the mining lease after the removal of infrastructure. The landform has been refined based on the outcomes of relevant technical studies to support the PRCP. These studies include Landloch (2024a) attached as Appendix 8 and demonstrate the relevant considerations for design of the final landform at SWC, including to demonstrate that it is geotechnically, erosionally and geochemically stable.

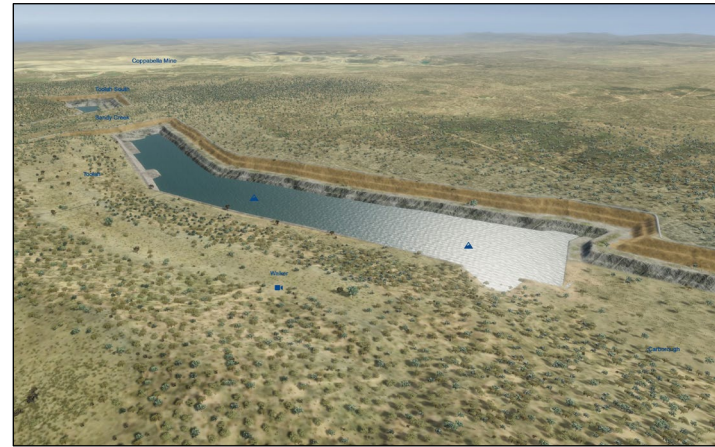
The landform design has also considered the relevant NUMAs and PMLUs which apply to the mining leases and ensures that the geotechnical stability of the residual voids is achieved (Section 3.6.3.2), and that they are mitigated against flood impacts (Section 3.6.3.1.1).

3.6.1.5.1 3D Design

The 3D design of the final landform at SWC is presented in Figure 3-42 and Figure 3-43.



Toolah South Pit

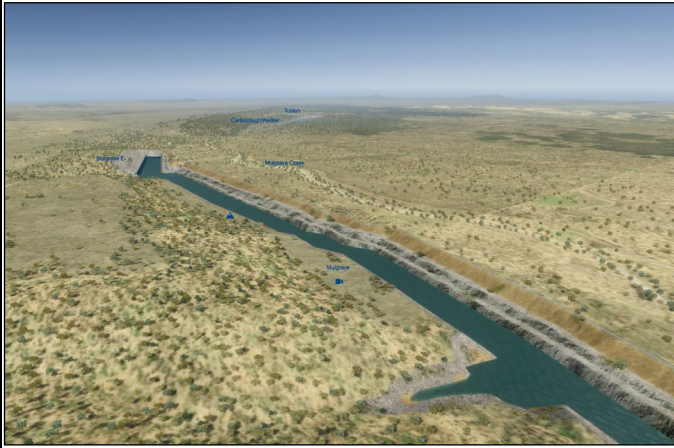


Toolah Pit

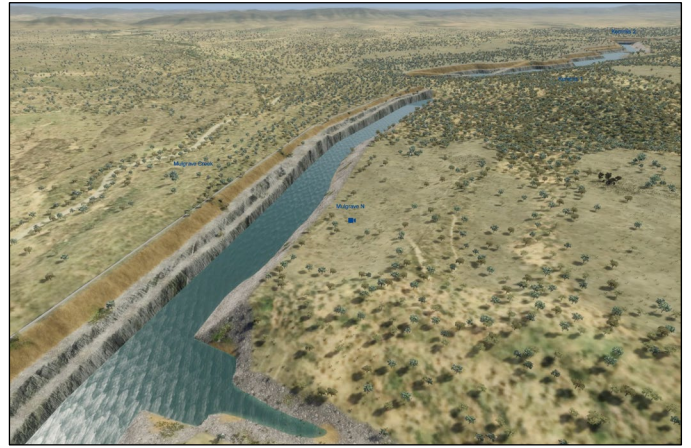


Carborough Pit

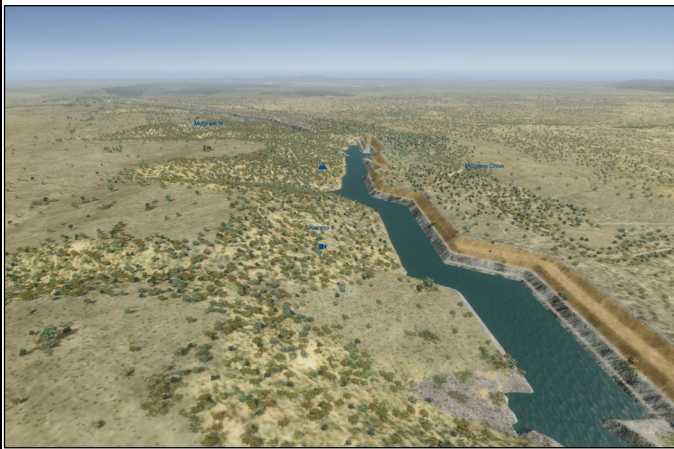
Figure 3-42 3D Post-Mining Landform Designs – Southern Pits



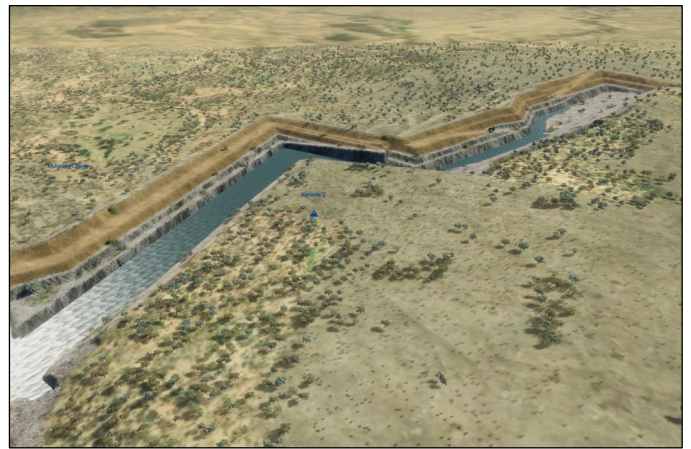
Mulgrave South – E and F Pits



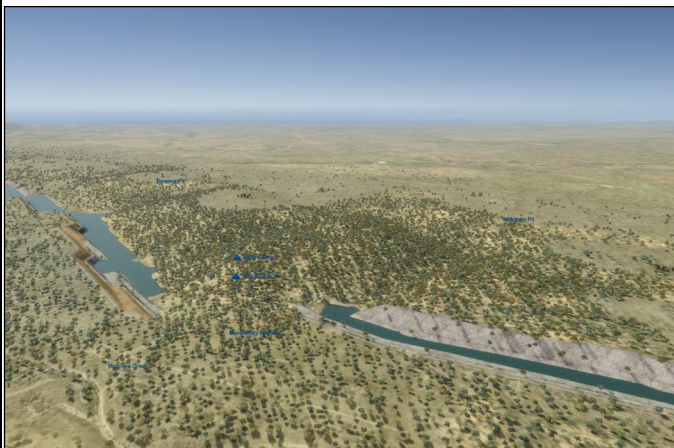
Mulgrave North – G and I Pits



Kemmis 1 Pits



Kemmis 2 Pits



Biodiversity Corridor

Figure 3-43 3D Post-Mining Landform Designs – Northern Pits

3.6.1.5.2 Method of Determining Landform Design

The final landform design at SWC has considered the relevant design objectives outlined in Table 3-43 below. Generally, the design objectives relate to slope gradient, slope stability and groundcover required to achieve an erosionally and geotechnically stable landform, and to sustain the PMLU. For clarify, the following definitions of inward and outward facing slopes has been applied:

- Inward facing slopes = direct water into a void.
- Outward facing slopes = direct water away from a void.

Table 3-43 Landform Design Objectives

Post Mining Land Use	Rehabilitation Area	Landform Design Assumptions (Appendix 8)	Design Objectives
Grazing	RA1 RA2 RA3 RA6	• Landforms with gradients of <15% or less shall have clay or loam soils applied as growth media. • Landforms with gradients of >15% or less shall have fresh Permian material applied growth media. • For waste landforms, at least 5m of non-acid forming fresh or weathered Permian waste shall be present below the growth media. • Waste landforms reshaped to be free draining.	• Landform reshaped with maximum 15% slope. • Outward facing slopes have: – Slope lengths <700 m. – Predicted erosion rates <5 t/ha/yr. – Groundcover >70%. • Inward facing slopes have: – Slope lengths <400 m. – Predicted erosion rates <12 t/ha/yr. – Groundcover >30%. • Landform achieves geotechnical Factor of Safety (FoS) ≥ 1.5. • Set-back of high-wall and end-wall achieves stability FoS within NUMA extents. • Flood mitigation provided for residual voids above the 0.1% AEP flood levels.
Woodland	RA5 RA8 RA9		• Landform reshaped with maximum 25% slope. • Outward facing slopes have: – Maximum 25% slope. – Slope lengths <700 m. – Predicted erosion rates <5 t/ha/yr. – Groundcover >70%. • Inward facing slopes have: – Maximum 15% slope. – Slope lengths <400 m. – Predicted erosion rates <12 t/ha/yr. – Groundcover >30%. • Landform achieves geotechnical FoS ≥ 1.35 • Set-back of high-wall and end-wall achieves stability FoS within NUMA extents. • Flood mitigation provided for residual voids above the 0.1% AEP flood levels.

Grassland	RA4		• Landform reshaped with maximum 25% slope. • Outward facing slopes have: – Maximum 15% slope. – Slope lengths <700 m. – Predicted erosion rates <5 t/ha/yr. • Inward facing slopes have: – Maximum 25% slope. – Slope lengths <400 m. – Predicted erosion rates <12 t/ha/yr. • Vegetative groundcover ≥ 10% • Landform achieves geotechnical FoS ≥1.35 • Set-back of high-wall and end-wall achieves stability FoS within NUMA extents. • Flood mitigation provided for residual voids above the 0.1% AEP flood levels.
Watercourse	RA7	-	• Final landform is performing in accordance with the DNRME Guideline: Works that interfere with water in a watercourse for a resource activity – watercourse diversions under the Water Act 2000 (OSW/2019/4599, or a later version) • A BioCondition assessment demonstrates that the final landform achieves the “Revised PRCP Benchmark” criteria in Table 3-56.

3.6.1.5.3 Materials Available

The materials available onsite for use in rehabilitation and closure consist of topsoils and spoils (Landloch, 2024a). Stockpiled topsoil materials were categorised into three management groups based on texture:

- Clays: Clay textured topsoils are the dominant topsoil stockpiled in the north and south of SWC, occurring at approximately 60% of the sample sites.
- Loams: Loam soils account for approximately 20% of stockpiled topsoils at SWC and are concentrated through the central and southern portions of the site; and
- Sands and light loams: account for 20% of stockpiled topsoils at SWC, with spatial variability across the site.

Spoils are categorised into three management groups:

- Fresh Permian spoil;
- Weathered Permian spoil; and
- Tertiary spoil

A summary of key chemical and physical properties for growth media to support rehabilitation activities is provided in Section 3.6.1.4.2 (Topsoils) and Section 3.6.1.4.3 (Spoils).

The following materials are proposed for use within the top 5m of final landforms:

- Clay topsoil;

- Loam topsoil; and
- Fresh Permian soil.

These materials will be stockpiled and used as growth media to facilitate vegetation growth and support rehabilitation of SWC landforms to achieve the approved PMLUs. Prior to recovery and stockpiling, materials will be characterised to develop an approach that limits the recovery and use of potentially acidic, sodic, or saline materials in rehabilitation. Where required to increase the erosional resistance of landforms, rock is available onsite and can be used in rehabilitation activities.

3.6.1.5.4 *Hydrological and Hydrogeological Assessments*

Except for the catchment into the residual void, the final landform will predominately be water shedding. Rehabilitation will include:

- Reshaping of the spoil dumps with no permanent water management structures on slopes.
- Reshaping of the rehabilitated mine areas to be free draining, and implementation of erosion protection measures to mitigate risk of increased flow velocities on final landforms.
- Partial backfill of the C/W/T and Toolah South final voids and placement to mitigate the risk of flooding into the residual voids up to the 0.1% AEP flood level.
- Implementation of landform structures to prevent flood and void interactions.
- Removal of road culverts and fill material from within the watercourse extents.

A flood assessment, including hydrologic and hydraulic modelling was completed for the SWC final landform. The assessment including modelling of voids in a flood plain (Section 3.5), and rehabilitation flood modelling (Section 3.6.3.1.1) of the final landform.

Some minor catchments had concept drainage included to capture these catchments and direct them to either Sandy, Kemmis or Walker Creek. These modifications represent the intent of the landform establishment (RM3), which will involve the design of this drainage outcome. The model results (with this concept drainage) prevent flood ingress to residual voids.

The flood plain assessment of the pre-mining landform identified the Kemmis IN, Mulgrave FN and EN, and Carborough DN pits would be located with the flood plains of Walker Creek under the SENS2 modelled scenario (Section 3.5).

A hydrogeological assessment (Section 3.6.3.3), including numerical modelling, and pit lake water balance modelling (Section 3.6.3.1.2) identified the residual voids, once stabilised, will through evaporative losses continue to act as a sink. Therefore, groundwater gradients in the proximity of the residual voids will maintain flows towards the pit lakes and retain any contaminants within the residual voids.

3.6.1.5.5 *Long-Term Landform Stability*

Landloch (2023a) undertook assessments to determine acceptable rates of soil loss and subsequently assess long-term stability of rehabilitated landforms at SWC.

A target soil loss was determined by assessing the erosion potential of areas surrounding SWC using the Revised Universal Soil Loss Equation (RUSLE). This assessment found that:

- For a groundcover levels of 50-70% (consistent with what is typically achieved for grazing land and open woodlands) the long-term erosion of naturally occurring erosion for the SWC region ranges from 0.3–18t/ha/y, and averages 4.4t/ha/y.
- Most land has a long-term annual erosion rate of less than 5t/ha/y, for a 50% vegetation cover level.
- For vegetation cover levels of 30% (consistent with what is typically achieved for grazing land and open woodlands on steeper land) the long-term erosion of naturally occurring erosion for the SWC region ranges from 1–39t/ha/y, and averages 14t/ha/y.
- The majority of land has a long-term annual erosion rate of less than 12t/ha/y.

- Based on these results, a target erosion threshold of <5t/ha/y and groundcover of 70% was selected for outward facing slopes, and >12t/ha/y and 30% groundcover for landforms with inward facing slopes.
- Landform evolution modelling (LEM) was undertaken on the final landform and included:
 - Simulations of runoff and erosion for a range of landform options using the Water Erosion Prediction Program (WEPP).
 - Derivation of parameters for the SIBERIA LEM.
 - Landform evolution simulations using SIBERIA for the 3D landform of SWC spoil dumps, which were designed based on the WEPP results.

The runoff and erosion simulations using the WEPP model and the landform evolution simulations using the SIBERIA model indicate that the proposed dumps and slope profiles (Table 29) at SWC can be expected to be stable over the long-term, provided the target levels of vegetation cover are achieved.

The results from the SIBERIA modelling predict the long-term development of channels and hillslopes in the landform catchments, considering runoff, erosion, and deposition. The model was run for 300 years, with outputs provided between 50 years and 300 years. At each output year, visualisations of the rate of erosion and gully development are provided, along with a table that includes rates for each material on the landform (LandLoch, 2024).

The modelling predicted that for the Toolah, Walker, Carborough, Mulgrave and Kemmis landforms, with cover soils of either Clay, Loam or Permian waste, erosion rates for outward-facing slopes with 70% groundcover remain below the target level of 5t/ha/y. Inward-facing slopes with groundcover >30% are also predicted to erode at rates lower than the target of 12t/ha/y (Table 3-44 and Table 3-45).

Table 3-44 Predicted Erosion Rates and Maximum Gully Depths (Toolah-Walker-Carborough Landforms)

Simulation Year	Maximum Gully Depth (m)	Average Annual Erosion (t/ha/y)	Cumulative Erosion (mm)
Clay Soil with 70% Vegetation Groundcover			
50	-	4.6	18
100	-	3.7	32
200	0.3	3.3	45
300	0.4	3.2	57
Loam Soil with 70% Vegetation Groundcover			
50	-	4.3	16
100	-	3.3	29
200	0.3	2.9	41
300	0.3	2.8	51
Permian Waste with 30% Vegetation Groundcover			
50	-	4.9	19
100	0.3 Permian Waste with 30% Vegetation Groundcover	4.1	35
200	0.5	3.A	50
300	0.6	3.8	64

Table 3-45 Predicted Erosion Rates and Maximum Gully Depths (Mulgrave and Kemmis Landforms)

Simulation Year	Maximum Gully Depth (m)	Average Annual Erosion (t/ha/y)	Cumulative Erosion (mm)
Clay Soil with 70% Vegetation Groundcover			
50	-	4.6	18
100	-	3.6	32
200	-	3.2	44
300	-	3.2	56
Loam Soil with 70% Vegetation Groundcover			
50	-	4.3	16
100	-	3.3	29
200	-	2.8	40
300	-	2.7	50
Permian Waste with 30% Vegetation Groundcover			
50	-	4.7	18
100	0.3	4.2	34
200	0.5	4.0	50
300	0.7	4.0	65

The results from the landform evolution modelling indicate that vegetated soils (>70% groundcover and vegetated fresh Permian waste (>30% groundcover) can be used to create a rehabilitated landform that is erosionally stable in the long-term.

3.6.1.5.6 Method of Construction

The majority of the spoil dumps are dumped within the mined-out pit extents and comprise of dragline spoil at the base of the dump with haul trucks dumping ~20m lifts above the dragline spoil. The spoil dumps will be reprofiled to be consistent with the final landform design. The dumps are to be capped with a layer of fresh of weathered Permian, prior to application of primary growth media.

Where required, temporary drainage controls will be designed and constructed to ensure erosion of the final landform is minimised.

3.6.1.5.7 Quality Assurance / Quality Control

Construction methodologies applied to landforms will be appropriately designed, to ensure success in achieving the proposed completion criteria. Records of the method applied in construction of final landforms 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 $\pm 0.2\text{m}$ vertical height measured over a maximum distance of 50m, 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 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 3.7). 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.

3.6.1.5.8 Trial Methodology

Assessments and modelling undertaken as part of PRC planning has indicated that final landforms will be stable, therefore no trials have been proposed. However, 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.

3.6.1.5.9 Limitations and Assumptions

The limitations and assumptions of the final landform design include:

- 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.
- A swell factor of 25% has been assumed for the dump scheduling. This is a standard factor based on experience in the Bowen Basin.
- Landform evolution modelling has been completed for up to 300 years based on the best available inputs at this time.
- Detailed contaminated land assessments undertaken in Rehabilitation Milestone 2 (Section 3.1.6) will identify if any additional materials need to be managed, remediated, or removed from site. This is not expected to materially alter the final landform design.
- All landforms are assumed to be compacted during construction, and no adverse impacts from settlement or requirement for remedial earthworks is expected long-term.

3.6.1.6 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.

Cover systems are required when mine landforms are expected to be a source of contamination, representing an unacceptable risk of generating acid, neutral, metalliferous, or saline drainage. The potential for generation, as well as mobilisation of contaminants, can be mitigated to an acceptable level by installing an appropriate cover.

There are three mineral waste types generated at SWC, the characteristics of which are discussed in Section 3.6.1.3. These include:

- Spoil: Representing approximately 97% of generated waste at SWC and is comprised of weathered Tertiary and weathered and fresh Permian material. Non-carbonaceous spoil, typically the weathered and fresh Permian material, was found by Terrenus (2021) to have a negligible

potential to generate acid, metalliferous, neutral, and/or saline drainage and makes up approximately 95% of all spoil.

- Rejects: Representing approximately 2.4% of all mineral waste at SWC. Rejects are co-disposed within Spoil dumps.
- Tailings: Representing approximately 0.5% of all mineral waste at SWC. Tailings material is present within the TSFs at SWC (Old Tailings Dam (OTD) and Bidgerley Tailings Storage Facility (BTSF)).

Spoil and tailings are co-disposed within spoil dumps and are considered to present low risk of generating acid, neutral, metalliferous, or saline drainage. Tailings as a bulk material, are expected to generate pH-alkaline, low salinity run-off and seepage. In 2021, tailings samples (n=44) were found to be non-acid forming (NAF) and subsequently, have a low potential to generate acid, neutral or saline drainage, due to the low total S and sulfide-sulfur concentrations (Terrenus Earth Sciences, 2021).

Further to presenting low risk of neutral, metalliferous, or saline drainage generation, spoil is overwhelmingly NAF, with high natural alkalinity, high ANC relative to MPA and low metal/metalloid concentrations and, as such, is geochemically suited to receive dewatered tailings (Terrenus Earth Sciences, 2021).

3.6.1.6.1 Waste Rock Dumps

The geochemical risk posed by spoil 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 (Landloch 2024, Terrenus Earth Sciences, 2021). As a result, an engineered cover to address these risks are not required.

- A cover design for the waste rock dumps has been undertaken and is attached as Appendix 10 of this document. The broad strategies of managing the wastes will include:
- Co-mingling of the wastes and coal rejects. Co-disposal of any PAF material within a large proportion of NAF material will provide excess acid neutralising capacity.
- Tertiary waste will not be present at the final landform surfaces (minimum 3m cover of fresh and/or weathered Permian over tertiary spoil).
- A topsoil surface layer with an average thickness of 0.15m placed on outward-facing slopes, to support >70% groundcover. This would overlie the 3m thick layer of NAF weathered and/or fresh Permian waste.
- Fresh NAF Permian waste (without topsoil) with an average thickness of 0.5m placed on inward-facing slopes, to support >30% groundcover. This would overlie the 3m thick layer of NAF weathered and/or fresh Permian spoil capping tertiary spoil.

3.6.1.6.2 Tailings Storage Facilities

The OTD and BTSF are the out of pit tailings storages at SWC. Both TSFs are classified as “Down Slope Turkey’s Nest” earth fill embankment facilities, with OTD capped with coal rejects. The detailed characterisation of tailings materials and TSFs is included in Section 3.6.2. A summary of the conceptual cover design for OTD and BTSF is provided below:

- A transition layer:
- Comprised of coarse rejects and Permian spoil, this layer would be of varied thickness depending on pre-construction geotechnical assessment to determine stability risk. This layer would form a bridging layer to support heavy machinery undertaking rehabilitation activities and may include a geotextile to provide additional bearing capacity.
- A 2 m compacted spoil layer:
- This layer will have a sufficient air entry value break and be comprised of select clayey spoil, compared to the overlying topsoil and subsoil to act as a capillary break to limit the potential for capillary rise of salt into overlying soils. The layer will be graded and compacted in a way that expels excess rainfall infiltration.

- 0.5 m of topsoil and subsoil won from existing stockpiles:
- This layer will act as a growth medium to retain sufficient rainfall to support fertility and a seed bank for the establishment of vegetation.

This cover approach is commensurate with the geochemical risk presented by tailings material, which over the course of operations at SWC, has consistently demonstrated negligible risk of acid. Although the SWC TSFs do not require significant controls to prevent the formation of acid, metalliferous, saline or neutral drainage; the current design approach limits the potential for rainfall infiltration, which will limit the long-term potential for seepage.

3.6.1.7 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).

The following section details water management concerning the rehabilitation at SWC. SMC will develop a Closure Water Management Plan (CWMP) prior to closure to systematically address and delineate the operational requirements related to water management.

The design of the closure landform for SWC aims to create landforms that satisfy the specified PMLU and NUMA milestone 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, outlined in detail in the relevant sections of this PRC Plan, including:

- The closure landform surface is intended to be free draining to prevent ingress into voids or ponding in the rehabilitated landform, with runoff flowing to the surrounding watercourses.
- Dams will be retained where located on Stanmore land tenure and where they will have a demonstratable benefit to support the grazing PMLU.
- All dams not located on Stanmore land tenure, will be decommissioned, and removed, and the rehabilitated areas will be free draining.
- Final residual voids will remain as NUMAs and will establish and stabilise into long-term groundwater sinks.
- TSFs will be rehabilitated such that they are not present within the final landform.
- Contaminated land investigations will be undertaken at the completion of mining where required and any identified remediation/management requirements to render the site suitable for the nominated PMLUs will be undertaken.
- Groundwater inflows and outflows to/from all the SWC residual voids reach equilibrium with net positive inflows occurring throughout the simulation period.
- The minor modelled outflows from the Kemmis 2N, Mulgrave EN and Toolah South residual voids to the surrounding spoil do not move beyond the spoil or mining leases as a result of the modelled hydraulic gradient centred on the SWC residual voids.
- No lowering of groundwater levels is predicted to occur or peak lowering is predicted to occur at the end of SWC mining with minimal ongoing drawdown occurring in the post-closure environment while groundwater levels recover and stabilise.
- No additional post-closure lowering of groundwater levels within the alluvium aquifer bores.

- The particle tracking simulation (i.e., source-path-receptor (SPR) linkages) predicts that the water particles within the potential contaminant source areas of the mining leases will migrate towards the residual voids and remain on the mining leases post-closure.

3.6.1.7.1 Potential Contaminants

SWC operations include heavy industrial type operations that maintain the processing facilities, vehicles and equipment required for the extraction and processing of coal. These heavy industrial type operations include the storage, use and disposal of a variety of hazardous materials.

The receiving waterways are considered to be slightly-to-moderately disturbed systems (Section 3.1.2). A summary of the potential contamination sources, the type of contamination and mechanism of contamination is presented in Table 3-46 (BHP, 2019).

Table 3-46 Summary of Potential Contamination Sources

Potential Source	Potential Contaminants	Mechanisms of Contamination
Runoff from disturbed land (pre-rehabilitation)	Suspended Solids (Turbidity), Dissolved Solids (sodium, chloride, sulphate), +/- pH, metals	Erosion, overland flow, capillary rise of salts, sodic spoils (elevating pH), acid generating rejects (lowering pH).
Runoff from rehabilitated land (contaminant loading expected to be significantly lower than disturbed areas)	Suspended Solids (Turbidity), Dissolved Solids, +/- pH, Dissolved Solids (sodium, chloride, sulphate), +/- pH, metals	Erosion, overland flow, capillary rise of salts, sodic spoils (elevating pH).
Release of recycled waters from tailings dams, sewage treatment plants, industrial areas, etc.	Suspended Solids (Turbidity), Dissolved Solids (sodium, chloride, sulphate), +/- pH, hydrocarbons, pathogenic microorganisms, metals	Releases from dams (seepage, catastrophic failure, by wash), pipes, drains, spills, acid generating rejects (lowering pH) ineffective sewage treatment, release from sewage ponds
Release of waters from pits and storages	Suspended Solids (Turbidity), Dissolved Solids (sodium, chloride, sulphate), +/- pH, metals	Releases from dams (seepage, catastrophic failure, by wash), pipes, drains, etc.
Release of waters from sediment dams	Suspended Solids (Turbidity), Dissolved Solids (sodium, chloride, sulphate), +/- pH, metals	By wash, capacity reduced due to sedimentation.
Spilt or leaking flammable and combustible liquids and chemicals	Hazardous or toxic products, +/- pH, metals.	Contamination of land and surface runoff causing impact to regional water systems.

Current operational water management involves segregating and containing water from mine operational areas. The collected water is stored in on-site mine dams and recycled within the mine operations. Excess water is released in accordance with EA conditions. Mine Affected Water (MAW) includes runoff from CHPP and mine industrial areas, along with water extracted from pits. MAW dams have the potential to accumulate contaminants and sediments. Contaminants of concern include those mentioned for mine industrial operations, metals, and salinity.

Upon completing mining operations, a contaminated land investigation will evaluate the area for potential contamination in accordance with the PRCP Schedule.

3.6.1.7.2 Infiltration, Seepage and Collection Controls

The WSP post-closure hydrogeological technical report integrates a particle tracking analysis to inform migration/flow pathways for contaminants and residual voids, accessing potential particle migration routes. The findings indicate that contaminants, originating from potential source areas within the ML could

accumulate in residual voids above a specified level however the water particles within the potential contaminant source areas of the mining leases will migrate towards the residual voids and remain on the mining leases post-closure.

Modelling confirmed that groundwater exchange in the voids is expected to stabilise after mine closure; each of the voids will operate wholly as a groundwater sink, with no water seepage into the natural environment (WSP, 2024). Therefore, there are no dedicated infiltration of seepage collection controls required. However, monitoring of groundwater will still occur (Section 3.8.5).

3.6.1.7.3 Surface Water Diversions and Long-Term Management

SWC has several existing diversions within one watercourse (Walker Creek) which were designed and constructed to enable open-cut mining. The MRA2A Walker Creek Diversion is approximately 8km upstream of the Walker Pit Diversion (Figure 3-8). Between the two diversions, Carborough Creek flows into Walker Creek. A diversion assessment framework was developed (Engeny, 2020) that analysed the licenced creek diversions at SWC against industry standard performance criteria and objectives and found that:

- MRA Walker Creek Diversion – Stage 2A: Aligns with the defined assessment objectives for post-mining land use rehabilitation requirements related to watercourses. Consequently, in a closure state for SWC, the diversion will remain in its current alignment. The assessment findings include:
 - The diversion either achieves or will progress towards achieving water license relinquishment objectives.
 - In SWC's closure state, the land around the diversion will be used for grazing, ensuring the diversion's water quality, hydraulic, and sediment transport align with the natural upstream and downstream reaches of Walker Creek and Carborough Creek.
 - Monitoring and rehabilitation programs for the diversion will be sustained throughout SWC's operational phase (section 3.8.3).

The Walker Pit Diversion (WL100271) was unlikely to achieve a relinquishable state at closure. Consequently, a remediation concept design was deemed necessary to fulfill the relinquishment objectives for the PRCP. Therefore, post mine closure, it would be intended the existing diversion will be altered such that the waterway will remain in a new remediation alignment, with the designated post-mining land use being 'watercourse.' The integration of the surrounding PRCP closure landform with the concept diversion involves the following steps:

- Complete functional design for the new diversion and obtain subsequent approvals. Diversions constructed in accordance with the engineering designs developed by an AQP.
- The closure landform will be extended to prevent ingress into the void during a 0.1% AEP flood event.
- The existing Walker Pit diversion will be backfilled and plugged once the new diversion reach is constructed.
- The removal and rehabilitation of adjacent mine infrastructure, including haul roads, light vehicle roads, and sediment dams within a radius of less than 100m, will take place.
- Rehabilitation efforts aim to better integrate the diversion into the adjacent landform, facilitate effective riparian vegetation establishment, limit the potential for excess sediment, and reinstate the natural floodplain.
- The design and assessment process have demonstrated that the diversion remediation concept can be safe, stable, non-polluting, and self-sustaining, requiring minimal ongoing maintenance post closure.

SWC also has two new approved diversion, a Walker Creek which has recently been completed (MRA2C diversion) and the realignment of the unnamed tributary of Bee Creek

The SWC creek diversion information, including water licenses, assessment results, and commitments for relinquishment, is provided in Table 3-47. Forward work for the Walker Pit diversion will involve necessary realignment and rehabilitation efforts to ensure the creek diversion achieves a stable condition, facilitating its transition to a relinquishable state (i.e., PMLU of Watercourse), not requiring long-term management.

Table 3-47 SWC Surface Water Diversion Details and Forward Work Plans

Details	Walker Pit Diversion	MRA Walker Creek Diversion – Stage 2A (MRA2A)	MRA Walker Creek Diversion – Stage 2C (MRA2C)	Realignment of the unnamed tributary of Bee Creek
Water License	WL100271	WL613491	WL613491	N/A (not a defined watercourse under the <i>Water Act 2000</i>)
Drainage Basin	Isaac River	Isaac River	Isaac River	Isaac River
Year of Construction	1999	2015 (Stage 1) 2016 (Stage 2)	2023 – 2024	TBC
Diversion Length (m)	900	3728	8010	1630
Diversion Assessment Outcome	At closure, the existing diversion alignment is not expected to achieve Watercourse PMLU milestone criteria. Diversion requires implementation of the forward work plan commitments, including rehabilitation as per the concept design form and alignment.	Diversion in its existing alignment is meeting or will continue progressing towards achieving the EA watercourse PMLU goals. Diversion will be relinquished in its existing alignment with a PMLU of Watercourse.	Diversion has been designed in accordance with Guideline: <i>Works that interfere with water in a watercourse – watercourse diversions</i> , DNRM (2014) (Alluvium, 2016) and therefore is intended to be a permanent diversion that would be stable in the long term and relinquished in its existing alignment with a PMLU of Watercourse.	Although the existing unnamed tributary of Bee Creek is not a defined watercourse under the <i>Water Act 2000</i> , the proposed realignment will be rehabilitated to achieve a PMLU of Watercourse.
Operational Phase	Routine monitoring and maintenance of the diversion during the operational phase of the mine.	Routine monitoring and maintenance of the diversion during the operational phase of the mine.	Routine monitoring and maintenance of the diversion during the operational phase of the mine.	Routine monitoring and maintenance of the diversion during the operational phase of the mine.
Forward Work Plan - Diversion Construction	When surrounding rehabilitation activities are planned, progress concept design to functional design, including undertaking site-specific investigations to ensure the design addresses key risks. Construction of the diversion in line with	N/A	Construction of the diversion in line with its final functional design, developed based on DNRME (2019) and ACARP (2014) guidelines.	Construction of the diversion in line with its final functional design.

Details	Walker Pit Diversion	MRA Walker Creek Diversion – Stage 2A (MRA2A)	MRA Walker Creek Diversion – Stage 2C (MRA2C)	Realignment of the unnamed tributary of Bee Creek
	the final functional design, developed based on DNRME (2019) and ACARP (2014) guidelines.			
Forward Work Plan – Infrastructure	Removal and rehabilitation of any current or future mine infrastructure near the diversion.	Removal and rehabilitation of any current or future mine infrastructure near the diversion.	Removal and rehabilitation of any current or future mine infrastructure near the diversion.	Removal and rehabilitation of any current or future mine infrastructure near the diversion.

3.6.1.7.4 Dewatering

The only dewatering required will be associated with any dams to be decommissioned that are not on SMR land tenure. All water within these storages will be dewatered back to the voids or other mine water storages during operations.

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

3.6.1.7.5 Ongoing Water Management

Based on the proposed rehabilitation strategy for SWC, once rehabilitation milestones are met and PMLUs have been achieved, no further water management are expected at SWC, including infiltration and seepage interventions, dewatering, and active reduction requirements due to:

- No water storages outside of Stanmore land tenure, that were created for or by the mining operations, are proposed to remain as part of the closure landform.
- Contamination will have been investigated, remediated and/or appropriately managed (RM2 of the PRCP Schedule).
- The residual voids will generally continue to act as long-term sinks capturing and containing any groundwater seepage from the site, and will not overtop or interconnect with groundwater aquifers (WSP, 2024)
- MRA2A, MRA2C and realignment of the unnamed tributary of Bee Creek will remain stable within their current alignments.
- The Walker Creek Pit Diversion will be realigned and rehabilitated in accordance with a functional design to form a stable landform that supports relinquishment of water licences.
- Upon relinquishment of WL associated with the diversion, and the subsequent closure of the mine, it is anticipated that there will be no requirement for ongoing, extended-term management of diversions at SWC.

3.6.1.8 Revegetation

PRCP Guideline (Section 3.6.1)

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

The PRC plan Guideline (DES 2023) states that the revegetation plan must, “propose activities that will establish self-sustaining vegetation communities that are appropriate for the intended post-mining land use

(PMLU).” Revegetation must also consider the establishment of appropriate fauna habitat if appropriate. The revegetation plan must include:

- Revegetation objectives for the site that are consistent with the PMLUs, NUMAs, and rehabilitation milestones identified in the PRCP schedule.
- Identify key vegetation species for the proposed PMLU.
- Identify any species of conservation significance relevant to the mine’s approval.
- Identify any fauna habitat and use requirements.
- Include evidence and justification for any analogue sites of the monitoring plan.
- Describe the works for establishing and managing the revegetation.
- Identify what plant/seed mixes are appropriate for the PMLU and where the mixes will be sourced.
- Identify seed density application rate and timing of seeding.
- Identify the proposed location of any infrastructure required to protect revegetation.
- Identify the growth media that would be suitable to sustain the PMLU and if it is available on site.
- Identify topsoil depth requirements for revegetation success and sustainable PMLU.

3.6.1.8.1 Revegetation Objectives

The revegetation plan for SWC is based on a rehabilitation approach that seeks to establish similar vegetation, rather than on a restoration approach that seeks to restore completely what was present prior to mining. The rehabilitation approach is most suitable for disturbed areas with modified or disturbed soil, depleted soil seed banks, and the potential for weed species that prevent natural regeneration of the pre-disturbance ecological community.

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 does not aim to restore the exact conditions of the target REs in their remnant or undisturbed state.

Revegetation activities for the woodland and watercourse PMLUs will focus on the establishment of groundcover to facilitate stability and topsoil retention and shrub and tree cover to enable the return of fauna habitat. Seed mixtures will contain a variety of perennial grass, shrub, and tree species introduced by direct seeding to establish a self-sustaining woodland ecosystem.

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

Condition E3 of the EA EPML00712313 requires all areas significantly disturbed by mining activities to be rehabilitated in accordance with SWC EA Table E1 Rehabilitation Requirements. Condition E4 also requires that progressive rehabilitation must commence within three (3) years when areas become available within the mining lease. The revegetation objectives of the planned PMLUs of grazing, woodland, grassland and watercourse are consistent with the rehabilitation requirements of the EA.

No infrastructure is proposed to protect the revegetation.

Grazing Revegetation Objectives

- To ensure final landform achieves a pasture condition rating ≤ 3 , based on the Pasture Condition Assessment criteria in Table 3-54.

Woodland Revegetation Objectives

- To ensure final landform achieves the “Revised PRCP Benchmark Criteria” as outlined in Table 3-55.

Grassland

- To ensure final landform has at least four native grass species present, with vegetative groundcover of $\geq 110\%$ and no bare areas greater than 10m^2 .

Watercourse

- To ensure final landform is performing in accordance with the DNRME Guideline: Works that interfere with water in a watercourse for a resource activity – watercourse diversions under the Water Act 2000 (OSW/2019/4599, or a later version), and riparian vegetation achieves the “Revised PRCP Benchmark Criteria” as outlined in Table 3-55.

NUMA

- Rehabilitation objectives for NUMAs are focused on ensuring they remain safe, stable, and non-polluting.

3.6.1.8.2 *Species of Conservation Significance*

It is noted that SWC has no obligations requiring specific inclusion of species of conservation significance in the revegetation planning. Nonetheless, the proposed woodland and watercourse PMLUs, in particular those associated with riparian vegetation, will provide connectivity between rehabilitated areas and existing vegetation and habitat values. Additionally, areas rehabilitated to a watercourse PMLU will connect existing riparian habitat values for potential conservation significant species.

3.6.1.8.3 *Fauna Habitat and Use Requirements*

There are no existing obligations to establish fauna habitat and/or fauna use in the rehabilitation areas for SWC. However, watercourse revegetation and adjacent woodland areas will provide longer term connectivity values for threatened fauna, including the Koala, Ornamental Snake, Greater Glider and Squatter Pigeon.

3.6.1.8.4 *Surface Preparation and Topsoil Quality to Support Vegetation Establishment and Management*

Grazing, Woodland and Grassland Habitat

Final rehabilitation will be undertaken progressively on disturbed areas as mining operations progress. The general sequence of works during each progressive rehabilitation campaign (excluding TSF, refer to Section 3.6.2) includes:

- Reshape disturbed areas when disturbance has been completed and the mine pit has progressed. Reshape to the final design shape (Section 3.6.1.5) (RM3).
- For spoil dumps, conduct sampling and testing of the surface 2m of waste to confirm the material is waste and non-acid-forming.
- Conduct sampling of the growth media to confirm fertiliser requirements (RM5).
- Rip waste to reduce compaction and allow adequate water and root penetration into this layer.
- Spread topsoil to an average depth of 0.15 m dependent on the PMLU.
- Apply ameliorants (e.g., fertiliser) as required based on the sampling completed.
- Scarify the topsoil to incorporate soil ameliorants but not to a depth that will bring any waste material to the surface.
- Apply seed and till on the contour with a tined implement.

Watercourse

As discussed in Section 3.6.1.7, some existing diversions have been assessed as already on a trajectory for relinquishment and therefore the rehabilitation milestones associated with landform establishment (RM3), surface preparation (RM5) and revegetation (RM6) will not apply to these diversions. These three milestones are intended to apply to future approved modifications to diversions.

The general sequence of works during each progressive rehabilitation campaign for new/modified diversions includes:

- Reshape the channel to the final design shape.
- Conduct sampling and testing of the surface 2m of the reconstructed benches to assess subsoil/spoil suitability.
- Conduct sampling of the growth medium to confirm fertiliser requirements.
- Rip to reduce compaction and allow adequate water and root penetration.
- Spread topsoil to an average depth of 0.15m.
- Apply ameliorants (e.g., fertiliser) as required based on the sampling completed.
- Scarify the topsoil to incorporate soil ameliorants but not to a depth that will bring subsoil to the surface.
- Apply seed and till on the contour with a tined implement.
- Complete supplemental hand planting of trees and shrubs as required.

Topsoil Quality

As described in Section 3.6.1.4, topsoil stockpiles across site will be the primary growth media for SWC. Permian spoil material may be used to supplement topsoil resources as secondary growth media where required and where quality is suitably tested and ameliorated.

Growth media properties based on material characterisation (Appendix 4) to support the desired PMLU will have:

- Cation exchange capacity and major macronutrient (N, P, K, and organic C) concentrations in root zone (0–0.3m) at least 80% of those measured at comparable reference sites. Soil reference sites could coincide with vegetation analogue sites. Alternatively, existing soil survey data could be used to establish reference values.
- pH range between 6.0–9.0 in root zone (0–0.3m).
- Primary growth media (0–0.3m) salinity (EC1:5) is less than 0.75dS/m.
- <6% ESP.

Further details on the primary growth media (topsoil) characteristics are given in Section 3.6.1.4 and Appendix 4.

Given the time period between the development of this revegetation plan and the point at which implementation may occur, it is recommended that fertiliser requirements are assessed according to RM 4 of the SWC PRCP Schedule approximately 6 months prior to rehabilitation being progressively implemented.

3.6.1.8.5 Plant Species

Pasture Species

Areas of grazing are predominately planned for the lower gradient areas disturbed by mining activities, areas that require shallow rooted species and/or areas where there was significant clearing prior to mining.

The recommended revegetation species mix for the grazing PMLU is based on seeding preferred, palatable, and productive (3P) pasture species and legumes cognisant of grazing best management practice. Suitable pasture species are provided in Table 3-48. These species have been recommended based on a combination of 3P species recorded during SWC baseline surveys, as well as a selection of 3P species suitable for clay and/or loam topsoils.

Table 3-48 Recommended Species to be Established in the Grazing PMLU (RA2, RA3, and RA6)

Common Name	Scientific Name	Sowing Rate (kg/ha)	Comment
Qld Blue grass	<i>Dicanthium sericeum</i>	2	3P grass Suitable for clay soils

Bisset Creeping Bluegrass	<i>Bothriochloa insculpta</i>	4*	3P grass Drought tolerant
Rhodes grass	<i>Chloris gayana</i> cvv. <i>Callide</i> ¹	4*	3P grass Tolerate a range of soils
	cvv. <i>Reclamer</i>	4*	3P grass Tolerate to a range of soils Salt tolerant
Black spear grass	<i>Heteropogon contortus</i>	2	3P grass
Sabi grass	<i>Urochloa mosambicensis</i>	3	3P grass Drought tolerant
Stylos ²	<i>Stylosanthes scabra</i> ¹	2	Legume requires specific rhizobium inoculum strain CB1650
Wynn cassias	<i>Chamaecrista rotundifolia</i>	2	Legume will inoculate naturally but a Group M strain is recommended
Cover crop	(e.g., <i>Echinochloa esculenta</i> ¹)	5	Cover crop for soil protection
Total		30	

1. Exotic species.

2. Must be sown within 28 days of inoculation.

*Assumes seed is coated. If not coated, use half prescribed rate.

Woodland Species

Creation of a woodland is more likely to achieve successful rehabilitation to a sustainable ecosystem that has habitat values. As such, the species selection has been expanded from a the restrictive RE 11.10.1 species list to include as many species as possible from the relevant broad vegetation groups (BVG). The relevant BVG for RE 11.10.1 located on the anthropogenic rocky landform is BVG 10a.

The total recommended seeding rates for upper-story tree species is 5kg/ha, mid and lower story tree and shrub species is 5kg/ha, and ground cover is 5kg/ha. Selection of seeds will be based on species outlined in Table 3-49 with a species richness that results in achievement of the respective success criteria (Table 3-55).

Table 3-49 Recommended Species to be Established in the Woodland PMLU (RA5, RA8 and RA9)

BVG	Upper-Storey Tree Species	Mid and Lower Storey Tree and Shrub Species	Groundcover Species
10a	<i>Corymbia citriodora</i>	<i>Alphitonia excelsa</i>	<i>Cymbopogon refractus</i>
	<i>Eucalyptus crebra</i>	<i>Acacia leiocalyx</i>	<i>Themeda triandra</i>
	<i>Eucalyptus fibrosa</i>	<i>Acacia cretata</i>	<i>Eremochloa bimaclate</i>
	<i>Corymbia hendersonii</i>	<i>Acacia longispicata</i>	<i>Arundinella nepalensis</i>
	<i>Corymbia clarksoniana</i>	<i>Petalostigma pubescens</i>	<i>Panicum effusum</i>
	<i>Angophora leiocarpa</i>	<i>Breynia oblongifolia</i>	<i>Desmodium varians</i> ,
	<i>thozetiana</i>	<i>Capparis canescens</i>	<i>Brunoniella australis</i>
	<i>Eucalyptus cambageana</i>		<i>Cyanthillium cinereum</i>
	<i>Eucalyptus crebra</i>		<i>Chrysocephalum apiculatum</i>
	<i>Acacia harpophylla</i>		<i>Eustrephus latifolius</i>
	<i>Acacia cambagei</i>		<i>Dianella revoluta</i>
	<i>Casuarina cristata</i>		<i>Phyllanthus virgatus</i>
			<i>Evolvulus alsinoides</i>
			<i>Lomandra confertifolia</i> subsp. <i>Pallida</i>

BVG	Upper-Storey Tree Species	Mid and Lower Storey Tree and Shrub Species	Groundcover Species
			<i>Lomandra multiflora</i> subsp. <i>Multiflora</i> <i>Glossocardia bidens</i> .

Grassland Species

The recommended revegetation species mix for grassland PMLU is based on a seeding preferred, palatable, and productive (3P) pasture species and native grasses. Suitable species are provided in Table 3-50.

Table 3-50 Recommended Species to be Established in the Grassland PMLU (RA4)

Scientific Name	Common Name
<i>Dicanthium sericeum</i>	QLD Blue Grass
<i>Themeda triandra</i>	Kangaroo Grass
<i>Heteropogon contortus</i>	Black Speargrass
<i>Heteropogon triticeus</i>	Giant Speargrass
<i>Bothriochloa erianthoides</i>	Forest Mitchell Grass
<i>Chloris ventricosa</i>	Tall Windmill Grass
<i>Cymbopogon refractus</i>	Barb Wire Grass

Watercourse Habitat Species

The vegetation in the SWC watercourses is associated with riparian vegetation which includes species adapted to upper-, mid- and lower banks (revegetation zones) as illustrated in Figure 3-44.

Previous ecological studies conducted at SWC (Figure 3-15) indicate that watercourse habitat species is akin to RE 11.3.25. This provides a degree of confidence that the proposed species will establish successfully on site. However, creation of a watercourse PMLU is more likely to achieve successful rehabilitation to a sustainable ecosystem that has habitat values. As such, the species selection has been expanded from a restrictive RE species list to include as many species as possible from the relevant broad vegetation group (BVG). The relevant BVGs for RE 11.3.25 is 16a.

A BioCondition assessment completed by an appropriately qualified person using the methodology outlined in the Queensland Herbarium's BioCondition Assessment will be undertaken to verify that the achievement of the watercourse habitat. It is noted that the SWC PRCP watercourse species selection is based on BVG however BioCondition monitoring assessment described by the Queensland Herbarium is based on undisturbed regional ecosystems. As such, RE 11.3.25 is used for the purposes of establishing PRCP milestone completion criteria as this is the target RE based pre-mining and reference site ecological investigations (Figure 3-16).

The total recommended seeding rates for upper-story tree species is 5kg/ha, mid and lower story tree and shrub species is 5kg/ha, and groundcover is 5kg/ha. Selection of seeds will be based on species outlined in Table 3-51 with a species richness that results in achievement of the respective success criteria (Table 56).

As described in Section 3.6.1.8.5, these seeding rates and species selection criteria will only apply to future approved modifications to diversions.

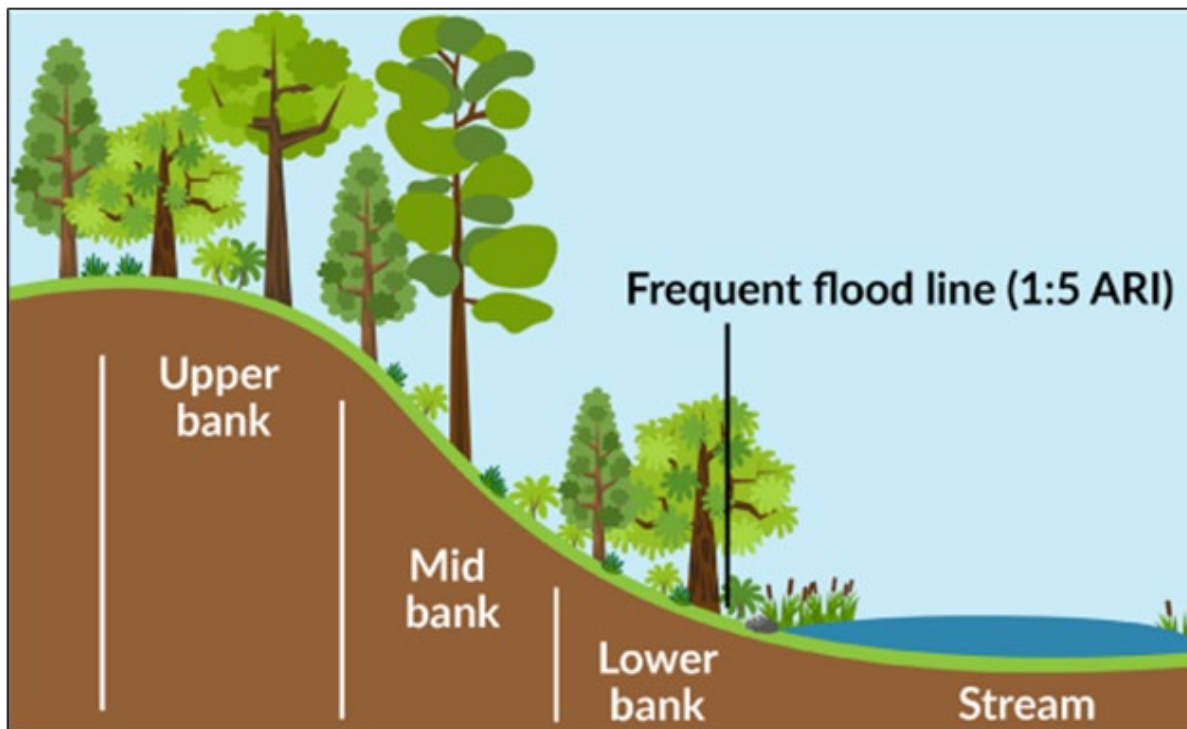


Figure 3-44 Typical Riparian Revegetation Plantings Zone (BCCA, 2014)

Table 3-51 Recommended Species to be Established in the Watercourse PMLU (RA7)

BVG	Upper-Storey Tree Species	Groundcover Species
16a	<i>Eucalyptus camaldulensis</i>	<i>Heteropogon contortus</i>
	<i>Eucalyptus tereticornis</i>	<i>Themeda triandra</i>
	<i>Eucalyptus coolabah</i>	<i>Chrysopogon fallax</i>
	<i>Melaluca sp.</i>	<i>Imperata cylindrica</i>
	<i>Corymbia tessellaris</i>	<i>Eulalia aurea</i>
	<i>Angophora spp.</i>	<i>Cyanthillium cinereum</i>
	<i>Casuarina cunninghamiana</i>	<i>Phyllanthus virgatus</i>
		<i>Eustrephus latifolius</i>
		<i>Brunoniella australis</i>
		<i>Crotalaria montana</i>
		<i>Rostellularia adscendens</i>
		<i>Evolvulus alsinoides</i>
		<i>Sida spp</i>

Planting Rates and Timing

The recommended sowing rate for seeded plant species have been specified above however will be cross-checked with the rates recommended by the seed supplier. In addition to this amount, a contingency of +20% will be adopted to account for plant mortality. The composition of the different seeds will be guided by species richness criteria in respective modified BioCondition criteria.

Care should be taken to not overseed tree and shrub species and cause very high densities of trees and shrubs to develop. This will have an adverse impact on the establishment of groundcover species that are critical for managing the erosion potential of the final landform.

Timing for seeding will typically be targeted for late summer or early autumn when soil moisture is high, and temperatures are milder.

Seed Collection and Procurement

If required, and where possible, native seed could be collected from populations on or near SWC to maintain regional tolerances. Seed collection could occur in the years prior to commencement of rehabilitation, and then on an ongoing basis 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, in quantities sufficient to undertake direct seeding operations. An appropriate temporary storage will be set up on site in advance of receiving the collected/bought seed.

3.6.1.8.6 *Vegetation Establishment and Management Methods*

Seeding

Direct seeding will be preferred to achieve an even, continuous cover of vegetation for the grazing, woodland habitat, and watercourse PMLUs. Seeding may be undertaken using conventional broadacre seeding equipment (e.g., combine seeder, 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 should be scarified prior to sowing. This will allow scarified seeds to imbibe and germinate. By only scarifying half of the seeds additional reserve are maintained in the soil seed bank. Seed scarification can be required from the supplier prior to delivery however 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 monitoring has been included in the rehabilitation monitoring for all PMLUs which will allow for targeted management (Refer to Section 3.8).

Weed management operations will use controls that include:

- Conduct employee awareness training in scheduled toolbox talks directed at weeds and feral pests.
- Provision of, and requirements for vehicle wash down facilities.
- Wash down bays will collect seeds that are washed from the vehicles to prevent ingress to drainage lines.
- SMR will maintain regular weed monitoring and control programs.

Planting Success

Monitoring of newly seeded rehabilitation will commence immediately after planting and continue until plants have established in accordance with monitoring procedures (Section 3.6.1.8.7).

Fauna Control

Over grazing activity from native animals (e.g., kangaroos and wallabies), livestock (cattle, sheep, etc), and feral pests (e.g., pigs, goats, and mice) have the potential to impact rehabilitation success.

Grazing activity that impacts rehabilitation will be recorded during annual rehabilitation monitoring assessments. Where damage exceeds acceptable levels, grazing reduction treatments are to be engaged. Feral pest controls (e.g., trapping and shooting) will be instigated if they are found to be damaging revegetated areas. Damage from other animals may need to be managed through the establishment of exclusion areas (e.g., fencing) until rehabilitation has recovered.

3.6.1.8.7 Revegetation Monitoring

Monitoring is an integral part of the overall management strategy, enabling early detection of risks to rehabilitation and an indicator to commence effective risk management actions.

Key objectives of the monitoring program are to:

- Track the progress of rehabilitation activities with respect to milestones and benchmarks for comparable communities.
- Identify problems affecting the progress or success of rehabilitation, which can then be addressed through management actions.
- Identify key site-specific success factors for successful rehabilitation and apply these more broadly throughout SWC.
- Collect data to objectively assess compliance with the SWC 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 10-15 years. The shorter timeframes for rehabilitation relate to the fast growth rate of grasses.

A summary of key stages expected in the rehabilitation of woodland and grazing ecosystems at SWC is provided in Table 3-52.

Table 3-52 Summary of Key Stages Expected in the Rehabilitation of Woodland and Grazing Ecosystems at SWC

Revegetation Phase	Definition	Anticipated Timeframe	
		Woodland	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 and replace vegetation losses.	6 years	6 years
Maintenance	The period of growth post establishment until the time that the rehabilitation becomes dominant and self-sustaining on site.	10 years	10 years
Completion	Final vegetation community and associated fauna habitats establish.	15 years	10 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 may be made with those at analogue sites and 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 may also be assessed against those present in analogue sites or those consistent with published benchmarks or suitability targets.

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 3.8.

3.6.1.8.8 Analogue Reference Sites

Vegetation analogue sites were established for SWC during initial rehabilitation monitoring assessments to provide comparable data for rehabilitated sites. These vegetation analogue sites were chosen based on their representative features of the respective land disturbances such as topography, soil characteristics and vegetation type and structure. Analogue sites were also selected based on their representation of the REs surrounding SWC.

Summary details of the analogue sites are included in Table 3-53, images in Figure 3-45, and Figure 3-46 and a map showing the locations is given in Figure 3-47.

While indicators and limitations for each analogue site have been considered, it is noted that ongoing monitoring of these sites is not strictly required to demonstrate compliance with vegetation- and soil-related milestone criteria. For vegetation, benchmark indicator values will be applied, and for soils, indicator values can be sourced from existing soil survey data

Table 3-53 Rehabilitation Monitoring Analogue Site Locations

Site ID	Latitude	Longitude	Period	Status	RE Type (Ground-truthed unless specified)	Soil Properties (Cardno)
3	-21.7855	148.4880	Prior to 2012 (Cardno)	Active	11.5.3/11.7.2^	Red duplex soils supporting narrow leafed ironbark
4	-21.7700	148.4860	2016 (relocated Eco Logical)	Active*	11.5.3	Sand to sandy loam surfaced duplex soils supporting poplar box.
6	-21.7530	148.4560	2021 (relocated Eco Logical)	Active	11.5.3	Red non cracking clay and duplex soils supporting bloodwood and narrow leafed ironbark

*Not shown

^ RE mapping has been taken from Queensland Globe, as site data was not available.



Figure 3-45 Analogue Site 3 (Cardno, 2012)



Figure 3-46 Analogue Site 6 – Looking South (Ecological, 2021)

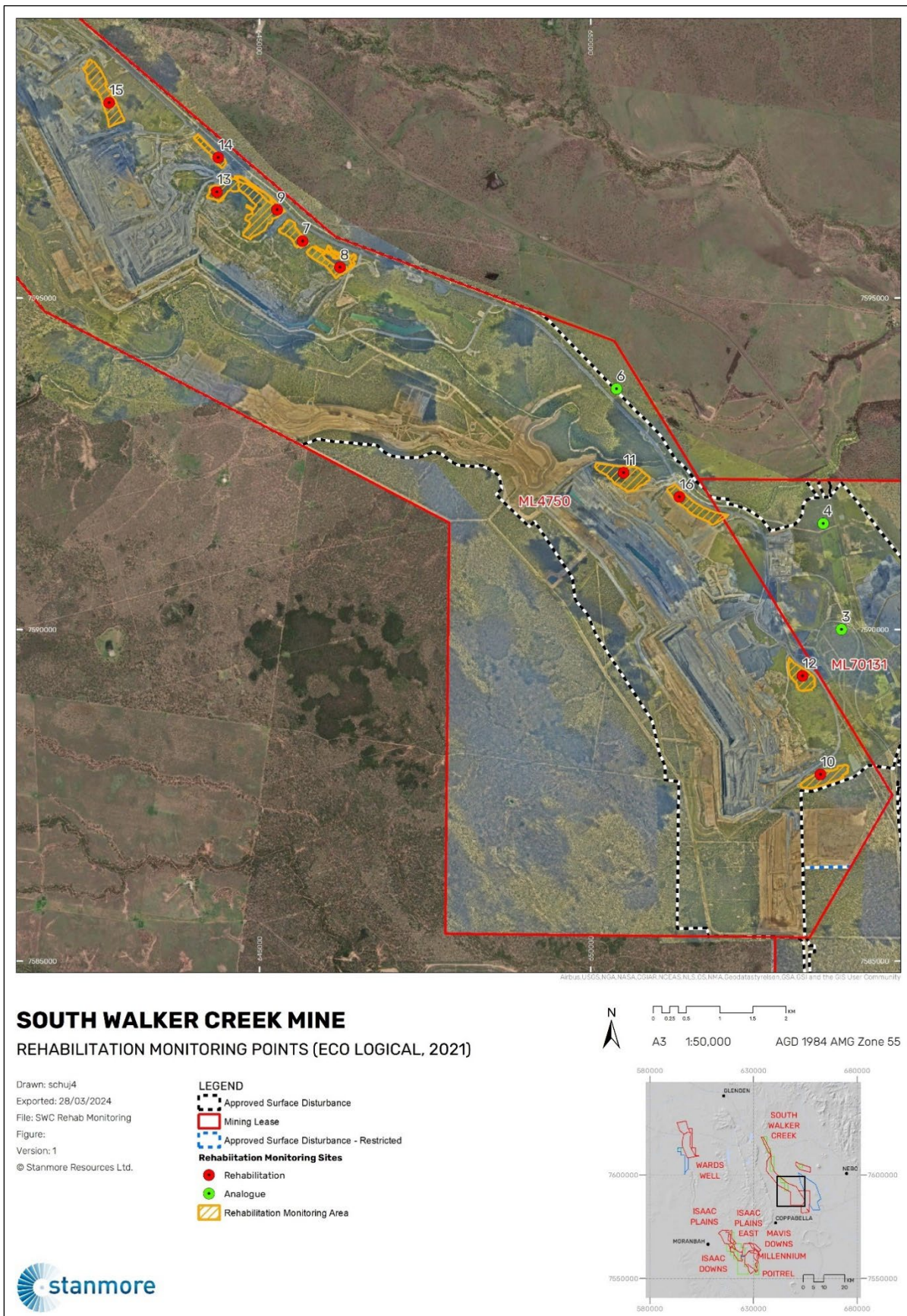


Figure 3-47 Locations of Rehabilitation Monitoring Sites Including Analogue Site Locations (2021)

3.6.1.8.9 Revegetation Milestones and Objectives

Grazing

Table 3-54 summarises the proposed pasture condition assessment criteria for grazing PMLU.

Table 3-54 Pasture Condition Assessment at RA1, RA2, RA3, and RA6

Condition Rating	Condition Indicators				
	Preferred Pasture Species		Annual Grass % DM Yield	Undesirable Grasses and 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

Woodland and Watercourse RE Benchmarks

Additional to analogue data, woodland and watercourse rehabilitation will be assessed against representative published RE benchmark data with considerations given for the revegetation potential of reconstructed soil profiles at SWC.

Proposed assessable attributes and weightings for deriving the final BioCondition scores outlined in Table 3-55 and Table 56.

Proposed rehabilitation completion criteria which incorporate BioCondition scoring is outlined below:

- Table 3-55 contains BioCondition benchmark data for RA5, RA8 and RA9. Data is derived from Queensland Government BioCondition benchmark database. A revised PRCP benchmark is identified from the remnant vegetation benchmark, and only a subset of BioCondition assessable attributes is used, as some (i.e., large trees, coarse woody debris) would not be achievable in the timeframe from revegetation to achievement of the post-mining land use.
- It is noted that Table 3-55 does not contain BioCondition benchmark scores for mid story (shrubs) species. This is consistent with that stated on the Queensland Government Website which states that shrubs may form a conspicuous layer. This is also consistent with the departments BVG 10a description which states, 'that a shrub layer is very sparse'.

BioCondition benchmark data for RA7 is outlined in Table 3-56. A BioCondition assessment completed by an appropriately qualified person using the methodology outlined in the Queensland Herbarium's BioCondition Assessment will be undertaken to verify that the watercourse / riparian vegetation PMLU achieves the Revised PRCP Benchmark criteria in Table 3-56.

- It is noted that the SWC PRCP watercourse species selection is based on BVG however BioCondition monitoring assessment described by the Queensland Herbarium is based on undisturbed regional ecosystems. As such, RE 11.3.25 is used for the purposes of establishing PRCP milestone completion criteria as this is the target RE based pre-mining and reference site ecological investigations Table 3-18.
- It is also noted that Table 3-56 does not contain mid story shrub species and BioCondition benchmark scores respectively. This is consistent with that stated on the Queensland Government Website which states that 'RE11.3.25 may often consist of a tall shrub layer' and

‘that low shrubs are present but rarely form a conspicuous layer’. This is also consistent with the departments BVG 16a description which states, ‘that a shrub layer is frequently absent’.

Table 3-55 Representative RE Benchmark Criteria for Woodland Rehabilitation (>15% Slope) at RA5, RA8 and RA9

Regional Ecosystem	11.10.1 Benchmark	11.10.1 Revised PRCP Benchmark
Short description	<i>Corymbia citriodora</i> +/- <i>Eucalyptus crebra</i> +/- <i>Corymbia clarksoniana</i> woodland	<i>Corymbia citriodora</i> +/- <i>Eucalyptus crebra</i> +/- <i>Corymbia clarksoniana</i> woodland
Recruitment	100%	100%
Non-native plant cover	0	≤ 10%
Tree species richness	4	≥ 3 (inc. <i>Corymbia citriodora</i>)
Native shrub species richness	4	≥ 3
Native grass species richness	9	≥ 4
Native forb other species richness	17	≥ 5
Tree canopy cover	30%	≥ 15%
Shrub canopy cover	13%	N/A
Native perennial grass	16%	≥ 10%
Litter grid cover	50%	≥ 10%

Table 3-56 Representative RE Benchmark Criteria for Watercourse Habitat Rehabilitation at RA7

Regional Ecosystem	11.3.25 Benchmark	11.3.25 Revised PRCP Benchmark
Short description	<i>Eucalyptus tereticornis</i> +/- <i>E. camaldulensis</i> woodland fringing drainage lines	Rehabilitated <i>Eucalyptus tereticornis</i> +/- <i>E. camaldulensis</i> woodland fringing drainage lines woodland
Recruitment	100%	100%
Non-native plant cover	0	≤ 10%
Tree species richness	4	≥ 3
Native shrub species richness	4	≥ 3
Native grass species richness	8	≥ 4
Native forb other species richness	13	≥ 6
Tree canopy cover	34%	≥ 15%
Shrub canopy cover	NA	NA
Native perennial grass	35%	≥ 15%
Litter grid cover	21%	≥ 10%

3.6.2 Tailings Storage Facility

PRCP Guideline (Section 3.6.2)

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

The design for a TSF must include relevant elements:

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

Tailings comprises approximately 0.5% of all mineral waste at SWC, there are two (2) surface TSFs which receive fine tailings from the coal handling preparation plant (CHPP). The TSFs at SWC are the OTD, which is currently inactive and does not receive tailings, and the BTSF which is an active facility, comprised of Cells 1, 2 and 3. An additional two cells (4a and 4b) are planned to receive fine tailings, to be established north-west of the existing cells.

The OTD was originally used for tailings storage, however, with the completion of the BTSF (Cells 1, 2 and 3) in December of 2002, deposition into the OTD ceased. Both TSFs are classified as “Down Slope Turkey’s Nest” earth fill embankment facilities (Hatch, 2017), with OTD capped with coarse rejects.

The OTD has had three downstream raises of the embankment from its initial construction, prior to its final regrading and capping. Additional modifications to the capping surface were undertaken in 2020 to eliminate low points causing ponding to enable a free draining surface.

The BTSF comprises of three existing cells, named Cells 1 – 3 and two proposed cells, named Cells 4a and 4b. A summary for the BTSF is described below:

- Cell 1 was the main tailings storage facility during 2002 - 2012 and has been inactive since 2012. In 2016, hydraulic mining was initiated to recover additional coal fines after upgrading the fine circuit of the process plant. The hydraulic mining is currently on hold due.
- Cell 2 was initially used to store tailings between 2013 and 2017. The construction of a raise to cell 2 (Stage 7) was undertaken in 2021 to increase the storage capacity. The cell is currently active.
- Cell 3 was constructed during 2016 and 2017 and is currently active.
- Cell 4a – yet to be constructed (likely to commence in 2026). The proposed cell will be constructed and operated in alignment with existing BTSF cells,
- Cell 4b – yet to be constructed (likely to commence when additional capacity is required). The proposed cell will be constructed and operated in alignment with existing BTSF cells,

A detailed summary of the past construction stages for the OTD and BTSF are shown in Table 3-57.

Table 3-57 Summary of Past Construction Stages for Old Tailings Dam and Bidgerley Tailings Storage Facility (Tailings Cells 1,2,3, 4a, 4b, ESD and WC)

Design Details	Old Tailings Dam	Bidgerley Tailings Storage Facility					Western Compartment Dam	Eastern Sediment Dam
		Tailings Cell 1	Tailings Cell 2	Tailings Cell 3	Tailings Cell 4a	Tailings Cell 4b		
Embankment Design	Zoned earth fill	Zoned earth fill with a Zone 2A toe drain	Zoned earth fill	Homogeneous earth fill	Zoned earth fill	Zoned earth fill	Zoned earth fill	Unknown
Slope	IB: 2.5H:1V OB 2.5H:1V	IB: 2H:1V OB: 2.5H:1V to 3H:1V	IB: 3H:1V OB: 3H:1V	IB: 3H:1V OB: 3.5H:1V	IB: 4H:1V OB: 4H:1V	IB: 4H:1V OB: 4H:1V	IB: 2.5H:1V OB: 2.5H:1V	IB: 2.5H:1V OB: 2.5H:1V
Maximum Embankment Height	11.2	9	8.4	9	10.6	9.7	Approx. 5m	Unknown
Embankment Length (at Crest)	2,301.5m	3,387m	2,612m	2,900m	1,552m + 609m of shared Cell 3 wall	1,706m	Approx. 1,500m	Unknown
Crest Width	6m	6m	5.5m	5.5m	6m	6m	6m	6m
Number of Construction Stages and Construction Dates	• 1996: Original Construction (Stage 1) • Unknown: First Raise (Stage 2) • 1999: Second Raise (Stage 3)	• 2002: Cell 1 Construction (Stage 1) • 2006: First Raise (Stage 2) • 2011: Second Raise (Stage 3)	• 2012: Cell 2 Construction (Stage 4) • 2014: First Raise (Stage 5)	• 2017: Cell 3 Construction (Stage 6) • 2021: Cell 3 Raise Stage 7)	• 2026: Cell 4a Construction (Stage 9)	• TBC: Cell 4b Construction (Stage 11)	• 2002: As a part of Cell 1 Construction (Stage 1)	• 1996: Original Construction (with OTD and RWD) • 2002: First Raise (With Stage 1 BTSF Construction)

Bidgerley Tailings Storage Facility								
Design Details	Old Tailings Dam	Tailings Cell 1	Tailings Cell 2	Tailings Cell 3	Tailings Cell 4a	Tailings Cell 4b	Western Compartment Dam	Eastern Sediment Dam
	- Unknown: Third Raise (Stage 4) 2002: Closure and capping							
Embankment Raise Method	Downstream	Downstream	Downstream	N/A	N/A	N/A	Downstream	N/A
Decant Design	Gravity Decant Pipe Penetration later replaced with a siphon pipe. Decommissioning of decants unclear.	Filter Wall later replaced with Gravity Decant Pipe Penetration	Gravity Decant Pipe Penetration	Gravity Decant Pipe Penetration	Gravity Decant Pipe Penetration	Gravity Decant Pipe Penetration	External pump with inlet canal	External pump with inlet canal
Spillway Design	Original Concrete Spillway Undermined and replaced with Gabion and Concrete Spillway.	Concrete Overflow Spillway with Reno Mattress	Concrete Overflow Spillway with HDPE Liner	Concrete Overflow Spillway with HDPE Liner	Concrete Overflow Spillway with HDPE Liner	Concrete Overflow Spillway with HDPE Liner	Concrete Overflow Spillway	Excavated Overflow Canal

3.6.2.1 Geotechnical Characterisation

TSF characterisation has been undertaken for various aspects including geochemistry, rheology, and geotechnical properties. A summation of this data attained at both OTD and BTSF, with reference to PRCP Guideline requirements is provided in Table 3-58. Where relevant, the detailed characterisation of the OTD and BTSF is provided in subsequent sections.

Table 3-58 TSF PRCP Guideline Applicability

Guideline Requirement	Applicability to PRCP	Reference in this Document
Particle size distribution analysis based on conditions in the TSF. Particle size distribution of tailings affects their hydraulic sorting down the tailings beach, and their settling, consolidation, and desiccation on atmospheric exposure.	Yes	Refer Below
Specific gravity testing. The specific gravity of tailings affects their hydraulic sorting down the tailings beach, and their settling and consolidation.	Yes	Refer Below
Atterberg limit testing to determine the plasticity of the tailings, which affects their settling, consolidation, and desiccation on atmospheric exposure.	Yes	Refer Below
The moisture content and dry density profiles with depth of the indicative tailings. The dry density profile indicates the efficiency to which the available storage volume for tailings is utilised. Rheological testing to determine the pumpability of the tailings.	Yes	Refer Below
Settling testing of the tailings used as an indicator of the settling density of the tailings.	No –undertaken to predict capacity of a facility and rate of embankment rise. Not considered relevant to closure planning	
Shear strength testing of the indicative tailings, both peak and remoulded shear strengths. The shear strength profile of deposited tailings affect their bearing capacity on rehabilitation.	Yes	Refer Below
Consolidation testing of the tailings to estimate their consolidated density and saturated hydraulic conductivity.	Yes	Refer Below
Soil water characteristic curve testing to assess the unsaturated behaviour of the tailings on desiccation and calculate the unsaturated hydraulic conductivity function.	Yes	Refer Below
Instrumented column testing of the tailings to assess their settling, self-weight consolidation and desiccation.	No – CPT soundings and consolidation testing will provide field information on in situ densities of tailings. Undertaking instrument column testing is not relevant for closure planning	

A geotechnical characterisation program has been undertaken on tailings on the BTSF to characterise the geotechnical parameters for the BTSF (Stantec, 2019) and in situ tailings.

The geotechnical characterisation included:

- Geotechnical borehole logs, cone penetration testing (CPT) and flat dilatometer test (DMT) results.
- Geotechnical laboratory testing.

The site investigations comprised of the following:

- Drilling of 23 boreholes throughout the BTSF dam area including the embankment crest areas, toe areas, as well as Installation of 9 standpipe piezometers to monitor groundwater levels across the site;
- 34 cone penetration tests with pore pressure measurement (CPTu) within the BTSF embankment crest and toe area and 2 CPTu in F Dam embankment crest;
- 9 pore pressure dissipation tests (PPDT), 12 in-situ vane shear and 4 dilatometer (DMT) tests, undertaken as part of the CPTu investigation;
- Geotechnical laboratory testing associated with boreholes.

Disturbed and undisturbed samples were recovered from the boreholes and CPT locations.

The results from the laboratory testing are summarised below in Table 3-59 and Table 3-60.

Table 3-59 Borehole Laboratory Data (Stantec, 2019)

				Particle Size Distribution (PSD) / PSD with Hydrometer										
				Fines (%)				Atterberg Limits						
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	LL (%)	PL (%)	PI (%)	LS (%)	Emerson Class	Soil Particle Density (t/m^3)	Pin Hole Dispersion
Location	BH ID	Depth (m)	Moisture Content (%)											
BTSF Cell 1	BH-09	4.0-4.45	12.7	0	27	63		48	19	29	14.5	-		
		11.0-11.45	22.1	0	5	36	59	74	27	47	19.5	-		
		13.5-13.7	23.4	0	16	84		68	23	45	23.4	-		
	BH-10	2.5-2.95	17.5	9	34	57		54	21	33	16.5	-		
		7.0-7.45	14.3	4	25	71		52	15	37	16.5	2		D2
		11.5-11.95	9.2	1	48	52		37	13	24	12.5	2		D2
	BH-122	4.0-4.45	15.5	0	29	71		49	15	34	16.5	-		-
		8.5-8.95	15.5	0	24	28	48	53	20	33	17.5	2	D2	
		13.0-13.45	18.0	0	35	65		45	16	29	14.5	-		-
BTSF Cell 2	BH-07	2.5-2.95	16	9	34	57		50	14	36	16	4		PD2
		7.0-7.45	16.6	-	-	-		72	25	47	19.5	-		-
	BH-119	2.5-2.95	12.6	-	-	-		46	11	35	15	-		-
	BH-120	4.0-4.45	16.7	-	-	-		46	11	35	7.5	-		-
		9.5-9.9	15.4	-	-	-		61	20	41	17	-		-
BTSF Cell 3	BH-13	4.0-4.45	19.1	5	33	62		47	20	27	14.5	-		-
		7.0-7.45	16.1	0	42	23	35	51	16	35	17	-		2.60
	BH-17	2.5-2.95	14.2	1	40	59		45	16	29	15	-		
		8.5-8.95	14.2	3	34	29	34	51	18	33	17.5	4		2.51
		11.5-11.61	14.9	0	9	91		54	20	34	16	-		

Note: LL: Liquid Limit (%), PL: Plastic Limit (%), PI: Plasticity Index (%), LS: Linear Shrinkage (%)

Table 3-60 Summary of Laboratory Testing – Cone Penetration Tests (Stantec, 2019)

Location	CPT ID	Depth (m)	Moisture Content (%)	Particle Size Distribution			Atterberg Limits			
				Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	LS (%)
BTSF Cell 1	CPTu-10	4.2 - 4.70	43.4	0	11	89	43	30	13	1.5
	CPTu-10	5.5 – 6.0	46.5	0	5	95	45	14	14	2.0
	CPTu-13	4.5 – 5.0	44.3	0	8	92	43	16	16	1.5
	CPTu-13	6.5 – 7.0	48.0	0	8	92	46	15	15	2.0
BTSF Cell 2	CPTu-16	6.0 – 6.5	49.6	0	16	84	43	12	12	1.0
	CPTu-16	8.0 – 8.5	52.2	0	14	86	44	11	11	0.5
	CPTu-24	3.0 – 3.5	37.0	0	41	59	34	8	8	1.5

Note: LL: Liquid Limit (%), PL: Plastic Limit (%), PI: Plasticity Index (%), LS: Linear Shrinkage (%)

3.6.2.1.1 Summary Results

The geotechnical properties for the BTSF are summarised in Table 3-61. The embankment fills within the BTSF were classified as medium to high plasticity clays. The foundation materials are similar to the embankment fill, with fines content varying in a wider range than that of the embankment fills.

Table 3-61 Average Values of Laboratory Test Results for BTSF Samples

Material	Moisture Content – Avg (%)	Moisture Content – Range (%)	Fine Content – Avg (%)	Fine Content – Range (%)	PI (Avg)	PI (Range)	Emerson Class	Dry Density (t/m ³)
Embankment Fill	15.7	7.9 – 22.6	61.5	45 - 76	34	27 - 40	2	1.9 – 2.0
Foundation Soil	15.1	7.8 – 24.8	71.6	28 - 95	37	24 - 53	2	1.6 – 1.9
Tailings	37.9	16.1 – 52.2	70.9	16 - 96	14.8	1 - 16	-	-

The tailing's materials tested had the following characteristics:

- Tailings materials were classified as low plasticity silt/clay.
- Tailings materials were classified as Emerson class 2 to 4, indicating the tailings material is likely dispersive. This is supported by the results of the pin hole dispersion testing.
- The size distribution for tailings predominantly comprises of fines.
- The moisture content generally increases with depth.
- Tailings samples had high moisture contents.

3.6.2.2 Geotechnical Characterisation – OTD

Geotechnical site investigations carried out within the OTD was undertaken between June to August 2019 (Stantec 2019). The results from the investigations are summarised in Table 3-62 and Table 3-63.

The site investigations comprised of the following:

- Drilling of 24 boreholes throughout the OTD including the embankment crest areas, toe areas, OTD tailings area, and access road. The boreholes were drilled to depths ranging between 5.72 and 14.95m BGL (approximate RL 212.1 to 196.9 m).
- Installation of 19 standpipe piezometers to monitor groundwater levels.
- Excavation of 8 test pits undertaken within the tailings area of the OTD.
- 19 cone penetration tests with pore pressure measurement (CPTu) within the OTD tailings, crest and toe area.
- 3 pore pressure dissipation tests and 3 dilatometer (DMT) tests, undertaken as part of the CPTu investigation.
- Laboratory testing associated with boreholes.

Table 3-62 Summary of Borehole Lab Results Within the Old Tailings Dam (OTD)

				Particle Size Distribution (PSD) / PSD with Hydrometer				Atterberg Limits				
Location	Bore Hole ID	Depth (m)	Moisture Content (%)	Gravel (%)	Sand (%)	Fines (%)		LL (%)	PL (%)	PI (%)	LS (%)	Emerson Class
						Silt (%)	Clay (%)					
OTD Crest	BH104A	2.50 - 2.95	12.7	0	50	26	24	41	13	28	13.0+	2
		7.00 - 7.45	16.9	2	45	26	27	43	15	28	14.0+	4
		10.00 - 10.45	11.7	0	53	47		38	14	24	13.0+	-
	BH106A	4.00 - 4.45	15.3	0	43	27	30	42	14	28	13.5+	2
		12.00 - 12.15	15.8	0	63	19	18	39	17	22	7.0+	2
	BH109	5.50 - 5.95	15.0	-	-	-	-	46	17	29	13.5+	-
	BH109A	2.50 - 2.95	5.3	0	47	22	31	40	14	26	12.5+	2
		7.00 - 7.45	18.4	0	47	28	25	43	15	28	14.0+	2
		11.50 - 11.95	13.4	0	57	43		33	13	20	11.5+	-
	BH119A	4.00 - 4.45	11.2	0	53	20	27	42	13	29	13.5+	2
		10.00 - 10.45	15.1	1	45	54		44	16	28	14.5+	-
OTD Toe	BH110	2.50 - 2.95	11.5	9	58	33		45	19	26	6	-
	BH111	4.00 - 4.45	12.2	0	50	50		33	16	17	8	-
	BH121	1.00 - 1.45	11.5	1	49	50		39	14	25	13.5+	-
		4.00 - 4.45	16.9	0	70	30		35	16	19	9.0	-
		5.50 - 5.95	15.4	0	50	50		38	16	22	11.0+	-
OTD Tailings	BH101	4.00 - 4.45	41	0	26	74		-	-	-	-	-
		10.00 - 10.45	28.8	-	-	-		-	-	-	-	-
	BH102	1.00 - 1.45	5.8	20	71	9		-	-	-	-	-

				Particle Size Distribution (PSD) / PSD with Hydrometer				Atterberg Limits				
Location	Bore Hole ID	Depth (m)	Moisture Content (%)	Gravel (%)	Sand (%)	Fines (%)		LL (%)	PL (%)	PI (%)	LS (%)	Emerson Class
						Silt (%)	Clay (%)					
OTD Tailings	BH103	8.50 - 8.95	50.3	0	13	87		-	-	-	-	-
	BH105	2.50 - 2.95	41.9	0	6	94		-	-	-	-	-
		13.00 - 13.45	38.8	-	-	-		-	-	-	-	-
	BH106	5.50 - 5.95	17.3	1	49	50		-	-	-	-	-
	BH108	8.50 - 8.95	14.0	0	62	38		-	-	-	-	-

Note: LL: Liquid Limit (%), PL: Plastic Limit (%), PI: Plasticity Index (%), LS: Linear Shrinkage (%), + indicates sample curling occurred

Table 3-63 Summary of Test Pit Lab Results Within the Old Tailings Dam (OTD)

Location	Test Pit ID	Depth (m)	Moisture Content (%)	Particle Size Distribution			Atterberg Limits				4 Day Soaked CBR with MDD
				Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	LS (%)	
OTD Tailings	TP02	0.2 - 1.00	6.0	13	74	13	25	24	1	0	50
	TP03	0.5 - 1.00	6.1	27	66	7	28	26	2	0.5	80
	TP08	0.2 - 1.00	4.7	41	48	11	24	21	3	1.5	70

Note: LL: Liquid Limit (%), PL: Plastic Limit (%), PI: Plasticity Index (%), LS: Linear Shrinkage (%)

3.6.2.2.1 Summary Results

The average values of laboratory results from the 2019 OTD investigations are shown below in Table 3-64.

Table 3-64 Average Values of Laboratory Test Results for OTD

Material	Water Content	LL	PL	PI	LS (%)	Gravel (%)	Sand (%)	Fines (%)	CBR (%)	Triaxial Test Results
Embankment Fill	13.4	42.4	15.1	27.3	12.7	1.5	49.0	49.5	-	-
Foundation Soil	17.6	42.8	17.5	25.4	11.5	5.0	53.6	41.4	-	c'=5 kPa $\phi' = 25.8^\circ$
Tailings	28.4	-	-	-	-	3.5	37.8	58.7	-	-
Coarse Reject	5.6	25.7	23.7	2.0	0.7	27.0	62.7	10.3	67	-

The embankment fill plasticity index within the OTD ranges between 26% – 29% and fine content between 47% - 57%, the material is classified as medium plasticity sandy clay. The foundation soils comprise mainly low to medium plasticity sandy clay with fine contents generally varying in a range between 30% and 50%.

The tailing's materials tested had the following characteristics:

- Tailings materials were classified as low plasticity to non-plastic sandy silt, clayey silt or silty clay.
- Tailings materials were classified as Emerson class 2 to 4, indicating the tailings material is likely dispersive.
- The size distribution for tailings predominantly comprises of fines.
- The moisture content generally increases with depth.
- Tailings samples had high moisture contents.

3.6.2.3 Geochemical Characterisation

Tailings as a bulk material, are expected to generate pH-alkaline, low salinity run-off and seepage and have a low potential to generate acid, neutral or saline drainage, due to the low total S and sulfide-sulfur concentrations (Terrenus Earth Sciences, 2021). The geochemical characteristics of tailings material is discussed in Section 3.6.1.3.

3.6.2.4 Performance Monitoring

Instrumentation has been installed to monitor the performance of the OTD and BTSF. These instruments consist of the following:

- Piezometers
- Telemetry Station and MRL Marker
- Global Navigation Satellite System (GNSS) Monitoring Stations
- Flow meters

The OTD and BTSF are regulated structures, and as such have Operations, Maintenance and Surveillance Plans developed by suitably qualified persons which manage the operation of the dams in accordance with EA requirements and industry best practice (ANCOLD).

3.6.2.5 Conceptual Closure Design

The basis of design and closure considerations are provided in this Section.

The OTD and BTSF remain as out of pit tailings storages, with conceptual cover and rehabilitation designs developed by Hatch (2017). Both TSFs are classified as “Down Slope Turkey’s Nest” earth fill embankment facilities (Hatch, 2017), with the OTD capped with rejects.

The conceptual rehabilitation cover design for OTD and BTSF aim to achieve the following design objectives:

- Facilitate ongoing free drainage and prevent ponding;
- Stabilise the surface to mitigate against potential ongoing erosion;
- Produce a substrate capable of plant growth and a grazing land use; and
- Reduce potential rainfall infiltration into the tailings as recharge to seepage.

As the tailings at SWC are benign, there is no requirement for the installation of liners to provide barriers preventing release of contaminants to the environment. As there are no liners installed, the installation of leak detection systems is not practical, especially considering the BTSF is supported by active decants.

The conceptual closure and capping design comprise the following components as described below to meet the design objectives:

- **A Transition Layer:** Comprised of coarse rejects and Permian spoil, this layer would be of varied thickness depending on pre-construction geotechnical assessment to determine stability risk. This layer would form a bridging layer to support heavy machinery undertaking rehabilitation activities and may include a geotextile to provide additional bearing capacity. The capping material will need to have a low moisture content (i.e., not saturated) prior to placement and will need to be placed in accordance with approval requirements regarding minimum cover. Capping material should be dumped short of the leading edge of the advancing cap and pushed into position by a dozer. Dumping of the capping material directly onto the tailings surface should be avoided until additional geotechnical testing is carried out across the tailings surface.
- **A 2m Compacted Spoil Layer:** This layer will have a sufficient air entry value break and be comprised of select clayey spoil, compared to the overlying topsoil and subsoil to act as a capillary break to limit the potential for capillary rise of salt into overlying soils. The layer will be graded and compacted in a way that expels excess rainfall infiltration.
- **0.5 m of Topsoil and Subsoil from Existing Stockpiles:** This layer will act as a growth medium to retain sufficient rainfall to support fertility and a seed bank for the establishment of vegetation.

This cover approach is commensurate with the geochemical risk presented by tailings material (Refer to Section 3.6.1.3), which over the course of operations at SWC, has consistently demonstrated negligible risk of acid generation. Although the SWC TSFs do not require significant controls to prevent the formation of acid, metalliferous, saline, or neutral drainage; the design approach limits the potential for rainfall infiltration, which will limit the long-term potential for seepage.

For the construction of the BTSF, the following measures were adopted to minimise seepage through the embankment and where seepage does occur, to intercept it and discharge it in a controlled manner.

- A low permeability Zone 1 A layer and a key trench have been incorporated within the embankment and foundations to reduce the quantity of seepage through both the embankment and foundations.
- With the raising of Tailings Cell 1, a high permeability Zone 2 filter layer has been incorporated into the downstream toe of the East Wall embankment below RL 191 m i.e., where the embankment is over 8 m in height. The toe filter will lower the phreatic surface within the embankment and collect the majority of the seepage through the embankment, discharging the flow into the Northern Diversion Drain.

As part of closure, additional earthworks are required to tie the capping layers into the surrounding landform. Future capping layers should be placed to promote the drainage of surface water runoff and prevent areas of ponding. The final capped surface should tie in with the surrounding landform in accordance with the final landform design objectives as described in Section 3.6.1.5.2. Further design (detailed design) is required prior to the placement of subsequent capping layers to confirm the strength of the underlying tailings in BTSF to support the capping material and advise on allowable construction load limits for closure.

Given the low density of the tailings and high moisture content in BTSF, there is limited potential for machinery to safely work on the surface, this limiting the ability to progressively rehabilitate the BTSF. Commencing TSF closure works following cessation of deposition across all cells is the only safe method available. Operating the decant following cessation of deposition is a key strategy to dewater the facility in closure.

3.6.2.6 Hydraulic Design

Design criteria proposed for drainage both within and external to the TSFs are presented in Table 3-65. The existing external embankment drains will be upgraded to be the closure spillways during TSF closure works. As these works aren't forecast to occur for at least 30 years from now, a concept design has not been completed as it is best practice to undertake the design process closer towards end of mining and confirm the spillway location.

Table 3-65 Hydraulic Design Criteria

Criterion	Element
Maximum Capped Surface Grade	<2% to minimize the risk of scour and eliminate requirement for contour drains
Upstream Capture Basin	10m long basin to channels flow into embankment chute
External embankment drains	Sized to convey a 1:100 AEP flood event with a minimum freeboard of 300mm and the 1:1000 AEP with no freeboard
Rock armouring	Trapezoidal maximum 1m depth, 25% side slopes. Base and side slopes to be rock lined D ₅₀ sized for 1:1000 AEP peak velocity. Thickness = 2 x D ₅₀

The conceptual cover designs for closure of these TSFs is discussed in the cover design section of the PRCP. As the tailings at SWC are benign, there is no requirement for the installation of liners to provide barriers preventing release of contaminants to the environment. As there are no liners installed, the installation of leak detection systems is not practical, especially considering that the TSFs are supported by active decants.

Regulated dams must be able to withstand seasonal rainfall events without releasing contaminants from the dam in an unauthorised manner. A minimum available storage, called a design storage allowance (DSA), is required to be estimated for regulated dams in accordance with the DEHP Manual (EM635, Version 5), in order to accommodate seasonal rainfall to a specified annual exceedance probability (AEP) and process inputs during the wet months. On-site water management must allow for and provide the DSA volume in each regulated dam, on the 1 November each year. The climatic input portion of the DSA volume required for Bidgerley Tailings Dam with a failure to contain consequence category of "Significant" is the volume for the 1:20 AEP 3-month critical wet period.

3.6.2.7 QA/QC Program During Construction

A QA/QC program is critical to prevent contaminant release and ensure that the TSF performs as-designed post-closure. A post-closure aftercare monitoring and maintenance plan will be required to ensure that the agreed post-closure objectives are achieved. The extent and duration of the aftercare period depends on site conditions. The stages of monitoring and maintenance will be split into proactive and reactive monitoring. The proactive stage should include the following aspects for the first ten years after closure:

- Monitoring cover system performance (net percolation).
- Monitoring equipment.
- Monitoring soil quality pertaining to plant growth and establishment for the first three years or until vegetation adequately established and further monitoring is not necessary.
- Surface water monitoring (quality and performance of hydraulic design).

3.6.3 Voids

PRCP Guideline (Section 3.6.3)

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

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

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

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

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

A Void Closure Plan and a Geotechnical Report have been compiled to support the development of this PRC Plan (Appendix 9). Flooding assessments (Appendix 5 and 6), residual void water balance modelling (Appendix 11) and groundwater assessments (Appendix 3) have also been utilised in the development of the Void Closure Plan to also support the overall objective of demonstrating that the voids are rehabilitated to a stable condition that minimises risks to the environment.

As per the EA, a residual void is “an open pit resulting from the removal of coal and waste rock that will remain following the cessation of all mining activities and completion of rehabilitation processes”. Therefore, for this PRC Plan, a residual void is considered to be the remaining mined out pit below ground level after backfill. For SWC, there are four residual voids in the closure landform (herein referred to as the SWC residual voids):

- Kemmis2N
- Mulgrave EN (KN, KS, IN, LS, GN, FN, FS and EN),
- Carborough/Walker/Toolah (C/W/T)
- Toolah South (YS)

The presence of residual voids at SWC are authorised under Schedule E (Condition E6 and E7) of the EA. The three residual voids proposed at SWC are being transitioned as pre-approved NUMAs in the SWC PRCP (Section 3.4.1). The NUMA extents achieve an area that is safe and structurally stable and include additional setbacks from the void low-wall, high-wall and end-wall crests if required to achieve wall geotechnical stability, and a safety bund and fence.

3.6.3.1 Void Hydrology

3.6.3.1.1 Flooding Interaction

The Rehabilitation Flood Assessment (Engeny, 2024, 2025; Hydrobalance, 2025) confirmed no flood ingress into voids during AEPs exceeding 0.1% with conceptual drainage modifications in place (drainage designed as part of RM3) (Section 3.6.3). Future modifications will prioritise erosion protection to prevent flood-related

erosion risks in the landform, however because there is no flood ingress expected into voids, there is negligible flood related erosion risks or weathering for the void.

Specific management measures/milestones include:

- Engineering and design plans are finalised including drainage (RM3)
- Update hydraulic flood modelling using drainage designs (RM3)
- If necessary, identify and implement mitigation measures for appropriate protection works of landforms where floodwaters from watercourses interact with the final mine closure landforms.

3.6.3.1.2 Void Water Balance

A dedicated void water balance model – based on the closure landform (Section 3.6.1.5), was completed for the period from 2045 – 2199 (155 years) to understand water balance behaviour (including climate change considerations and groundwater interactions) within the residual voids over time (Appendix 9 VCP for more details on model set up and assumptions).

In accordance with the PRCP Guideline the WBM aimed to assess the following:

- Long-term water balance, formation of lakes, and predicted water levels in the residual voids.
- Potential for residual void lakes to interact with regional groundwater aquifers (creating sources or through-flow systems).
- Potential for overflow from the residual voids and subsequent release to surface water catchments.

Key findings are summarised in Table 3-66 and Figures 47 – 50.

Key findings show that after 2120 mean water levels start to stabilise for all voids, with simulated mean inflows being very similar to mean outflows. This indicates that the mean water balance has reached an equilibrium by the end of the simulation period.

The void water levels remain below the residual void spill points for all voids for the duration of the simulation. Therefore, there is a very low risk of overtopping.

With sustained equilibrium water levels below groundwater levels in residual voids, acting as sinks, the minimal risk of groundwater flow beyond tenure boundaries eliminates the need for void hydrology-specific management activities.

Table 3-66 Key Findings of Void Water Balance Model

Residual Void	Spill Level (m AHD)	Mean Water Flows (year)		Long-Term Mean Void Lake Level Range (mAHD)
		Inflows (ML/yr)	Outflows (ML/yr)	
Kemmis 2N	228	Year 2120		172 - 182
		1,571	1,569	
Mulgrave EN	216	Year 2120		169 - 180
		1,865	1,858	
Carborough/Walker/Toolah	199	Year 2100		137 - 145
		1,868	1,875	
Toolah South	299	Year 2120		127 - 138
		516	514	

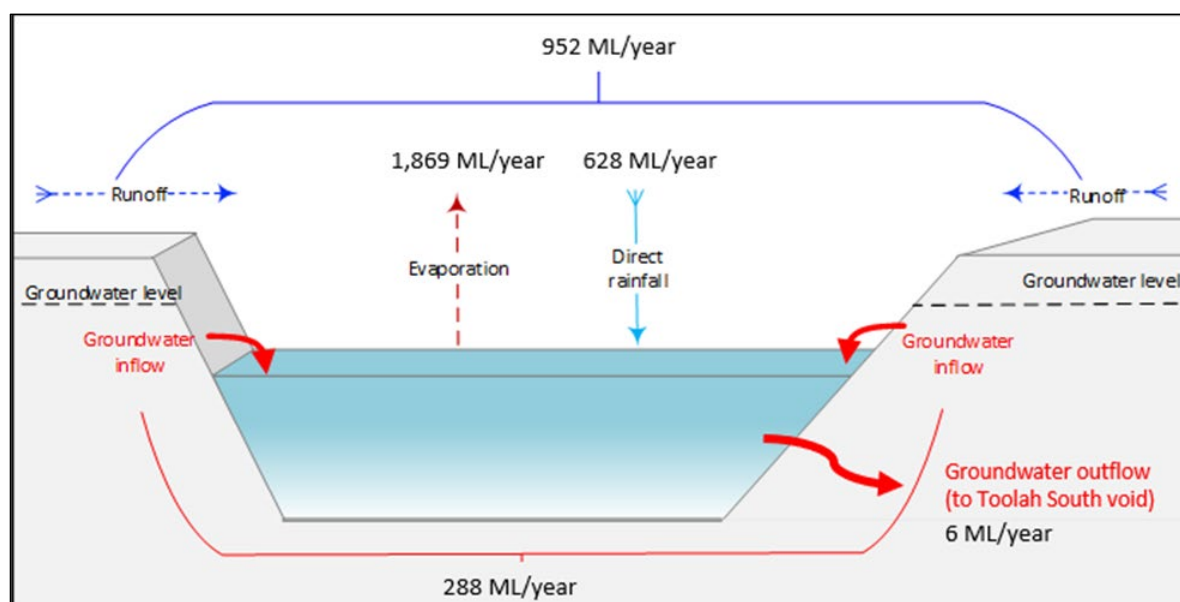


Figure 3-48 Average Inflows/Outflows Simulated for Period from 2180 to 2199 – C/W/T Residual Void

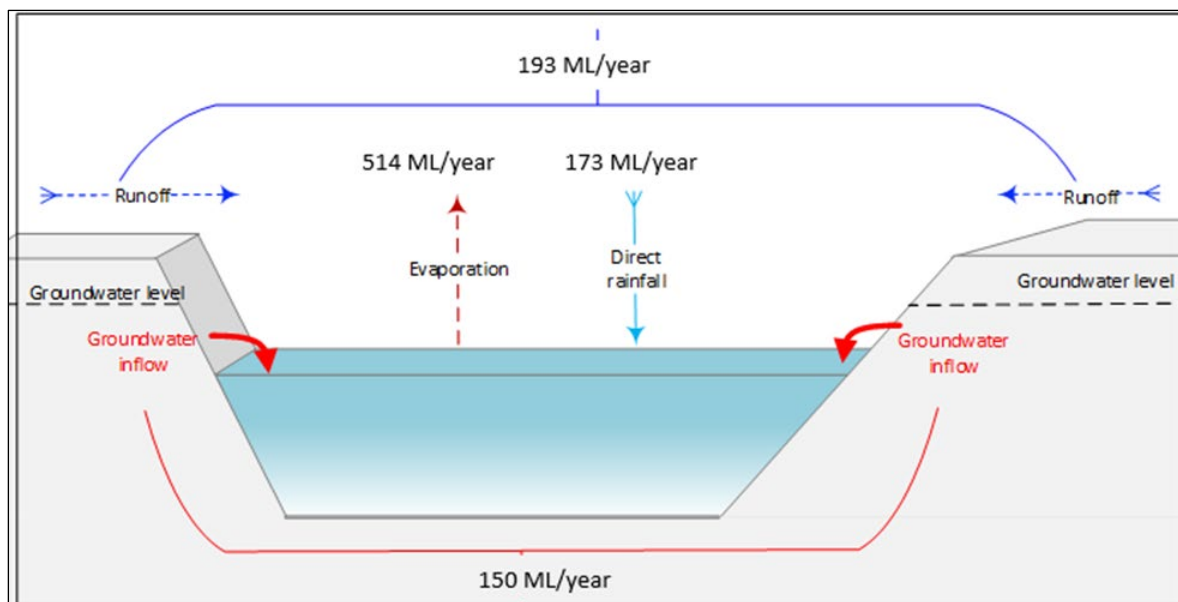


Figure 3-49 Average Inflows/Outflows Simulated for Period from 2180 to 2199 – Toolah South Residual Void

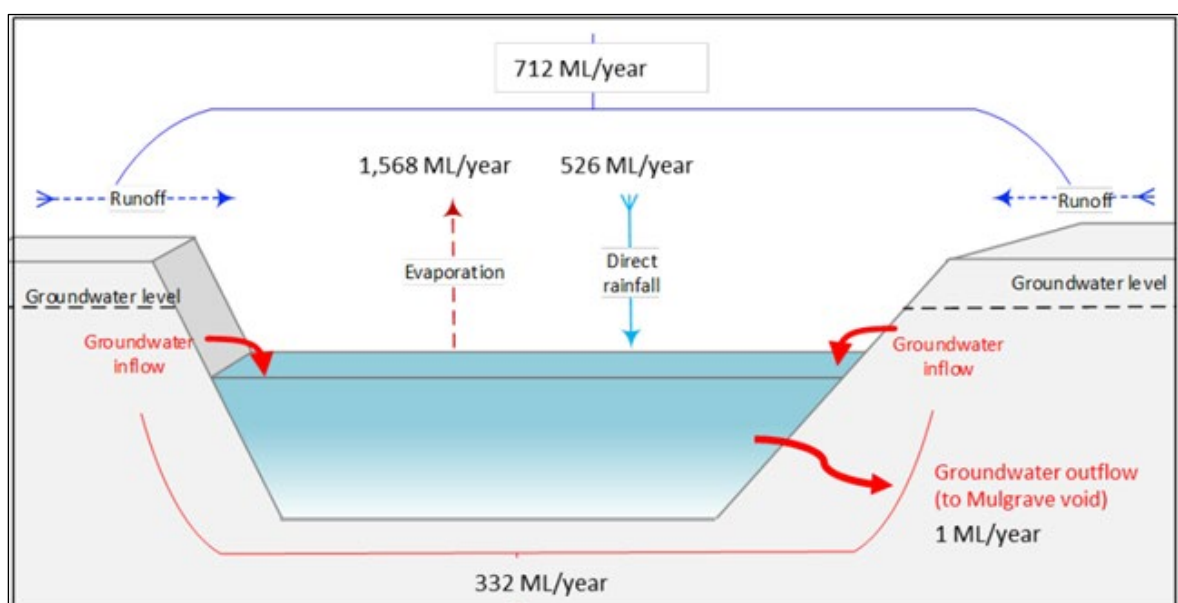


Figure 3-50 Average Inflows/Outflows Simulated for Period from 2180 to 2199 – Kemmis Residual Void

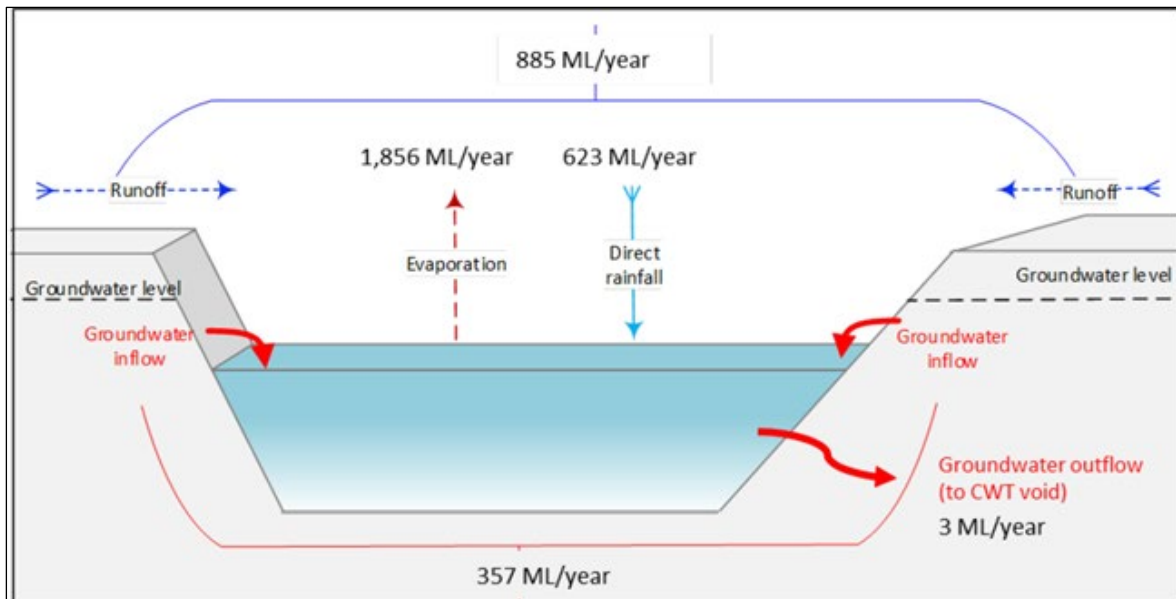


Figure 3-51 Average Inflows/Outflows Simulated for Period from 2180 to 2199 – Mulgrave South Residual Void

3.6.3.2 Geotechnical Stability

The Void Closure Plan (Appendix 9) includes a geotechnical stability analysis of the proposed residual void high-walls, end-walls, and low walls.

Geotechnical stability assessments have been completed to demonstrate that post-closure, the conceptual void high-wall, end-wall and low wall slopes will all exhibit long-term geotechnical stability for the SWC residual voids and will not adversely impact nearby woodland and grazing PMLU (Henderson Geotech, 2024). A visual depiction of the interactions of NUMA and the PMLUs is provided in Figure 3-53.

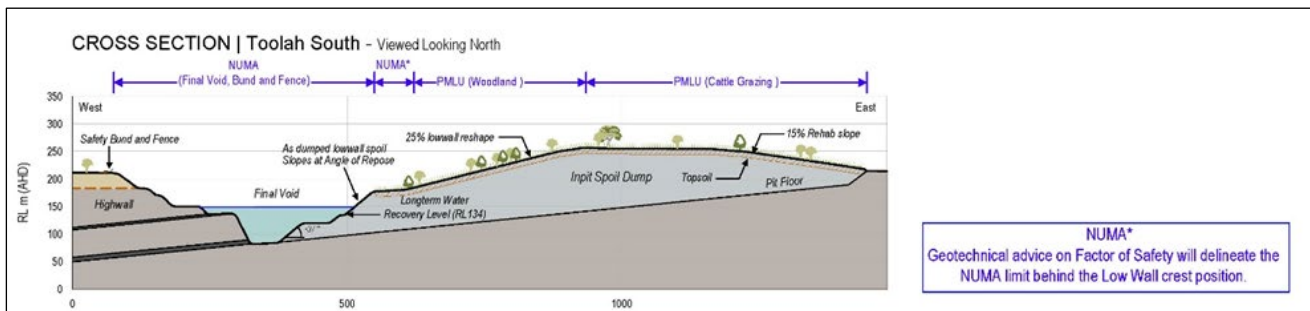


Figure 3-52 Example Visual Depiction of the Interactions of NUMA and the PMLU's at SWC Residual Voids (Minserve, 2024)

Cross-sections through each residual void were selected to capture the deepest voids; greatest depth of weathering and Tertiary (for high-walls); steepest floor dips (for low-walls); highest spoil (for low-walls); and locations where creek channels occur close to the residual void crests (Henderson Geotech, 2024; Blackrock Mining Solutions, 2025). Two additional cross-sections were later selected to address elements of the PRCP information request, including:

- Section EW: End-wall section of the Mulgrave EN residual void where Walker Creek passes between the Carborough and Mulgrave voids – included to assess the presence of waterway (and flooding influence) in this location.

- Section LB: End-wall section of the biodiversity corridor included in the landform between the Kemmis 2N and Mulgrave EN residual voids – included to assess stability outcomes from landform change to include the corridor.

For the C/W/T and Toolah South pit continuation, a reassessment of these voids was undertaken and included the sections S1 to S9 (WSP, 2025).

These cross-sections were then analysed using Slide2 Modeler, two-dimensional (2D) Limit Equilibrium Analysis for Slopes to determine the factor of safety (FoS).

The results from the geotechnical assessment for a dry void at the end-of-mining and for when the residual void lake reaches the long-term average water level are presented in Table 3-67. Refer to Appendix 9 for description of the cross-sections and more detail on the assessment.

Table 3-67 Geotechnical Stability Assessment Results for SWC Residual Voids

Section	Residual Void Water Level	Management Measure Applied	FoS - NUMA (Target 1.25)	FoS - Woodland (Target 1.35)	FoS - Grazing / watercourse (Target 1.5)
Low Wall					
S1	Final pit lake	Nil	n/a	n/a	1.53
S2	Final pit lake	Nil	n/a	n/a	1.64
S5	Final pit lake	Treated to 25°	1.29	n/a	n/a
S6	Final pit lake	Treated to 20°	1.54	n/a	n/a
S7	Final pit lake	Nil	n/a	n/a	1.51
S8	Final pit lake	Nil	n/a	n/a	2.35
S9	Final pit lake	Treated to 20°	n/a	1.4	n/a
S9	Final pit lake	Treated to 14°	n/a	n/a	1.78
4	Dry	Nil	1.22	1.40	2.65
4	Final Pit Lake	Nil	1.01	1.22	2.51
4	Dry	Benched 1 in 2	1.62	1.66	2.78
4	Final Pit Lake	Benched 1 in 2	1.31	1.37	2.46
4	Dry	Benched 1 in 2.5	1.94	1.94	2.79
4	Final Pit Lake	Benched 1 in 2.5	2.26	2.16	2.67
7	Dry	Nil	1.2	1.3	3.57
7	Final Pit Lake	Nil	0.95	1.06	3.92
End-Wall					
EW	Final Pit Lake	Nil	n/a	n/a	1.73
LB	Final Pit Lake	Nil	n/a	0.87	n/a
High Wall					
S1	Final pit lake	Nil	2.01	n/a	n/a
S2	Final pit lake	Nil	2.57	n/a	n/a
S4	Final pit lake	Nil	1.89	n/a	n/a
S5	Final pit lake	Nil	2.19	n/a	n/a

Section	Residual Void Water Level	Management Measure Applied	FoS - NUMA (Target 1.25)	FoS - Woodland (Target 1.35)	FoS - Grazing / watercourse (Target 1.5)
S6	Final pit lake	Nil	1.6	n/a	n/a
S7	Final pit lake	Nil	1.7	n/a	n/a
S8	Final pit lake	Nil	2.34	n/a	n/a
S9	Final pit lake	Nil	1.6	n/a	n/a
4	Dry	Nil	2.28	n/a	2.08
4	Final Pit Lake	Nil	2.18	n/a	2.08
7	Final Pit Lake	Nil	2.48	n/a	2.48
7	Final Pit Lake	Nil	2.44	n/a	>2.44

***Bold text** indicates target FoS is met.

Table 3-68 below outlines the adopted design acceptance criteria for SWC residual voids.

Table 3-68 Adopted Design Acceptance Criteria for SWC Geotechnical Assessment (Henderson Geotech, 2024)

Scenarios	Minimum Factor of Safety
Instability extending into grazing PMLU	1.5 (also imposed by pre-existing EA conditions)
Instability extending to watercourses or flood protection structures	1.5
Instability extending into woodland PMLU	1.35
Instability contained within NUMA	1.25

Based on the assessment outcomes:

- High-wall FoS for all residual voids were greater than (>) 1.5 and therefore met the nominated design acceptance criterion where instability may extend into watercourses, flood protection structures or a grazing PMLU. There is no requirement as indicated in the geotechnical stability assessment for additional setback distance; however, setbacks may be required to enable the construction and maintenance of other void management measures such as abandonment bunds and fencing. These distances have been incorporated into the proposed NUMA boundary where relevant.
- Except for a section with a limited strike length of approximately 100 m along the analysed land bridge end-wall, the end-wall FoS for all residual voids > 1.5. Therefore, most end-walls met the nominated design acceptance criterion where instability may extend into watercourses, flood protection structures, or a grazing or woodland PMLU. The final landform design for the land bridge end-wall section where FoS is less than (<) 1.35 where instability may extend into the woodland PMLU will be re-shaped to achieve the nominated design acceptance criterion (i.e. the target FoS).
- FoS for grazing PMLUs behind the low wall were mostly >1.5 and therefore met the nominated design acceptance criterion.
- Where FoS for woodland or grazing PMLUs behind the low-walls was <1.5, mitigation measures such as benching or reshaping of the slope will be applied to achieve the design acceptance criteria FoS for the low-walls.
- The EW section that was assessed due to the presence of a waterway in this location achieved a modelled FoS of >1.5 at the pit crest. Therefore, the modelled slope is expected to achieve an even greater FoS beyond the bund where flood influence might be expected.

- Where the assessment included the residual void lake level at long-term average equilibrium, the FoS for some sections of the low wall within the void NUMA boundary did not achieve the design acceptance criterion. When saturated strength properties were applied to the spoil below the established residual void lake level, the FoS was not achieved in these assessments due to the final dragline heaps being dumped out at angle of repose. Any potential failure of low-walls within the NUMA boundaries would be contained within the void NUMA and not impact the surrounding PMLUs. Applying mitigation measures such as benching or reshaping of the slope results in the FoS achieving the design acceptance criteria for the low-walls within the void NUMA boundary. This may be considered in the final mine closure landform if there are potential impacts to achieving the surrounding PMLUs.

3.6.3.3 Groundwater Modelling

Calibrated numerical groundwater modelling was undertaken as part of the PRCP hydrogeological assessment based on the conceptual model for the residual voids that includes all projected inflows, outflows, and recharge rates (Section 3.6.1.1). The groundwater modelling evaluated the potential groundwater-related impacts of the mine closure landform, including the residual voids. The objectives of this modelling were as follows:

- Assess the potential impacts of the final mine closure landform on the groundwater regime including private supply bores and GDEs following cessation of active mining. This includes identifying potential risk areas that may require groundwater impact mitigation/control measures, post-closure.
- Assess groundwater interactions with the residual voids including simulation of the residual void lake level and rate of groundwater recovery.
- Model the level and rate of recovery of mining-related groundwater drawdown in the groundwater system surrounding the residual voids and estimate the long-term groundwater behaviour post-closure.
- Assess the potential for migration/flow pathways for contaminants and residual void water through particle tracking.
- The proposed mine closure landform was replicated in the model, including the three SWC residual voids and spoil that will form part of the landform. The post-closure simulation applied the predicted end of mining groundwater head levels as the starting head levels for the post-closure simulation. The model simulation period commenced at the end of mining and ran for 500 years. Yearly stress periods were applied for the first 100 years of the post-closure period, and then ten-year stress periods applied for the remaining 400 years, with a total of 140 stress periods.
- Climate change effects on rainfall and evapotranspiration (ET) have been included considering the climate change values applied in the WBM post-closure simulations.

By the end of the post closure simulation, groundwater inflows and outflows to/from the residual voids reach equilibrium (i.e., have stabilised to a constant value), with net inflows occurring throughout the simulation period. Minor outflows from the Kemmis 2N (1 ML/yr), Mulgrave EN (3 ML/yr) and C/W/T (6 ML/yr) residual voids to the surrounding spoil are modelled at the end of the post-closure simulation period. Modelling indicates these outflows do not move beyond the spoil or mining leases, effectively saturating the spoil initially before returning to one of the SWC residual voids as indicated by the positive net groundwater inflows throughout the simulation period (WSP, 2025). No outflows are observed from the Toolah South residual void that is modelled to behave as a post-closure groundwater sink

The modelling results indicate that the peak lowering of groundwater near potential GDE sites in proximity to SWC is expected at the conclusion of mining. Minimal ongoing drawdown is anticipated during the post-closure period, allowing groundwater levels to recover and stabilize. No additional post-closure lowering is foreseen for potential groundwater users in the alluvium aquifer near SWC. However, some ongoing lowering of groundwater levels within the regolith occurs post-closure before recovering to approximate levels at the end of mining, likely due to a lag in mining-related drawdown rather than drawdown associated with the mine closure landform. Additionally, steady post-closure lowering of groundwater levels is modelled in the RCM

overburden/Rewan formation, underscoring the need for revised modelling of residual void lake levels and groundwater as the site approaches closure.

Considering the C/W/T and Toolah South pits continuation, the suppressed groundwater hydraulic gradient continues to be maintained towards the residual voids for the simulation period, with groundwater elevations generally declining during the first decade after mine closure, reflecting a delayed response to mine-related drawdown post-closure. With time, groundwater elevations begin to recover in most areas; however, they will remain suppressed, although the suppressed groundwater levels decrease with increasing distance from the residual void (i.e. the elevation of the regional groundwater table will increase with increasing distance from the former pit) (WSP, 2025).

3.6.3.4 Void Water Quality

The Void Closure Plan (Appendix 9) includes a geochemical stability assessment with analysis of the voids' water quality, and identifies the following key findings across the residual voids:

- Acidic conditions are unlikely to form within the SWC residual voids, with mildly alkaline to alkaline conditions developing through the modelled period. When geochemical controls are considered, the pH begins and remains above the EA-derived upper trigger value for the modelled period. The main geochemical control is CO₂ degassing which raises pH, resulting in carbonate precipitation and reducing pH. These geochemical processes are driven by the input of dissolved inorganic carbon, from runoff and groundwater inflow to the void lake.
- TDS concentrations increase over the model duration, indicating the development of brackish to saline conditions. However, the EA-derived trigger value is not exceeded for TDS.
- The increase in TDS concentration is primarily driven by evapo-concentration of the residual void lake water.
- TDS concentrations are lower in simulations with geochemical controls due to removal via precipitation of some metals/metalloids that contribute to the TDS concentrations. An 'equilibrium' state for TDS concentrations is not reached (i.e., constant TDS).
- Low TDS do not suggest favourable conditions for stratification within the SWC residual voids.
- Hydrodynamic/limnological analysis is required to assess the potential for thermal/chemical stratification to occur, and the importance of seasonal mixing processes and groundwater mixing inputs. However, as the residual voids are considered NUMAs and modelled as groundwater sinks (or outflows terminate in the C/W/T void), further stratification assessment is not warranted.

As all residual voids generally stabilise as groundwater sinks over time, they do not present an unacceptable risk of environmental harm beyond the residual void itself or the tenure boundary.

Geochemical source terms, extracted from Stanmore's SWC groundwater and environmental geochemistry databases, involve results from drill core analyses and solubility testwork on additional drillcores. The environmental geochemistry dataset ("SWM_Drill-hole Geochem Results_WORKING.xlsx") compiles test results, filtered by lithology, with medians used to determine source terms. Analytical values below the reporting limit are substituted with half the limit. The groundwater database, covering May 2004, includes data from 35 monitoring bores across four aquifer types, with no differentiation between aquifers or bores in deriving the groundwater source term. The source term derivation data is summarized in Table 3-69.

Table 3-69 Summary of Data Used to Derive Geochemical Source Terms for the SWC Residual Voids

Water Inflow	Data Source	Comment
Initial void lake	-	It is assumed that no water is present in the SWC residual voids at closure.
Natural catchment runoff	SWC Drill-core database	Represented by leachate data from weathered non-carbonaceous drill core samples.

Water Inflow	Data Source	Comment
Rehabilitated catchment/in-pit spoil runoff	SWC Drill-core database	It is assumed that non-carbonaceous interburden will be specified as cover material for final landform. Spoil runoff is, therefore, represented by leachate data from fresh non-carbonaceous drill core samples.
High-wall runoff	SWC Drill-core database	The SWC drill core databases were used to derive source terms for each lithological domain/grouping.
Groundwater inflow	SWC Ground-water database	Median water quality from SWC groundwater database
Direct Rainfall	-	Pure water equilibrated with atmospheric carbon dioxide (CO ₂)

3.6.3.5 Options for Minimising Final Void

Technical studies, including the water balance and hydrogeology modelling, have been undertaken through an iterative approach with the development of the mine closure landform design. These iterations have resulted in a mine closure landform design that includes refinements comprising residual void partial backfill, catchment reduction and changes to the landform to minimise environmental harm from the residual voids.

Further detail including a void minimisation options assessment is described in Section 3.4.

3.6.3.6 Final Void Dimensions and Wall Angles / FoS

Outcomes of the void geotechnical and geochemical stability analyses, void water balance modelling, site-wide hydrogeological and rehabilitation flood modelling have resulted in optimisation of the residual void dimensions towards minimising the extent and location of the NUMAs.

The residual void extents are defined by the high-wall, end-wall, and low-wall crests at natural ground level. Indicative dimensions for each residual voids are presented in Table 3-70. All residual voids will need to be assessed as geotechnically stable and achieving a minimum FoS of ≥ 1.25 above the maximum predicted water level as determined by an AQP, and achieve an overall slope angle 65° for void highwall and end wall in competent (unweathered) rock, and an overall slope angle 45° for highwall and end wall in less competent (weathered) rock. 3D void design plans for each residual voids, including void lakes, are presented in Figure 52.

Table 3-70 Indicative Dimensions of the Residual Voids

Residual Void	Indicative Maximum Width (m)	Indicative Maximum Length (m)	Indicative Maximum Depth (m)
Kemmis 2N	480	6,760	122
Mulgrave EN	460	6,730	123
Carborough / Walker / Toolah	800	5,300	162
Toolah South	700	1,100	146

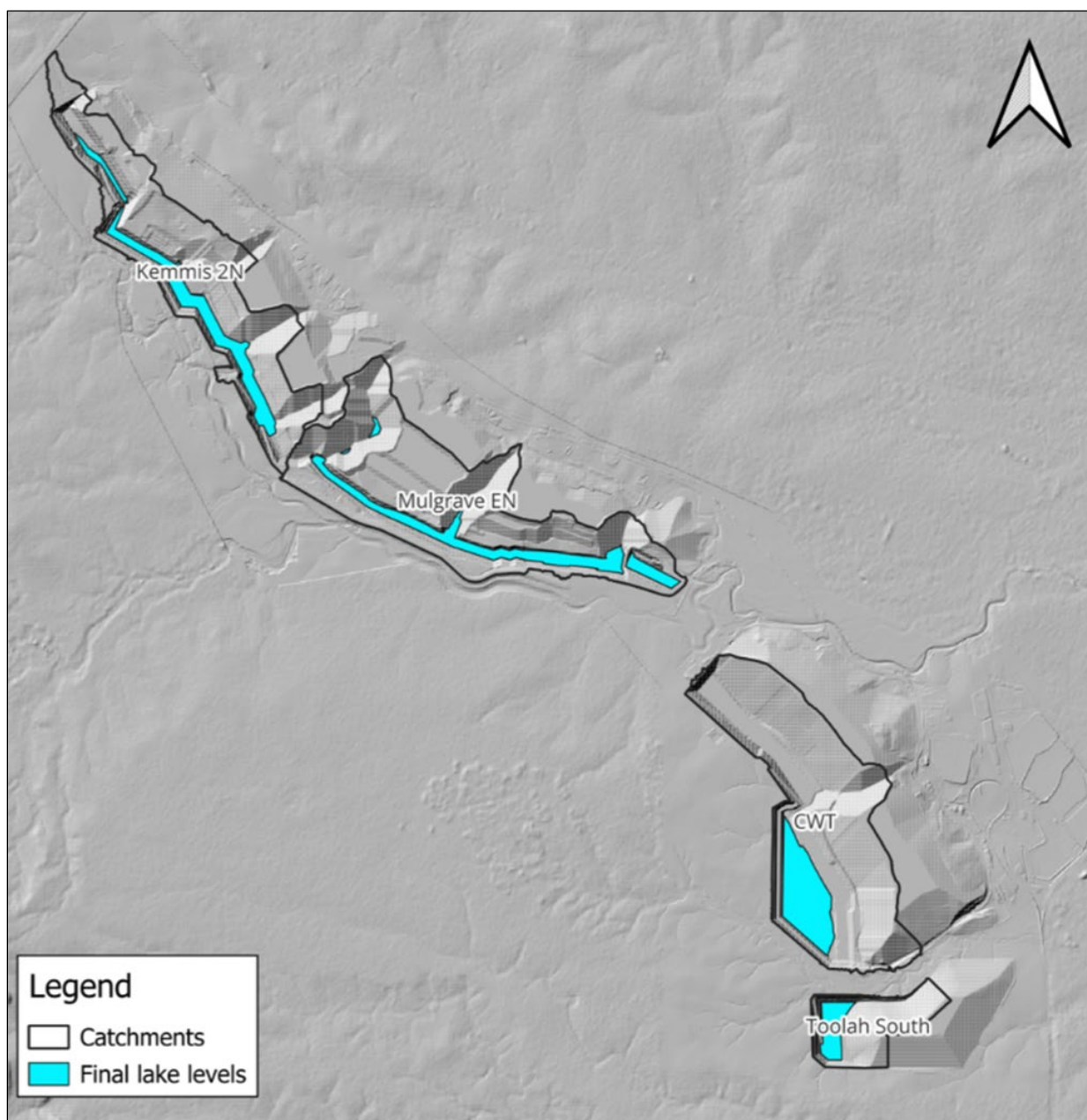


Figure 3-53 3D Depiction of SWC Residual Voids and Mean Lake Levels at End of Water Balance Model Simulation

3.6.3.7 NUMAs Improvements and Void Rehabilitation Strategies

The residual voids become available for improvement once mining of each pit is complete and reshaping of the spoil dump low wall outside of the NUMA area is complete (IA1). This is for safety reasons to eliminate the risk of any injury or damage within the NUMA area from the reshaping and rehabilitation activities.

To support attainment of residual voids that are safe and do not present an unacceptable risk of off-tenure environmental harm, the improvement and/or management strategies provided in Table 3-71 will be undertaken.

All four residual voids will be retained as NUMA with no expectation to achieve a PMLU outcome.

Table 3-71 SWC Residual Void Closure Aspects, Context and Management Considerations

Residual Void Closure Aspect	Closure Objective			Residual Void Closure Context	Management Consideration
	Safety	Stability	Env-Harm		
Geotechnical Stability	✓	✓	-	Stability outside of the NUMA extents of the high walls = $FoS \geq 1.5$. Stability of the low walls within the PMLU for grazing = $FoS \geq 1.5$. Stability of the end-walls where a watercourse or flood protection structure abuts or is near the residual voids = $FoS \geq 1.5$. Stability of the end-walls and low-walls where woodland PMLU abuts the residual void (e.g. biodiversity corridor) = $FoS < 1.35$ or grazing PMLU abuts the residual void = $FoS < 1.5$, mitigation measures such as benching or reshaping of the slope will be applied to achieve the FoS design acceptance criteria for the low-walls and end-walls. Extents of all SWC residual voids have been defined by geotechnical analysis based on currently available information.	Develop geotechnical parameters that are specific to SWC for spoil and other materials to apply to geotechnical modelling. As mining approaches the final limits, re-assess the geotechnical stability of the low-walls based on the latest available data, including the developed site-specific geotechnical parameters. Use a minimum $FoS \geq 1.5$ as a guidance for ongoing void closure planning. (This may be refined over the mine life should industry research provide optimised guidance on observational methods and consequence assessment). If FoS extending into the woodland PMLU after re-assessment remains < 1.35 following closure, review the risk of instability affecting the ability to achieve the PMLU milestone criteria. Mitigation measures such as benching or reshaping of the slope to be considered for achieving the design acceptance criteria FoS for the low-walls and end-walls.
Void Hydrology	✓	✓	✓	Based on rehabilitation flood modelling completed: - The proposed drainage features effectively exclude floodwaters from the residual voids. inundation from floodwaters for the 0.1% AEP event. - Peak flow velocities of a 0.1% AEP event are generally below 0.5 m/sec, indicating a low erosion potential and a correspondingly low risk to the long-term stability of the landforms or their ability to meet the intended PMLU outcomes.	Undertake regular update of hydrological models at key mine planning milestones to ensure that residual void catchments are minimised as far as practicable. Update and refine the final mine closure landform to consider spoil dumping and landform design to exclude floodwaters entering the residual voids. If necessary, identify and implement mitigation measures for appropriate protection works of

Residual Void Closure Aspect	Closure Objective				
	Safety	Stability	Env-Harm		
	Residual Void Closure Context			Management Consideration	
	- As the water levels remain below the recovered groundwater levels for all SWC residual voids (and well below each voids' spill point), the voids will not overtop and environmental harm beyond that of the void itself or mining lease boundary is not expected. Therefore, no management activities required. - The long-term mean void lake levels for all SWC residual voids are modelled to remain below the interpreted and modelled groundwater levels due to evaporative effects on the residual void lakes. An available storage capacity remains for the voids to continue acting as long-term sinks. The mean water balance for all SWC residual voids reaches equilibrium: - After 2120, mean water levels in Kemmis 2N residual void start to stabilize, with simulated mean inflows of 1,571 ML/year being equal to mean outflows of 1,569 ML/year. - After 2120, meal water levels in Mulgrave EN residual void start to stabilise, with simulated mean inflows of 1,865 ML/year being equal to mean outflows of 1,858 ML/year. - After 2100, mean water levels in C/W/T residual void start to stabilise, with simulated mean inflows of 1,833 ML/year being very similar to mean outflows of 1,834ML/year. - After 2120, mean water levels in Toolah South residual void start to stabilise, with simulated mean inflows of 516 ML/year being very similar to mean outflows of 514 ML/year .			landforms where floodwaters from watercourses interact with the final mine closure landforms. At cessation of mining activities, review and update the void water balance modelling, incorporating identified changes to the voids' final mine closure landforms and spill point elevations, rainfall and evaporation, surface water runoff, groundwater inflows, and climate projections. Obtain certification from an appropriately qualified person that the residual voids will not cause environmental harm beyond the tenure boundary.	

Residual Void Closure Aspect	Closure Objective			Residual Void Closure Context	Management Consideration
	Safety	Stability	Env-Harm		
Void Hydrogeology	-	-	✓	Mining-related dewatering activities have lowered groundwater levels that will result in continued suppression of the water table centred on the SWC residual voids. Void lakes are predicted to form in the residual voids post-mining. Water levels in these void lakes are modelled to remain below the interpreted and modelled groundwater levels due to evaporative effects on the residual void lakes. The SWC residual voids remain as groundwater sinks post-closure or any minor groundwater outflows remain within the SWC residual voids, with Toolah South modelled to behave as a terminal groundwater sink for the network of residual voids. Modelling, including particle tracking, indicates that infiltration of rainfall through the spoil, tailings area, and other areas around the voids within the tenure will migrate towards, and be captured within the residual voids. Groundwater flow is not expected to flow off-tenure toward the receiving environment, minimising the risk of environmental harm due to the proposed final mine closure landform.	At cessation of mining activities, review and update the groundwater modelling, incorporating updated void WBM outputs and in-field groundwater sampling data, as required. Obtain certification from an appropriately qualified person that, upon completion of mining, residual voids do not present an unacceptable risk of environmental harm beyond the tenure boundary.
Void water quality	-	-	✓	Acidic conditions are not expected to establish within the SWC residual voids. TDS concentration in all SWC residual voids will continue to increase over time. The water quality within the SWC residual voids is not modelled to deteriorate beyond the EA-derived trigger values. In addition to the above, all SWC residual voids do not present an unacceptable risk of environmental harm beyond that of the void itself as: they are NUMAs; and remain as groundwater sinks, or any minor	At cessation of mining activities, review and update the void geochemical assessment including additional or refined data from in-pit surface water samples, surface- and groundwater samples, and biochemical modelling. Obtain certification from an appropriately qualified person that the residual voids will not present an unacceptable risk of environmental harm beyond the tenure boundary.

Residual Void Closure Aspect	Closure Objective			Residual Void Closure Context	Management Consideration
	Safety	Stability	Env-Harm		
				groundwater outflows remain within the SWC residual voids (i.e. Toolah South modelled to behave as a terminal groundwater sink). Void water quality should be interpreted in this context.	
Void Access Control	✓	-	-	Access to the residual void will be restricted for humans and livestock.	Following cessation of mining activities: • Construct a safety bund (exclusion measure) at the relevant geotechnical set-back distance for each residual void high-wall. • Erect fencing and signage (where required) around the perimeter of the safety bund (exclusion measure). • Erect fencing and signage around the perimeter of the woodland PMLU (where required) • Obtain certification from an appropriately qualified person that the residual void is safe to humans and livestock.

3.6.4 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.

Not applicable, as there is no underground mining at SWC.

3.6.5 Built Infrastructure

PRCP Guideline (Section 3.6.5)

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

The rehabilitation planning part must include:

- 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.

In accordance with EA condition E10: All infrastructure constructed by, or for the EA holder during the mining activities including water storage structures, must be removed from the site prior to surrender, except where agreed in writing by the post-mining landowner/landholder. However, the EA further notes that this is not applicable where the landowner / landholder is also the environmental authority holder, which is the case for the majority of SWC.

Table 3-72 details the infrastructure associated with the mining activities at SWC.

SMR owned surface infrastructure not beneficial to the PMLU will be removed in accordance with EA conditions. Surface infrastructure that may be retained to support the PMLUs will have a demonstratable benefit and may include a selection of the following: fencing; access tracks; services related infrastructure; sheds and buildings; hardstand areas/transport logistics areas; and water related infrastructure.

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

Priority will be to repurpose, salvage or recycle any infrastructure to be removed. Demolition and disposal will only be undertaken when alternatives are deemed by SMC not to be viable. This approach is in line with the waste and resource management hierarchy outlined in the Queensland Waste Management and Resource Recovery Strategy created under the Queensland Waste Reduction and Recycling Act 2011.

Table 3-72 Infrastructure Associated with the Approved SWC Mining Activities

Category		Infrastructure
Built Infrastructure	Steel, concrete, and brick infrastructure	• CHPP • MIA • Administration • Workshop • Fuel, oil and chemical storage • Fuel and wash bays • Pipes and pumps • Power lines • Switchyard and substations • Communications towers • Fences
	Rail and train load-out related infrastructure	• Conveyors • Loading bin and facilities
	Supporting services	• Pipes and pumps • Power lines • Switchyard and substations • Communication and lighting towers
Water Infrastructure		• Process water dams • Raw water dams • Drains and pipelines

The timing of the decommissioning and removal of the infrastructure is based on the proposed timing of the SWC operation, processing of the final coal and rehabilitation activities. Any public infrastructure associated with roads, power, water and communications supply to landowners or townships is not included in this PRC Plan or Schedule. Further detail on the rehabilitation stages after decommissioning of the infrastructure, such as landform reshape, surface preparation, revegetation, and monitoring, are covered in the relevant sections of this PRC Plan.

3.6.5.1 Decommissioning Built Infrastructure

Other than as required by the PRCP Schedule or agreed to be retained by the landholder (as evidenced by a signed landholder agreement):

- All services will be disconnected and decommissioned.
- All buildings will be demolished and/or removed.
- All hardstand and concrete areas will be removed.
- All mine roads, access tracks and fences will be removed.
- All pipelines will be drained and removed.
- All waste will be removed.
- All dams will be dewatered and desilted, and any liners present will be removed, before being decommissioned.
- All exploration drill holes will be rehabilitated in accordance with the eligibility criteria and standard conditions for exploration and mineral development projects – V2 (EHP, 2016).
- All machinery and equipment will be removed.

3.6.5.2 Contaminated Land Assessment

In accordance with EA conditions E8, F1 and F41, contaminants must not be released in a manner that constitutes serious environmental harm, and spillage of any waste, contaminants or other materials must be cleaned up as quickly as practicable, stored in accordance with relevant standards, and handled in a way that prevents environmental harm.

At completion of mining operations and after infrastructure decommissioning (RM1) but prior to landform establishment, surface preparation and revegetation, a contaminated land investigation will be undertaken in accordance with RM2 and will include:

The contaminated land investigation will be completed by a suitability qualified person (SQP) in accordance with the Environmental Protection Act (1994), including

- I. Contaminated and hazardous material will be either remediated in-situ or removed/transported to an approved landfill for disposal, with waste tracking information recorded and submitted.
- II. Validation testing will be undertaken to confirm that contaminated and hazardous materials have been removed or remediated successfully.
- III. Contaminated land assessment will be undertaken, and it must indicate that no contamination unsuitable for the post-mining land use remains or is occurring.
- IV. If required, a site investigation report including a site suitability statement will be prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act.
- V. If a site investigation report is required, a Site suitability statement from a SQP will be obtained to confirm the uses or activities for which the land is suitable, and that these uses/activities align to the approved PMLUs for the site.

3.7 Risk Assessment

Legislative Requirement

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

3.7.1 Identifying, Assessing, and Treating Risks

PRCP Guideline (Section 3.7)

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

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

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

3.7.2 Risk Methodology

A risk-based approach to the SWC PRC Planning has been undertaken in term of the method described in Figure 3-55.

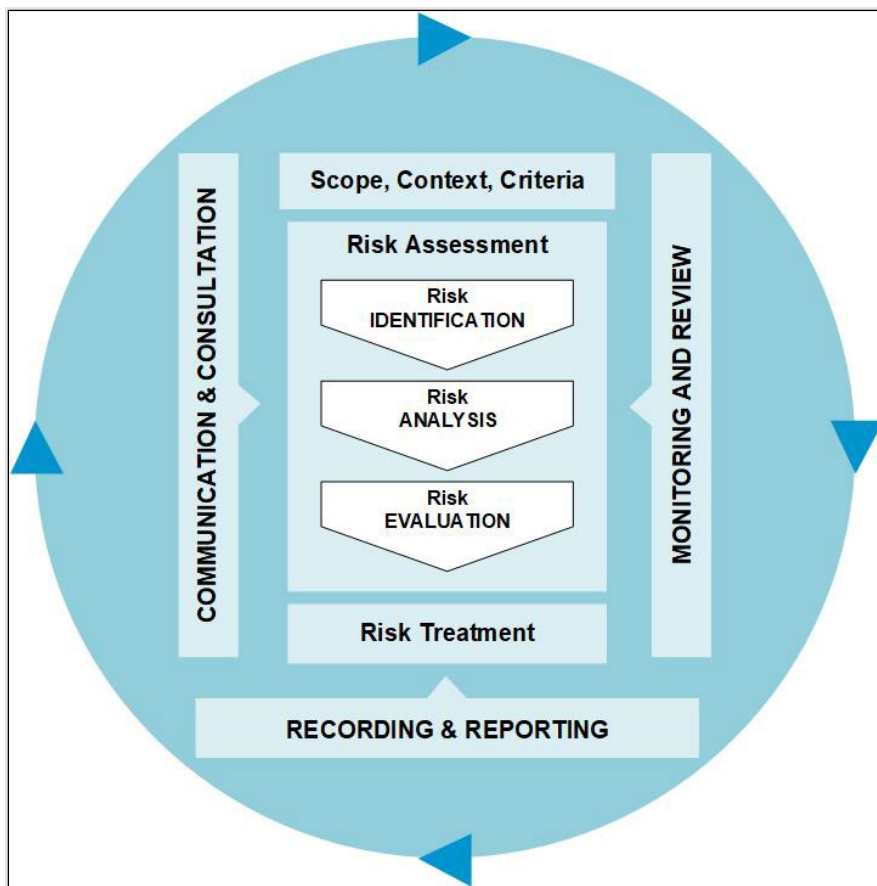


Figure 3-54 ISO 31000-Compliant Risk-Based Approach Followed for the SWC PRC Plan

3.7.3 Risk Identification

The risk event - a stable condition for land described as a post-mining land use not being achieved - was assessed per ISO 31000 methodology described in Figure 3-55 above (the full risk assessment is included in Table 3-77, where stable condition is 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.

For SWC the PMLUs being assessed are grazing, woodland, grassland and watercourse (Section 3.3.1).

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 PMLU.
- Alteration of hydrogeological conditions.
- Alteration of local hydrologic 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 final landforms.
- Landform establishment inconsistent with milestone criteria.

Additionally, the risk of NUMAs not meeting a stable condition consistent with milestone criteria was assessed.

3.7.3.1 Risk Analysis, Evaluation, and Relevant Treatments

Table 3-77 provides the full detail of risk analysis, risk evaluation and risk treatment for these scenarios. Worst case outcomes were assessed for each scenario, preventative and mitigating controls identified and from there a residual risk rating was calculated. The SMC likelihood and severity tables, as well as the outcomes of the residual risk rating (RRR) heat map ratings matrix are provided in Table 3-73, Table 3-74 and Table 3-75, respectively. Table 3-76 details necessary risk treatments identified to achieve a stable condition for the PMLUs.

Table 3-73 Risk Likelihood Table

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 - 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 - 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 - 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 3-74 Risk Severity Table

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

Table 3-75 Residual Risk Rating (RRR) Heat Map

Likelihood			Severity Level	S1	S2	S3	S4	S5
			Severity Factor	10	30	100	300	1000
	Likelihood	Likelihood Factor	Timeframe	Residual Risk Calculation (With Controls in Place & Effective)				
	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	Within 50 years	0.3	1	3	10	30

With controls in place and implemented effectively, the RRR for the identified risk scenarios of this risk event is deemed to be medium (RRR of 10).

Table 3-76 Necessary Risk Treatments Identified to Achieve a Stable Condition for the PMLUs

Aspect	Risk Treatment
Risk Event 1. Alteration of Hydrogeological Conditions	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments minimise and/or prevent impacts.
Responsibility for plan: - Approval - Implementation	SMR.
Proposed actions	Refer to Table 3-77.
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 2. Alteration of Local Hydrological Conditions	
Reasons for selecting treatment option	Studies and analysis performed show that these treatments minimise and/or prevent impacts.
Responsibility for plan: - Approval - Implementation	SMR.
Proposed actions	Refer to Table 3-77.
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.

Aspect	Risk Treatment
Risk timing and scheduling	Alignment with PRCP milestones and schedule.
Risk Event 3. Contaminated Land Impacting on Environmental Receptors, Rehabilitation and Attainment of PMLUs	
Reasons for selecting treatment option	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	SMR.
Proposed actions	Refer to Table 3-77.
Resource requirements	- Suitably qualified person (SQP) to undertake contaminated land investigations and oversee ongoing monitoring requirements. - Sample collection, laboratory analysis and engineering controls.
Performance measures and constraints	Alignment with PRCP milestones.
Reporting and monitoring	SQP reporting as per PRCP milestones (RM2).
Risk timing and scheduling	Alignment with PRCP milestones and schedule.
Risk Event 4. Impact of Extreme Weather Event Prior to Final Landform 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	SMR.
Proposed actions	Refer to Table 3-77.
Resource requirements	- AQP to undertake monitoring of final landforms post flood events. - Rehabilitation monitoring program. - Emergency response procedures. - Water cart.
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 5. 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	SMR.
Proposed actions	Refer to Table 3-77.
Resource requirements	Topsoil inventory.

Aspect	Risk Treatment
	• 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 milestones and schedule.
Risk Event 6. 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:	• SMR.
• Approval • Implementation	
Proposed actions	• Refer to Table 3-77.
Resource requirements	• Topsoil inventory. • 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 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:	• SMR.
• Approval • Implementation	
Proposed actions	• Refer to Table 3-77.
Resource requirements	• Data from waste characterization. • In-situ geochemical monitoring data. • 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.

Aspect	Risk Treatment
Risk Event 8. NUMA 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	SMR.
Proposed actions	Refer to Table 3-77.
Resource requirements	- Rehabilitation monitoring data. - 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.

Table 3-77 Risk Register

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Landform does not reach stable condition consistent with selected PMLU	RM7, RM8	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Erosional instability (including due to high 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. Contaminated land impacting on environmental receptors, rehabilitation, and attainment of PMLU (see separate risk event).	Unable to relinquish mining lease. Extended period required to remediate landform. Loss or degradation of cover materials. Poor landform design (capping depth, materials, and thickness). Ineffective monitoring and inspection program.	Probable (0.3)	3	Medium (30)	Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Outward-facing slopes have a gradient of 15% or less with slope lengths <700m, while inward-facing slopes have a gradient of 25% or less with slope lengths <400m. Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. Grazing (RA2, RA3, RA6) Landforms reshaped with maximum 15% slope. Grazing (RA2, RA3, RA6) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.5. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Areas >15% to be assessed by an AQP as being stable long term, with rock mulch or other treatments applied as required. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.35 unless an alternative is justified by an AQP. Updated hydraulic flood modelling using drainage designs. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use.	Unlikely (0.1)	3	Medium (10)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								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. Implement rehabilitation monitoring program. Maintain dams, perimeter drainage and erosion and sediment control systems during establishment. Monitoring of rehabilitated areas to be completed in accordance with monitoring criteria and identify re-work areas as applicable. Final landform for grazing PMLU has achieved a geotechnically stable condition with minimum ≥ 1.5 factor of safety and slopes $\leq 15\%$. Final landform for woodland and Grassland PMLU with slopes $\geq 15\%$ has achieved a geotechnically stable condition with minimum ≥ 1.35 factor of safety unless an alternative is justified by an AQP. No evidence of erosion for all RA's excluding RA7 is classified as 'moderate' or 'severe' as defined by Table 3-80 Erosion classification framework. Assessment report completed by an AQP certifying that the diversion (RA7) is operating in accordance with, DNRME Guideline: Works that interfere with water in a watercourse for a resource activity — watercourse diversions under the Water			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Act 2000 (OSW/2019/4599) criteria and is in a stable condition. Geomorphic index (IDC method) used to verify that Rehabilitation for RA7 is erosionally stable. 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”, as provided in Table 3-82 Pasture Condition Assessment Table. A BioCondition assessment at RA5, RA7, RA8 and RA9 is completed by an AQP using the methodology outlined in the latest version of the Queensland Herbarium’s BioCondition Assessment Manual. At least four native grass species are present at RA4 The BioCondition assessment required by RM8(f) at RA5, RA8, RA9 and RA7 demonstrates achievement of the PRCP Benchmark for each assessable attribute. Contaminated land investigation completed by a suitability qualified person (SQP)¹ in accordance with the Environmental Protection Act (1994). A site suitability statement from a SQP confirms the uses or activities for which the land is suitable and aligns to the approved PMLUs for the site. Vegetation establishment per proposed rehabilitation criteria. Earthworks timed to avoid periods of heavy predicted rainfall.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Protection from un-approved livestock access. Only approved seed mixes to be used and seeding to occur at optimal timing for favourable weather conditions. See also – controls for inadequate vegetation cover and establishment, insufficient volume of rehabilitation materials or unsuitable materials used and extreme or significant weather events.			
Contaminated land impacting on environmental receptors, rehabilitation, and attainment of PMLU	RM2	RA2, RA3, RA3	Erosional instability of landforms resulting in sediment mobilisation and exposure of encapsulated waste. Unsuitable materials used in rehabilitation or as capping. Potential contamination sources not adequately investigated and/or remediated. Incorrect placement of geochemically unstable waste materials. Seepage from MAW sources or residual voids.	Contamination of soil, surface water and groundwater above selected thresholds/guidelines. Migration of contaminants from source to sensitive receptors.	Probable (0.3)	3	Medium (3)	Contaminated land investigation with a site investigation report prepared by an appropriately qualified person (AQP). Removal and appropriate disposal of contaminated materials. Conduct validation testing to confirm that contaminated materials have been removed or remediated. Certification from an AQP that all contaminated land has either been remediated or removed. Landform and cover design technical specifications must include a QA/QC program. Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. Grazing (RA2, RA3, RA6) Landforms reshaped with maximum 15% slope.	Unlikely (0.1)	3	Medium (10)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Grazing (RA2, RA3, RA6) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.5. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Areas $>15\%$ to be assessed by an AQP as being stable long term, with rock mulch or other treatments applied as required. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.35 unless an alternative is justified by an AQP. Updated hydraulic flood modelling using drainage designs. All rehabilitation areas to demonstrate stability of diversions. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use. Final landform for grazing PMLU has achieved a geotechnically stable condition with minimum ≥ 1.5 factor of safety and slopes $\leq 15\%$. Final landform for woodland and grassland PMLU with slopes $\geq 15\%$ has achieved a geotechnically stable condition with minimum ≥ 1.35 factor of safety unless an alternative is justified by an AQP. No evidence of erosion for all RA's excluding RA 7 is classified as 'moderate' or 'severe' as defined by Table			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								3-80 Erosion classification framework. Environmental monitoring and reporting as per the EP Act 1994 and existing EA requirements. Implement rehabilitation monitoring program.			
Insufficient volume of material available or unsuitable quality for rehabilitation activities	RM3, RM4, RM5	RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	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. Inadequate amelioration does not prepare soil for target vegetation impacting PMLU.	Insufficient quantities of capping and cover materials to achieve rehabilitation of final landform to support PMLU. Potential for acid mine drainage or saline mine drainage to reduce water quality in groundwater and surface water. Insufficient quality of capping and cover materials to achieve rehabilitation of final landform to support PMLU. High cost of remediation.	Unlikely (0.1)	4	Medium (30)	Sufficient quantities of growth material estimated to be sourced from site for construction of final landform. Sufficient quantities of suitable waste material to be sourced from site for construction of final landform. Soil sampling of stockpiles prior to placement to refine amelioration fertilizer rates. Growth medium placed at minimum depth of 150 mm for all RAs except RA1. An assessment of growth media characteristics is completed by an AQP that identifies amelioration and other treatments required to achieve the following primary growth media quality targets^: - pH (1:5) 6.0–9.0 (0–0.3m). - Electrical Conductivity - EC (1:5) ≤ 0.75dS/cm ((0–0.3m). - ESP = ≤6%. - CEC and major macronutrient (N, P, K, and organic C) concentrations in root zone (0–0.3m) at least 80% of those measured at comparable reference sites. Rip along contour, if required.	Highly unlikely (0.03)	4	Medium (10)
Inadequate vegetation cover	RM6, RM7, RM8	RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Inadequate amelioration does not prepare soil for target	Excessive erosion of rehabilitated areas.	Probable (0.3)	4	Medium (90)	Waste characterisation to be undertaken when entering new un-tested areas.	Unlikely (0.1)	4	Medium (30)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
and establishment			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 tertiary waste within 2 m of the surface. Poor introduction of livestock due to inadequate fencing or deviation from schedule.	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.				Ongoing testing of mine-affected water throughout operations. Primary growth media quality targets listed in PRCP Schedule are achieved based on a number of representative samples as determined by AQP. Selection of appropriate vegetation species, seed species and their rates. Soil sampling of stockpiles prior to placement to refine amelioration fertilizer rates. Implement rehabilitation monitoring program. Document growth media depth. Document ameliorants and physical treatments applied. Document seed mix and source/s. Document seed application rates/density, planting timing and areas. Appropriate topsoil stockpile management. Placement of topsoil material across rehabilitated areas (minimum 150mm). Management of topsoil stripping and application during rehabilitation in accordance with TMP and RMP. Ameliorants and fertiliser applied per approved ratio. Appropriate equipment to be utilised during activities. Seeding at optimal time of year with respect to favourable rainfall conditions. Monitoring of rehabilitated areas in accordance with monitoring schedule to identify reduced germination early.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Re-seeding where required in critical situations. Variable seed criteria to allow for seasonal variation and availability. Where applicable, additional ESC measures to be implemented. Continual improvement through annual review of completed rehabilitation activities. Only authorised vehicles and persons to access rehabilitated areas. Fencing surrounding South Walker Creek Mine is to be maintained to control external livestock access when required. Development of a revegetation plan that reduces the risk of poor vegetation establishment, and that outlines soil suitability indicators. Develop a revegetation plan that outlines remedial actions if these wastes are found within 2m of the surface. 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. Monitoring to identify any erosion initiation, particularly following rainfall events >20 mm, and early rectification of erosion.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Alteration of hydrogeological conditions	RM1, RM2, RM3, RM4, RM5, RM6, RM7, RM8	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Insufficient or incorrect landform design or construction methods. Incorrect placement of geochemically unstable waste materials. Seepage from MAW sources or residual voids.	Adverse impacts to the receiving groundwater environment including contamination of groundwater above selected thresholds/guidelines.	Unlikely (0.1)	4	Medium (30)	Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. Grazing (RA2, RA3, RA6) Landforms reshaped with maximum 15% slope. Grazing (RA2, RA3, RA6) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.5. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Areas >15% to be assessed by an AQP as being stable long term, with rock mulch applied as required. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.35 unless an alternative is justified by an AQP. Updated hydraulic flood modelling using drainage designs. All rehabilitation areas to demonstrate stability of diversions. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use". 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	Highly unlikely (0.03)	4	Medium (10)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								waters or groundwaters. As a result, a specific cover design to address these risks is not required. Final landform for grazing PMLU has achieved a geotechnically stable condition with minimum ≥ 1.5 factor of safety and slopes $\leq 15\%$. Final landform for woodland habitat PMLU with slopes $\geq 15\%$ has achieved a geotechnically stable condition with minimum ≥ 1.35 factor of safety unless an alternative is justified by an AQP. No evidence of erosion for all RA's excluding RA 7 is classified as 'moderate' or 'severe' as defined by Table 3-80 Erosion classification framework. Assessment report completed by an AQP certifying that the diversion (RA7) is operating in accordance with, DNRME Guideline: Works that interfere with water in a watercourse for a resource activity — watercourse diversions under the Water Act 2000 (OSW/2019/4599) criteria and is in a stable condition. Geomorphic index (IDC method) used to verify that Rehabilitation for RA7 is erosionally stable. Contaminated land investigation with a site investigation report prepared by an appropriately qualified person (AQP.) Removal and appropriate disposal of contaminated materials. Conduct validation testing to confirm that contaminated materials have been removed			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								or remediated. Certification from an AQP that all contaminated land has either been remediated or removed. Document (map) locations where mining wastes will be stored during mining operations. Water balance assessment was undertaken (WSP, 2024) and concluded that post-closure, all SWC residual voids will continue to act as sinks and have a very low risk of overtopping, for all climate projections selected for the assessment. Implement rehabilitation monitoring program including groundwater quality monitoring. All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations. Water quality in retained dams is not expected to cause degradation of adjacent or downstream surface or ground water resources, although testing will be carried out to establish whether water quality meets the water quality criteria in accordance with the PRCP schedule (RM8). Particle tracking modelling confirms that residual voids will act as sinks and even if water levels rise, contaminants will report back to residual voids. Groundwater monitoring to be undertaken in accordance with section 3.8.3 groundwater monitoring. Appropriate management, placement/encapsulation, and			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								monitoring of waste (spoil and rejects) during operations.			
Alteration of local hydrologic conditions	RM1, RM2, RM3, RM4, RM5, RM6, RM7, RM8	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Insufficient or incorrect landform design or construction methods. Erosional instability of landforms resulting in sediment mobilisation into receiving environment. Inadequate surface preparation or vegetation cover establishment. Surface water contamination from unsuitable waste rock material. Failure of ESC structures post establishment leading to loss of sediment offsite. Interactions with the flood plain and final landform (Carborough DN and Mulgrave EN landforms). High velocities in landform drainage leading to erosion instability.	Adverse impacts to the receiving surface water environment including contamination of surface water above selected thresholds/guidelines.	Probable (0.3)	4	Medium (90)	Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. Grazing (RA2, RA3, RA6) Landforms reshaped with maximum 15% slope. Grazing (RA2, RA3, RA6) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.5. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Areas >15% to be assessed by an AQP as being stable long term, with rock mulch applied as required. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.35 unless an alternative is justified by an AQP. Updated hydraulic flood modelling using drainage designs. All rehabilitation areas to demonstrate stability of diversions. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use". Final landform for grazing PMLU has achieved a	Unlikely (0.1)	4	Medium (30)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								geotechnically stable condition with minimum ≥ 1.5 factor of safety and slopes $\leq 15\%$. Final landform for woodland and grassland PMLU with slopes $\geq 15\%$ has achieved a geotechnically stable condition with minimum ≥ 1.35 factor of safety unless an alternative is justified by an AQP. No evidence of erosion for all RA's excluding RA 7 is classified as 'moderate' or 'severe' as defined by Table 3-80 Erosion classification framework. Assessment report completed by an AQP certifying that the diversion (RA7) is operating in accordance with, DNRME Guideline: Works that interfere with water in a watercourse for a resource activity — watercourse diversions under the Water Act 2000 (OSW/2019/4599) criteria and is in a stable condition. Geomorphic index (IDC method) used to verify that Rehabilitation for RA7 is erosionally stable. Implement rehabilitation monitoring program including water quality monitoring. All imported hazardous materials to be stored and used in accordance with relevant standards and removed from site on completion of operations. Landforms will be designed with appropriate erosion protection for any areas with flood interactions. Monitoring of retained dams to ensure suitability for supporting grazing PMLU.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								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 SWC diversions undertaken to ensure trajectory to achieving rehabilitation milestones. Appropriate management, placement, and monitoring of waste (spoil and rejects) during operations. Landforms designed and constructed to minimise the potential for flooding of the residual voids. Flood modelling confirms no ingress to residual voids. Schedule works outside of high erosion risk periods (i.e., December - February). Implement rehabilitation monitoring program. The proposed PMLU and landform is consistent and similar with existing/surrounding landforms and vegetation that is compatible to a PMLU of grazing and therefore has resilience/tolerability for current weather patterns. Undertake regular update of hydrological models to ensure that the residual void catchments are minimised as far as practical. Update and refine the final mine closure landform to consider spoil dumping and landform design to exclude floodwaters entering the residual void.			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								If necessary, identify and implement mitigation measures for appropriate protection works of landforms where floodwaters from watercourses interact with the final mine closure landforms. As cessation of mining activities, review and update the void water balance modelling, incorporating identified changes to the voids final mine closure landforms and spill point elevations, rainfall and evaporation, surface water runoff, groundwater inflows and climate projections. Obtain certification from an appropriately qualified person that the residual voids will not cause environmental harm beyond the tenure boundary.			
Impact of extreme weather events prior to final landform establishment leads to instability of final landforms	RM1, RM2, RM3, RM4, RM5, RM6, RM7, RM8	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Extreme weather such as cyclones, flooding, or uncontrolled fire. Interactions with the flood plain and final landform (Carborough DN and Mulgrave EN landforms).	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. Failure to achieve milestone criteria pertaining to vegetation cover. Loss or alteration of habitat.	Probable (0.3)	5	High (300)	Schedule works outside of high erosion risk periods (i.e., December - February). Implement rehabilitation monitoring program. The proposed PMLU and landform is consistent and similar with existing/surrounding landforms and vegetation that is compatible to a PMLU of grazing and therefore has resilience/tolerability for current weather patterns. Emergency response procedures (including fire.). Water cart availability during rehabilitation. Establishment of vegetation within Watercourse PMLU suitable for the environment and reduces erosion risks. Landforms will be designed with appropriate erosion protection for any areas with flood interactions.	Unlikely (0.1)	5	Medium (100)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Undertake regular update of hydrological models to ensure that the residual void catchments are minimised as far as practical. Update and refine the final mine closure landform to consider spoil dumping and landform design to exclude floodwaters entering the residual void. If necessary, identify and implement mitigation measures for appropriate protection works of landforms where floodwaters from watercourses interact with the final mine closure landforms. As cessation of mining activities, review and update the void water balance modelling, incorporating identified changes to the voids final mine closure landforms and spill point elevations, rainfall and evaporation, surface water runoff, groundwater inflows and climate projections. Obtain certification from an appropriately qualified person that the residual voids will not cause environmental harm beyond the tenure boundary. Develop revegetation plan that considers vegetation suitability to adverse climatic conditions. Monitor climate and plant responses as part of ongoing monitoring.			
Landform establishment inconsistent with milestone criteria	RM3, RM4, RM5, RM6, RM7, RM8	RA2, RA3, RA4, RA5, RA6, RA7, RA8 and RA9	Erosional instability. Placement of unsuitable tertiary waste within 2 m of the surface. Rehabilitated Landforms Result in Alteration of Flood Hydrology Upstream and Downstream.	Failure to establish proposed vegetative cover and therefore stable PMLU. Loss or degradation of cover materials. Adverse impacts to hydrological or hydrogeological systems.	Likely (1)	4	High (300)	Low slope gradient for gazing in landform design to limit capacity for sediment loss. Woodland does not exceed 25%. Outward-facing slopes have a gradient of 15% or less with slope lengths <700m, while inward-facing slopes have a	Unlikely (0.1)	4	Medium (100)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
			Interactions with the flood plain and final landform (Carborough DN and Mulgrave EN landforms). 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.					gradient of 25% or less with slope lengths <400m 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. ESC measures to be operational during surface preparation and revegetation. Soil sampling of stockpiles prior to placement to refine amelioration fertilizer rates. Landforms to be designed and constructed to minimise the potential for flooding of the residual voids. Flood modelling confirms no ingress to residual voids. Undertake rehabilitation monitoring include landform erosion monitoring. Remediate aeras 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. As cessation of mining activities, review and update the void water balance modelling, incorporating identified changes to the voids final mine closure landforms and spill point elevations, rainfall and evaporation, surface water runoff, groundwater inflows and climate projections. Obtain certification from an appropriately qualified person that the residual voids will not			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								cause environmental harm beyond the tenure boundary. 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. Development of a revegetation plan that reduces the risk of poor vegetation establishment, and that outlines soil suitability indicators. Develop a revegetation plan that outlines remedial actions if these wastes are found within 2m of the surface. Construction management, technical supervision, and QA/QC of final landforms and covers will be done by a SQP. Erosion and sediment control systems are designed by an AQP, installed, and fit for purpose. Grazing (RA2, RA3, RA6) Landforms reshaped with maximum 15% slope. Grazing (RA2, RA3, RA6) Landforms design is assessed by an AQP as being geotechnically stable with a factor of safety ≥ 1.5. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Areas >15% to be assessed by an AQP as being stable long term, with rock mulch or other treatments applied as required. Woodland and Grassland PMLU (RA4, RA5, RA8 and RA9) Landforms design is assessed by an AQP as being geotechnically stable with a			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								factor of safety ≥ 1.35 unless an alternative is justified by an AQP. Updated hydraulic flood modelling using drainage designs. All rehabilitation areas to demonstrate stability of diversions. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use". Final landform for grazing PMLU has achieved a geotechnically stable condition with minimum ≥ 1.5 factor of safety and slopes $\leq 15\%$. Final landform for woodland and grassland PMLU with slopes $\geq 15\%$ has achieved a geotechnically stable condition with minimum ≥ 1.35 factor of safety unless an alternative is justified by an AQP. No evidence of erosion for all RA's excluding RA 7 is classified as 'moderate' or 'severe' as defined by Table 3-80 Erosion classification framework. Assessment report completed by an AQP certifying that the diversion (RA7) is operating in accordance with, DNRME Guideline: Works that interfere with water in a watercourse for a resource activity — watercourse diversions under the Water Act 2000 (OSW/2019/4599) criteria and is in a stable condition. Geomorphic index (IDC method) used to verify that			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Rehabilitation for RA7 is erosionally stable. Develop revegetation plan that considers vegetation suitability to adverse climatic conditions. Monitor climate and plant responses as part of ongoing monitoring.			
NUMA does not meet stable condition consistent with milestone criteria	MM1, MM2, MM3	IA1	NUMA is not safe. NUM A is unstable - geotechnical stability: Stability outside of the NUMA extents of the high walls = FoS >= 1.5. NUMA causing environmental harm.	Steep slopes. Rock falls. Slope failure. Residual void extends beyond permitted EA 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.	Likely (1)	4	High (300)	Surface water management system. Diversion drains. Minimal external catchment into pit lake. Monitoring of slip failure. Residual void lake levels remain below the spill points for the duration of the simulation. All residual voids present a low risk for overtopping. Residual void lake levels remain below groundwater levels and the voids act like sinks for the considered closure scenarios. Groundwater modelling including particle tracking confirms residual voids act as sinks during closure. Obtain certification from an appropriately qualified person that the residual void is safe to humans and livestock. Highwall and endwall slopes are no greater than 65 degrees in competent (weathered) material and 45 degrees in less competent (weathered) material. Safety bund is constructed, where required, at the geotechnical set-back distance. Fencing erected around perimeter of safety bund, where required	Unlikely (0.1)	5	Medium (100)

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								Warning signage placed along the fence line. Hazard Assessment conducted to verify safety hazards are not significantly different to surrounding unmined landscapes subject to the same land use. As mining approaches, the final limits, re-assess the geotechnical stability of the low walls based on the latest available data, including the developed site-specific geotechnical parameters. Use a minimum factor of safety ≥ 1.25 as a guidance for ongoing void closure planning. If factor of safety extending into the woodland PMLU after re-assessment remains < 1.35 following closure, review the risk of instability affecting the ability to achieve the PMLU milestone criteria. Undertake regular update of hydrological models to ensure that the residual void catchments are minimised as far as practical. Landforms to be designed and constructed to minimise the potential for flooding of the residual voids. Flood modelling confirms no ingress to residual voids. Implement erosion protection measures for appropriate protection works of landforms where floodwaters from watercourses interact with the final mine closure landforms. As cessation of mining activities, review and update the void water balance modelling, incorporating identified changes to the voids final mine closure landforms and spill point elevations, rainfall and			

Risk Event	Rehabilitation Milestone	Rehabilitation Area	Causes	Impact Description	Risk Analysis			Controls/Mitigation	Residual Risk Rating		
					Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
								evaporation, surface water runoff, groundwater inflows and climate projections. Obtain certification from an appropriately qualified person that the residual voids will not cause environmental harm beyond the tenure boundary.			

3.7.4 Rehabilitation Trials

PRCP Guideline (Section 3.7.1)

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

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

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

Although no rehabilitation trials are currently planned at SWC, rehabilitation trials may be conducted at SWC as part of continuous improvement. Current rehabilitation practices will be executed in line with the PRC Plan rehabilitation and management methodologies outlined for each PMLU.

3.7.4.1.1 Previous Trials

No previous trials have been carried out at SWC.

3.8 Monitoring and Maintenance

PRCP Guideline (Section 3.8)

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

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

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

3.8.1 Rehabilitation Milestone Monitoring

The RMs and associated milestone criteria for SWC are detailed in Table 3-29.

Rehabilitation milestone monitoring and reporting will be undertaken at SWC to demonstrate achievement of the RMs, as they relate to achieving surface requirements and PMLU criteria for grazing, woodland, grassland and watercourses.

A combination of approaches will be used to monitor and report on achievement of RMs. Monitoring and reporting requirements for RM1 to RM8 are listed against each milestone in Table 3-78 and will primarily involve documentation and/or inspections and sign off by an appropriately qualified person 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 the relevant PMLU criteria, or if rehabilitation areas may require maintenance to improve their performance.

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

- Woodland
- Grazing
- Grassland
- Watercourses

Further discussion on the estimated time that has been scheduled for achieving each PMLU is discussed in Section 3.8.6.

Table 3-78 Rehabilitation Milestones with Relevant Reporting Requirements

Milestone Reference	Rehabilitation Milestone	Reporting Requirements
RM1	Infrastructure decommissioning and removal	• Undertake visual inspections • Document inspections
RM2	Identification and or remediation of contaminated land	• Documentation by a suitably qualified person confirming the land does not present an unacceptable risk to proposed future land uses or the environment
RM3	Landform establishment (excluding TSF)	• Survey/LiDAR of landform • Analyse final landform against design • Documentation of riverine and/or operation works permits or associated exemptions
RM4	Landform establishment (TSF only)	• Certified decommissioning plan and confirmation TSF is stable
RM5	Surface preparation	• 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 • Water Course • Documentation of riverine and/or operation works monitoring

Milestone Reference	Rehabilitation Milestone	Reporting Requirements
RM6	Revegetation	Document seed mix, purity information, planting timing, planting rates and areas as per PRCP Schedule
RM7	Achievement of surface requirements	Undertake rehabilitation monitoring as per Sections 3.8.2 – 3.8.5
RM8	Achievement of stable condition – All PMLU	Undertake rehabilitation monitoring as per Sections 3.8.2 – 3.8.5

3.8.2 Grazing and Woodland Rehabilitation Monitoring

3.8.2.1 Monitoring Locations

For the woodland PMLU monitoring locations will be identified using the methodology outlined in the latest version of the Queensland Herbarium's BioCondition Assessment Manual.

No reference sites will be included in the rehabilitation monitoring program as the performance is based on standard methods for assessing pasture condition consistent with industry guidelines.

Nevertheless, reference/analogue sites have previously been identified (Section 3.6.1.8) and will potentially be incorporated into the assessment process of rehabilitation success.

Permanent rehabilitation monitoring sites will be established at the start of the rehabilitation monitoring program (Year 0). The permanent sites will be assessed during all phases of rehabilitation monitoring.

In addition to the using the Queensland Herbarium's BioCondition Assessment Manual permanent field monitoring sites will be selected prior to commencing any field monitoring work and selected using the following criteria:

- Representative of rehabilitation slope.
- Located in a lower slope position to capture maximum hydrologic and erosion processes.
- Accessibility (vehicle access preferred).
- Located on mining lease or Stanmore owned land.
- Low risk of site being disturbed by mining activity in the future.
- At least one permanent rehabilitation monitoring site will be established in each RA.

3.8.2.2 Monitoring Schedule

The woodland and grazing PMLU rehabilitation monitoring program has been designed to demonstrate achievement of surface preparation (RM5) and woodland and grazing PMLUs to a safe, stable, non-polluting, and self-sustaining condition (RM7-RM8) (Section 3.3.1).

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 (RM6) 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 (RM7-RM8).

The consistent phased approach of the monitoring program ensures that there is continual monitoring of rehabilitation parameters against milestone criteria up to the point of surrender of the EA.

Table 3-79 illustrates the monitoring schedule for grazing and woodland PMLUs and indicates the rehabilitation parameters monitored during each phase of the schedule commencing from Year 0. This 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 3-79 Monitoring Schedule and Measured Rehabilitation Parameters

Rehabilitation Parameters	Monitoring Schedule				
	Year 0	Year 1	Year 2	Year 6	Year 10+ and 4 Yearly Thereafter
All PMLUs					
Landform and erosion	✓	✓	✓	✓	✓
Soil and spoil	✓	x	✓	✓	✓
Groundcover	✓	✓	✓	✓	✓
Invasive plants	✓	✓	✓	✓	✓
Grazing					
Pasture species diversity	✓	✓	✓	✓	✓
Pasture yield	x	x	✓	✓	✓
Pasture condition	x	x	✓	✓	✓
Grazing Land Suitability Assessment	x	x	x	✓	✓
Woodland					
Recruitment	x	x	✓	✓	✓
Non-native plant cover	✓	✓	✓	✓	✓
Tree, shrub, grass, and forb species richness	✓	✓	✓	✓	✓
Tree and shrub canopy cover	x	x	✓	✓	✓
Native perennial grass	✓	✓	✓	✓	✓
Litter grid cover	✓	✓	✓	✓	✓

3.8.2.3 General Rehabilitation Monitoring Parameters

3.8.2.3.1 Landform and Erosion

Landform and erosion are assessed as part of all monitoring phases.

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

- Develop a Digital Elevation Model (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 50m tape perpendicular to the slope and across the erosional activity identified during the LiDAR analysis.

Erosion should then be assessed against the erosion classification framework (Table 3-80) and classified as minor, moderate or severe.

Table 3-80 Erosion classification framework

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, and either tend to branch away from primary drainage lines and on to foot slopes, or have multiple branches with drainage lines
Tunnel erosion	Absent	Present	
Mass movement	Absent	Present	

*The erosion classification framework is based on the 'Australian Soil and Land Survey Handbook' Third Edition by the National Committee on Soil and Terrain (2009)

3.8.2.3.2 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 3-81 are monitored during Year 0, Year 2, and every four years thereafter. Surface sampling refers to the layer at 0 – 10cm; and sub-surface sampling refers to layers at 10 – 30cm, 30 – 60cm and 90 – 100cm.

The surface soil sampling results should be compared to the target suitability characteristics for growth medium in RM5.

Table 3-81 Soil and Spoil Analysis Parameters for SWC 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	✓	✓
	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	✓	✓

Category	Analyte	Purpose of Analyte	Depth		Monitoring Phase	
			Surface	Sub-Surface	Year 0	Year 2 and 4 Yearly Thereafter
Trace Elements	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	✓	✓
	Copper	Trace element important for vegetation success.	✓	x	✓	✓
	-	Metals that have been identified as occurring at elevated levels during material characterization analysis should be tested during monitoring.	✓	✓	✓	✓
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

3.8.2.3.3 *Groundcover*

Groundcover is assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases.

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.

3.8.2.3.4 *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 are assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases.

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

3.8.2.4 *Grazing Rehabilitation Parameters*

3.8.2.4.1 *Pasture Species Diversity*

Pasture species diversity is assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. Table 3-48 outlines the recommended species list and sowing rates for the grazing PMLU (RA2, RA3, RA6).

Species diversity is classified into the number of preferred pasture species (identified as perennial grasses that are productive and palatable to stock) (3P), within the pasture including but not limited to those listed in Table 3-48.

3.8.2.4.2 *Pasture Yield*

Pasture yield and quality 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 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.

3.8.2.4.3 *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 3-82.

Table 3-82 Pasture Condition Assessment Table

Condition Rating	Condition Indicators				
	Preferred Pasture Species			Undesirable Grasses & Other Weeds	Preferred Pasture Species Diversity
	% DM Yield	Crown Cover	Annual Grass % DM Yield	% DM yield	
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

3.8.2.5 Woodland Rehabilitation Parameters

Woodland rehabilitation monitoring involves BioCondition monitoring assessments completed by an appropriately qualified person using the methodology outlined in the Queensland Herbarium's BioCondition Assessment Manual. Key parameters are outlined in the sections below and will collect data required to compare to criteria within Appendix 5 of the PRCP Schedule.

3.8.2.5.1 Species Richness

Species richness is assessed at the permanent rehabilitation monitoring sites as part of all monitoring phases. Species richness is assessed for native tree, shrub grasses and forbs by recording the number of flora species at each site. If vegetation composition across the rehabilitation appears to have a high degree of spatial variability, it is likely that the monitoring site may not capture a representative species richness for canopy species (trees). In this case, it may be necessary to establish additional vegetation assessment sites across the rehabilitation – these will be identified and included in the monitoring program as rehabilitation monitoring proceeds over time.

3.8.2.5.2 Tree Canopy and Shrub Cover

Tree canopy and shrub cover is assessed at the permanent rehabilitation monitoring sites from Year 2.

Canopy cover is recorded using the line intercept method for tree canopy and shrub canopy at each monitoring site. Each tree (single-stemmed woody plant greater than 2m tall) and shrub (multi-stemmed woody plant or single stemmed woody plant less than 2m tall) crown is recorded and summed as a total canopy distance and converted to a percent cover.

3.8.2.5.3 Recruitment

Recruitment is assessed at the permanent rehabilitation monitoring sites from Year 2.

Recruitment is assessed as the proportion of woody perennial canopy (<10cm diameter at breast height (DBH)) and shrub species that are regenerating. The dominant canopy and shrub species are identified and then the proportion of these species which are observed to be present in a juvenile state are recorded.

3.8.2.6 Grassland Rehabilitation Parameters

Grassland habitat rehabilitation monitoring involves monitoring of groundcover and species presence to compare to criteria within Appendix 2a of the PRCP Schedule.

3.8.3 Watercourse PMLU Monitoring

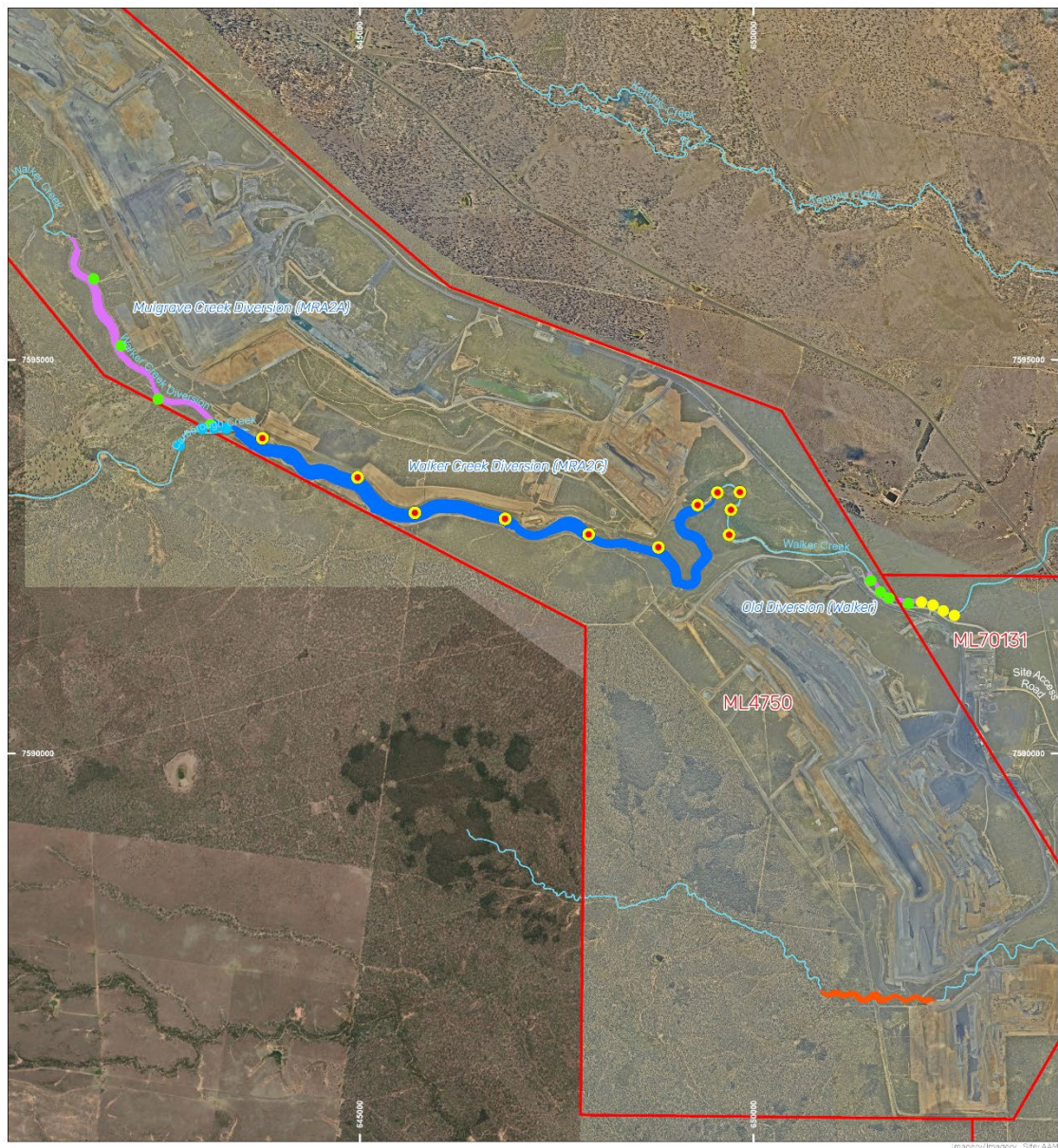
Watercourse monitoring will be conducted at SWC for the creek diversions proposed with the Watercourse / Riparian Vegetation PMLU to assess the performance of the rehabilitated watercourses and creek diversions disturbed by mining activities. The purpose of the watercourse monitoring is to assess the performance of the rehabilitated watercourses in achieving watercourse surface requirements RM3-8 and post mining land use criteria.

There are two methodologies for watercourse PMLU monitoring:

- The Index of Diversion Condition methodology (IDC) which is outlined in the ACARP guidelines for Monitoring and Evaluation Program for Bowen Basin River Diversions (ACARP, 2001)
- BioCondition monitoring assessments completed using the methodology outlined in the Queensland Herbarium's BioCondition Assessment Manual

3.8.3.1 Watercourse Monitoring Locations

Monitoring locations have been established in the existing creek diversions, as shown in **Figure 3-56**. New diversion monitoring locations for any future changes to the Walker Pit Diversion (Section 3.6.1.7) will be developed as part of the functional design. Monitoring locations for the realignment of the unnamed tributary of Bee Creek will be established during detailed design.



SOUTH WALKER CREEK MINE - PRC PLAN WATERCOURSE - CREEK DIVERSION MONITORING

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Version: 1
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LEGEND

- Mining Lease
- MRA2C Creek Diversion
- Walker Creek Diversion
- Drainage Feature Realignment
- Secondary Road
- Highway
- Railway
- Creek
- Gully

Creek Diversion Monitoring Points

- Diversion MP
- Downstream MP
- Upstream MP
- Proposed MP

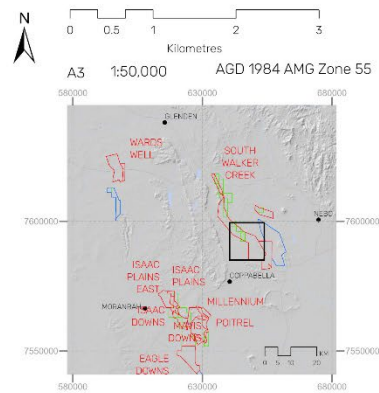


Figure 3-55 SWC Watercourse Creek Diversion Monitoring Locations

3.8.3.2 Monitoring Schedule

The SWC watercourse monitoring schedule is illustrated in Table 3-83. The monitoring schedule indicates how the monitoring progresses over time from Year 1, Year 2, and Year 3 then 3 yearly thereafter. Table 3-83 also indicates the geomorphic and riparian parameters monitored during each phase.

MRAC2C is based on frequency of operational monitoring from the ACARP guideline, and accounts for more frequent monitoring during early establishment of vegetation post construction and aligns with operational monitoring requirements of the existing WLs. The other diversions will have monitoring on a minimum 3 yearly frequency of the below activities monitoring until achieve milestone outcomes (RM8).

Table 3-83 Watercourse PMLU Monitoring Schedule and Measured Rehabilitation Parameters

Monitoring Parameters		Monitoring Schedule			
Parameter	Monitoring Detail	Year 1 ¹	Year 2	Year 3	Year 6 (3 Yearly Thereafter)
IDC Monitoring					
Geomorphic Index Parameters	- Groundcover (%) - Width of high flow channel (m)	✓	✓	✓	✓
- Groundcover - Stream width - Bank condition - Piping of banks - Bed condition - Spoil piles - Recovery - Instream Structures	- Width of active channel (m) - Width of low flow channel (m) - Presence of erosion - Presence of piping on the banks - Presence of aggradation or degradation within the channel bed - Proximity of spoil dumps in relation to the monitoring point - Presence or absence of benches with/without vegetation - Stability of each identified instream structure				
Riparian Vegetation Index Parameters	- Width of riparian zone (m) - Over-storey, understorey and ground cover (% density)	✓	✓	✓	✓
- Riparian zone - Structural intactness - Regeneration - Longitudinal continuity	- Presence or absence of regeneration on banks - Assess the gaps in the riparian vegetation corridor along the banks				
Watercourse Habitat Vegetation					
Recruitment		x	✓	✓	✓
Non-native plant cover		✓	✓	✓	✓
Tree, shrub, grass, and forb species richness		✓	✓	✓	✓
Tree and shrub canopy cover		x	✓	✓	✓

Monitoring Parameters		Monitoring Schedule			
Parameter	Monitoring Detail	Year 1 ¹	Year 2	Year 3	Year 6 (3 Yearly Thereafter)
Native perennial grass		✓	✓	✓	✓
Litter grid cover		✓	✓	✓	✓

¹ - in the case of diversions, year 1 represents year after diversion construction. For existing diversions, frequency would be 3 yearly.

3.8.3.3 IDC Monitoring

The IDC is a quantitative monitoring method used to measure the geomorphic and riparian condition of diversions. The purpose of the IDC methodology is to compare the condition of diversions with the reference (i.e., upstream) condition and flag potential management issues for remediation. The IDC monitoring methodology encompasses:

- Visual inspection of the diversion reach, and upstream and downstream reaches to undertake the IDC assessments.
- Assessment of Geomorphic Index and Riparian Index at nominated monitoring points in the diversion, upstream and downstream reaches.
- Determination of reach-averaged Geomorphic Index, Riparian Index and overall IDC scores for the diversion, upstream and downstream reaches.
- Compare the Geomorphic Index, Riparian Index and overall IDC score for the diversion reach to the relative upstream and downstream reaches. The Geomorphic and Riparian Index of a reach are each given a score out of 10. Overall IDC scores of above 12 are considered 'good' whereas scores less than 8 are considered 'poor' (ACARP, 2014).
- Compare the Geomorphic Index, Riparian Index and overall IDC scores for the diversion, upstream and downstream reaches against the corresponding scores from previous monitoring activities to assess any changes and trends. The value of assessing IDC overtime is to demonstrate how the watercourse PMLU is maintaining or on a trajectory towards achieving the stable and self-sustaining rehabilitation goals.

The IDC method utilises a suite of monitoring parameters to ensure the watercourses are able to sustain an agreed PMLU of watercourse.

3.8.3.4 BioCondition Monitoring

The BioCondition monitoring assessments will be completed by an appropriately qualified person using the methodology outlined in the Queensland Herbarium's BioCondition Assessment Manual. Key parameters are outlined in the sections below and will collect data required to compare to criteria within Appendix 6 of the PRCP Schedule.

3.8.3.4.1 Species Richness

Species richness will be assessed at a selection of the diversion monitoring sites (not upstream or downstream reaches) as part of all monitoring phases. Species richness is assessed for native tree, shrub grasses and forbs by recording the number of flora species at each site. If vegetation composition across the rehabilitation appears to have a high degree of spatial variability, it is likely that the monitoring site may not capture a representative species richness for canopy species (trees). In this case, it may be necessary to establish additional assessment sites across the rehabilitation – these will be identified and included in the monitoring program as rehabilitation monitoring proceeds over time.

3.8.3.4.2 Tree Canopy and Shrub Cover

Tree canopy and shrub cover will be assessed at a selection of the diversion monitoring sites (not upstream or downstream reaches) from Year 2.

Canopy cover is recorded using the line intercept method for tree canopy and shrub canopy at each monitoring site. Each tree (single-stemmed woody plant greater than 2m tall) and shrub (multi-stemmed woody plant or single stemmed woody plant less than 2m tall) crown is recorded and summed as a total canopy distance and converted to a percent cover.

3.8.3.4.3 Groundcover

Groundcover will be assessed at a selection of the diversion monitoring sites (not upstream or downstream reaches) as part of all monitoring phases.

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

3.8.3.4.4 Recruitment

Recruitment will be assessed at a selection of the diversion monitoring sites (not upstream or downstream reaches) from Year 2.

Recruitment is assessed as the proportion of woody perennial canopy (<10cm diameter at breast height (DBH)) and shrub species that are regenerating. The dominant canopy and shrub species are identified and then the proportion of these species which are observed to be present in a juvenile state are recorded.

3.8.4 Surface Water Quality Monitoring

3.8.4.1 Monitoring Locations

Surface water monitoring locations for the PRCP have been selected in accordance with the current EA to ensure regulatory compliance and environmental protection during the operational and closure phases of SWC (refer to Table 3-84 and Figure 3-57).

The selected monitoring locations for the PRCP are appropriate to demonstrate that the final rehabilitated landform is non-polluting and poses no ongoing risk to the receiving environment. They appropriately account for the contaminant sources and hydrological pathways identified in Table 3-46, as well as local surface drainage patterns, overland flow paths, and potential seepage zones. This ensures comprehensive spatial coverage of all areas within the final rehabilitated landform that may contribute to surface water runoff or seepage to the receiving environment.

Table 3-84 SWC Surface Water Monitoring Locations

Monitoring Point (MP)	Receiving Waters Location Description	Latitude (GDA94)	Longitude (GDA94)
Upstream Background Monitoring Points			
MP1	Walker Creek – 4280m upstream of the confluence of Walker Creek and Carborough Creek	-21.722476	148.36443
MP4	Bee Creek – 1500m upstream of the confluence of Bee Creek and Walker Creek	-21.74207	148.52522
KCUS	Kemmis Creek upstream St Albans	-21.68316	148.39453
Downstream Monitoring Points			
MP7	Walker Creek – 130m upstream from Hail Creek Mine railway spur	-21.76428	148.48613

Monitoring Point (MP)	Receiving Waters Location Description	Latitude (GDA94)	Longitude (GDA94)
MP8	Unnamed tributary of Bee Creek – 1350m upstream of the confluence of the unnamed tributary of Bee Creek and Bee Creek	-21.80868	148.50653
MP9	Bee Creek – 3600m downstream of the confluence of Bee Creek and the unnamed tributary of Bee Creek	-21.72993	148.4857
KCDS	Kemmis Creek downstream Strathfield	-21.72993	148.4857

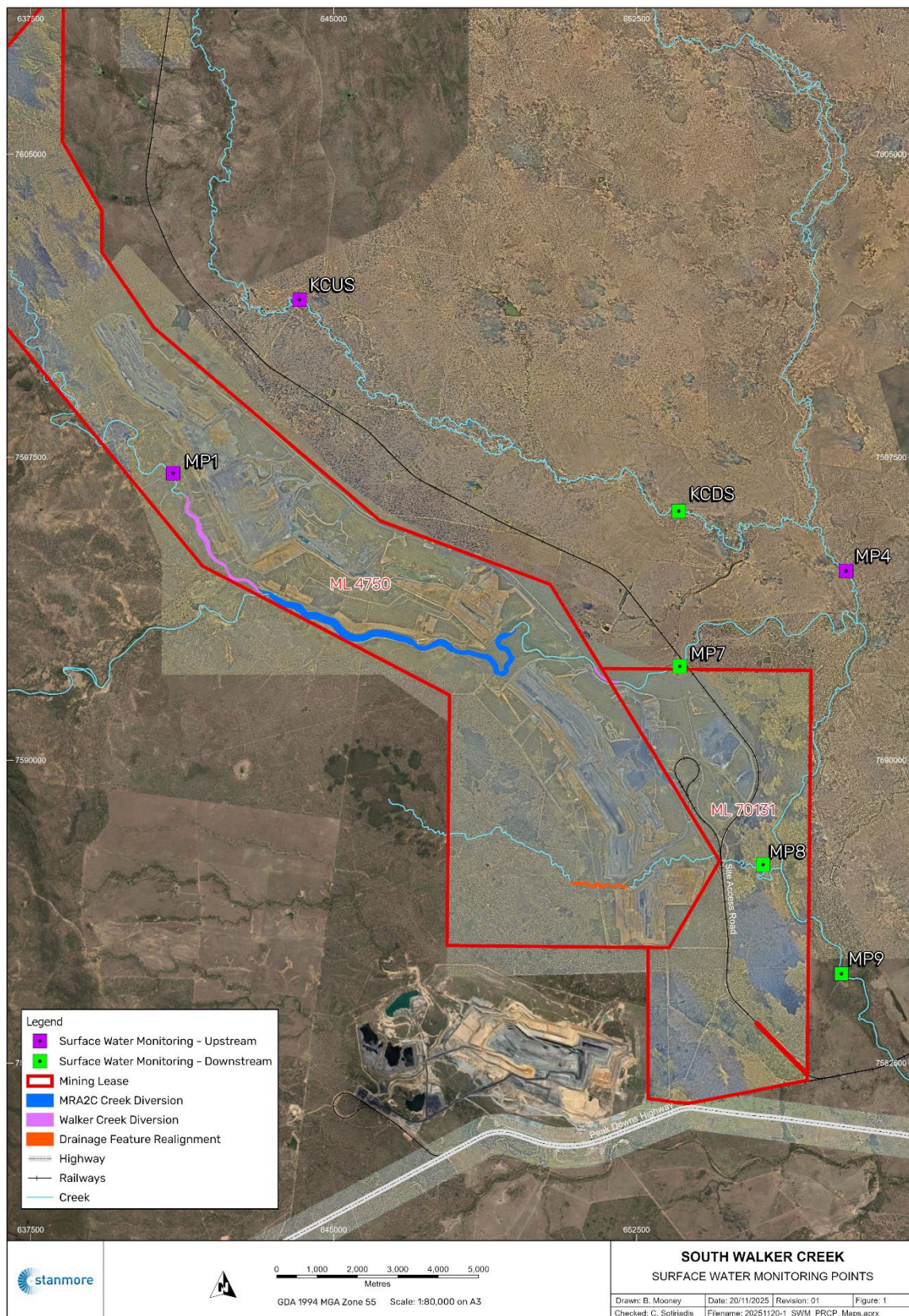


Figure 3-56 Surface Water Monitoring Points

3.8.4.1 Monitoring Frequency and Duration

As the watercourses at SWC are ephemeral, surface water sampling and the assessment of water quality cannot be conducted on a fixed schedule. Rather, PRCP surface water monitoring will be conducted opportunistically during and/or following suitable rainfall events.

PRCP surface water monitoring will be carried between the completion of RM6 and achievement of RM8 and RM9, for a minimum period of five years to ensure sufficient data is collected under a range of flow conditions. Following this period, results will be assessed against the relevant milestone criteria outlined in the approved PRCP Schedule. A review of the surface water data will be undertaken by an appropriately qualified person to determine whether the milestone has been met.

3.8.4.1 Monitoring Parameters and Limits

Surface water quality parameters for the PRCP have been selected based on the current EA and Contaminants of Concern (COC) relevant to SWC's mining process, including potential seepage from dams, tailings, and the geochemical characteristics of waste materials (refer to Table 3-85). The selected parameters are appropriate for closure and mirror the parameters used in groundwater monitoring.

The selection of the surface water quality limits for the PRCP has been guided by the following:

- The current EA (Tables F3 and F5) – used in the first instance.
- Site-specific limits
- WQOs for Upper Isaac River catchment waters – used for parameters where there are no site-specific limits in the current EA (Tables F3 and F5).
- Relevant Water Quality Objectives (WQOs) from the ANZG (2018) – used for parameters where there are no site-specific limits in the current EA (Tables F3 and F5) or WQOs for Upper Isaac River catchment waters.

Table 3-85 Surface Water Quality Parameters

Quality Characteristics	Unit	Limit	Comment on Limit
pH	pH units	6.5-8.5	EA Table F5, WQO for Upper Isaac River catchment waters
Electrical Conductivity	µS/cm	5,700	Site-specific (95 th percentile of all data)
Sulphate	mg/L	40	Site-specific (95 th percentile of all data)
Aluminium - dissolved	µg/L	55	ANZG 2018
Arsenic - dissolved	µg/L	13	EA TableF3, ANZG 2018 (for AsV)
Copper - dissolved	µg/L	1.4	ANZG 2018
Manganese - dissolved	µg/L	1,900	ANZG 2018
Molybdenum - dissolved	µg/L	34	EA TableF3, ANZG 2018
Nickel - dissolved	µg/L	11	ANZG 2018
Vanadium - dissolved	µg/L	6	ANZG 2018
Ammonia - dissolved	µg/L	900	EA TableF3, ANZG 2018
Nitrate - dissolved	µg/L	1,100	EA TableF3, ANZG 2018 (for soft water)
Petroleum hydrocarbons (C6-C9)	µg/L	20	LoR
Petroleum hydrocarbons (C10-C36)	µg/L	100	LoR
Major ions Calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate	mg/L	N/A	For interpretation purposes only
Hardness	mg/L	N/A	For interpretation purposes only

Quality Characteristics	Unit	Limit	Comment on Limit
Water level	mAH D	N/A	For interpretation purposes only

1. All metals and metalloids must be measured as 'dissolved' (from analysis of a field filtered sample) and total (unfiltered).

2. Limits for metals and metalloids apply to dissolved results.

3. ANZG (2018) Aquatic ecosystem protection for moderately disturbed system (95% protection)

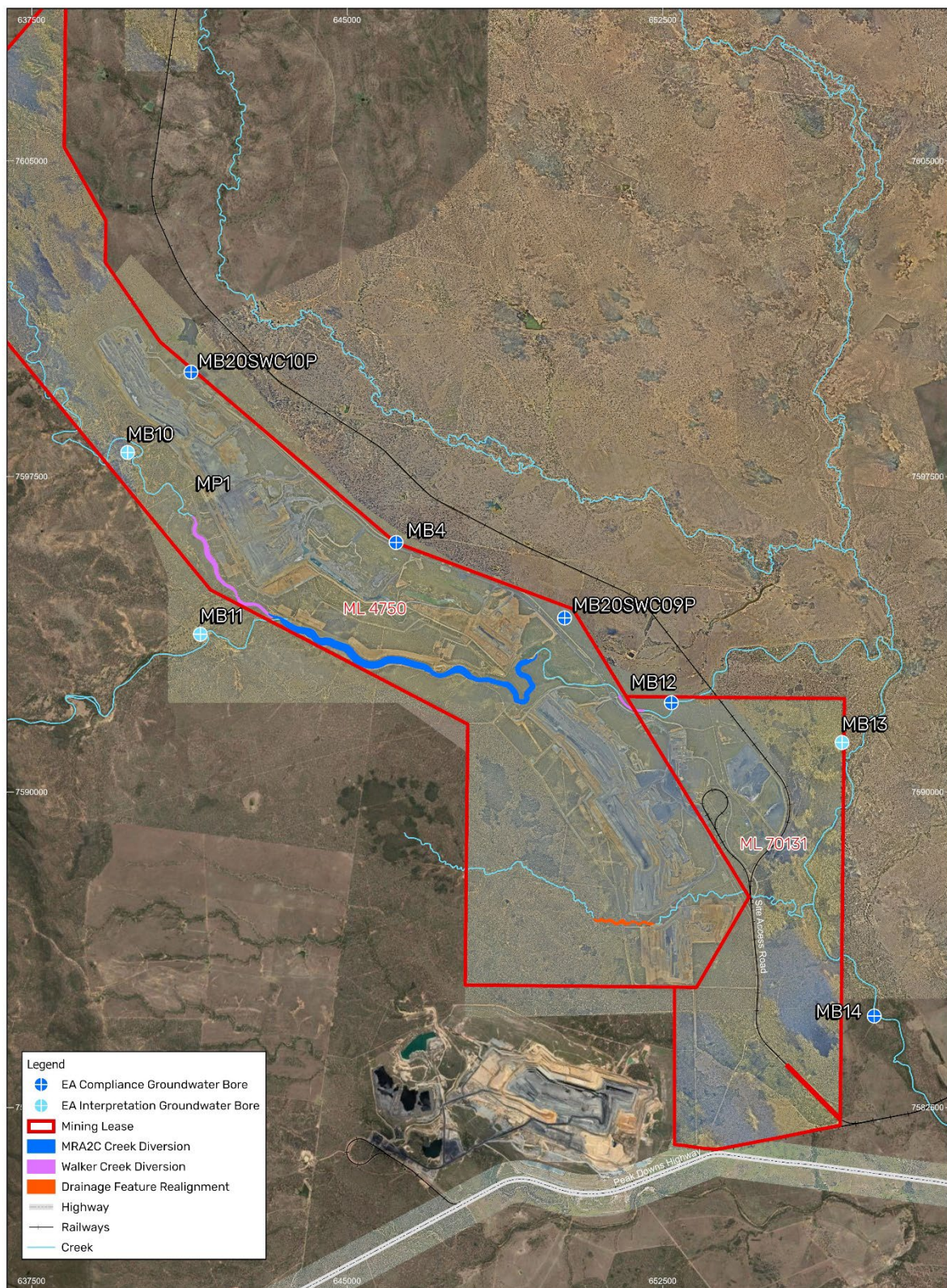
3.8.5 Groundwater Quality Monitoring

3.8.5.1 Monitoring Locations

Groundwater monitoring locations for the PRCP have been selected in accordance with the requirements of the EA to ensure that groundwater quality is effectively and consistently monitored throughout the operational and closure phases (refer to Table 3-86 and Figure 3-58). The groundwater monitoring network consists of existing operational bores located up-gradient (background/interpretation) and down-gradient of disturbed areas.

Table 3-86 Groundwater Monitoring Locations

Monitoring Bore	Hydrostratigraphic Unit	Surface RL (m AHD)	Latitude (GDA94)	Longitude (GDA94)
Interpretation Bores				
MB10	Alluvium	232.4	-21.71368	148.35252
MB11	Alluvium	225.8	-21.7526	148.36962
MB13	Alluvium	192.9	-21.77454	148.51733
Compliance Bores				
MB12	Regolith	206.3	-21.76635	148.4781
MB14	Alluvium	187.3	-21.83322	148.52532
MB4	Coal Seam	263.07	-21.73250	148.41441
MB20SWC09P	Coal Seam	212.35	-21.74835	148.45327
MB20SWC10P	Coal Seam	241.56	-21.69633	148.36693



- Legend**
- + EA Compliance Groundwater Bore
 - + EA Interpretation Groundwater Bore
 - Mining Lease
 - MRA2C Creek Diversion
 - Walker Creek Diversion
 - Drainage Feature Realignment
 - Highway
 - Railways
 - Creek



0 1,000 2,000 3,000 4,000 5,000
Metres
GDA 1994 MGA Zone 55 Scale: 1:80,000 on A3

SOUTH WALKER CREEK GROUNDWATER MONITORING POINTS

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Figure 3-57 Groundwater Monitoring Locations

3.8.5.2 Monitoring Frequency and Duration

PRCP groundwater monitoring will be carried on a quarterly basis between the completion of RM6 and achievement of RM8, for a minimum period of five years to ensure sufficient data is collected. Following this period, results will be assessed against the relevant milestone criteria outlined in the approved PRCP Schedule. A review of the groundwater data will be undertaken by an appropriately qualified person to determine whether the milestone has been met.

3.8.5.3 Monitoring Parameters and Limits

Similar to surface water, the groundwater monitoring parameters and limits for the PRCP focus on the current EA and CoC specific to SWC's mining process, including potential seepage from dams, tailings, and the geochemical characteristics of waste materials (refer to Table 3-87). They are suitable for the closure phase and have been guided by the following:

- Site-specific limits in the current EA (Table I2) – used in the first instance.
- WQOs for Upper Isaac River catchment waters – used for parameters where there are no site-specific limits in the current EA (Table I2).
- Relevant Water Quality Objectives (WQOs) from the ANZG (2018) – used for parameters where there are no site-specific limits in the current EA (Table I2) of WQOs for Upper Isaac River catchment waters.

Table 3-87 Groundwater Trigger Limits

Quality Characteristics	Unit	Limit	Comment on Limit
pH	pH units	6.5-8.5	EA Table I2, WQO for Upper Isaac River catchment waters
Electrical Conductivity	µS/cm	5,700	Site-specific (95 th percentile all data)
Sulphate	mg/L	40	Site-specific (95 th percentile all data)
Aluminium - dissolved	µg/L	55	EA Table I2, ANZG 2018
Arsenic - dissolved	µg/L	13	EA Table I2, ANZG 2018 (for AsV)
Copper - dissolved	µg/L	1.4	ANZG 2018
Manganese - dissolved	µg/L	1,900	ANZG 2018
Molybdenum - dissolved	µg/L	34	EA Table I2, ANZG 2018
Nickel - dissolved	µg/L	11	ANZG 2018
Vanadium - dissolved	µg/L	6	ANZG 2018
Ammonia - dissolved	µg/L	900	ANZG 2018
Nitrate - dissolved	µg/L	1,100	ANZG 2018 (for soft water)
Petroleum hydrocarbons (C6-C9)	µg/L	20	EA Table I2, LoR
Petroleum hydrocarbons (C10-C36)	µg/L	100	EA Table I2, LoR
Major ions Calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate	mg/L	N/A	For interpretation purposes only
Hardness	mg/L	N/A	For interpretation purposes only
Water level	mAHD	N/A	For interpretation purposes only

1. Limits only apply to compliance bores

2. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

3. LoR – Limit of reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LoR.

4. ANZG (2018) Aquatic ecosystem protection for moderately disturbed system (95% protection unless otherwise specified)

3.8.6 PMLU Achievement Schedule

RM1 to RM8 will be subject to ongoing reporting requirements to ensure achievements of the associated milestone criteria. The timing of the rehabilitation milestones specific to achievement of surface requirements (RM7) and achievement of PMLUs to stable condition (RM8), are listed in Table 3-88 and detailed in the section that follows.

Table 3-88 Time for Achievement of Surface Requirements and PMLU Rehabilitation Milestones

Rehabilitation Milestone Reference	PMLU	Rehabilitation Milestone	Milestone Achievement Timeline After Revegetation (in PRCP Schedule)
RM7	Grazing	Achievement of surface requirements	10 years
	Woodland	Achievement of surface requirements	10 years
	Grassland	Achievement of surface requirements	10 years
	Watercourse / Riparian Vegetation	Achievement of surface requirements	10 years
RM8	Grazing	Achievement of stable condition	5 years
	Woodland	Achievement of stable condition	5 years
	Grassland	Achievement of stable condition	5 years
	Watercourse	Achievement of stable condition	5 years

3.8.6.1 Grazing

Achievement of surface requirements (RM7) for grazing is proposed within a 10 year timeframe from revegetation. There are a number of factors which can influence the successful establishment of pastures on post-mined land including soils and landform, soil management and amelioration species selection, sowing rates, and sowing timing plus rainfall. The revegetation plan has considered these elements and allows a period up to 10 years to achieve surface requirement condition (RM7) for seasonal rainfall variation to successfully establish a pasture suitable for a PMLU of grazing at SWC.

Achievement of stable condition PMLU for grazing (RM8), is proposed within a 15-year timeframe from initial revegetation. This includes the 10 years allowed for achieving RM7, plus an additional 5 years for achievement of RM8 (15 years). This will allow for sufficient time to demonstrate the ongoing sustainability of the PMLU for grazing through additional rehabilitation monitoring data associated with landform, erosion, soils, vegetation, pastures, and surface water (Section 3.8.2).

3.8.6.2 Woodland, Grassland and Watercourse

Achievement of surface requirements (RM7) for woodland, grassland and watercourse is proposed within a 10-year timeframe from revegetation.

Achievement of stable condition PMLU for woodland, grassland and watercourse RM8 is proposed within a 15-year timeframe from revegetation. This includes the 10 years allowed for achieving RM7, plus an additional 5 years for achievement of RM8. This allows for initial establishment and successional process, and senescence of Acacia and other pioneer species as well as natural recruitment to occur.

3.8.7 Data Analysis and Reporting

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

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

3.8.8 Maintenance

Maintenance will be implemented when monitoring identifies issues with the rehabilitation, or milestone criteria are not being met. In order to select the most appropriate remedial actions, the likely cause would be assessed. Contributing factors may be related to:

- Climatic conditions (i.e., droughts).
- Weed presence.
- Poor drainage design.
- Insufficient vegetation cover.
- Influence of adjacent land use.
- Soil type.

Required rehabilitation actions are to be entered into SMR's work management system for actioning.

3.8.9 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 SWC ongoing rehabilitation monitoring is illustrated in Figure 3-59. 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., contingency strategies), as needed (Section 3.8.8). The rehabilitated areas as well as corrected and/or maintenance areas then undergo further rehabilitation monitoring, and 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 milestone criteria and eventual certification.

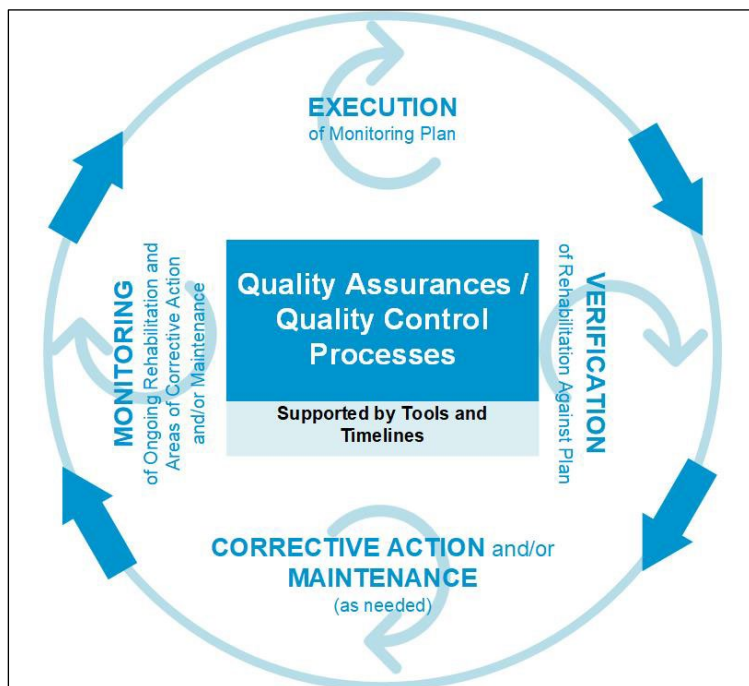


Figure 3-58 Rehabilitation Monitoring Quality Assurance / Quality Control Process

4 APPENDICES AND ATTACHMENTS

Section B is attached to this PRCP and includes the PRCP Schedule for SWC.

Section C is attached to this PRCP and includes any relevant required reports/plans appended to this submission.

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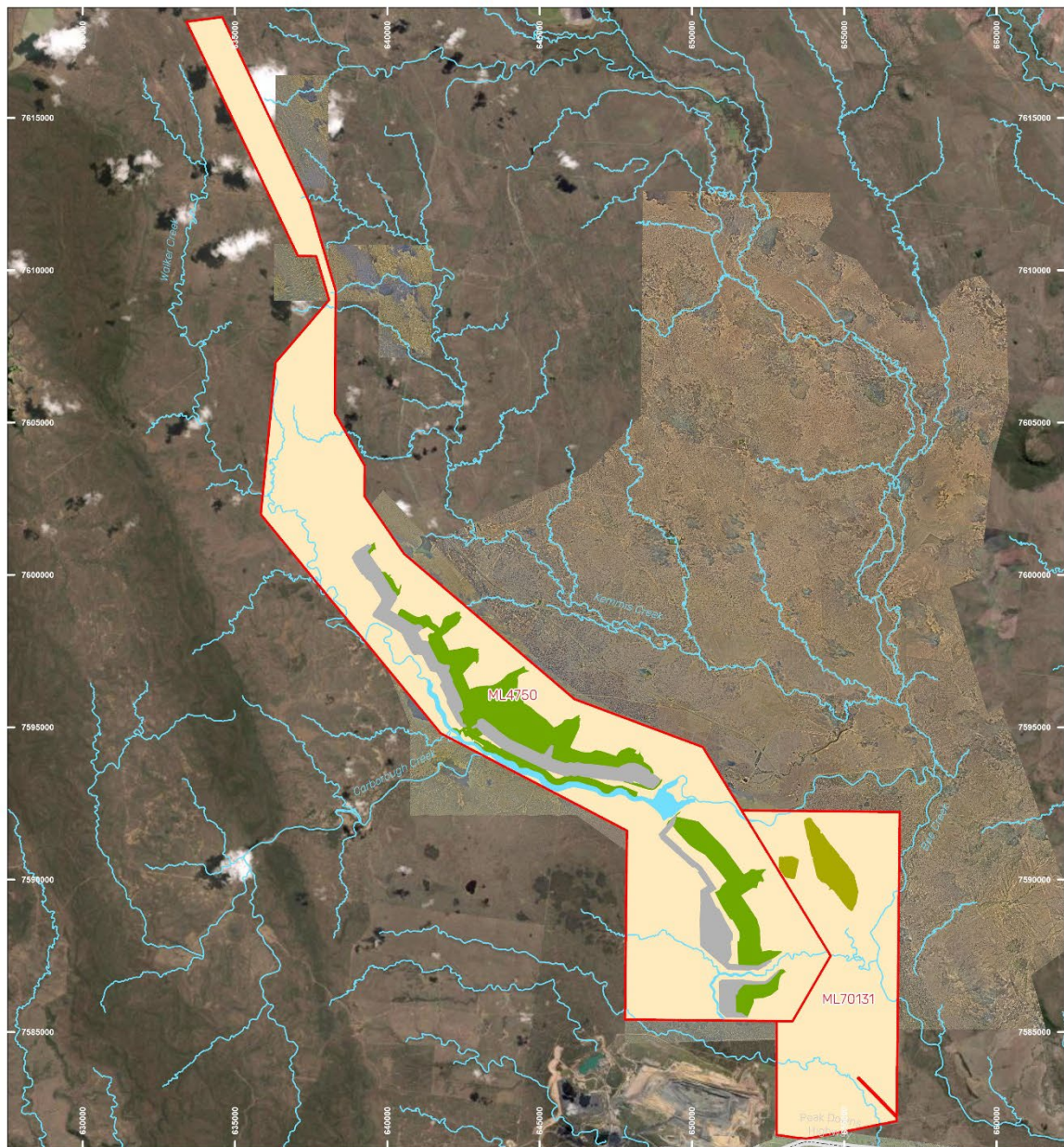
SECTION B - PRCP SCHEDULE

Legislative Requirement

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

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

Final Site Design



SOUTH WALKER CREEK MINE - PRC PLAN POST MINE LAND USE (PMLU) AND NON-USE MANAGEMENT AREA (NUMA)

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LEGEND

- Mining Lease
- Creek
- Highway
- PMLU**
 - Grassland
 - Grazing
 - Woodland
 - Watercourse
- Non-Use Management Area (NUMA)**
- NUMA

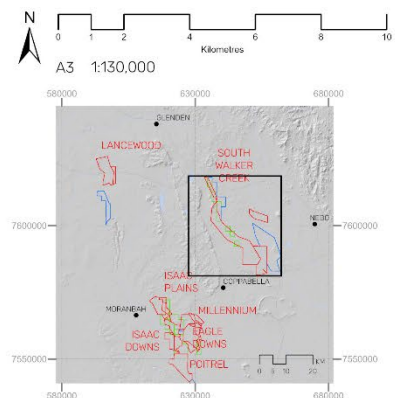
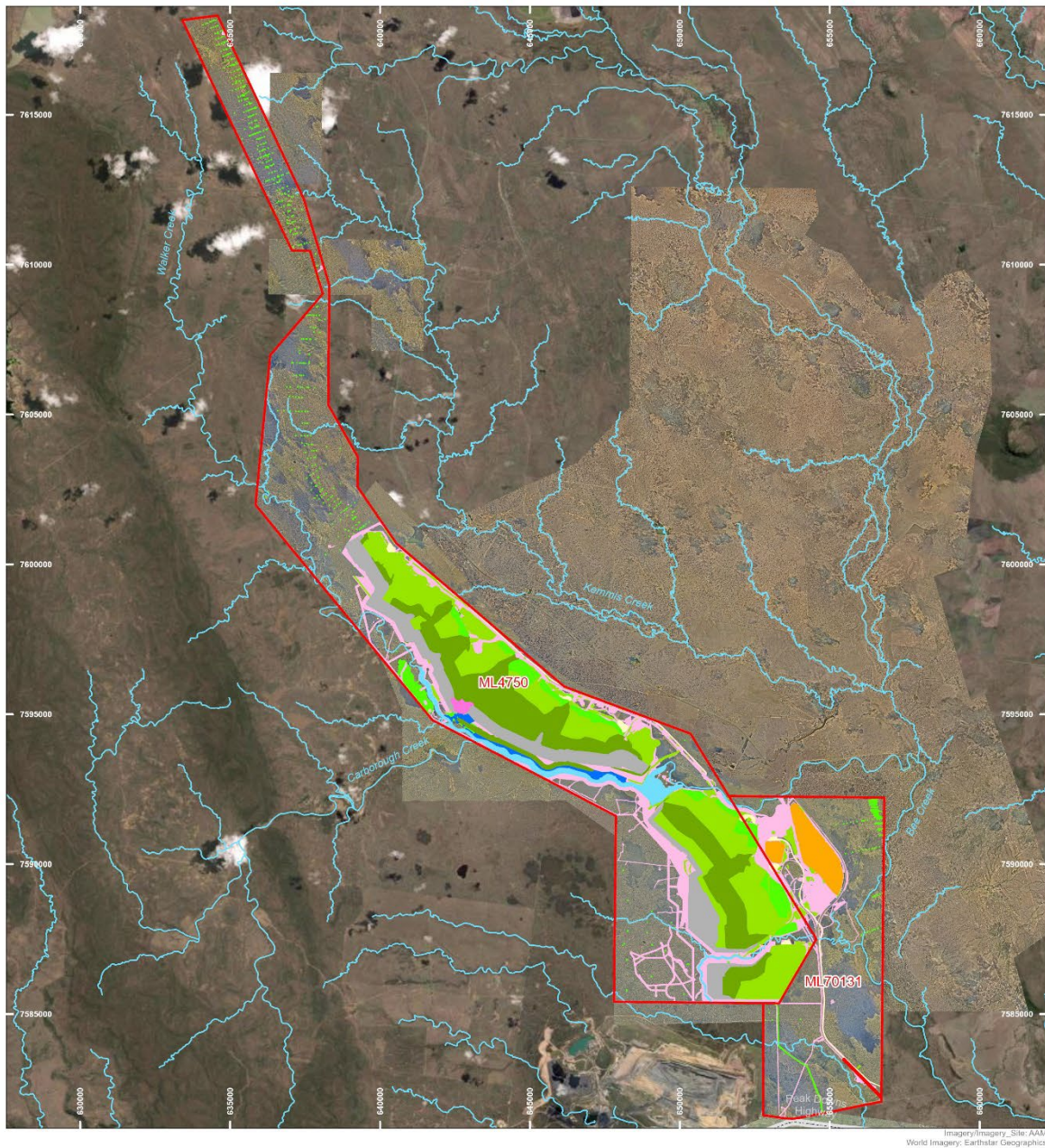


Figure 5-1 SWC Final Site Design

Reference Map



SOUTH WALKER CREEK MINE - PRC PLAN

REFERENCE MAP

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LEGEND

Rehabilitation Area (RA)

- RA1 - Existing Rehabilitation
- RA2 - Infrastructure for Decommissioning
- RA3 - Infrastructure to be Retained
- RA4 - Tailings Storage Facility
- RA5 - WRD and T/S (Woodland)
- RA6 - WRD and T/S (Grazing)

Improvement Area

- IA1
- Mining Lease
- Highway
- Creek

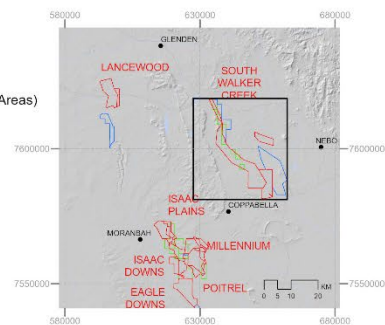
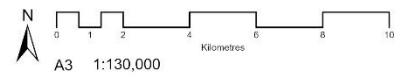


Figure 5-2 Reference Map

Schedule and Rehabilitation Milestones

Refer to attached PRCP Schedule

SECTION C - APPENDICES

Appendix 1	South Walk Creek Environmental Authority EA (EPML00712313) (January 2026)
Appendix 2	South Walker Creek Mine Rehabilitation Management Plan (RMP) Version 4: 2012
Appendix 3	WSP (June 2025) Post-Closure Hydrogeological Assessment – South Walker Creek Mine
Appendix 4	Landloch (June 2025) South Walker Creek (SWC) Material Characterisation Study
Appendix 5	Engeny (June 2025) South Walk Creek Mine PRCP - Voids in Floodplain Assessment
Appendix 6	Engeny (June 2025) South Walker Creek Mine PRCP- Rehabilitation Flood Assessment
Appendix 7	Terrenus Earth Sciences (30 November 2021) Geochemical Assessment of Potential Spoil, Coal and Coal Reject Materials
Appendix 8	Landloch (June 2025) Rehabilitation Landform Design- South Walker Creek Mine
Appendix 9	WSP (November 2025) Void Closure Plan- South Walker Creek Mine
Appendix 10	Landloch (June 2025) Cover Design-South Walker Creek Mine
Appendix 11	WSP (June 2025) Void Water Balance Report- South Walker Creek Mine
Appendix 12	WSP (21 February 2024) Geochemical Void Water Quality Report- South Walker Creek Mine