



Prominent Hill

Program for Environment Protection and Rehabilitation

Volume 1 of 2 Main document

Prominent Hill Mineral Lease:	ML 6228
Site Access Road:	MPL 83, MPL 84
Concentrate Export Road:	MPL 91, MPL 96, MPL 97 and MPL 101
Virgo Borefield:	MPL 81 and MPL 82
Aries Borefield:	MPL 93, MPL 94, MPL 112 to MPL 117 and MPL 169 to MPL 176
Electricity Transmission Line:	MPL 119 to MPL 122
Extractive Minerals Area:	EML 6234, EML 6236 to EML 6242, EML 6278 to EML 6296 and EML 6299 to EML 6301

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Program for Environment Protection and Rehabilitation – Prominent Hill	May 2026	BHP 2026 (this document)

Acknowledgements

We would like to acknowledge and pay respect to the Kaurna cultural heritage, spiritual beliefs and their relationship with this land we meet on today. We also would like to acknowledge the Kokatha peoples, the traditional owners of the land on which Olympic Dam and Carrapateena mines operates and from Prominent Hill the Antakirinja Matu- Yankunytjatjara peoples. We pay our respect to their Elders past and present. We would also like to recognise the Traditional Owners who are so central to Olympic Dam, Roxby Downs, Prominent Hill and the surrounding communities; Barngarla, Kuyani, Arabana and Dieri. We extend our respects to all Aboriginal and Torres Strait Islander people who are present with us today.

BHP Prominent Hill Operations would like to acknowledge the following companies who have assisted in the development of various versions of the Prominent Hill Program for Environment Protection and Rehabilitation (2021, 2019 and 2015) and associated technical studies.



Minerals Australia

On 2 May 2023, BHP Group Limited (Company) announced the completion of the acquisition of OZ Minerals Limited and the implementation of a scheme of arrangement for BHP Lonsdale Investments Pty Ltd, a wholly owned subsidiary of BHP Group Limited, to acquire 100% of the shares in OZ Minerals Limited. As a result of the acquisition, BHP Group Limited is now the ultimate parent company of OZ Minerals Limited.

The Prominent Hill operation has been developed and operated by OZ Minerals Prominent Hill Operations Pty Ltd, wholly owned by OZ Minerals Limited. The Prominent Hill site has been integrated into the BHP Copper SA asset, also incorporating BHP's Carrapateena mine, Olympic Dam mine and Oak Dam exploration sites. Copper SA falls under the BHP Minerals Australia business portfolio which also incorporates Western Australia Iron Ore, Western Australia Nickel, Coal, Mt Arthur Coal and Operations Services.

References to BHP in this Program for Environment Protection and Rehabilitation are context sensitive however, in the main, refer to OZ Minerals Prominent Hill Operations Pty Ltd unless otherwise stated

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All figures are expressed in Australian dollars unless stated otherwise.

Production targets cautionary statement

BHP advises that the Prominent Hill Expansion Study update referenced in this Program for Environment Protection and Rehabilitation is based on a subset of the Prominent Hill Mineral Resources and Ore Reserves as described in the report *Prominent Hill Mineral Resource and Ore Reserve Statement and Explanatory Notes as at 31 March 2021* released on 18 August 2021. The Production Targets of the expansion study case comprise:

- 27.8% Proved Ore Reserves
- 37.3% Probable Ore Reserves
- 1.4% Measured Mineral Resources
- 3.6% Indicated Mineral Resources
- 29.9% Inferred Mineral Resources.

BHP notes that there is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production targets will be realised.

Current information with respect to Mineral Resources and Ore Reserves can be found in the Annual Report 2025, available at www.bhp.com/-/media/documents/investors/annual-reports/2025/250819_bhpannualreport2025.pdf.

Currency

Where possible, the contents of the Program for Environment Protection and Rehabilitation (Document) are up to date as at May 2026. This was not possible where parts of the Document were prepared from information provided by third parties (as discussed below) prior to the third-party documents being finalised.

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Executive summary

ES1 Prominent Hill context

Prominent Hill is a site within BHP's Minerals Australia business portfolio. The underground mine, targeting copper and gold, is located approximately 650 kilometres (km) north-west of Adelaide, South Australia, on the traditional lands of the Antakirinja Matu-Yankunytjatjara (AMY) People.

Prominent Hill commenced operations in 2009 with the development of the Malu open pit (completed in Q1 2018) and Ankata underground mining operations. The conventional grinding and flotation minerals processing plant (MPP) produces a high-quality copper and gold concentrate for export. Subsequent expansions include the development of the Malu underground mining operation and the Prominent Hill Operation Expansion (PHOX) project.

Infrastructure supporting the mining and processing operations at Prominent Hill includes an accommodation village and airstrip, haul and access roads, rail loading facilities, electricity supply infrastructure, water supply infrastructure, and an integrated waste landform (IWL) which is a combined tailings storage and rock storage facility.

A summary of the key characteristics of the Prominent Hill operation is presented in ES Table 1.

ES Table 1 | Prominent Hill key characteristics

Key project element	Prominent Hill
Mining	
Total Resources	158 Mt (underground sulphide), 1.9 Mt (stockpile sulphide) and 2.2 Mt (stockpile low-grade) as 30 June 2024
Production target	81 Mt
Mining method	Sub-level open stoping
Production rate	Approximately 7.5 Mtpa average over the mine life following shaft commissioning
Mine Life	15 years
Mine access	Decline (ramp)
Secondary access	Decline (ramp) and Hoisting Shaft
Commodities	Copper, gold, silver
Primary crushing	Underground gyratory crusher
Ore handling	1,329 m, 7.5 m diameter Hoisting Shaft and decline (ramp)
Underground loading fleet	8 vehicles (13 post shaft commissioning)
Underground trucking fleet	5 vehicle (10 post shaft commissioning)
Underground fleet electrification	Future electrification enabled

Key project element	Prominent Hill
Scope 1 emissions intensity	0.28 t CO ₂ -e/tonne concentrate
Ventilation	Upgraded ventilation and cooling
Processing	
Flow sheet	SAG mill, ball mill, and rougher flotation followed by four-stage cleaning
Production	Copper, gold and silver in concentrate
Feed rate	Approximately 7.5 Mtpa average over mine life
Surface infrastructure	
Surface ore handling	Overland conveyor from shaft tip to coarse ore stockpile
Power	55 MW demand, 132 kV high voltage connection to grid
Water	~13 ML/d sourced from wellfields
Village and airstrip	1200 rooms and airstrip located at site
Site access	Mine Access Rd (45 km off Stuart Highway)
Tailings disposal	TSF uplifts
Tailings storage facility	Standard circular embankment design 1.7 km in diameter (2 stages – 206 Mt storage capacity sufficient for PHOX needs)

ES2 Primary approvals

The Prominent Hill iron oxide copper gold silver (IOCG) deposit was first discovered in 2001 by Adelaide-based Minotaur Exploration Limited and was a standout greenfield discovery in Australia. In March 2006, Oxiana Pty Ltd (Oxiana, subsequently OZ Minerals Limited (OZ Minerals) and now BHP) submitted a Mining Lease Proposal (MLP) for the Prominent Hill Copper-Gold Project (the Project).

The MLP addressed the credible environmental and social impacts associated with the construction, operation and closure of the open pit mining project and received approval from the Australian Government and Government of South Australia in August 2006. Mining Lease (ML) ML 6228 was granted by the Department of Primary Industries and Resources of South Australia (PIRSA, now Department for Energy and Mining (DEM)) to Oxiana. To support the ML, Miscellaneous Purpose Licences (MPLs) and Extractive Mineral Leases (EMLs) applications were also submitted. MPLs were granted for a site access road, a concentrate export road, a construction wellfield, an operations wellfield and an electricity transmission line, and EMLs were granted for borrow pits to facilitate construction and ongoing maintenance activities.

Under the *Mining Act 1971* (SA) (Mining Act) section 70B and regulation 63 of the Mining Regulations 2020, a compliant program must be in force before carrying out operations as defined in a Program for Environment Protection and Rehabilitation (PEPR).

To satisfy this requirement, OZ Minerals Prominent Hill Operations Pty Ltd (hereafter BHP) submits this PEPR for the following tenements:

- Prominent Hill Mining Lease (ML) 6228
- Site access road (Miscellaneous Purpose Licence (MPL) 83-84)
- Concentrate export road (MPL 91, 96, 97 and 101)
- Virgo Borefield (MPL 81-82)
- Aries Borefield (MPL 93-94, 112-117 and 169-176)
- Electricity transmission line (MPL 119-122) and
- Extractive minerals area (Extractive Mineral Lease (EML) 6234, 6236-6242, 6278-6296 and 6299-6301).

This PEPR has been developed in accordance with the requirements of Terms of Reference (TOR) 005, 'Terms of reference Metallic and industrial mineral PEPRs' (December 2020) and Ministerial Guideline (MG) 2b 'Preparing a PEPR Metallic and industrial minerals' (December 2020). As such, this PEPR includes the following:

- Chapter 1 – Introduction
- Chapter 2 – Proponent details
- Chapter 3 – Operator capability
- Chapter 4 – Description of the environment
- Chapter 5 – Description of the operations
- Chapter 6 – Closure management
- Chapter 7 – Consultation and engagement
- Chapter 8 – Operational outcomes, strategies, criteria and monitoring
- Chapter 9 – Closure outcomes, strategies, criteria and monitoring
- Chapter 10 – Licences, permits and agreements
- Chapter 11 – Program notifications
- Chapter 12 – Verification of uncertainty
- Chapter 13 – Supporting technical reports
- Chapter 14 – List of superseded documents
- Chapter 15 – References
- Chapter 16 – Definitions and abbreviations
- Chapter 17 – Terms of reference (TOR) 005 PEPR content checklist

ES3 Changes to approved operations

The key change to the operation detailed within this PEPR is the inclusion of aspects related to the Aries Transfer Pipeline Replacement Project (the Project) tenements MPL 169 to MPL 176, granted on 9 December 2025.

The Project has been initiated to replace portions of the existing Aries Transfer Pipeline (the pipeline) with a buried mild steel, cement-lined (MSCL) pipeline located adjacent to the existing pipeline. This would be undertaken in stages, with the first stage involving the replacement of 20.7 km of the pipeline, commencing at the existing Transfer Pump Station and extend west towards Prominent Hill, where it would tie into the remainder of the existing pipeline. Future stages of the project may replace further portions of the existing pipeline as required.

There are no changes to the description of mining and minerals processing operations, ancillary operations nor to resource inputs (i.e., water, electricity and workforce demands) as a result of the additional tenements required to enable replacement of the pipeline. Minor, non-material, changes to some production metrics (e.g., ore and concentrate production, waste and tailings production) and the description of operations to reflect current operations.

A summary of the changes in this revision of the PEPR is presented in ES Table 2.

ES Table 2 | Summary of key changes to this PEPR revision

Chapter and/or section	Summary of changes
1.0 (Introduction)	No material change
2.0 (Proponent details, Tenements, Land Ownership)	No material change
3.0 (Management capabilities)	No material change
4.0 (Description of environment)	Minor updates to the local climate of Prominent Hill. Further incorporation of hydrostratigraphic units was made to Figure 4.7
5.0 (Description of mining operations)	Updates to this chapter included: - Revised project summary that reflects the update of annual production rate of approximately 9Mtpa until surface stockpiles are depleted to ~6Mtpa, increasing to ~7.5Mtpa once the shaft is operational, with underground and processing operations to cease in 2036. - Indicative project schedule and timeframes - Reserves and resources which align with the 2024 Prominent Hill Annual Report - Addition of a modular batch plant for greater efficiency and operational performance - Revision of tailings deposition totals - Revision of the mining equipment numbers - Addition of information related to the Aries Transfer Pipeline and associated scour pits - Energy efficiency
6.0 (Closure management)	Information surrounding the rehabilitation liability estimate has been included to reflect the current bond held with the South Australian Government
7.0 (Consultation and engagement)	Updated to reflect consultation records taken since the last PEPR update

Chapter and/or section	Summary of changes
8.0 (Operational outcomes, strategies, criteria and monitoring)	Additional scour pits as control measure for Aries pipeline maintenance activities (Impact No. 15.1)
9.0 (Closure outcomes, strategies, criteria and monitoring)	No material change
10.0 (Licences, permits and agreements)	Update to information surrounding the Significant Environmental Benefit Offset for the pipeline only
11.0 (Self assessments)	Renaming of Section from “program notifications” to “self assessments”
12.0 (Verification of uncertainty)	Forward work plan has been updated to reflect timelines and status of matters as specified in the 2024 Annual Compliance Report
13.0 (Supporting technical reports)	No material change
14.0 (List of superseded documents)	No material change
15.0 (References)	No material change
16.0 (Definitions and abbreviations)	No material change
17.0 (Terms of Reference (TOR005) PEPR contents checklist)	Updated to reflect content of this PEPR

Declaration of accuracy

I, Anna Wiley, the applicant, have taken the following steps to review the information in this application to ensure its accuracy.

- implementing an audit process against the terms of reference to ensure the minimum requirements have been addressed
- internal peer review by a suitably qualified and experienced company employee
- an internal process for review, endorsement or sign off by senior management or executive.

Name	Anna Wiley
Position	Asset President Copper South Australia
Signature	
Date	5 May 2026

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Appendices

Appendix A Leases and Licences

A1 Mining Lease

A2 Miscellaneous Purposes Licences

A3 Extractive Minerals Leases

Appendix B Grouped Conditions

Appendix C Stage Two SEB Offset Area Management Plan

Appendix D Waste Management Plan

Appendix E Prominent Hill Expansion Groundwater Modelling Report

1. Introduction

1.1 Primary approvals context

The Prominent Hill iron oxide copper gold silver (IOCG) deposit was first discovered in 2001 by Adelaide-based Minotaur Exploration Limited and was a standout greenfield discovery in Australia. In March 2006, Oxiana Pty Ltd (Oxiana, subsequently OZ Minerals Limited (OZ Minerals) and now BHP) submitted a Mining Lease Proposal (MLP) for the Prominent Hill Copper-Gold Project (the Project). The Project comprised an open pit mine with an integrated waste landform (IWL) for waste rock and tailings, a processing plant, accommodation village, airstrip and associated infrastructure.

The MLP addressed the credible environmental and social impacts associated with the construction, operation and closure of the open pit mining project and received approval from the Australian Government and Government of South Australia in August 2006. Mining Lease (ML) ML 6228 was granted by the Department of Primary Industries and Resources of South Australia (PIRSA, now Department for Energy and Mining (DEM)) to Oxiana. A condition of the ML (Second Schedule Lease Condition No.1) required the operation to operate in accordance with an approved Mining and Rehabilitation Program (MARP) (Oxiana, 2006a).

To support the ML, Miscellaneous Purpose Licences (MPLs) and Extractive Mineral Leases (EMLs) applications were also submitted. MPLs were granted for a site access road, a concentrate export road, a construction wellfield, an operations wellfield and an electricity transmission line, and EMLs were granted for borrow pits. Full copies of all ML, MPL and EML leases and licences for Prominent Hill can be found in Appendix A. Appendix B contains a grouped version of conditions for all leases and licences relating to the operation.

Based on feasibility studies conducted during 2008 and 2009, the Project description was updated to include the development and operation of an underground mine. Based on the project description variation, the impact assessments that lead to the compliance criteria were revisited in the 2006 MARP (Oxiana, 2006a) and an updated MARP was submitted in 2009 (OZ Minerals, 2009). The 2009 MARP was approved in 2009 and the development of the Ankata underground mine commenced in November 2010. Underground access to the Malu Underground area was achieved via an extension to the main Ankata Underground decline in early 2013. Both underground mines are now in operation and are known as the Prominent Hill Underground mine.

An amendment to the *Mining Act 1971* (SA) (Mining Act) as of 1 July 2011 removed the reference to MARPs and introduced the Program for Environment Protection and Rehabilitation (PEPR). It was acknowledged that all existing MARPs would be accepted as PEPRs unless an opportunity for an update and amendment arose which would require the document to be submitted in the new PEPR format.

The PEPR 2017 (i.e., the transition document from MARPs to a PEPR) was submitted to DEM for formal assessment in December 2017 and approved 1 June 2018 (MPEPR2015/087). This approval was conditional on addressing various Matters Subsequent, including:

- providing an updated section on Mine Completion (including an updated closure plan with surveyed data of the location of the Potentially Acid Forming (PAF) material within the Tailings Storage Facility (TSF)/ Waste Rock Dumps (WRD) and a TSF cover system strategy)
- updated mine completion outcomes
- updated progressive rehabilitation and mine closure strategies and completion criteria

- updated schedule for future works
- updated plans showing the final open pit and underground workings and
- once mine completion strategies and criteria are finalised, provision of a specific assessment which demonstrates that the mine closure and rehabilitation strategies for the Northern WRD will be effective in the long-term.

An updated PEPR was submitted to DEM in June 2019, which aimed to address the Matters Subsequent. This PEPR was subsequently withdrawn from assessment on 18 February 2021, to enable the PEPR to be updated with information pertaining to Prominent Hill Operation Expansion (PHOX) Project. The revised PEPR, addressing Matters Subsequent and providing details sufficient to enable the PHOX Project, was submitted and subsequently approved in early 2022. The current Forward Works Plan is described in Section 12.

1.2 PEPR context

This PEPR has been developed in accordance with the requirements of Terms of Reference (TOR) 005, 'Terms of reference Metallic and industrial mineral PEPRs' (March 2021) and Ministerial Guideline (MG) 2b 'Preparing a PEPR Metallic and industrial minerals' (August 2023) and incorporates the following key changes:

- update to PEPR format to reflect BHP external document standards
- updates to management capabilities components of the PEPR to reflect BHP systems and processes
- updates to Minerals Resources and Ore Reserve information to reflect current statements
- incorporation of the additional tenements, project description, stakeholder consultation and associated elements to reflect the approved Aries Transfer Pipeline Replacement Project
- other minor editorial changes as required to ensure document currency and for consistency

The PEPR includes the following key elements:

- proponent and tenement details
- an overview of BHP capability and capacity
- a summary of environmental baseline conditions
- a description of operations specifies the mining operations that BHP carries out in accordance with the ML 6228 and associated tenements
- incorporates project variations that have occurred since the previous approved PEPR into the project description
- sets out the criteria to be adopted to measure achievement of the lease conditions through either outcome or non-outcome-based approaches
- demonstrates the compliance criteria against the lease conditions to enable measurement of achievability of the environment and community outcomes (outcomes) that are expected to occur as a result of the mining operations over all phases including, exploration, construction, operations and closure

- identifies other legislative requirements and provides direction to streamline compliance reporting and
- provides information to demonstrate BHP's ability to achieve the outcomes.

2. Proponent details

2.1 Proponent details

Proponent details are summarised in Table 2.1.

Table 2.1 | Proponent details

Mine Name	Prominent Hill Operations		
Operations	Malu (open pit)		
	Prominent Hill (underground) Previously referred to as two separate underground operations being Ankata and Malu.		
Lease Holder	OZ Minerals Prominent Hill Operations Pty Ltd		
Australian Company Number	091 546 691		
Operator	OZ Minerals Prominent Hill Operations Pty Ltd		
Australian Company Number	091 546 691		
Mining Lease Number	ML 6228	Approval Date	2/08/2006
Site Location	In the Gawler Craton of South Australia, located approximately 650 km north-north-west of Adelaide, approximately 100 km south-east of Coober Pedy and 150 km north-west of BHP's Olympic Dam mine.		
Site Contact	Kirsty Liddicoat	Position	General Manager
Address	2 Hamra Drive	City (Postcode)	Adelaide Airport (5950)
Email	Kirsty.Liddicoat@bhp.com	Telephone	08 8672 8724

2.2 Tenements

The Prominent Hill operation is located approximately 650 km north-north-west of Adelaide, approximately 100 km south-east of Coober Pedy and 150 km north-west of Roxby Downs in northern South Australia (see Figure 2.1). The open pit and underground mining operations, WRD, processing plant, TSF, accommodation village and airstrip are located within ML 6228, covering an area of approximately 78.56 km² (see Figure 2.2). Supporting infrastructure, including the site access road, concentrate export road, construction borefield, operations borefield and electricity transmission line corridor are located on associated tenements including MPLs and EMLs. Details of the tenements associated with the current Prominent Hill operations are summarised in Table 2.2 and shown on Figure 2.3.

Table 2.2 | Tenement summary

Tenement	Tenement number	Approval date	Expiry date
Prominent Hill Mining Lease	ML 6228	02/08/2006	01/08/2041
Site Access Road	MPL 83-84	20/10/2006	01/08/2041
Concentrate Export Road	MPL 91	21/08/2007	01/08/2041
	MPL 96	22/10/2007	01/08/2041
	MPL 97	22/10/2007	01/08/2041
	MPL 101	05/11/2007	01/08/2041
Wellfields (Borefields) and Associated Infrastructure	MPL 81 (Virgo)	19/09/2006	01/08/2041
	MPL 82 (Virgo)	04/10/2006	01/08/2041
	MPL 93-94 (Aries)	10/09/2007	01/08/2041
	MPL 112-117 (Aries)	03/10/2008	01/08/2041
	MPL 169-176 (Aries)	09/12/2025	01/08/2041
Extractive Minerals Areas	EML 6234	17/10/2006	01/08/2041
	EML 6236-6242	09/11/2006	01/08/2041
	EML 6278-6296	20/12/2007	01/08/2041
	EML 6299-6301	23/01/2008	01/08/2041
Electricity Transmission Line	MPL 119-122	09/07/2010	01/08/2041

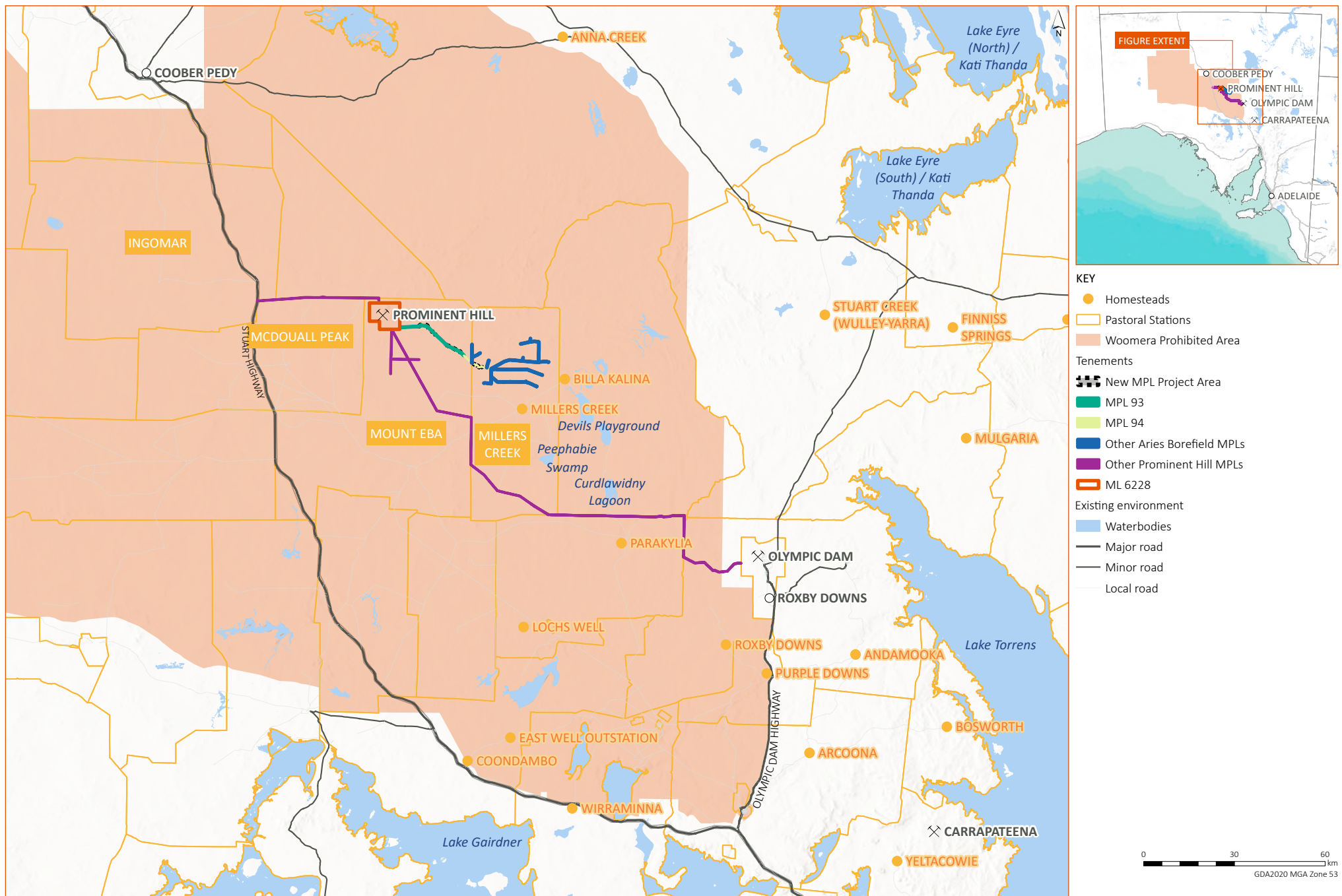


Figure 2.1 | Project regional locality

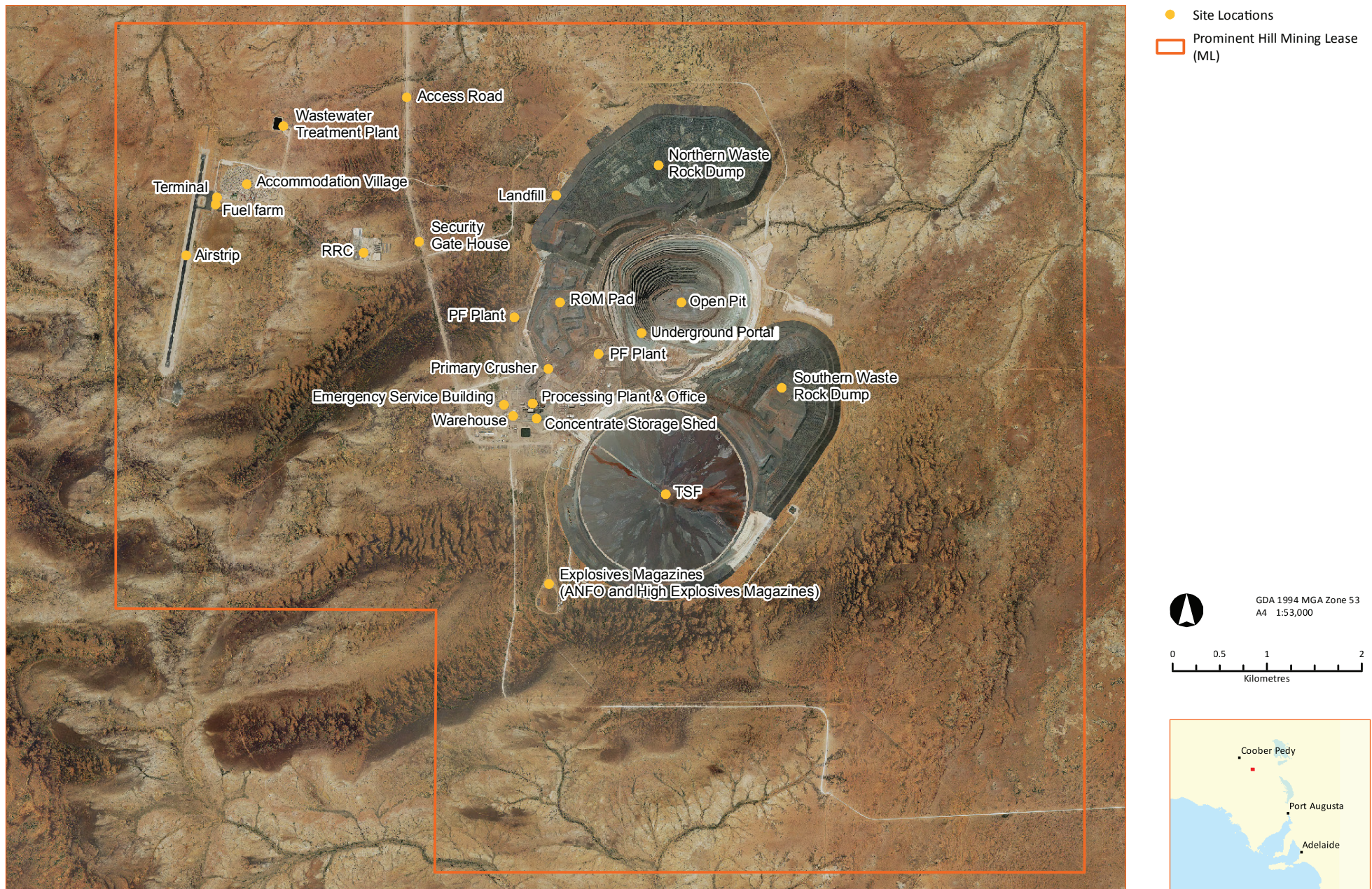


Figure 2.2 | Mining lease activities



2.3 Land ownership

Most tenements listed in Table 2.2 overlap with other land access arrangements as listed in Table 2.3.

Table 2.3 | Land ownership summary

Tenement	Tenement number	Land ownership and/or other lease agreements (as at May 2018)
Prominent Hill Mining Lease	ML 6228	Pastoral Lease 2340: Mount Eba Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licences 6364 and 6135: BHP
Site Access Road	MPL 83-84	Pastoral Lease 2339: Ingomar Pastoral Station Pastoral Lease 2341: McDouall Peak Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6364: BHP Exploration Licence 6704: Cu-River Mining Australia
Concentrate Export Road	MPL 91, 96-97	Pastoral Lease 2339: Ingomar Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6623: BHP Exploration Licence 6704: Cu-River Mining Australia Exploration Licence 6487: Southern Iron Exploration Licence 6566: South Australian Coal
	MPL 101	Pastoral Lease 2339: Ingomar Pastoral Station Pastoral Lease 2341: McDouall Peak Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6704: Cu-River Mining Australia Exploration Licence 6364: BHP
Wellfields (Borefields) and Associated Infrastructure	MPL 81-82 (Virgo)	Pastoral Lease 2340: Mount Eba Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licences 5975 and 6135: BHP
	MPL 93 (Aries)	Pastoral Lease 2340: Mount Eba Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licences 6446 and 6135: BHP
	MPL 94 and MPL 112 (Aries)	Pastoral Lease 2340: Mount Eba Pastoral Station Pastoral Lease 2315: Millers Creek Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6446: BHP Exploration Licence 6321: NT Minerals
	MPL 113 (Aries)	Pastoral Lease 2315: Millers Creek Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6446: BHP Exploration Licence 6321: NT Minerals
	MPL 114-116 (Aries)	Pastoral Lease 2315: Millers Creek Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Native Title SCD2012/002: Arabana People Exploration Licence 6446: BHP Exploration Licence 6110: FMG Resources Exploration Licence 6321: NT Minerals
	MPL 117 (Aries)	Pastoral Lease 2315: Millers Creek Pastoral Station Native Title SCD2012/002: Arabana People

Tenement	Tenement number	Land ownership and/or other lease agreements (as at May 2018)
Extractive Minerals Areas		Exploration Licence 6446: BHP
	MPL 169-176	Pastoral Lease 2315: Millers Creek Pastoral Station Pastoral Lease 2340: Mount Eba Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licences 6446 and 6135: BHP Exploration Licence 6321: NT Minerals
	EML 6234-6236	Pastoral Lease 2339: Ingomar Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People
	EML 6236-6242	Pastoral Lease 2341: McDouall Peak Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6364: BHP Exploration Licence 6704: Cu-River Mining Australia
Electricity Transmission Line	EML 6278-6296	Pastoral Lease 2339: Ingomar Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6566: South Australian Coal Exploration Licence 6487: Southern Iron Exploration Licence 6623: BHP
	EML 6299-6301	Pastoral Lease 2341: McDouall Peak Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6704: Cu-River Mining Australia
	MPL 119	Pastoral Lease 2340: Mount Eba Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6321: NT Minerals Exploration Licence 6135: BHP
	MPL 120	Pastoral Lease 2340: Mount Eba Pastoral Station Pastoral Lease 2315: Millers Creek Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Exploration Licence 6060: FMG Resources Exploration Licences 6247 and 6321: NT Minerals
	MPL 121	Pastoral Lease 2315: Millers Creek Pastoral Station Pastoral Lease 2415: Billa Kalina Pastoral Station Pastoral Lease 2197: Parakylia Pastoral Station Native Title SCD2001/001: Antakirinja Matu-Yankunytjatjara People Native Title SCD2014/004: Kokatha People Exploration Licences 6375, 6059 and 6060: FMG Resources
	MPL 122	Pastoral Lease 2415: Billa Kalina Pastoral Station Pastoral Lease 2197: Parakylia Pastoral Station Pastoral Lease 2338: Roxby Downs Pastoral Station Native Title SCD2014/004: Kokatha People Exploration Licences 5967, 6010, 6304 and 6059: FMG Resources Exploration Licence 5941: BHP

(Note: In Table 2.3, references to BHP Exploration Licences mean that these are held by OZ Minerals Prominent Hill Operations, a wholly owned entity of BHP)

3. Operator capability

3.1 Management capability

BHP Group Limited (BHP Group) is a world-leading resources company headquartered in Melbourne, Australia. BHP Group products are sold worldwide with sales and marketing led through our Singapore location. BHP Group has approximately 80,000 employees and contractors and works in over 90 locations worldwide.

BHP Group is focused on the resources the world needs to grow and decarbonise. Copper for renewable energy. Nickel for electric vehicles. Potash for sustainable farming. Iron ore and metallurgical coal for the steel needed for global infrastructure and the energy transition.

3.2 BHP sustainability framework

As described previously, Prominent Hill will progress towards integration with existing BHP systems as a component of the development of the Copper SA asset. In that context, the approach of BHP to sustainability and environmental management is described in the following sections.

3.2.1 Ambition

BHP are committed to finding new ways of operating more sustainably while supplying products that are essential for the global transition towards a more sustainable future. BHP recognises that it can only achieve this purpose through collective effort, and BHP values the opportunity of partnering across the value chain to make their business more sustainable and to contribute to global sustainable development goals.

3.2.2 Approach

BHP's approach to sustainability includes identifying opportunities to create a positive contribution to society through social value. Social value is BHP's positive contribution to society – their people, partners, the economy, the environment and local communities and is about creating enduring, mutual benefit for the company, their shareholders and the broader community.

BHP's social value framework, approach to governance and annual performance against the social value scorecard are detailed on the social value webpage and discussed in BHP's Annual Reports.

BHP defines the approach to sustainability through Our Charter, which is governed through the Our Requirements standards. These standards describe our mandatory minimum performance requirements and provide the foundation to develop and implement management systems at our operated assets.

3.2.3 Materiality assessment

Each year, BHP identify the sustainability topics most material to business, partners and stakeholders, by assessing the economic, social, environmental and cultural impact of BHP activities and business relationships. In alignment with the recommendations of the Global Reporting Initiative (GRI), BHP consider the actual and potential negative and positive impacts of their business in order to determine material sustainability topics.

As part of this assessment, consideration is given to a broad range of inputs, including BHP's priority and emerging risks, information recorded in internal event management system, social value framework, insights from interviews with senior leaders and subject matter experts across the business. BHP seek to ensure external partners' and stakeholders' perspectives inform the assessment by including consideration of issues raised at BHP's Annual General Meetings and investor roundtables, industry sustainability standards and guidance, sustainability-related regulatory focus areas, relevant media articles about impacts and input from the Forum on Corporate Responsibility. Material sustainability topics are reviewed by the Sustainability Committee.

BHP has been conducting sustainability materiality assessments for many years and has a well developed understanding of the organisation's context, and are actively involved in sector-specific initiatives such as the International Council on Mining and Metals (ICMM) and regularly engage with our stakeholders.

The materiality assessment process has the following key inputs:

- Identification of negative impacts: BHP's event management system is used to identify both actual and potential negative impacts arising from our operations. Specifically, the system is designed to capture events that have or could have resulted in adverse consequences to people (health and safety), the environment or local community, and to our legal, reputational or financial standing. Hazard reporting is also encouraged as a proactive measure to help reduce the likelihood of actual and high potential impacts.
- Assessing the significance of the negative impacts: BHP uses an internal severity rating scale (tiered from one to five by increasing severity), as defined in internal mandatory minimum performance requirements for risk management, to assess the significance of actual or potential negative impacts. For actual negative impacts, all events recorded in the event management system are assigned a severity level based on their actual or potential impact. BHP considers actual events from our event management system with a severity level of three or above to be 'material' for GRI reporting purposes.
- Identification and assessment of positive impacts: Positive impacts on the economy, environment and people are captured through the social value framework and social investment. The social value framework was developed through extensive consultation and identified the opportunity to build value, beyond minimum compliance, through proactive initiatives and investments that focus on sustaining long-term, mutual value with those who help to enable the realisation of BHP's sustainability purpose.

3.2.4 Governance and oversight

The BHP Board has oversight of the approach to, and delivery on, sustainability and is supported by each of its committees:

- The Board's Sustainability Committee advises and assists the Board in its oversight of BHP's management and performance in relation to health, safety, environmental, climate and community matters. The Sustainability Committee also advises the People and Remuneration Committee in setting safety and sustainability-related scorecard targets and evaluating performance against those targets.
- The Board's Risk and Audit Committee is responsible for assisting the Board in overseeing and reviewing emerging and priority group risks, risk management and internal controls. The Risk and Audit Committee also reviews and recommends to the Board public financial disclosures related to sustainability matters.
- The Nomination and Governance Committee is responsible for reviewing and making recommendations to the Board on BHP's significant social, community and sustainability policies. The Nomination and Governance Committee also reviews and makes recommendations to the Board on BHP's public sustainability targets and goals.
- The People and Remuneration Committee is responsible for considering and assessing the performance measures for the Executive Leadership Team and performance outcomes against those measures. In doing so, the People and Remuneration Committee considers recommendations from the Sustainability Committee in relation to health, safety, environment, climate and community measures.

3.2.5 Engagement

As a global company, BHP interacts with a range of partners and stakeholders. The methods, frequency of engagement and approach to listening to partners and stakeholders are diverse, and BHP use a range of formal and informal communication and engagement channels to understand partner and stakeholder views.

BHP also seeks advice from external experts and forums on issues relating to sustainability as inputs into our policy development and decision-making processes. The BHP Forum on Corporate Responsibility (FCR) is a key part of the governance approach and stakeholder engagement program. The FCR comprises independent civil society leaders in various fields of sustainability, who make an important contribution to the sustainability approach over a range of social and environmental issues and to the development of BHP Group policies, strategies and standards. They provide insight into current and emerging issues, challenge our thinking and allow BHP to understand and consider the broader impacts of BHP actions.

3.2.6 Performance

BHP use various metrics to measure sustainability progress and performance. Sustainability performance metrics are independently audited, and a copy of the independent assurance report is available in the BHP Annual Report. Further information with respect to sustainability performance data and social values is available within environmental, social and governance (ESG) Standards and Databook and the Social Value webpage (www.bhp.com/about/operating-ethically/social-value).

3.2.7 Risk management

Under the Group-wide Risk Framework, BHP's aim is to identify risks (both threats and opportunities) associated with business and activities, including risks and potential impacts that relate to sustainability issues. This enables the prioritisation and management of risks that matter most. All risks to which BHP is exposed are classified using the Group Risk Architecture. This is a tool to identify, analyse, monitor and report risk, which provides a platform to understand and manage risks. Similar risks are considered together in categories, such as 'people and culture', 'health and safety' and 'environment, climate change and community'. Each category is then further comprised of groups of risks, which include 'occupational safety', 'human rights', 'climate change' and other sustainability risks. This gives the Board and management visibility over the aggregate exposure to risks, including sustainability risks, on a Groupwide basis and supports performance monitoring and reporting against BHP's risk appetite.

When BHP assess the materiality of a current risk, the Risk Framework requires consideration of all potential impacts, including to health and safety, the environment, communities, human rights and social value. This is designed to support the consideration of all potential impacts in risk assessments and means potential sustainability impacts are required to be considered in the context of all identified risks.

Risk management is embedded into work processes and critical business systems to help develop a risk-informed approach to sustainability. Workplace health, safety, environment and community standards are set for operated assets and their application enforced. Contractors working at BHP operated assets must comply with BHP standards and requirements, and BHP seek to ensure that suppliers, agents and service providers maintain business practices and workplace standards comparable to theirs.

The Internal Audit team is responsible for providing independent and objective assurance over the control environment (governance, risk management and internal controls) to the Board and Executive Leadership Team. Third-party assurance providers visit selected operated assets and evaluate the sustainability approach to ensure we accurately represent our commitments and actions.

3.3 Environmental management

3.3.1 SHEC management system

The components of Prominent Hill's Safety Health Environment and Community (SHEC) Management System are aligned with the company overarching Stakeholder Value Creation policies and standards. The SHEC Management System ensures:

- A process of identifying and managing safety, emergency response, health and hygiene, environment and community risks and impacts, identifying training requirements and developing appropriate site-specific documentation.
- Guidance for all stages of the project (design, construction, operations, monitoring, rehabilitation and closure) meeting compliance and other obligations.
- Drives continuous improvement through regular auditing and workplace inspections.

Prominent Hill has a series of environment and community management plans that partner the site Safety Management Plan. These are operational documents, which cover the processes to be followed and the systematic approach to managing environmental, safety and community aspects for all licences relating to the operation.

The Prominent Hill operation also has a range of other regulatory requirements and licences that require specific management or monitoring plans to ensure regulatory agencies have the confidence that other licence conditions and obligations are being managed appropriately. In order to ensure effective allocation of resources, limited duplication of documentation, and clear and concise compliance requirements, this PEPR is also supported by the following documents:

- Groundwater Monitoring Plans which have been developed to meet the requirements of two Water Licences: Licence No. 396809, Water Resource Works Approval No. 396904 and Licence No. 396811, Water Resource Works Approval No. 396907, under the *Landscape South Australia Act 2019* (SA) (Landscape Act).
- Stage Two Significant Environmental Benefit (SEB) Offset Area Management Plan (Appendix C) which has been developed to meet the *Native Vegetation Act 1991* (SA) Native Vegetation Management Plan requirements.
- Threatened Fauna Species Management Plan which has been developed to meet:
 - the flora and fauna associated requirements of this PEPR
 - the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (Approval EPBC 2005/2040, Controlled Action)
- Waste Management Plan (Landfill Environment Management Plan) to meet the requirements of the EPA Licence No. 22764 (Appendix D).
- Radiation Management Plan and Radioactive Waste Management Plan to meet requirements of the *Radiation Protection and Control Act 1982* and the Code of Practice for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005).

All plans are regularly reviewed to ensure they are up to date and meet the requirements of this PEPR and other licences. Other legislative requirements are outlined in Section 10.

Reporting against the Outcomes, Leading Indicators (LI) and Outcome Measurement Criteria (OMC) outlined in this document (see Section 8 and 9), occurs annually to DEM in the Prominent Hill Annual Compliance Report (ACR).

Reporting requirements associated with secondary permitting conditions (e.g., annual Wastewater Treatment Plant Compliance Reports or Water Licence Compliance Reports) and other reporting obligations are undertaken in accordance with the relevant licence, permitting condition and/ or statutory requirements.

3.3.2 Roles and accountability

All Prominent Hill employees and contractors have a role in complying with the SHEC management system and have accountability in achieving the environmental Performance Standards and environmental management objectives. By outlining roles and responsibilities for key positions in the implementation of the SHEC management system, BHP can ensure that all stakeholders comprehend their obligations and work together to a common objective.

3.3.3 Sustainability reporting

BHP are committed to a number of sustainability frameworks, standards and initiatives and disclose data both as required by law and according to the requirements of those frameworks, standards and initiatives. Sustainability performance data is included in relevant sections of the BHP Annual Report, Operating and Financial Review, and in BHP's ESG Standards and Databook.

3.4 Impact assessment framework

As a component of the incorporation of Prominent Hill into the Copper SA asset, any impact assessments required to support project variations (see following section) going forward will use the BHP impact assessment framework.

BHP's impact assessment framework will support Prominent Hill throughout its lifecycle to manage environmental and social impacts and risks in a transparent and repeatable manner. This framework was used most recently in the development of the Aries Borefield Pipeline Replacement Project primary approvals and will continue to play a critical role in the environmental management of the site and for the assessment of future variations as detailed in the following section.

The assessment framework draws on the requirements of ISO 14001 Environmental Management (ISO 2015), Government of South Australia and Australian Government regulation and internationally recognised frameworks such as those established by the International Finance Corporation of the World Bank Group. The assessment methodology is consistent with TOR 005 (DEM 2021) and Ministerial Guideline MG2b (DEM 2023), to ensure it meets the requirements of the Mining Act and associated regulations.

The environmental impact assessment framework (see Figure 3.1) supports the process by assisting with the identification of potential impacts across the source-pathway-receptor (SPR) model at each of the phases in the Prominent Hill lifecycle. The impact assessment framework process can be summarised as:

- identify credible potential SPR linkages (planned events) and providing sufficient justification behind the statement of impact, including an explanation of any uncertainty.
- evaluate the role of controls in the design, their position in the hierarchy, and assessment of those design controls that are fundamental to achieving the Outcomes.
- identify other legislative requirements.
- determine materiality of any potential impact as a result of stakeholder consultation.
- assess the impact significance and justifying why if deemed 'not significant' that this is correct, and if 'significant' why this is acceptable.
- assess impact uncertainty by stating any uncertainty, in any element of the assessment, to develop a statement of impact.
- assess the relevant risks (unplanned events) that may occur that mean an Outcome may not be achieved.
- develop proposed Outcomes and OMC and providing any consultation that occurred on these Outcomes

3.5 Project variation management

Operational and closure strategies for Prominent Hill, as well as environmental monitoring arrangements, may evolve during the life of the operation as operational requirements change and further site knowledge is gained. As such, there may be a need to consider changes to approved operations. These variations should:

- ensure that Project activities remain optimised
- reduce uncertainty and assumptions within the PEPR through incorporation of the results of further works, trials, and refinement of strategies
- ensure that the Outcomes and OMC remain relevant.

3.5.1 Regulatory requirements

Part 8B, Division 7 of the Mining Act and Part 12 of the Mining Regulations sets out the process and requirements for a tenement holder to apply to DEM to make a change in authorised operations. These provisions were added to the Mining Act in 2020 so that tenement holders can make changes to their operations that may be considered outside the scope of what was approved as part of the original tenement grant, and which require an environmental impact assessment to authorise the change.

Under the Mining Act, a change may be authorised through:

- a new lease or licence application
- a change in operations application, in accordance with Part 8B Division 7 of the Mining Act
- a PEPR review, in accordance with Section 70C of the Mining Act.

The process for determining the approvals pathway for a proposed change in approved operations is described in Minerals Regulatory Guideline MG35 Applying for a change in operations (DEM 2023a) and summarised in the following sections.

3.5.1.1 Change in operations application

BHP will submit a change in operations application for Prominent Hill if the proposed change:

1. Is inconsistent with, or outside the scope of, the operations approved in the original tenement grant(s) (i.e. it is materially different from the operations assessed and approved in the MLP or MPL Management Plan application process).
2. Would result in non-compliance with existing lease or licence terms/conditions.
3. Requires an environmental impact assessment to understand its impact. This is determined on a case-by-case basis, considering factors such as the significance of proposed changes, environmental setting and the likelihood of new or additional unassessed impacts or new receptors being introduced as a result of the change.
4. Is an administrative change in the mineral that is intended to be recovered or to the tenement's terms or conditions.

The change in operations application must be prepared in accordance with the requirements of MG35 (DEM 2023a). A change in operations application also requires a corresponding PEPR review if the proposed change is inconsistent with the current approved PEPR.

3.5.1.2 PEPR review

A PEPR review will be required where:

1. there are proposed changes which, without requiring an environmental impact assessment, proposes changes to environmental outcomes or measurement criteria in the existing lease, license or PEPR
2. alter the description of mining operations or control strategies but does not affect achievement of approved outcomes
3. increase the operation's rehabilitation liability to a higher level than the bond currently in place for the site
4. relate to an existing control strategy that is essential for achieving environmental outcomes (i.e. there is a high reliance on this strategy to prevent impact to the environment and if it is changed, the tenement holder will no longer be able to achieve the environmental outcome
5. requires native vegetation clearance and/or provision of an SEB.

3.5.2 Variation process

When a variation is required, the first assessment task requires a review of the proposed variation in the context of the approved Prominent Hill activities, as described in Chapter 5. Any change in the described activities is then assessed against the stated impacts detailed in the original Mining Lease Proposal and Miscellaneous Purposes Licence Management Plans.

A review of the environmental impacts associated with Prominent Hill, including the potential for new impacts that were not previously assessed, and potential impacts to MNES, is undertaken to confirm whether the variation may change the approved impact profile of Prominent Hill using the impact assessment framework (see Section 3.4).

The outcomes of the internal variation assessment process determine the level of consultation required, and the requirement for the submission of further approvals documentation.

Other primary approvals and secondary permitting requirements are also considered. Consideration includes assessment to ensure the variation is adequately contemplated in the relevant EPBC Act referral, the adequacy of the current SEB provision under the *Native Vegetation Act 1991* (SA) (NV Act), to be repealed by the *Biodiversity Act 2025* (SA) in stages over the next two years, and the need for further Works Approvals or licences under the *Environment Protection Act 1993* (SA) (EP Act) to ensure all subsequent licences and permits for Prominent Hill remain valid and appropriate.



Figure 3.1 | Environmental Impact Assessment Framework

4. Description of the environment

A detailed description of the baseline environment at Prominent Hill was presented in the 2009 MARP (OZ Minerals, 2009) and the various supporting MPLs and EMLs within their respective MARP documents. Updates to the baseline environment, including the response to Prominent Hill operations, has been presented in previous PEPRs as required.

A summary of the current understanding of the baseline environment is summarised in the following sections. There have been no changes to the understanding of the baseline environment since submission of the previous PEPR is early 2022.

4.1 Topography and landscape

Topography and landscape description is summarised in Table 4.1. Regional topography is shown in Figure 4.1.

Table 4.1 | Topography and landscape summary

Project area	Landscape description	Surface elevations
Broader Project Area	Stony Plains Bioregion within Breakaway Land System	NA
Mining Lease	Located on the edge of a gently undulating broad plateau.	205 mAHD to 210 mAHD apart from 25 m high Prominent Hill landmark located 4 km north-east of the mine area.
Site Access Road	Relatively flat surrounds that follows existing pastoral tracks.	210 mAHD
Concentrate Export Road	Traverse areas of sparse shrubland in the east grading into open woodland in the west. Gently undulating terrain with some flat areas and long gently sloping foot slopes.	150 mAHD to 212 mAHD
Construction wellfield (Virgo Borefield)	Landscape is open with low-lying shrubs and generally flat topography. Located within the Oodnadatta land system. The pipeline corridor traverses the northern part of the Miller Creek catchment.	100 mAHD to 150 mAHD
Operations Wellfield (Aries Borefield)	Infrastructure Corridor – Generally flat topography with denuded flats around stock watering points and low-lying shrubs. Borefield – Located within the Oodnadatta land system. Open low-lying chenopod shrublands, scattered woodlands and gibber plains. Breakaway and Kadlongaroo environmental associations.	Infrastructure Corridor: 205 mAHD to 210 mAHD Borefield: 100 mAHD to 150 mAHD

Project area	Landscape description	Surface elevations
Electricity Transmission Line	Northern Section – areas of sparse vegetation and scattered trees, with areas of patchy gilgai and gibber soils. The terrain is gently undulating, with several minor drainage channels with gentle slopes and shallow incised watercourses. The transmission line traverses the Millers Creek drainage system, which is a wide, low-lying, sandy area with extensive peripheral clay pans and coarse mounded grasses. Southern Section – dominated by sand ridges that characteristically lie in linear bands, which run in an east to west direction with swales occurring between the sand ridges. Woodland vegetation on sand ridges alternates with low shrubland vegetation in the swales. The understorey vegetation along the fence line between the Parakylia and Roxby Downs properties appears to have been heavily grazed.	Northern Section: 205 mAHD to 210 mAHD Southern Section: 110 mAHD to 130 mAHD

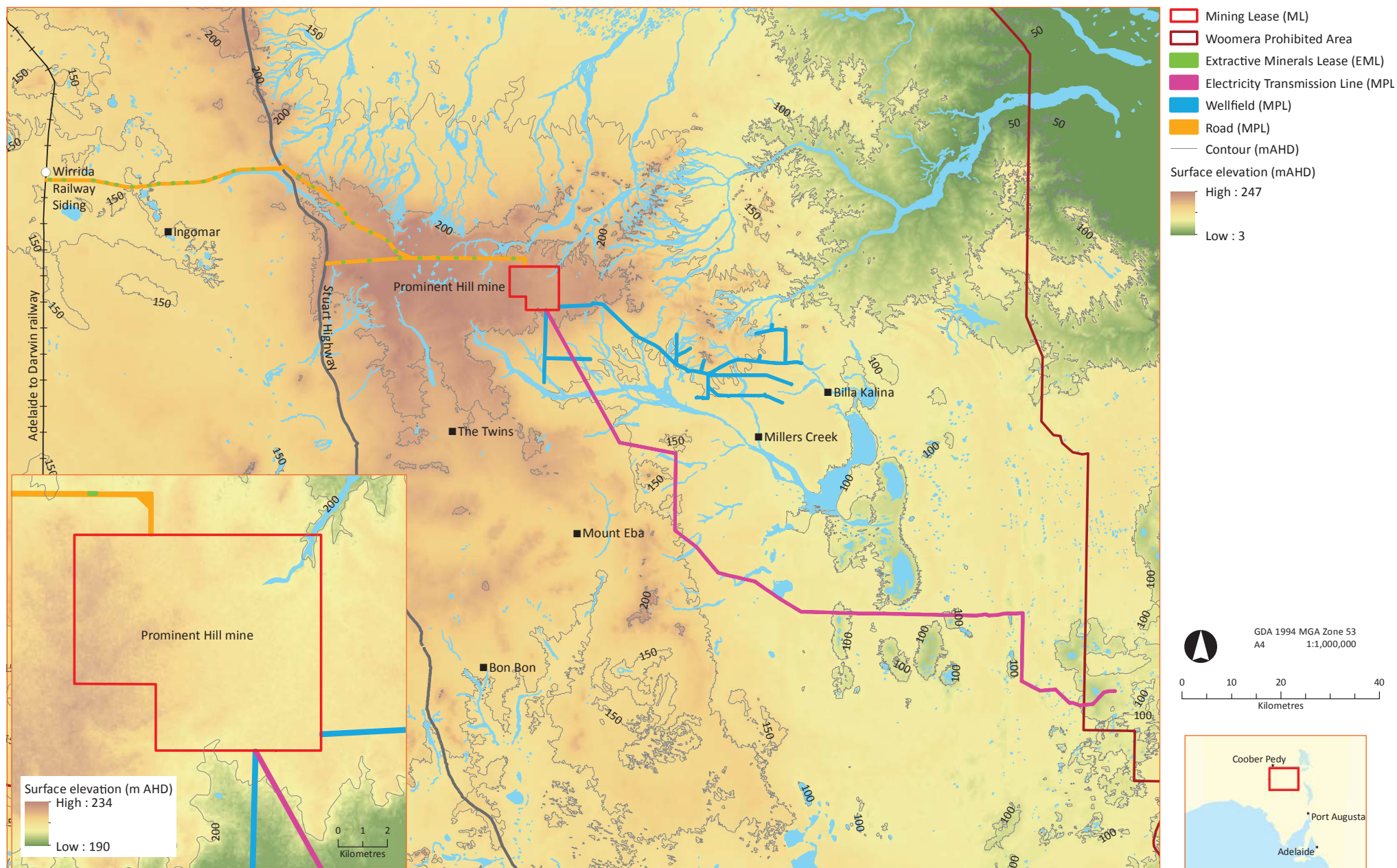


Figure 4.1 | Topography and drainage of mining lease area and surrounds

4.2 Climate

The meteorological data presented in the 2009 MARP was based on measured meteorological data collected from the Coober Pedy and Woomera Bureau of Meteorology (BoM) monitoring stations, and the outputs of meteorological modelling to predict the prevailing climate for the Prominent Hill region. In 2009, OZ Minerals installed a meteorological monitoring station adjacent to the Prominent Hill airstrip for the collection of hourly meteorological data. A summary of climate data is provided in the subsections below. Analysis of the monitoring data for the period 2010–2021 inclusive is summarised in Table 4.2.

Table 4.2 | Summary of Prominent Hill meteorology (2010-2021)

Month	Temperature ¹ (°C)		Relative humidity ² (%) ¹		Average rainfall ³ (mm)	Average evaporation ⁴ (mm) ²
	Daily maximum	Daily minimum	9 am	3 pm		
January	34.98	20.98	37.9	18.6	20.3	449.5
February	34.02	20.45	50.2	27.8	17.7	369.6
March	30.76	18.05	56.6	30.9	16.0	325.5
April	26.27	14.34	58.9	32.7	18.4	210.0
May	20.78	9.66	67.8	40.7	14.0	136.4
June	17.25	6.88	78.0	45.4	13.0	90.0
July	17.82	6.23	72.1	40.0	3.4	102.3
August	19.78	7.49	61.9	31.7	10.0	148.8
September	24.11	10.53	48.7	24.6	11.5	216.0
October	28.28	14.05	44.5	23.7	12.2	300.7
November	31.20	16.73	39.7	20.4	12.3	357.0
December	34.02	19.53	40.6	19.9	15.1	415.4
Annual					164.1	3,120.8

1 Temperature data sourced from Prominent Hill Airport: 2021 – 2023

2 Relative humidity data sourced from Cooper Pedy Airport (Station ID 016090): 2013 – 2023

3 Average rainfall data sourced from Prominent Hill Airport: 2009 – 2024

4 Average pan evaporation data sourced from Coober Pedy Airport (Station ID 016090): 2013 – 2023

4.2.1 Temperature

Maximum summer temperatures at Prominent Hill tend to exceed 35°C, with winter minimum temperatures typically being below 10°C. January is the hottest month (average maximum 34.98°C) and July the coldest (average minimum 6.23°C). The warmest daily maximum temperature recorded on-site in the last five years was 51.2°C in December 2012 and the coldest daily minimum temperature 0.6°C in July 2022. Figure 4.2 summarises the temperature trends for Prominent Hill. Temperature trends are similar to those measured at both Coober Pedy and Woomera, although temperatures at Woomera tend to be a few degrees cooler.

¹ Relative humidity data ceased logging at Prominent Hill in 2014; averages in Table 4.2 taken from closest monitoring station recording relative humidity. Woomera BoM monitoring station ID 016001 up to 2010 (1954-2010)

² Evaporation data from Woomera BoM monitoring station ID 016001 (1967–2017)

4.2.2 Relative humidity

Relative humidity levels measured at Prominent Hill are similar to those recorded at Coober Pedy and Woomera, and are higher in the mornings (9 am) than in the afternoons (3 pm). Humidity peaks in June and is lowest in January.

4.2.3 Rainfall and evaporation

Annual rainfall recorded on site averages around 164 mm, but is highly variable month-to-month and year-to-year, with a peak annual rainfall of 230 mm and a minimum of 106 mm recorded in the last seven years. The mean monthly rainfall is approximately 13.3 mm, but in the last seven years has varied between 84.2 mm and zero. The greatest daily (24-hour) rainfall event was 106.2 mm, recorded on 10 February 2020. Annual rainfall totals at Prominent Hill are described in Table 4.2. Figure 4.3 summarises mean rainfall and evaporation trends for Prominent Hill. Figure 4.4 provides annual rainfall totals at Prominent Hill since 2010.

4.2.4 Wind speed and direction

Winds recorded at Prominent Hill are predominantly from the south-to-south east (together representing around 28% of all winds), with a slightly lesser contribution from northerly winds (around 11%) (Figure 4.5). Seasonal indicates that summer and spring are dominated by south and south-eastern winds, while winter and autumn have a frequent (18%) northerly component.

The annual average wind speed recorded at Prominent Hill is 4.15 m/s, which is consistent with wind speeds and directions recorded at Woomera and Coober Pedy. Peak wind speeds exceed 15 m/s, with around 6% of hours recording calm conditions with little or no wind. Seasonally, autumn and winter record around 10% calm days with little or no wind, whereas summer and spring record only around 1% to 3% calm days. Figure 4.5 illustrates the distribution of wind speeds recorded at Prominent Hill.

4.2.5 Solar radiation

A solar radiation monitor (pyranometer) was installed and commissioned together with the other components of the site meteorological station in November 2009. It was subsequently decommissioned in January 2012. Data indicates that irradiation generally occurs between 8 am and 7 pm in summer, and 9 am and 5 pm in winter, with intensity typically peaking around 600–800 W/m² in summer and 200–400 in winter.

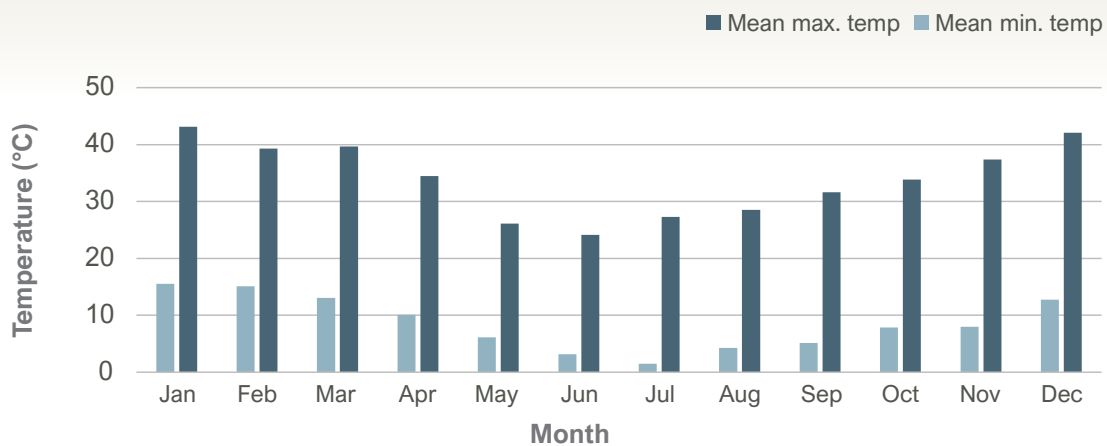


Figure 4.2 | Mean monthly temperature

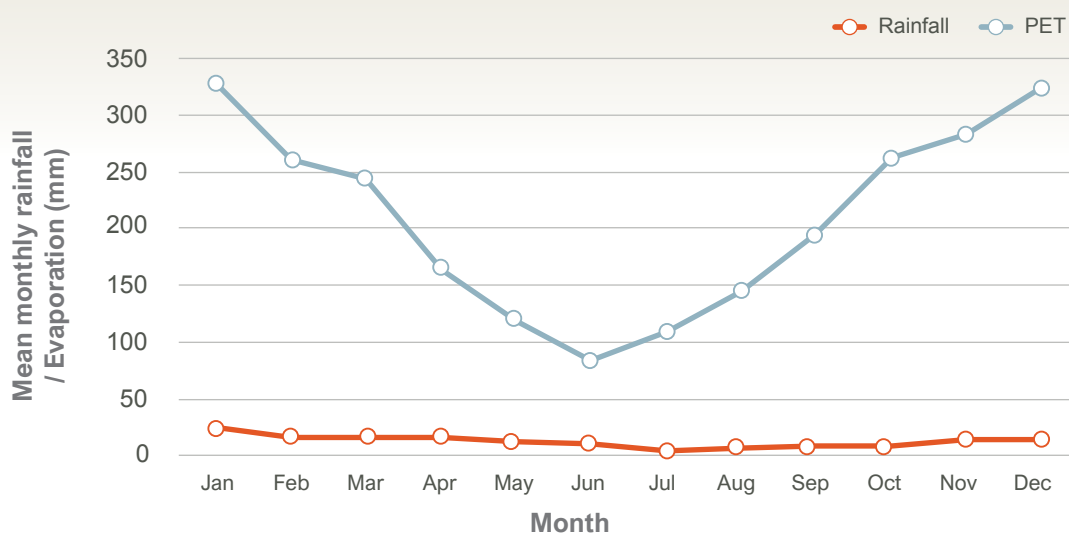


Figure 4.3 | Mean monthly rainfall and evaporation

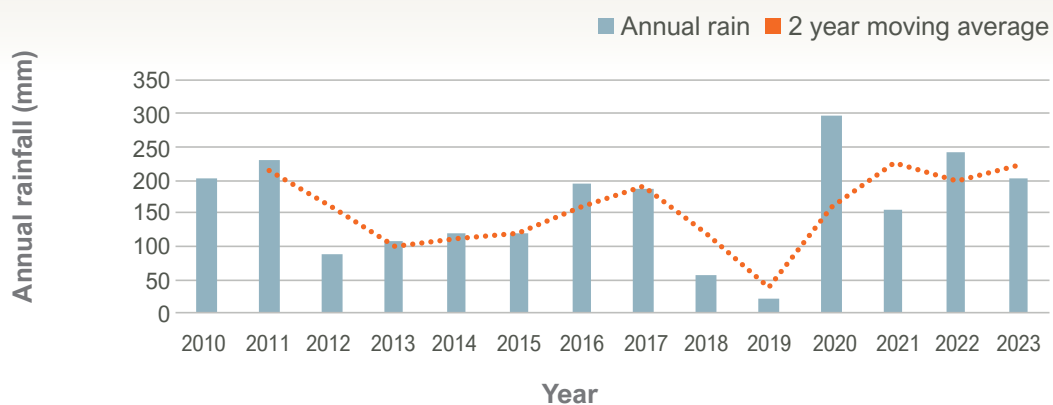
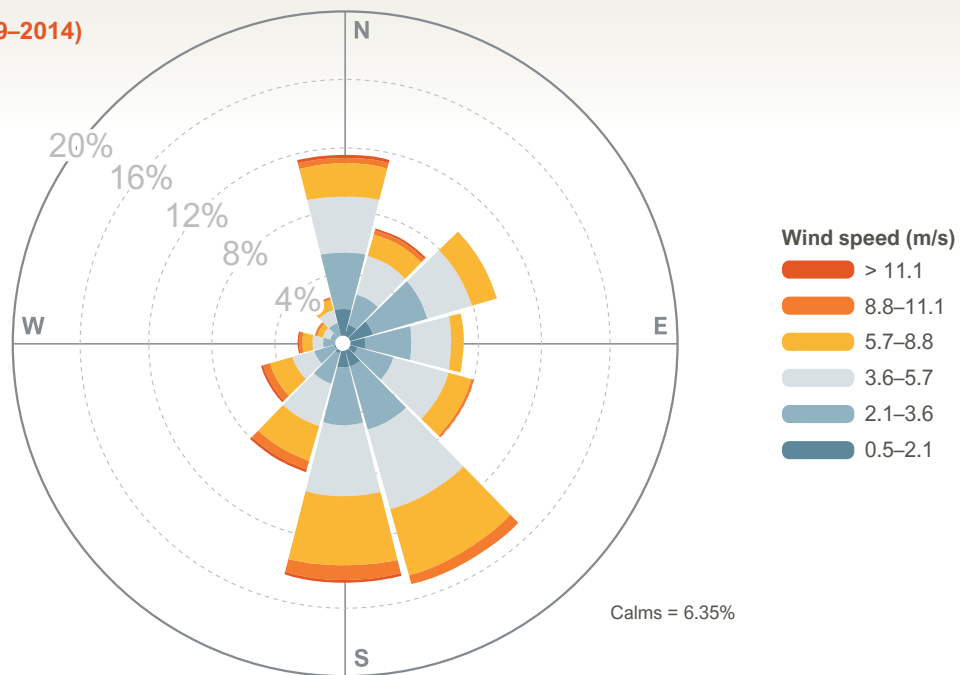
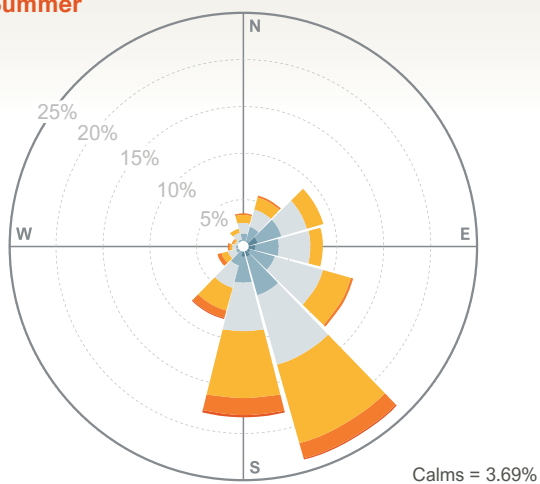


Figure 4.4 | Annual rainfall from 2010 - 2023

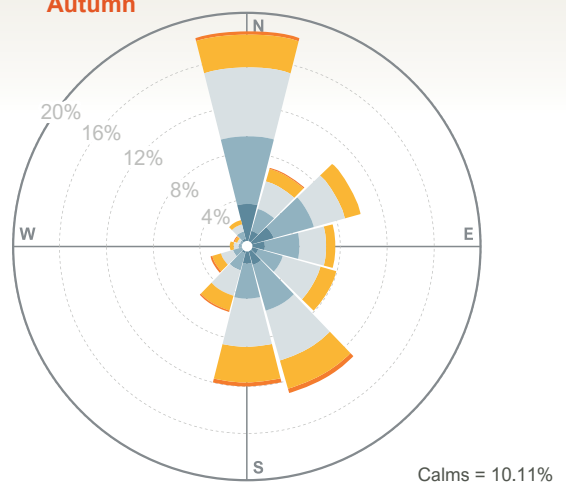
Annual (2009–2014)



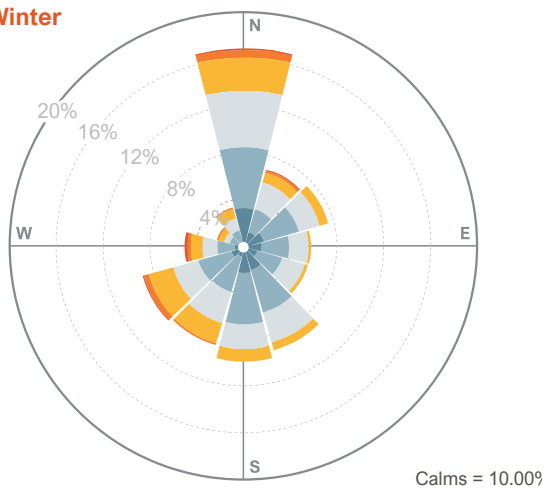
Summer



Autumn



Winter



Spring

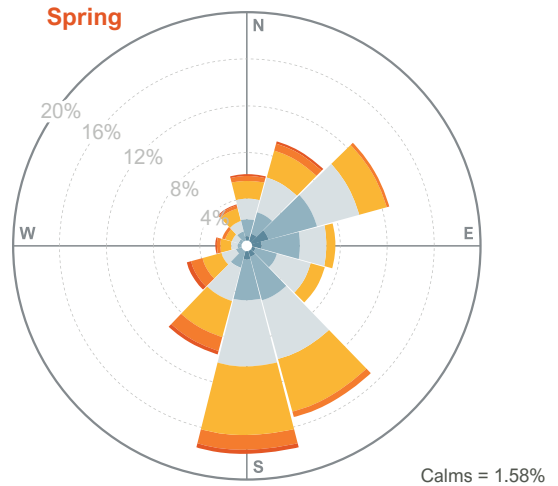


Figure 4.5 | Recorded wind speed and direction

4.3 Geology, topsoil, visual amenity and geohazards

4.3.1 Geology Summary

The deposit is located within the Mount Woods Inlier, located in the north-east of the Gawler Craton (see Figure 4.6). The Gawler Craton is Archaean to Mesoproterozoic in age (3,800 to 1,000 Ma) with an area of approximately 600,000 km², and hosts the Olympic Dam, Prominent Hill, Moonta and other smaller copper-gold deposits. Generally, rock types within the Mount Woods Inlier are metasediments and metavolcanics and include younger granitic intrusions.

The Mount Woods Inlier is covered by younger sediments of the Permian to Cretaceous Arckaringa Basin and the overlying Eromanga Basin (a subdivision of the Great Artesian Basin). The thickest sequence of Arckaringa Basin sediments is found in the Boorthanna Trough, which is the source of the raw water supplied by the Aries and Virgo Borefields.

The spatial extent of the two major geological basins (Arckaringa and Eromanga) is detailed in Figure 4.7. The table below summarises the geological units of relevance to this project.

Table 4.3 | Geological units of relevance

Geological basin and age	Geological unit	Description
Mesozoic Eromanga Basin	Bulldog shale	A grey marine mudstone (shelf mud deposit), containing silt/very fine sand intervals, as well as carbonaceous and pyritic material. The lower sequence comprises of organic shale, and thin beds of sandstone along the western margins of the Eromanga Basin.
	Cadna-owie Formation	Occurs extensively across the Eromanga Basin and represents a coastal transition between terrestrial-freshwater and marine depositional environments. The unit is typically a siltstone and very fine to fine-grained sandstone, and in parts it can be a medium to coarse-grained sandstone with minor carbonaceous clayey intervals.
Permian Arckaringa Basin	Stuart Range Formation	Conformably and sometimes unconformably overlies the Boorthanna Formation in most parts of the Arckaringa Basin, but intertongues with it in the south-western part of the Basin. The unit is typically a homogeneous grey marine claystone or shale with minor silt to fine grains of quartz sand and feldspar scattered throughout. The depositional environment for this unit was lower energy than that of the underlying Boorthanna Formation.
	Boorthanna Formation	Deposited in a marine and glacial environment and consists of an upper and lower unit. The upper unit is a marine conglomerate and sandstone, and the lower unit typically comprises boulder clays (diamictite) (Purczel 2015). The upper unit is extensive, covering all but the central Arckaringa Basin, while the lower diamictite appears to be restricted to the southern and south-eastern areas of the Basin.

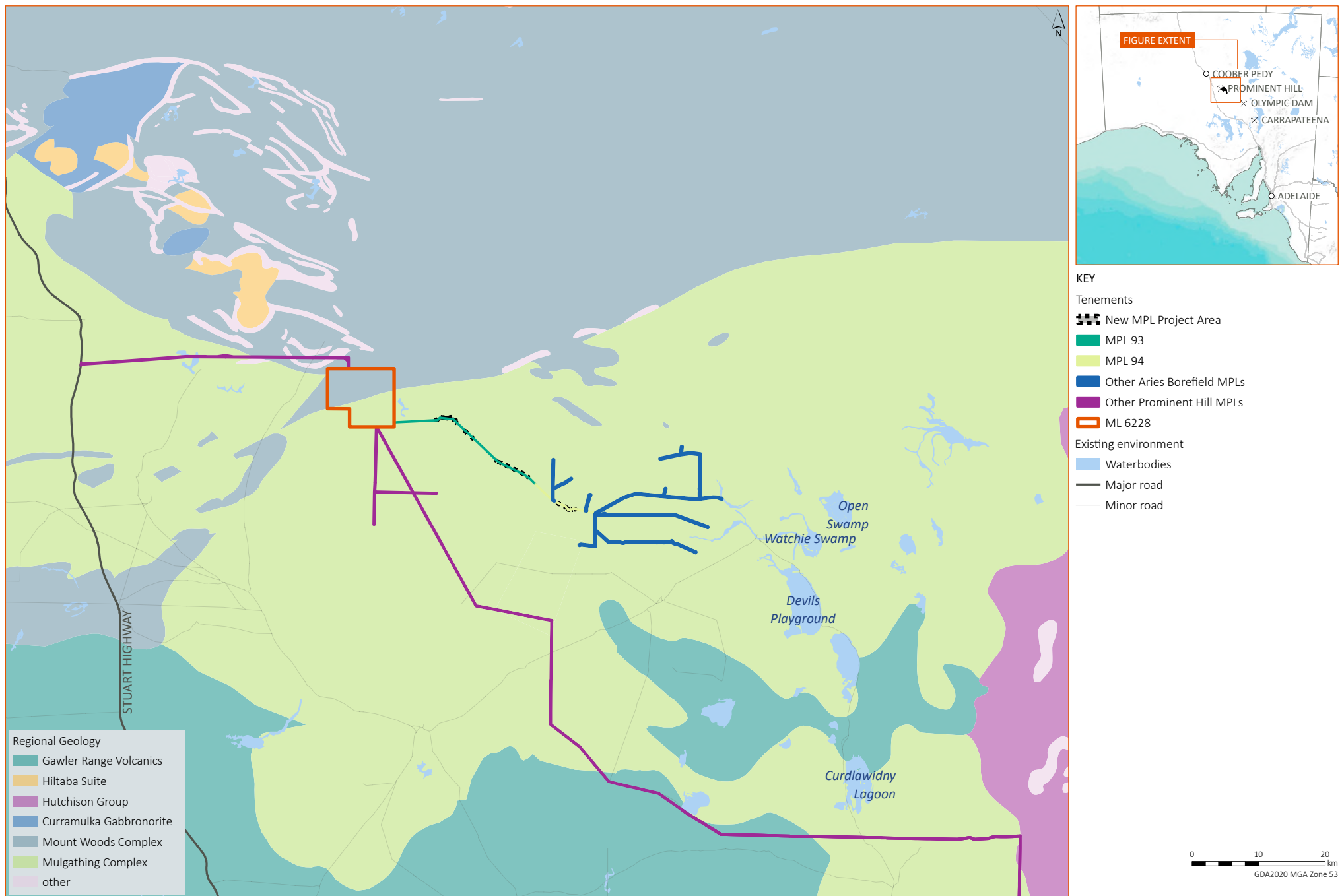


Figure 4.6 | Regional geology of the Prominent Hill area

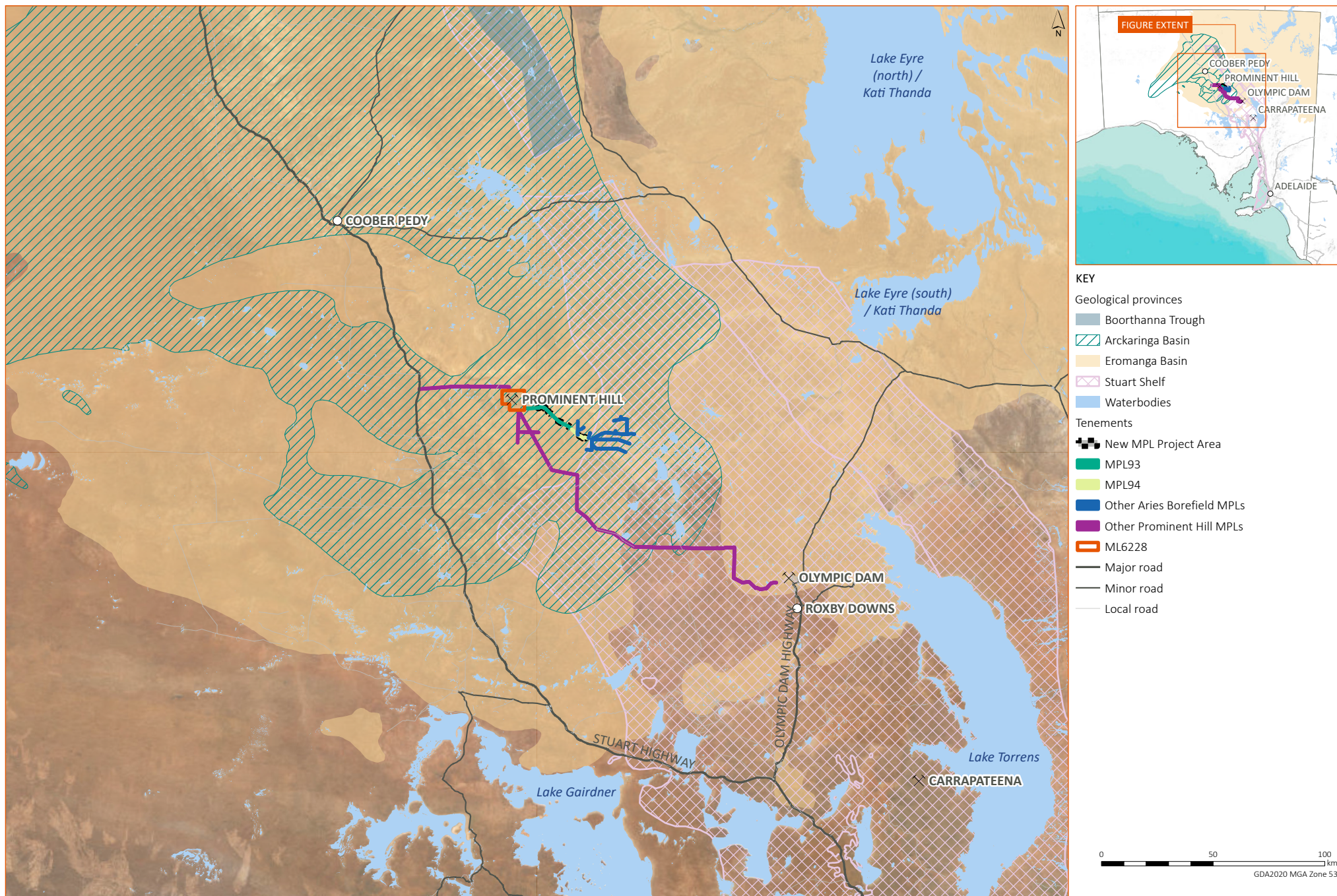


Figure 4.7 | Extent of geological basins and hydrostratigraphic units in the Prominent Hill region

4.3.2 Geological structures

Purczel (2015) describes the western portion of the Arckaringa Basin as thin, geologically simple and only moderately faulted whereas the eastern portion of the basin is more geologically complex, with structure influenced by faulting and glacial scouring (Figure 4.8). The Arckaringa Basin is bound to the east by the Peake and Denison Inlier (Davenport Range), to the south by the Gawler Ranges and Stuart Shelf and to the north and west by the Officer Basin. There are a number of depocentres that are located around basement highs (Figure 4.8). The deepest areas of the basin are within the Boorthanna Trough (where the Aries borefield has been constructed), Billa Kalina sub-basin, Penrhyn Trough, Phillipson Trough, Willira Trough and West Trough.

Geological structures, including the Billa Kalina Fault system, have been mapped in the Prominent Hill mine area and are presented in Figure 4.9. These faults are not thought to extend into the Eromanga Basin.

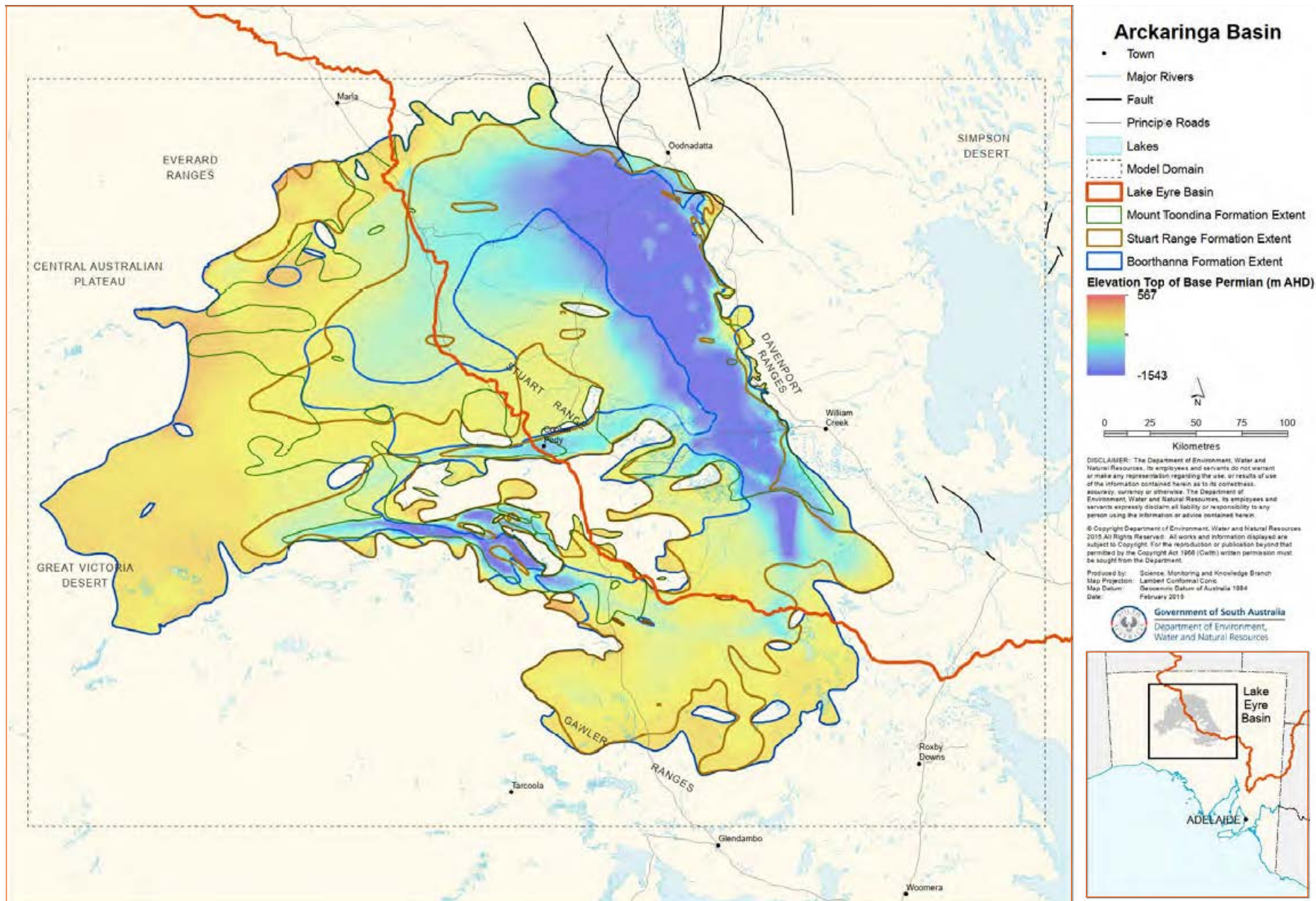


Figure 4.8 | Extent of the Arckaringa Basin

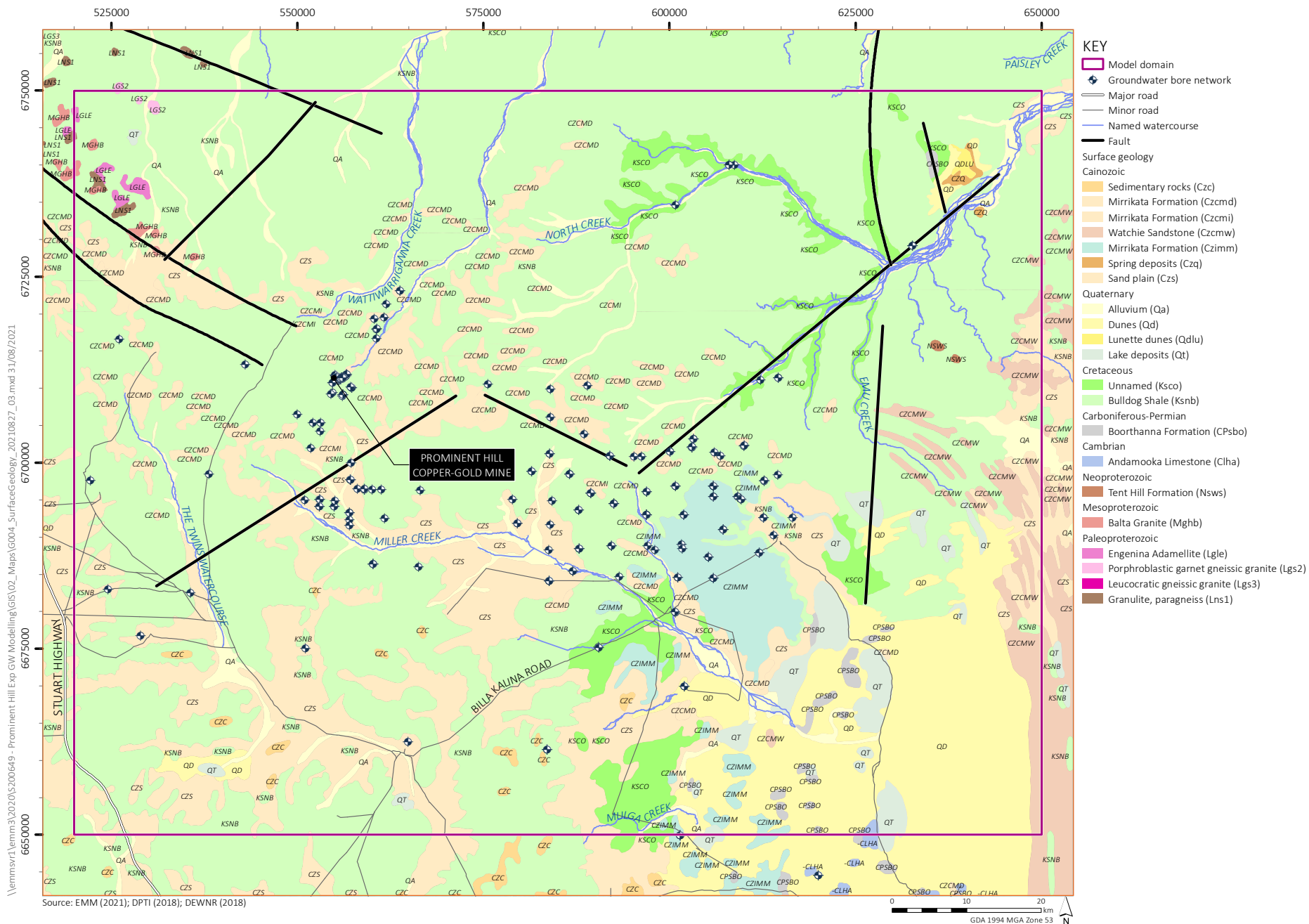


Figure 4.9 | Surface geology and faults

4.3.3 Soil summary

Soils in the broad Project Area are calcareous earths and duplex soils typical of arid climate. They include ironstone gravel spreads on alluvium and colluvium, and mudstone with fine-grained sandstone intervals (i.e. Bulldog Shale). Soil profiles include dry silty sandy gravel, sandy gravelly clay and sandy clay to depths of between 0.4 to 1.0 m. Some of the materials encountered during field assessments were cemented. Topsoil depth was generally up to 0.10 m. Soils are deficient in essential mineral nutrient content due to the very slow rates of erosion of parent rock and the leaching effect of flooding and rainwater in and on the soil.

Drainage lines are characterised by fluvial clays, silts and sands. Soils north-east of the Mining Lease are sandy with fine to coarse-grained clasts of silcrete, and reworked Bulldog Shale. This soil unit is known as the Danae Conglomerate Member. Extensive silcrete capping is also a feature in the north-east of the Project Area. These soil types are typical of the deep sands and crusty red duplex soils of the interior of South Australia, in which biological and chemical processes are minimal, thereby giving rise to nutrient-poor soils. Soils along the transmission line route, including the southern section, are deep to shallow alkaline red duplex soils and calcareous earths.

Soil distribution for the project area is represented in Figure 4.10.

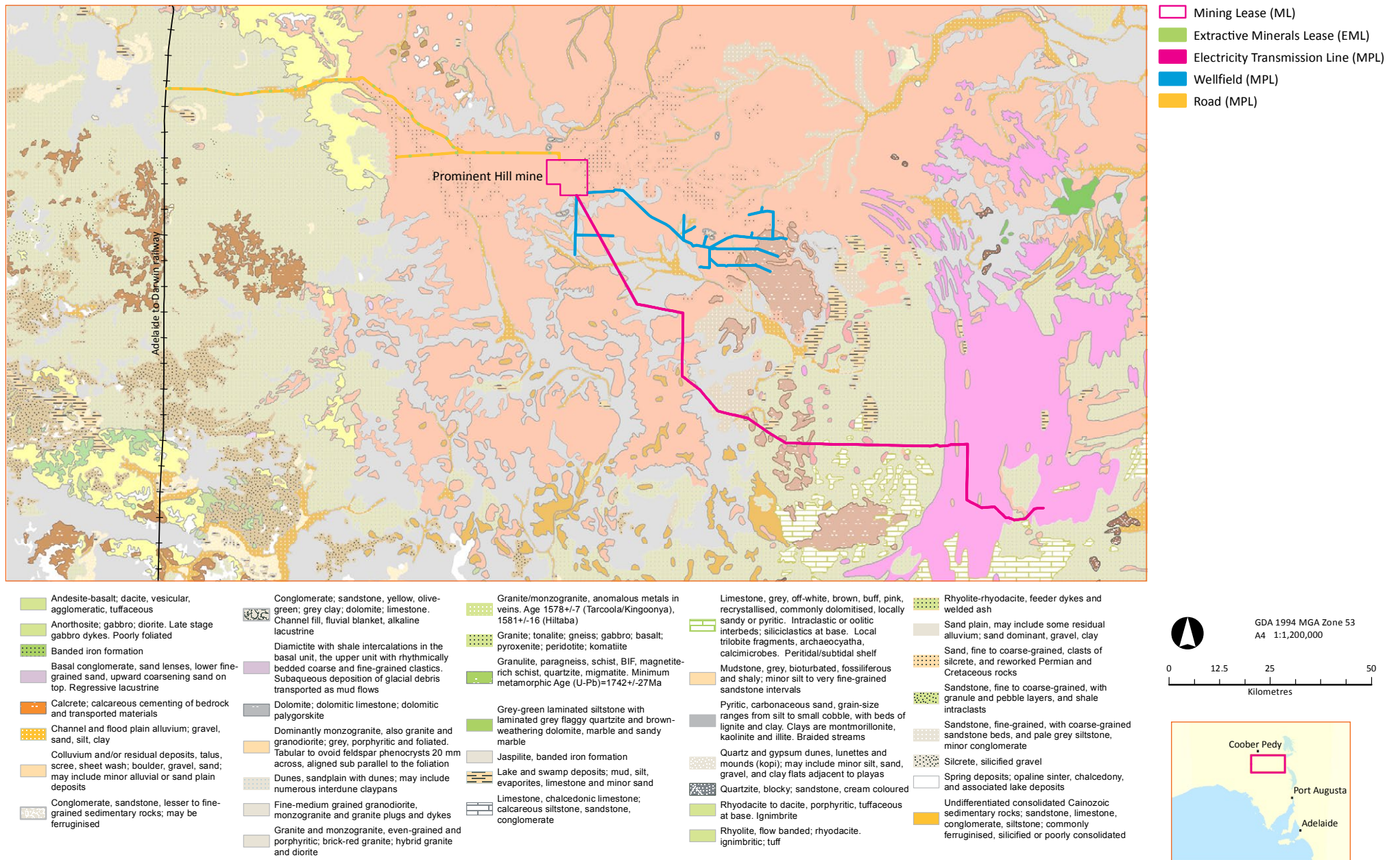


Figure 4.10 | Soil distribution of the Prominent Hill project area

4.3.4 Visual amenity

The main landscape values relate to the region's relatively undisturbed plains, remoteness and scenic attraction of the nearby Breakaway land system. The area is sparsely inhabited and distant from recognised tourist attractions. However, occasional outback travellers and local residents may enjoy the landscape. The site is at least 35 km from the nearest house and not visible from any inhabited residences.

4.3.5 Contamination

Excluding grazing impacts and grazing related infrastructure such as tracks and fences, the site is undisturbed. There are no identified potential sources of contamination and given the historical land uses, there is very low potential for existing soil or groundwater contamination in the area.

4.3.6 Geohazards

Geoscience Australia publishes an acceleration coefficient of between 0.05 and 0.10 gravity. The published risks represent a 10% chance of exceedance in 50 years, reflecting the low frequency of significant seismic events that have been recorded. This compares with the published acceleration coefficients (Australian Standard, AS 1170.4) for Adelaide and Melbourne of 0.10 and 0.08 gravity, respectively.

The nearest recorded earthquake was in 1948. It had with a Richter magnitude of 4.5 and was located over 500 km north-east of the Project Area. There are no recorded landslips within the vicinity of the Project Area.

4.4 Groundwater

Groundwater within the Project Area is summarised in the following sections.

4.4.1 Groundwater overview

4.4.1.1 Hydrogeology

The hydrogeological understanding of the Prominent Hill Project Area has been informed by numerous groundwater investigations since 2005 and the operation of the Aries (and previously Virgo) borefields. In the context of the PEPR, the Prominent Hill hydrological Project Area is defined by the numerical model boundary as detailed in Figure 4.11.

The Project Area is made up of two basins; the Eromanga and the underlying Arkaringa (Figure 4.7). The Eromanga Basin is broken up into artesian and non-artesian areas, of which the non-artesian Eromanga aquifer includes the Cadna-owie Formation. The aquifer of most relevance to the Project is the Boorthanna Formation within the Arkaringa Basin. The aquifers in the Prominent Hill Project Area, and south-east toward the Stuart Shelf, are a subset of four important hydrostratigraphic units which are described below.

The extent of the basins and hydrostratigraphic units are displayed in Figure 4.7. Table 4.4 outlines detail on the hydrostratigraphic units of the Project Area.

Table 4.4 | Summary of hydrostratigraphic units in the Project Area

Hydrostratigraphic unit	Type	Description
Bulldog Shale	Aquitard	- Typically unsaturated. - Of hydraulic importance in the TSF area, where seepage from the TSF as caused mounding of the watertable and saturation of the Bulldog Shale.
Cadna-owie Formation	Aquifer	- Primary source of pastoral groundwater supplies in the area. - Unsaturated in the mine and Virgo borefield areas and very thin or absent over the orebody. Partially saturated in the Aries borefield area. - Artesian conditions are observed east of the study area. - Referred to as the J-K aquifer by Purczel (2015). - Also referred to as the non-artesian Eromanga aquifer
Stuart Range Formation	Aquitard	Provides hydraulic separation between the overlying Cadna-owie Formation and the underlying Boorthanna Formation.
Boorthanna Formation (upper and lower)	Aquifer	- Targeted for Prominent Hill mine raw water supply. Not widely used for pastoral water supplies due to high salinity and burial depth. - Very thin or absent over the orebody.

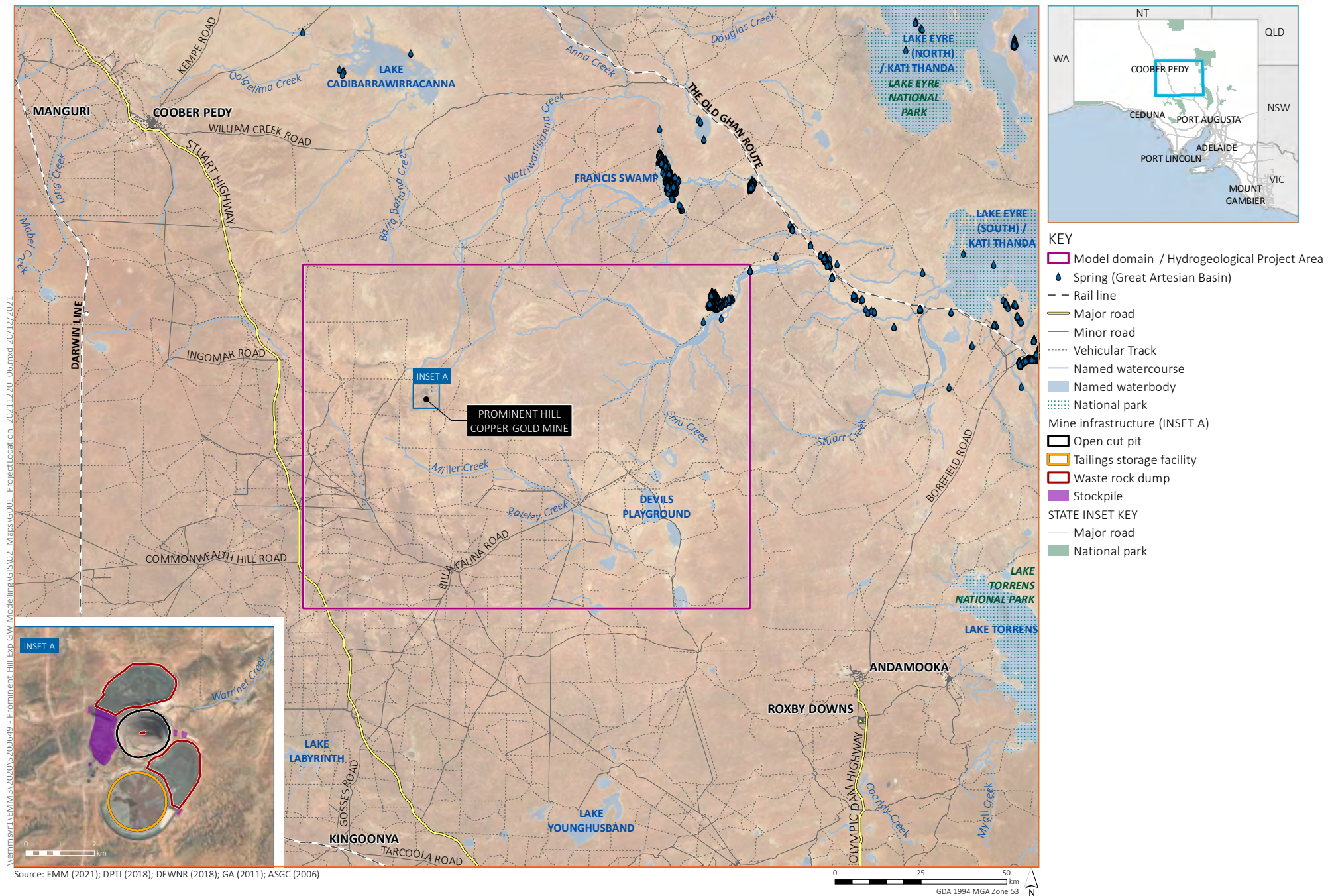


Figure 4.11 | Hydrological project area

4.4.1.2 Hydraulic properties

Estimates of hydraulic properties (hydraulic conductivity, K , and storage parameters (as specific storage, S_s , or specific yield, S_y)) have been derived from analysis of aquifer tests and operation of the borefield(s). Hydraulic properties from a collection of reference literature, on-site testing and numerical models completed in the area are collated in Table 2.3 of Appendix E.

4.4.1.3 Groundwater levels and flow

SKM (2009a) inferred the pre-mining groundwater elevations and flow directions in the Eromanga Basin and Arckaringa Basin. These are reproduced with some minor updates in Figure 4.12 and Figure 4.13 respectively, and show:

- Eromanga Basin: groundwater flow direction is broadly from west to east/north-east.
- Arckaringa Basin: groundwater flow direction is also generally from west to east, with a groundwater high inferred in the Prominent Hill mine area. SKM (2009a) inferred groundwater flow diverging in the Aries borefield area, with a groundwater flow component towards the north-east (consistent with the overlying non-artesian Eromanga aquifer) and another component in a south-easterly direction towards the Stuart Shelf.

Generally, there is a downward hydraulic gradient from the overlying Cadna-owie Formation to the Boorthanna Formation. In the north-east corner of the Project Area the Bulldog Shale, which acts as a confining unit further to the east, thins and pinches out. This allows artesian groundwater in the Cadna-owie Formation flowing from the north-east to discharge to ground surface at the GAB springs.

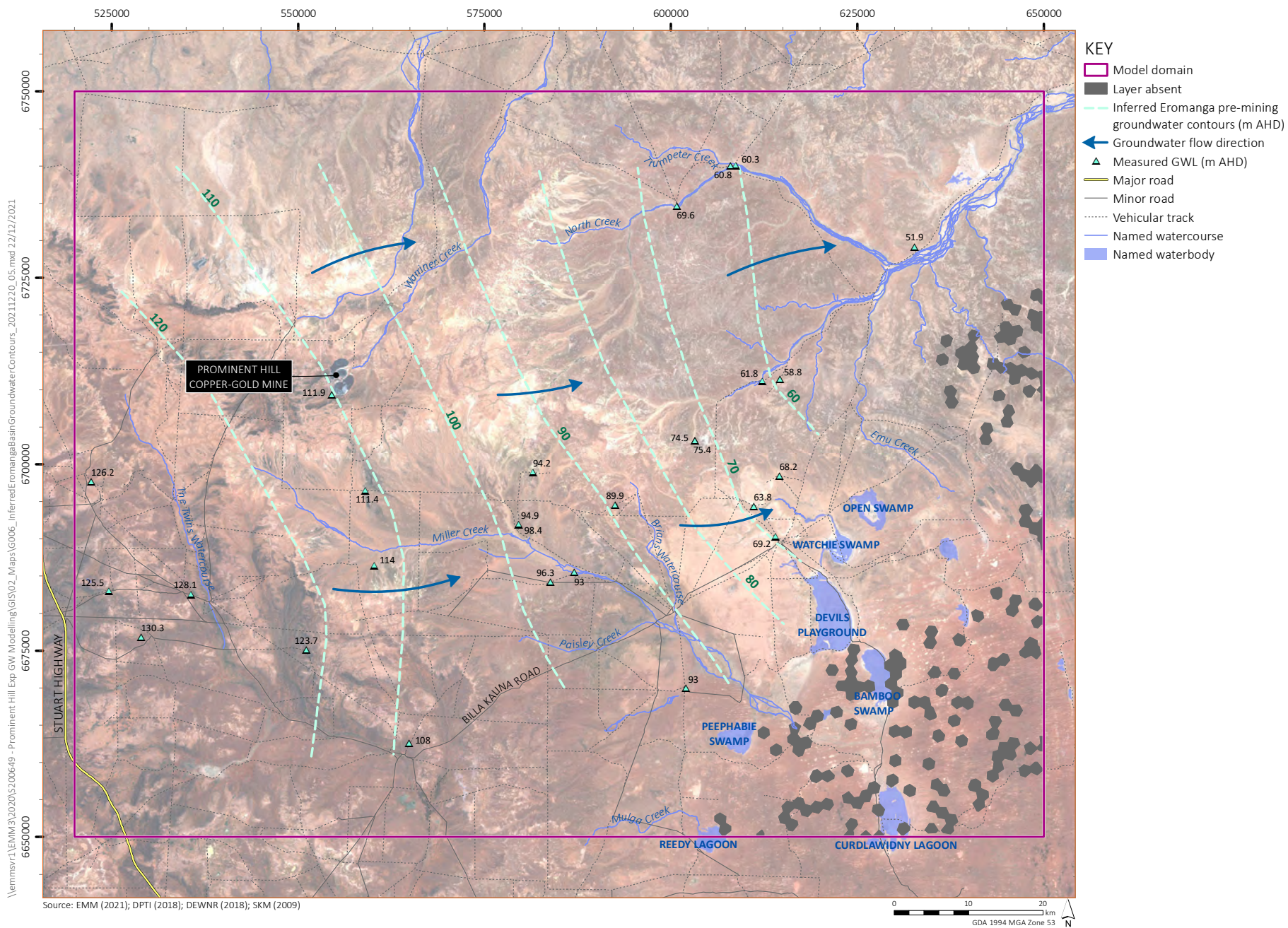


Figure 4.12 | Inferred Eromanga pre-mining groundwater contours

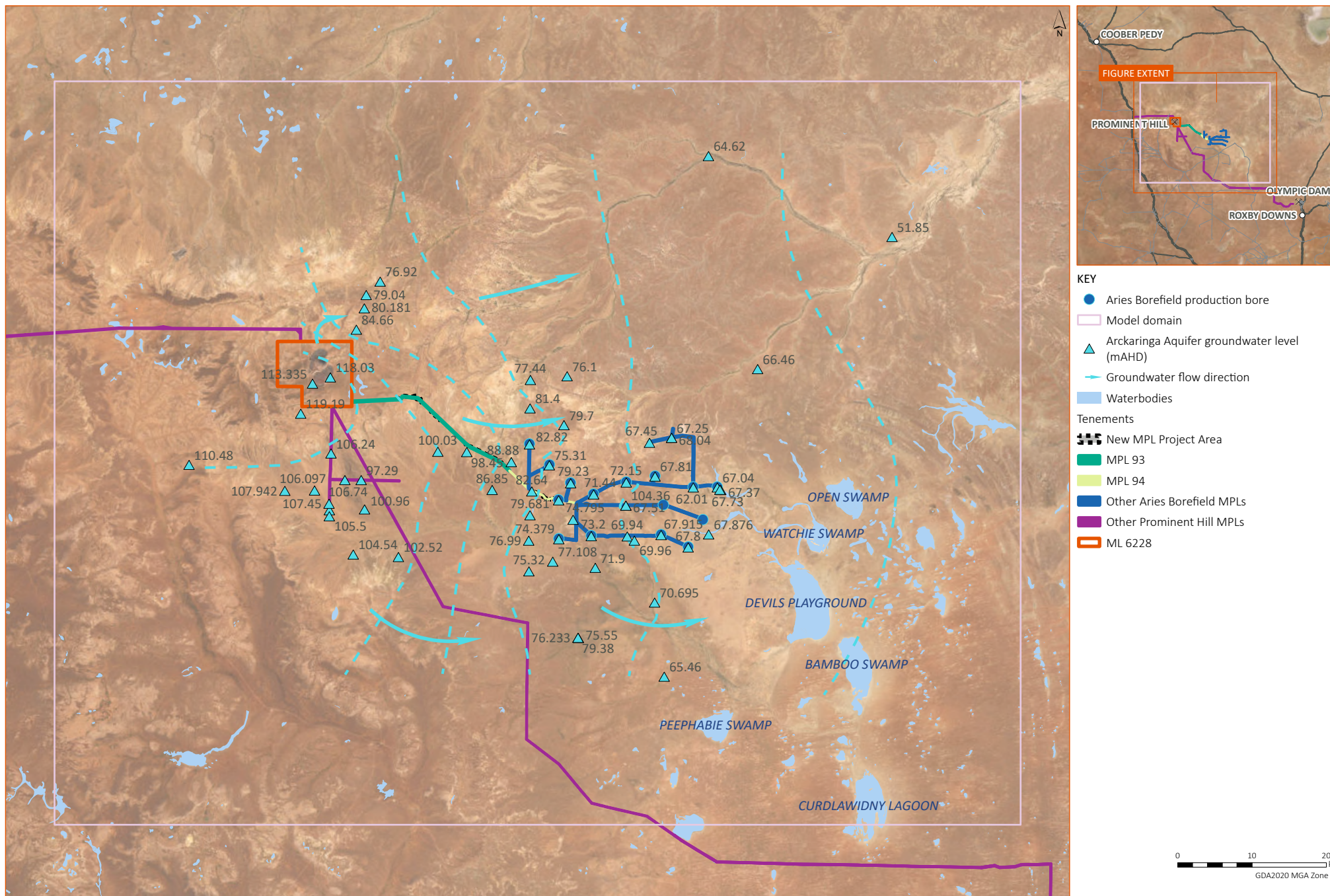


Figure 4.13 | Inferred Arckaringa pre-mining groundwater contours

4.4.1.4 Recharge and discharge

The following provides a brief summary of recharge and discharge processes of the Cadna-owie Formation and Boorthanna Formation:

- Cadna-owie Formation: Recharge is inferred to occur in the south and south-west of the Project Area, along creek lines and freshwater swamps near Millers Creek. Groundwater discharge is inferred to occur via upward leakage to salt pans and salinas in the east. Localised groundwater discharge also occurs via pumping from pastoral bores/pumping bores.
- Boorthanna Formation: Recharge is inferred to mainly occur west of Project Area. Minor/localised recharge is inferred to occur where the Boorthanna Formation is closer to ground surface and where the Stuart Range Formation is thin or absent (e.g., Millers Creek area). Purczel (2015) also reports infiltration of rainfall in higher elevation areas (e.g., along the Davenport Ranges) as a recharge source to Permian aquifers. Regional groundwater discharge is inferred to occur to the Stuart Shelf aquifers in the south-east. Groundwater discharge is also inferred at salt pans and salinas via upward leakage through the Eromanga Basin units. Localised groundwater discharge also occurs via pumping from mine water supply and pastoral bores.

SKM (2009a) and ELA (2017d) infer the GAB springs in the north-east of the model domain are mainly driven by groundwater flow from the wider artesian Eromanga (GAB) aquifers (from the north-east) rather than the non-artesian Eromanga aquifer.

4.4.1.5 Great Artesian Basin

Since the inception of the project, research regarding the artesian Eromanga (GAB) Aquifer has been undertaken, in particular hydrochemical characterisation and connectivity in relation to the Arckaringa Basin (Boorthanna) and the overlying GAB sequence (Eromanga) was undertaken by DEWNR (now the Department for Environment and Water (DEW)) technical reports (2015a) and (2015b). These summarise:

- There is a low degree of connectivity between the Arckaringa basin and overlying J-K GAB aquifer (Eromanga). It was determined that flow (flux) through the aquitard (Stuart Range Formation) is small, in the order of millimetres per 1000 years. While it was mainly found to be a lack of connectivity between the two for the majority of assessed locations; evidence from hydraulics and hydrochemistry does suggest localised connectivity between the Boorthanna Formation and the J-K GAB aquifer does occur due to secondary permeability in the Stuart Range Formation.
- Interpretation of hydrochemical data suggested that a major influence in the shallow aquifer systems is recharge from surface water as well as evaporation associated with shallow water tables. Groundwater recharge from surface water is believed to be associated with infiltration along the drainage channels and other points of surface water collections. Where the GAB aquifer is unsaturated, this water provides localised recharge to underlying aquifers. It is possible to distinguish two broad hydrostratigraphic units being the shallow GAB aquifer and deeper Boorthanna Formation/ crystalline baseline based on isotopic data.

4.4.1.6 Conceptual hydrogeological model

Figure 4.14 presents a graphical representation of the conceptual hydrogeological model, originally developed by SKM (2009a), which describes the main processes outlined in this table. The conceptual model shows the basement high in the vicinity of the mine, vertically expansive Boorthanna Formation to the south and east, and the edge of the Arckaringa Basin in the east. Groundwater flow is primarily towards the east, with downward hydraulic gradients resulting from diffuse surficial recharge. Upward gradients exist from the artesian Eromanga Basin in the east, with discharge to surface at localised GAB springs where the confining Bulldog Shale thins and pinches out.

Please note that Figure 4.14 displays faulting as reaching the surface. Whilst faults, which have caused displacement of the Arckaringa Basin, may contribute to variability in the presence and thickness of units within the Eromanga Basin, it is thought that the faults themselves do not extend upwards into the Eromanga Basin.

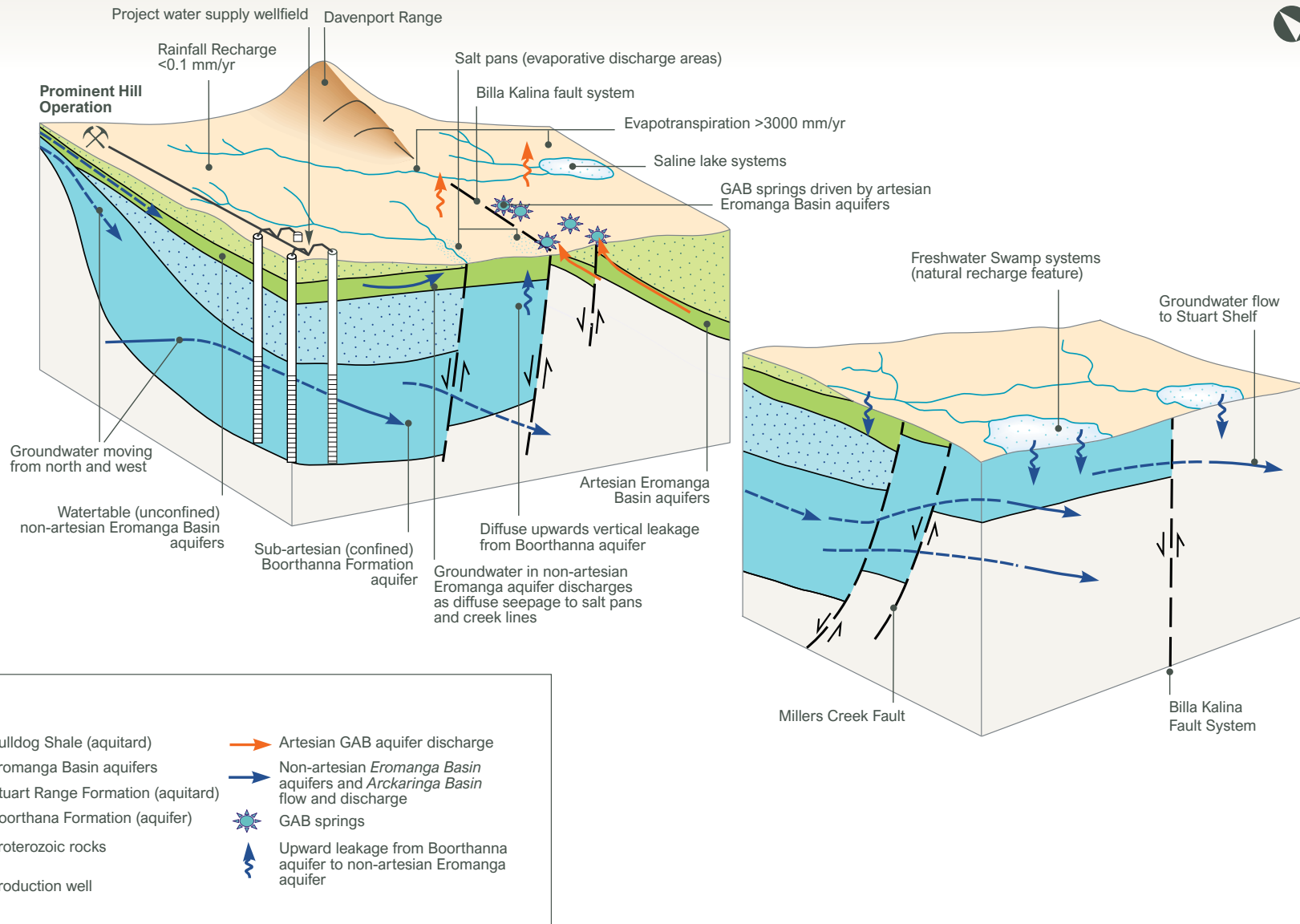


Figure 4.14 | Conceptual hydrogeological model

4.4.1.7 Fractured basement rock aquifers

Groundwater supplies in fractured rock aquifers can be obtained from a number of vastly different geological settings, including indurated sediments, metamorphics, volcanics and intrusive igneous rocks. Little information is available regarding the water supply potential of fractured rock aquifers in the Project Area, although there is some evidence that low-salinity fractured rock aquifers exist close to the Project Area.

These were considered unviable to provide supplies for mine operations. Variable quantities of water have been encountered in some mineral exploration drill holes intersecting the Proterozoic-aged host rock and deposit at Prominent Hill. These holes have encountered water from fractured metasediment and volcanic basement rock at depths ranging from 110 to 200 m. The salinity of this groundwater is quite low (less than 10,000 mg/L (TDS)).

4.4.1.8 Paleochannels

The Western Australia South Australia Northern Territory Palaeovalley Map data was reviewed in context of the mine site and associated tenement boundaries to determine the proximity of palaeochannel aquifers to the Project Area. This indicates that the Garford and Kingoonya paleochannels extend to about 60 km west and south of the proposed mine site (in the vicinity of Ingomar and Bon stations). Warriner Creek and Giddi-Giddinna palaeochannels are located approximately 100 km east and north of the Project Area.

4.4.2 Groundwater users

Groundwater is the main water source sustaining a range of activities throughout the Far North of South Australia and users are summarised in the following sections.

4.4.2.1 Far north region

Groundwater is the main water source sustaining a range of activities throughout the Far North of South Australia and is critical to the health of groundwater dependent ecological communities where they occur and the viability of the pastoral, mining, energy and tourist industries in the region.

In March 2003, the Far North Prescribed Wells Area (FNPWA) was prescribed under the *Water Resources Act 1997*. The Project Area is within the FNPWA. A Water Allocation Plan (WAP) for the FNPWA was released by the South Australian Arid Lands Natural Resources Management Board (SAALNRMB) in February 2009. The objective of the WAP is to achieve an equitable balance between the groundwater needs of community, industry and environment. Groundwater users in the vicinity of the Project Area are described below.

As a result of the introduction of the *Landscape South Australia Act 2019*, the WAP was updated in February 2021 by what the South Australian Arid Lands Landscape Board (SAALLB). Holistically, the WAP aims to achieve:

- security of access to water for current and future users
- ensures that the taking of water for licensed purposes is undertaken in a manner that provides for the long-term viability of the water resource
- supports the water interests and access to Aboriginal people while recognising and incorporating traditional knowledge in water management

- ensures the placement of a well will not damage, disturb or interfere with any sites of cultural significance
- authorise the taking of water, for equitable economic and social development within resource management limits and sustainable environmental limits
- the authorised taking of water does not unacceptably impact upon the ability of current licence holders to access groundwater, other water resources and GAB springs and refuge non-spring groundwater dependent ecosystems.

4.4.2.2 Community

The township of Coober Pedy, approximately 100 km to the north-west of the Project Area, uses about 0.64 ML/day of groundwater, which is desalinated for potable use. Several permanent Aboriginal communities (i.e., Indulkana, Mimili, Fregon and Oak Valley), located approximately 300 to 400 km to the north-west and west of the Project Area, rely on groundwater as the sole source of potable water supply. Aboriginal people also have important cultural ties to the GAB springs occurring along the western margin of the artesian Eromanga Basin.

4.4.2.3 Pastoral industry

Stock and domestic water supplies for local pastoral properties are mostly supported by groundwater drawn from the non-artesian Eromanga Aquifer. However, to the east and south of the Project Area some stock supplies are drawn from shallower intersections of the Boorthanna Formation aquifer. Fractured rock aquifers are also likely to provide water for these uses.

4.4.2.4 Mineral and petroleum industries

Mineral exploration licences and petroleum production licence applications are held by a number of companies on tenements in the vicinity of the Project Area. Water for exploratory drilling operations and camp supplies is typically sourced from existing groundwater supplies through negotiation with landholders or from exploration holes.

Mine water demand for future projects in the region may be met by use of the Boorthanna Formation aquifer. However existing users comprise of BHP's Olympic Dam Mine, located approximately 150 km southeast of the Project. Water extraction for this mine is approximately 36 ML/d from the GAB. Peculiar Knob is located approximately 30 km from the Project and requires up to 1.25 ML/d of non-potable water for mining operations (Peak Iron Mines, 2020).

4.4.2.5 Environment

Artesian groundwater is the water source for the GAB springs, which support a diversity of endemic flora and fauna, i.e., groundwater dependent ecosystems. Hydrogeological and hydrogeochemical data shows that the GAB springs are fed entirely by the artesian Eromanga (GAB) Aquifer groundwater moving from the east, and not from either the non-artesian Eromanga Aquifer or Boorthanna Formation waters.

Reviewing the Bureau of Meteorology Groundwater Dependent Ecosystems (GDE) Atlas, GDEs are referred to as falling into three categories, being:

- Aquatic – ecosystems that rely on the surface expression of groundwater
- Terrestrial – ecosystems that rely on the subsurface presence of groundwater

- Subterranean – ecosystems that includes cave and aquifer ecosystems

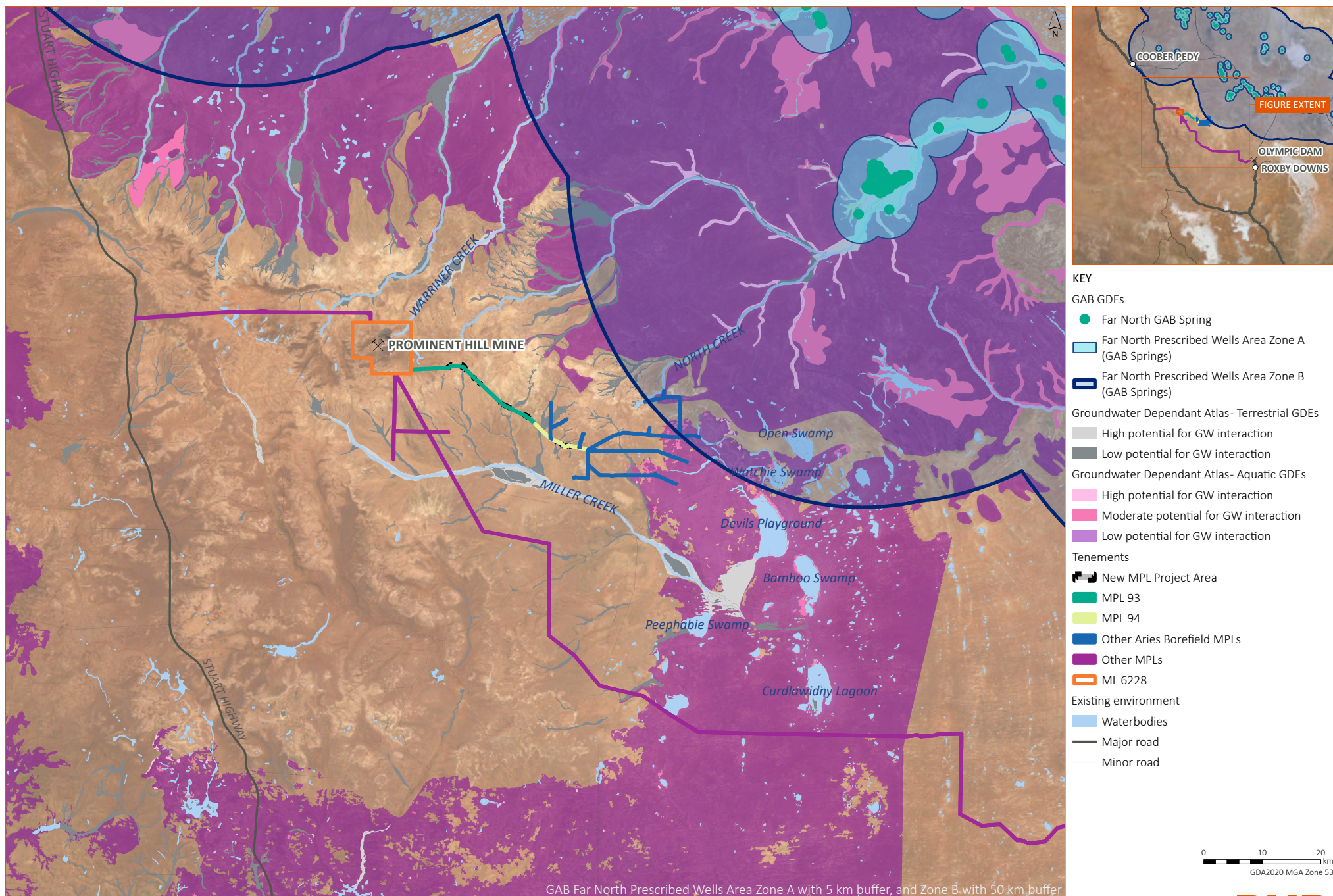
The Atlas indicates that the closest known aquatic GDE spring fed wetland (sourced from regional studies) is located approximately 97 km from the Project and 70 km from the borefield (Figure 4.15). These are referred to as the Billa Kalina Springs Wetland.

- As per the WAP, GDEs are identified as either: ‘Springs’ that depend on the GAB or other aquifers
- ‘Non-spring GDEs’ which are GDEs that are not springs but which have been identified by the WAP to be features or locations within the landscape which have a high probability of groundwater connection in the FNPWA.

The WAP defines buffer areas as Zone A (formerly referred to as the exclusion zone) which is a 5 km buffer around the FNPWA GAB Springs and Zone B (which replaces the formerly referred South West Spring Zone) is a 45 km buffer around the FNPWA Zone A. The boundary of Zone B is approximately 40 km north-east of the Project (Figure 4.15).

The WAP goes on to specify, that while non-springs GDEs exist in many places within the FNPWA, there are locations where it is considered likely that the taking of shallow groundwater in close proximity to these features has the potential to impact upon the GDEs. In reference to Figure 4.15, there are no identified GDEs in close proximity to the Project. The closest proximity of GAB Springs is a cluster on Billa Kalina Station, to the south west of William Creek.

To protect GAB springs, the WAP proposes that there be no new wells established in the Cadna-owie Sandstone/ Algebuckina Sandstone aquifer within a 5 km radius (Zone A) of any GAB spring (SAALLB, 2021). It proposes that any wells established outside this 5 km boundary should not cause a cumulative drawdown in the Cadna-owie Sandstone/ Algebuckina Sandstone aquifer in excess of 0.5 m at the Zone A boundary. New water allocation cannot be issued unless it can be proved that the drawdown limitation of 0.5 m at the boundary of Zone A will not be exceeded.



4.4.3 Progression of understanding

Since the MARP 2009 a significant monitoring program and scientific studies have been undertaken to further understand the complex hydrogeology of the Prominent Hill region. The following section outlines the advancement of our understanding of the environment since that time.

4.4.3.1 Groundwater response to mine development

The response of groundwater within close proximity to the mining operations and regionally is summarised in the following sections.

Water levels and flows (current)

Measured groundwater levels at January 2020 show effects from mining activities, with mounding in the Eromanga Basin from tailings seepage and drawdown in the Arckaringa Basin from groundwater abstraction. Conceptual contours of groundwater elevations at January 2020 are presented in Figure 4.16 and Figure 4.18 and show:

- Eromanga Basin: groundwater is largely unimpacted, with a localised mound in the vicinity of the TSF.
- Arckaringa Basin: a large area of drawdown is evident across the area of the Aries borefield, inducing inward radial groundwater flow from the surrounding aquifer (this will be discussed further in Section 4.4.3.2).

Predicted drawdown

Modelled drawdown and mounding contours in the Cadna-owie Formation, the Upper Boorthanna Formation and the Lower Boorthanna Formation at the end of the life of mine (as detailed in the PEPR) is presented in Figure 4.17, Figure 4.19 and Figure 4.20.

For more information on predictive groundwater drawdown from mining please refer to Appendix E.

Particle tracking

The following is taken from recent groundwater modelling undertaken by EMM (2021) (Appendix E).

Tailings seepage was simulated to directly recharge the Bulldog Shale, which is modelled with a very low vertical hydraulic conductivity. This results in a perched groundwater system which exists above the regional watertable hosted within the Boorthanna Formation. The Cadna-owie Formation is present at the mine site but is modelled to be dry throughout. Any water lost from the TSF to the groundwater is thus anticipated to primarily flow laterally away from the TSF.

Particle tracking was employed to simulate potential migration of seepage originating from the TSF. Results of particle tracking for the 12 ML/d abstraction scenario are presented in Figure 4.21. Particles were released at the watertable in January 2021 and tracked to the end of model simulation (1,000 years post-mining). Modelled particle tracks are coloured by hydrostratigraphic unit).

The majority of predicted tailings seepage remains in the Bulldog Shale for the duration of the model, showing minimal downward flow into deeper hydrostratigraphic units. Particles are simulated to either be captured by the open cut pit or migrate very slowly away from the TSF towards the east along the prevailing regional groundwater gradient. Over the 1,000-year simulation period, the seepage only

extends 8 km from the TSF. The particles that are not captured by the open cut pit are not expected to enter the regional groundwater system, as they primarily remain perched within the Bulldog Shale through to the end of simulation. At the end of the 1,000-year simulation, water from the TSF remains at least 10 km from the nearest pastoral bore and in the perched system above the regional water table.

Pit lake formation

Following mining, the open cut is predicted to behave as a groundwater sink, with no permanent pit lake predicted to form with evaporation removing modelled incident rainfall and minor groundwater inflows. For more information, please refer to EMM (2021), Appendix E.

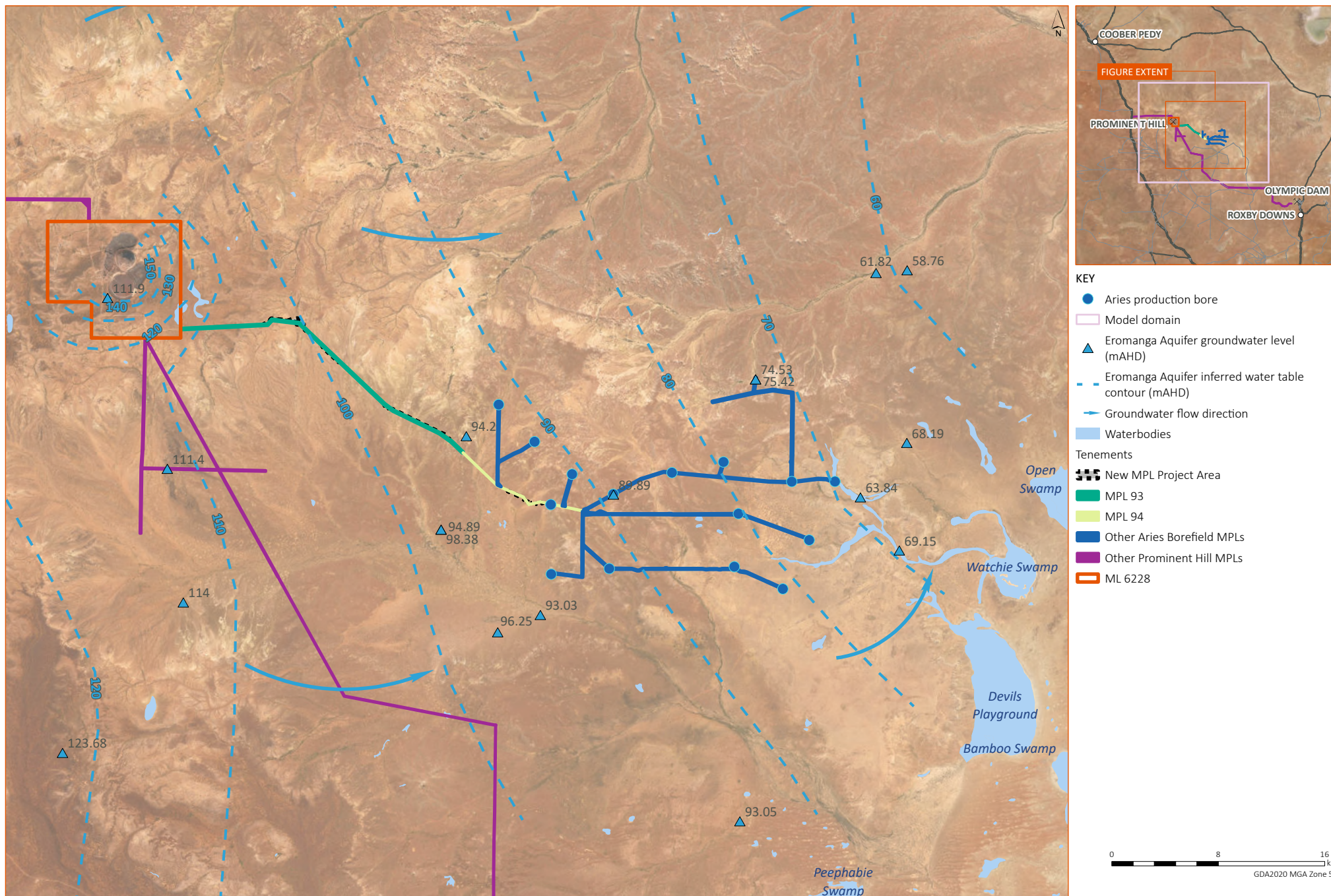


Figure 4.16 | Inferred Eromanga groundwater contours (January 2020)

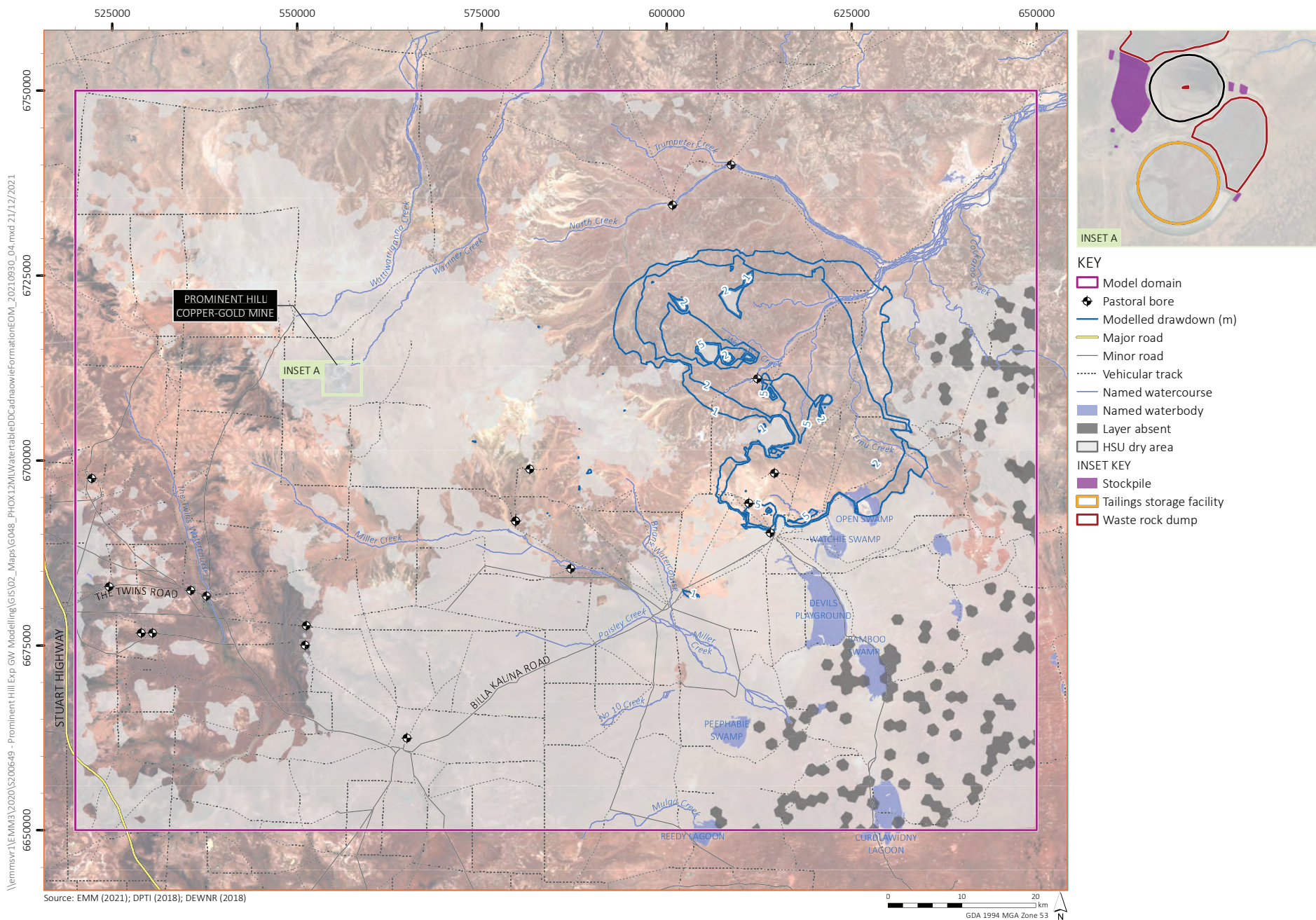


Figure 4.17 | Predicted groundwater drawdown in the Cadna-Owie Formation

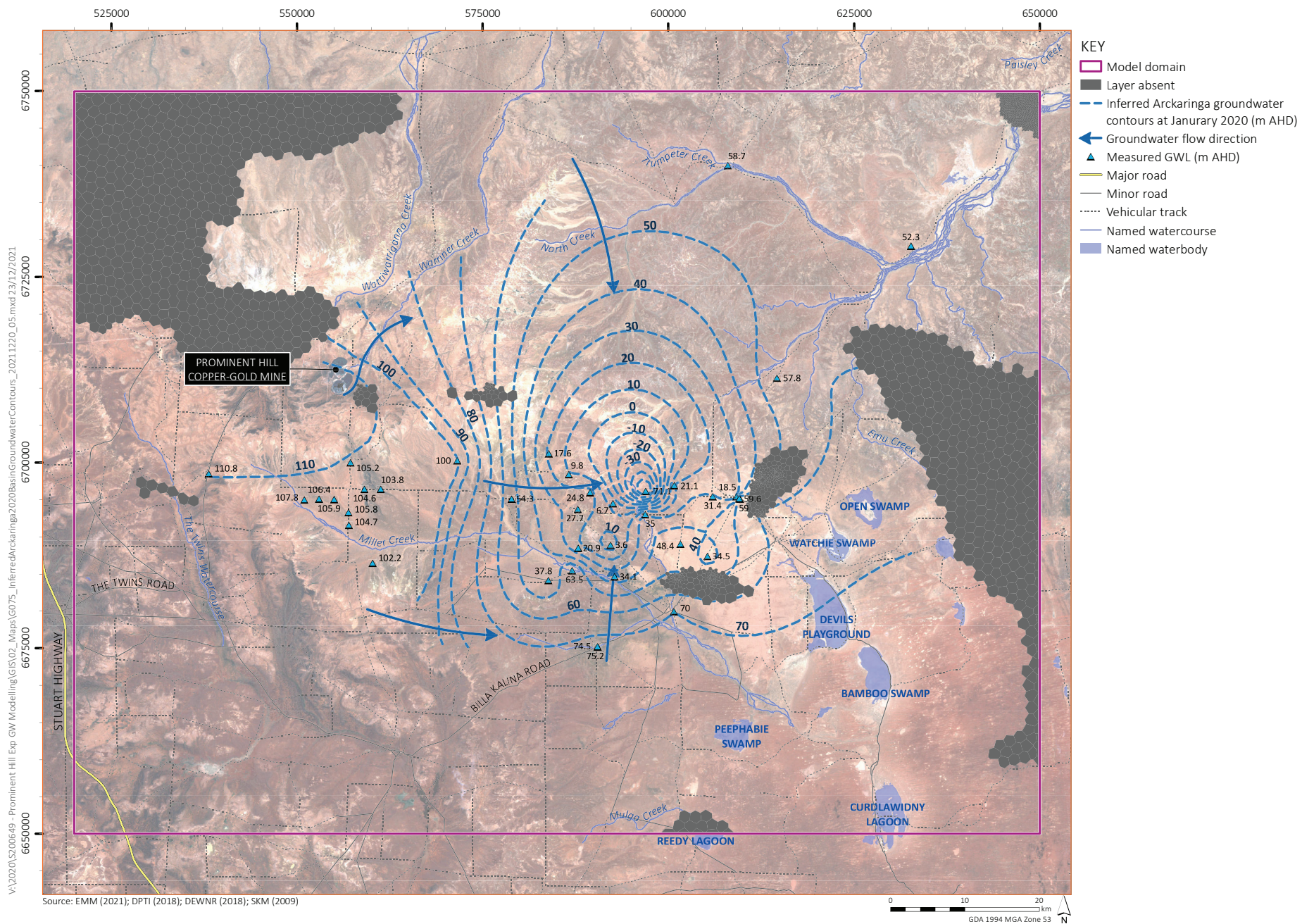


Figure 4.18 | Inferred Arckaringa groundwater contours at January 2020

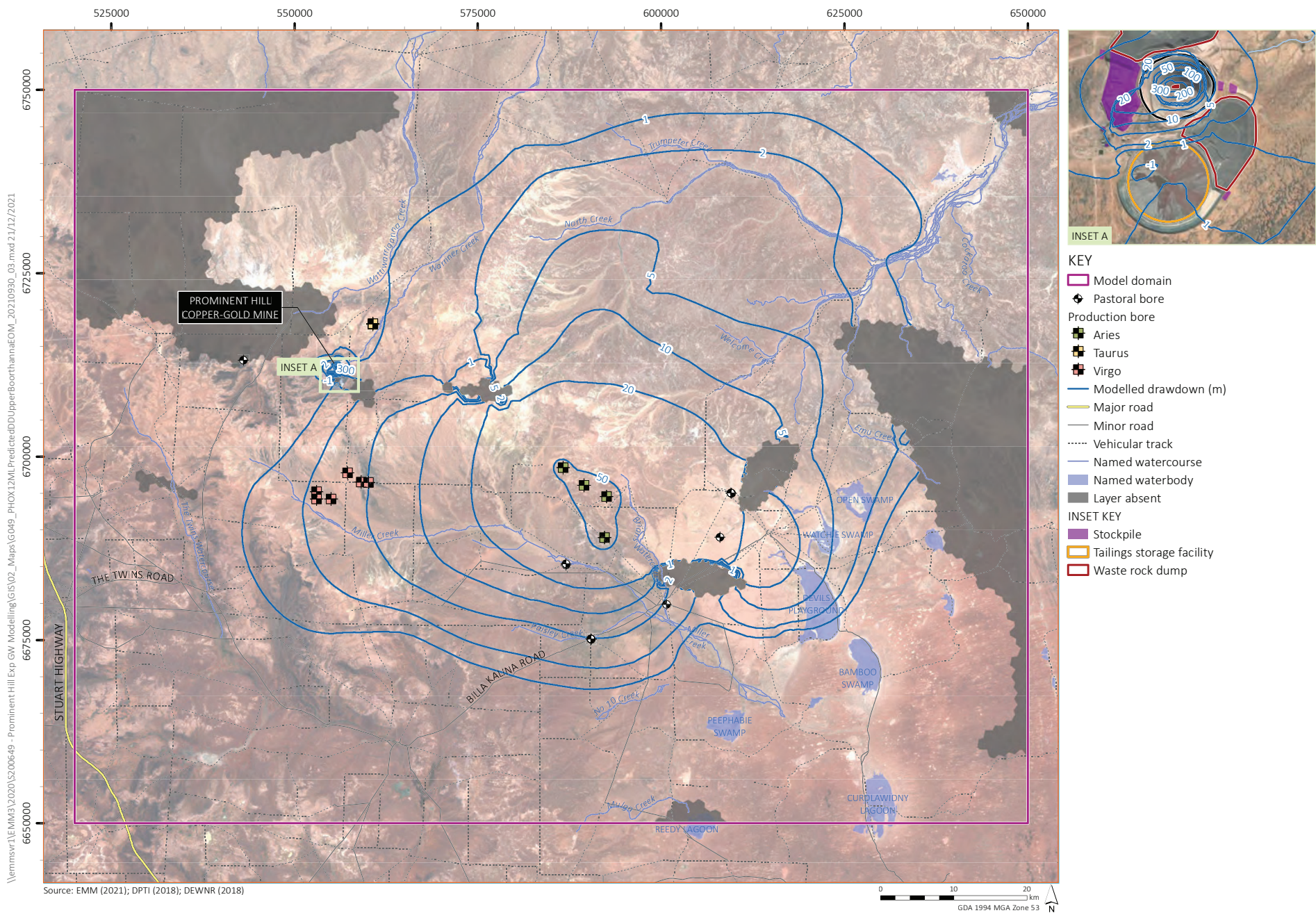


Figure 4.19 | Predicted groundwater drawdown in the Upper Boorthanna Formation

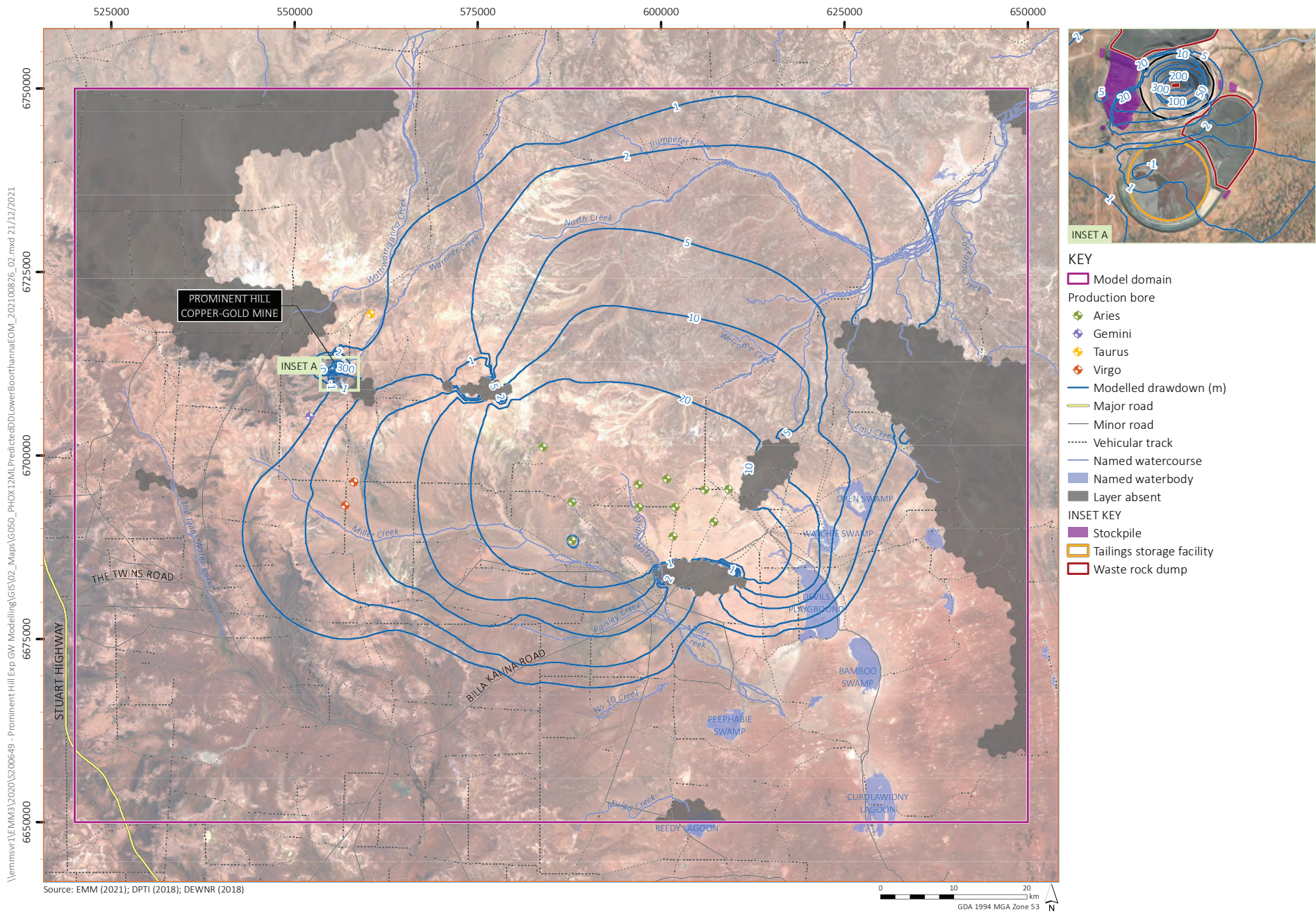


Figure 4.20 | Predicted groundwater drawdown in the Lower Boorthanna Formation

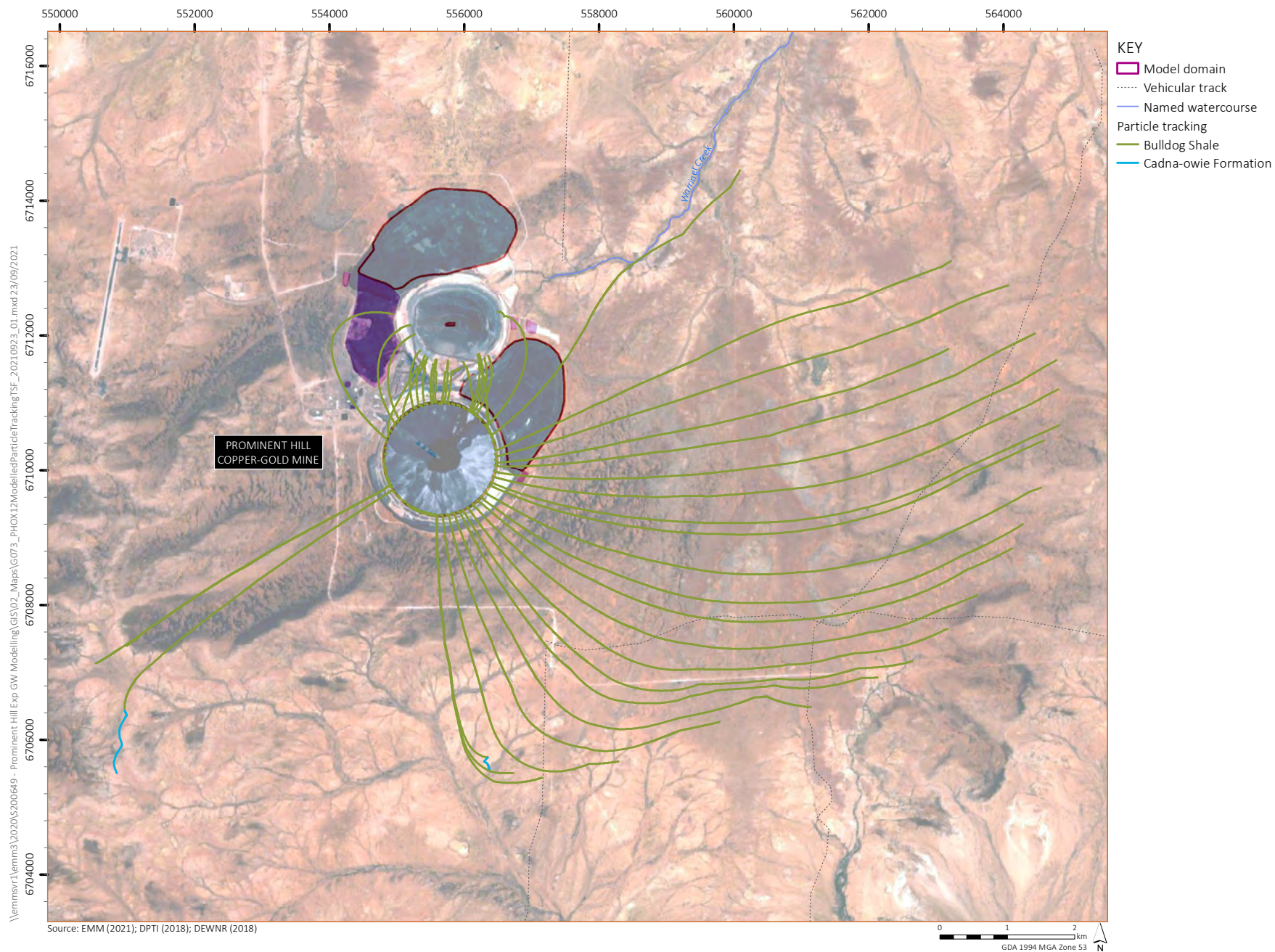


Figure 4.21 | Modelled particle tracking from the TSF

4.4.3.2 Groundwater response to borefield operation

The response of groundwater as a result of groundwater abstraction from the borefields is summarised in the subsections below. Section 4.4.3.3 summarises the updates to groundwater modelling that have occurred over the life of the operation.

Please note that the drawdown threshold depicted in any hydrographs in this section relate to those outlined in the operations Groundwater Management Plan as required under Water Licence No. 396811, Water Resource Works Approval No. 396907.

The locations of monitoring bores, and associated hydrographs, described in this section are shown in Figure 4.22 and Figure 4.23 to Figure 4.30 respectively.

Groundwater abstraction

Mine process, dust suppression, construction and camp water requirements are met primarily by abstraction from the Aries Borefield which has been supplemented by abstraction from the Virgo Borefield. The project is located within the Far North Prescribed Wells Area and as such, groundwater abstractions take place under the conditions of Water License No. 396811 (previously 41028). The licensed allocation for the Prominent Hill operations is 26.6 ML/day (9,709 ML/yr). A second Water Licence No. 183346 was obtained in 2010, however has since been updated to Water Licence No. 396809 for Prominent Hill to abstract 1 ML/day of groundwater on Ingomar Station for the purpose of haul road maintenance. The effect of Borefield abstraction on local and regional groundwater levels and quality is summarised in the following sections.

Virgo Borefield

Virgo Borefield was brought progressively on-line between September 2006 and March 2007, as a result of groundwater exploration and groundwater development occurring simultaneously for the Project. Operation of this borefield provided the opportunity of assessing how the broader groundwater system responded to pumping from the Boorthanna aquifer prior to the commissioning of Aries Borefield.

Groundwater levels within the Boorthanna Formation are monitored at four leading indicator/compliance wells (VMD-1, VMD-3, VMD-4 and VMD-5, see Figure 4.23). Groundwater levels within the non-artesian Eromanga Aquifer are monitored in one centrally located leading indicator well (VMS-1, see Figure 4.24). The VMD wells are located approximately 1 to 2 km outside of the Virgo Borefield extent.

The Virgo Borefield has since been decommissioned. Groundwater recovery in monitoring wells is evident in the water level data. The historical data indicates that:

- large drawdowns of more than 40 m occurred within the borefield footprint, a result of bounded aquifer conditions that occur in the borefield area (REM, 2007a; REM, 2007b), i.e., limited lateral aquifer extent,
- drawdowns appear to stabilise approximately one month after commissioning of each production well in response to leakage from confining units, and
- there has been no measurable response within the non-artesian Eromanga (stock water) aquifer to pumping from the deeper Boorthanna aquifer.

Aries borefield

The Aries Borefield was constructed throughout 2008, beginning with the western parts of the borefield) in early 2008 and extending eastwards thereafter. Throughout 2008, the Aries Borefield generally supplied less than 2 ML/d to the Prominent Hill Mine to support dust suppression, construction and RO camp water feed requirements. However, the borefield experienced a notable ramp up in early 2009 with commissioning of the Prominent Hill Mine process plant to around 16 ML/d. Production has fluctuated between approximately 14 ML/d to around 21 ML/d since 2009.

Non-Artesian Eromanga groundwater level response

Groundwater levels within the non-artesian Eromanga aquifer are monitored at six monitoring wells in the study area. Two of these are located within the Aries Borefield (Figure 4.25) while the other four are located in a ring regionally surrounding the borefield (Figure 4.26). The data shows a relatively stable groundwater level in five monitoring wells since commissioning of Aries Borefield to present. This suggests that the Stuart Range Formation is acting as an effective aquitard between the Boorthanna Formation (Prominent Hill's water supply aquifer) and the non-artesian Eromanga Aquifer.

The exception to this is RMS-2, which has always recorded a fluctuating water level trend and appears to be influenced by climatic factors and is not related to the operation of Prominent Hill.

Artesian Eromanga groundwater level response

Groundwater levels are monitored within the artesian Eromanga aquifer (GAB aquifer) through pressure gauge readings at Margret Creek Bore. The data (Figure 4.27) shows a relatively stable groundwater level at Margret Creek Bore since commissioning of Aries Borefield to present. This is an indication that effects from groundwater abstraction from the Boorthanna Formation is not affecting groundwater flow in the artesian Eromanga aquifer. A combination of the Stuart Range Formation aquitard and the separate groundwater flow systems is considered to be the reason effects are not realised at the Margret Creek Bore locations.

Boorthanna Formation and Andamooka Limestone groundwater level response

Groundwater levels are monitored within ten Boorthanna Formation wells and one Andamooka Limestone well (Figure 4.28, Figure 4.29 and Figure 4.30). It is also monitored at two locations which had test drilling occur for potential borefields, Gemini and Taurus (Figure 4.31). A groundwater level decline of approximately 6 to 9 m have been observed in RMD-3 and RMD-4 since 2008. Groundwater levels in RMD-1 and RMD-2, however, appear to have been unaffected by groundwater abstraction at the Aries Borefield, with data showing a relatively stable groundwater levels. RMD-2 screens both the Boorthanna aquifer and underlying Andamooka Limestone unit of the Stuart Shelf.

Stable groundwater levels are also observed in RMD-5 and Taurus-2 wells, which are screened in the Boorthanna Formation. These wells are located north-east and east of the operation in areas where groundwater abstraction has not occurred.

RMD-7 and Gemini-1, however, show larger groundwater drawdown (up to around 13 m) in comparison. It is considered that the larger drawdown observed in the RMD-7 and Gemini-1 is due to the operation of Aries Borefield and Virgo Borefield in parallel during the period from 2008 to approximately 2012. Once the Virgo Borefield was decommissioned (2014), groundwater levels in RMD-7 and Gemini-1 recovered close to pre-development levels.

Boorthanna Formation investigations

Since progressive commissioning of the Aries Borefield in 2008, groundwater drawdown has been observed in some pastoral wells and associated monitoring wells. These include the No.2 Bore, No.6 Bore, Napiers Bore, Woolshed Region and Millers Creek homestead. Hydrogeological investigations commissioned by OZ Minerals (SKM, 2009b; SKM, 2010; SKM 2012) found that the Boorthanna Formation (i.e., Prominent Hill's water supply aquifer) is observed to be uplifted to shallower depths, providing a pathway between Prominent Hill's operations and pastoral water supplies.

It is conceptualised that localised faulting (which is known to occur throughout the region (Ambrose and Flint, 1980; SKM, 2009a) has lifted the Boorthanna Formation to shallower depths within the No.2 Well area.

A drilling program was commissioned to provide a replacement water supply well due to the effects observed at No.2 Bore (Jacobs, 2014b). The replacement well (CH1) was drilled on the Billa Kalina station, approximately 3 km south-east of No.2 well. CH1 was installed in the Boorthanna Formation at a depth of 70 mbgl due to the non-artesian Eromanga aquifer being unsaturated. Groundwater airlift yields at the installed depth were approximately 2 L/s, with salinity (measured as electrical conductivity) around 4 mS/cm.

Figure 4.31 and Figure 4.32 presents a conceptual geological cross section of the No.2 Bore area, which includes the CH1 pastoral well and the interpreted uplift of Boorthanna Formation based on observations during drilling.

Pastoral monitoring wells groundwater level response

A pastoral groundwater monitoring well network has been established to allow observation of potential effects of mine water supply on pastoral water supplies in the study area. The monitoring network includes the Anna Creek, Billa Kalina, Ingomar, Millers Creek, Mt Eba and Twins pastoral leases.

The majority of pastoral wells that are used for water supply are installed into the non-artesian Eromanga aquifer or perched aquifers within the Bulldog Shale. However, it became evident (see information presented above in Boorthanna Formation Investigation) after Aries Borefield commissioning that some pastoral water supplies accessed groundwater from a shallow occurrence of the Boorthanna Formation (e.g., No.2 Bore, No.6 Bore, Woolshed Bore and Napiers Bore). It is conceptualised that localised faulting (which is known to occur throughout the region has lifted the Boorthanna Formation to shallower depths within the Aries-16/ No.2 Well area.

Groundwater level data show a relatively stable groundwater level in all wells that are screened across the non-artesian Eromanga aquifer. Groundwater level data from Boorthanna Formation monitoring wells, however, show a drawdown response of between 6 and 13 m in line with commissioning of the Aries Borefield. The drawdown response appears to have stabilised and reached a new steady state equilibrium with groundwater produced from the Aries Borefield. BHP continue to work with pastoral lease owners who have observed drawdown in their pastoral water supply wells to assist with management and mitigation of effects resulting from Aries Borefield operation. These works aim to minimise potential impact on their businesses and domestic water resource.

Locations of monitoring wells on third party leases are detailed later within this document in Section 8.2, Figure 8.4.

Predicted drawdown

Modelled drawdown and mounding contours in the Cadna-owie Formation, the Upper Boorthanna Formation and the Lower Boorthanna Formation at the end of the life of mine (as detailed in the PEPR) is presented in Figure 4.17, Figure 4.19 and Figure 4.20.

For more information on predictive groundwater drawdown from mining please refer to Appendix E.

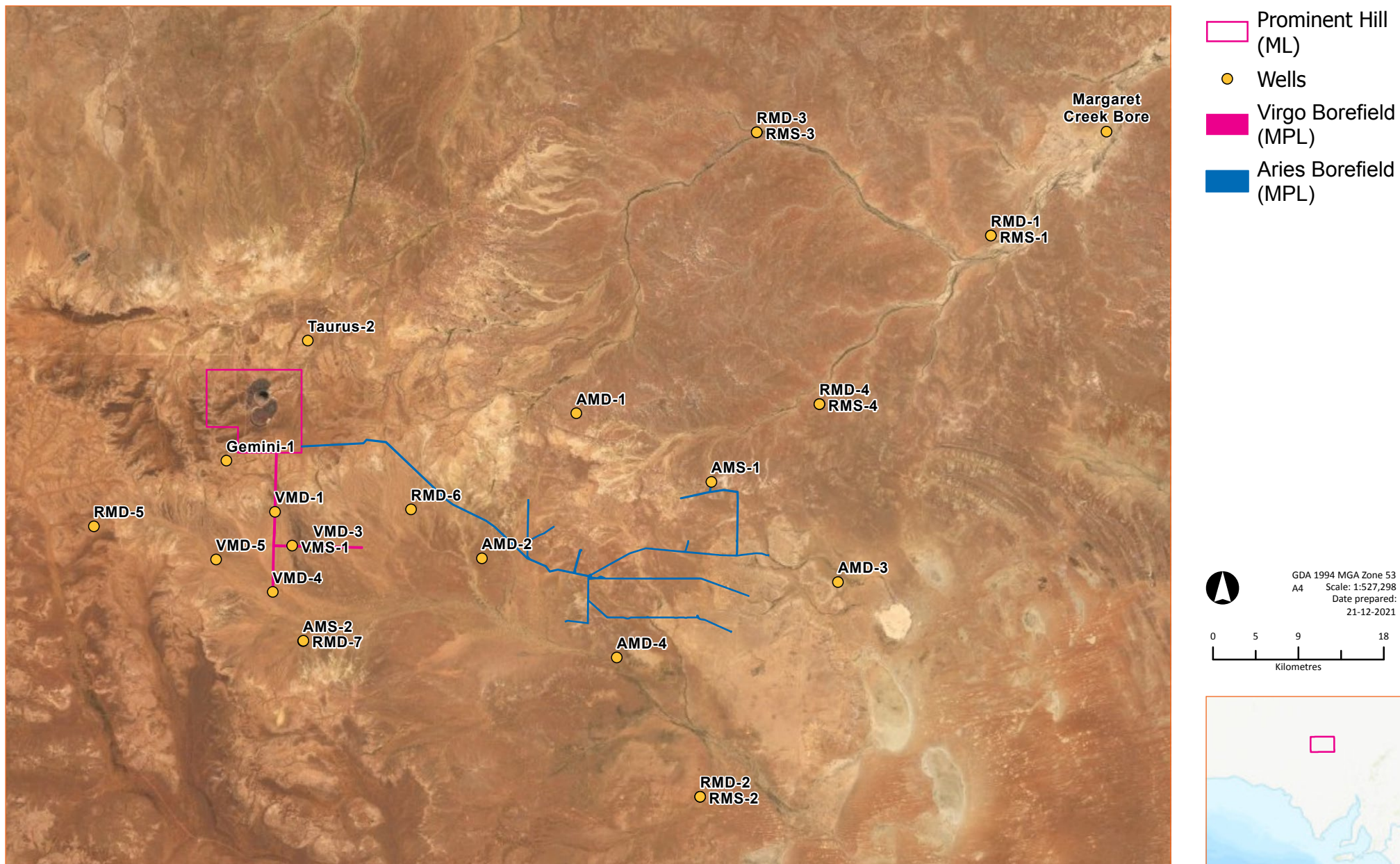


Figure 4.22 | Groundwater response to operations monitoring network

Virgo Leading Indicator Wells
Boorthanna Formation

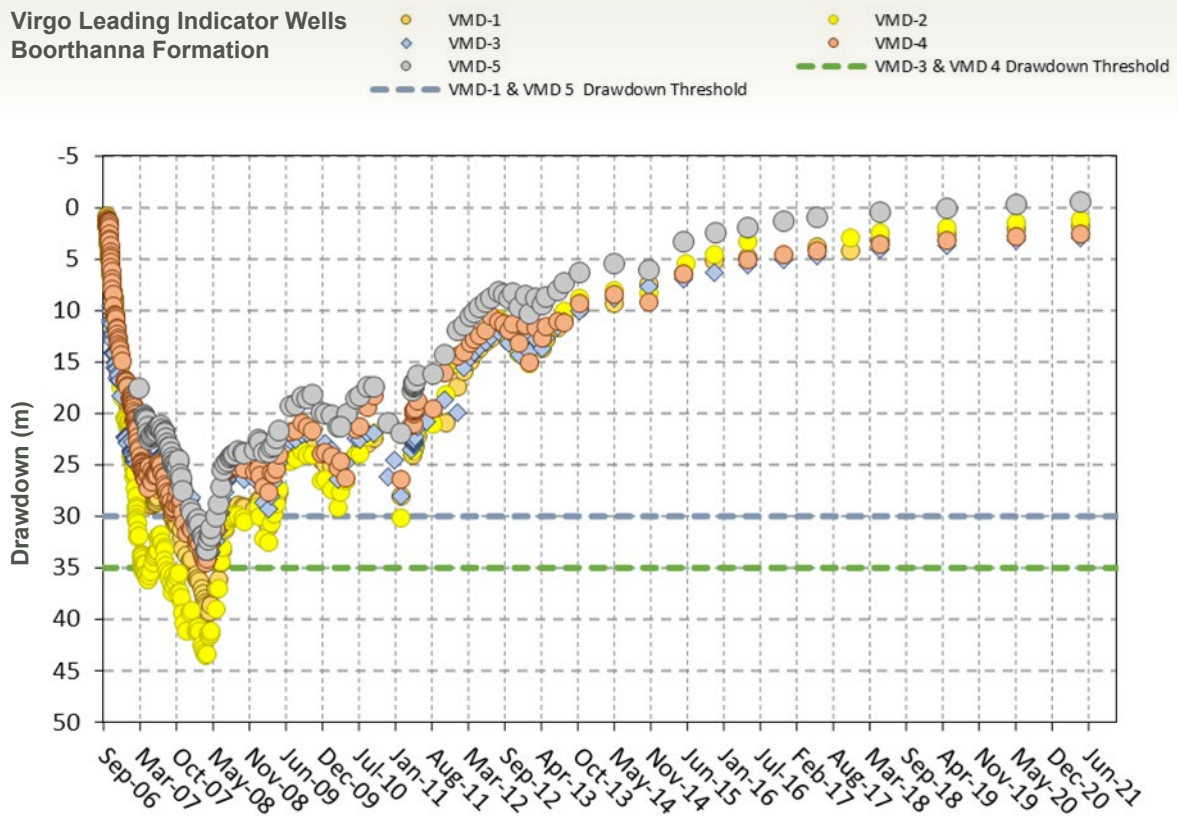


Figure 4.23 | Virgo borefield drawdown (Boorthanna Formation)

Virgo Leading Indicator Wells
Non-artesian Eromanga Aquifer

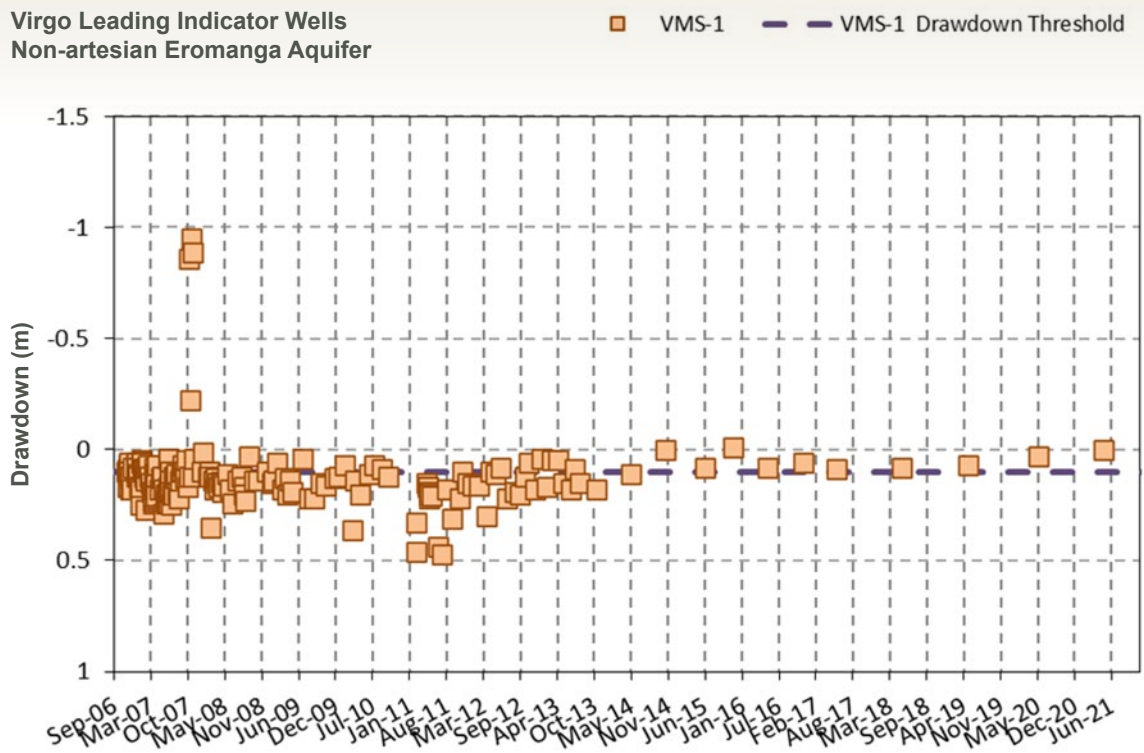


Figure 4.24 | Virgo borefield drawdown (Non-artesian Eromanga Aquifer)

Aries Leading Indicator Wells
Non-artesian Eromanga Aquifer

- AMS-1 & AMS-2 Drawdown Threshold
- ▲ AMS-1
- ◆ AMS-2

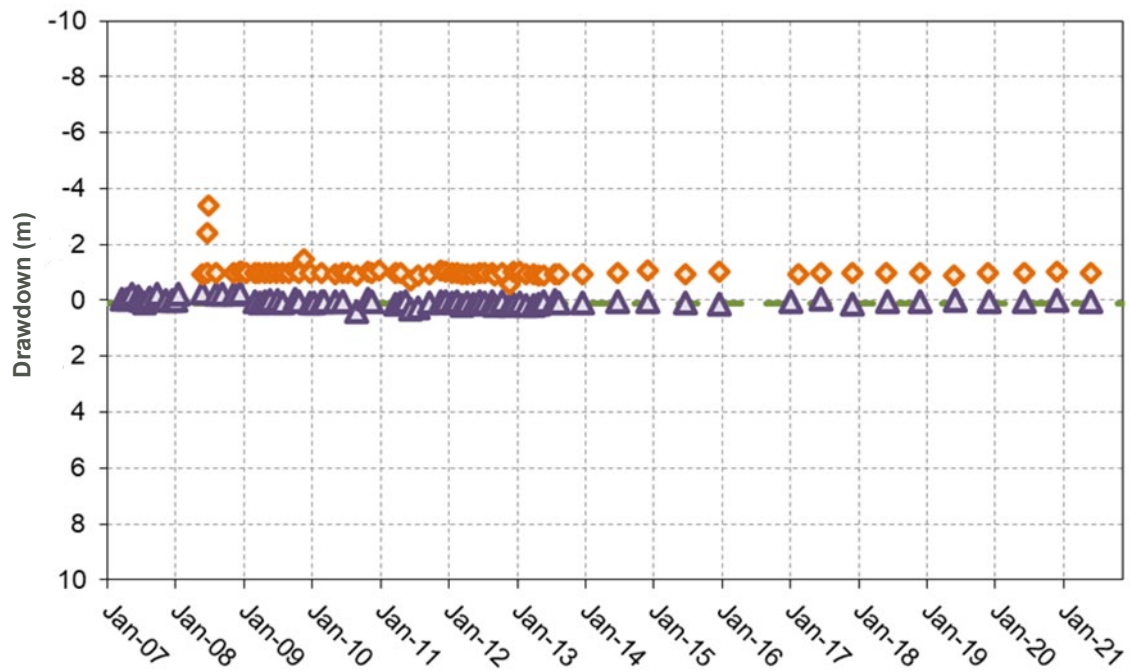


Figure 4.25 | Aries borefield drawdown (Non-artesian Eromanga Aquifer)

Regional Leading Indicator Wells
Non-artesian Eromanga Aquifer

- RMS-1
- RMS-3
- RMS-1 & RMS-3 Drawdown Threshold
- RMS-2
- RMS-4
- RMS-2 Drawdown Threshold

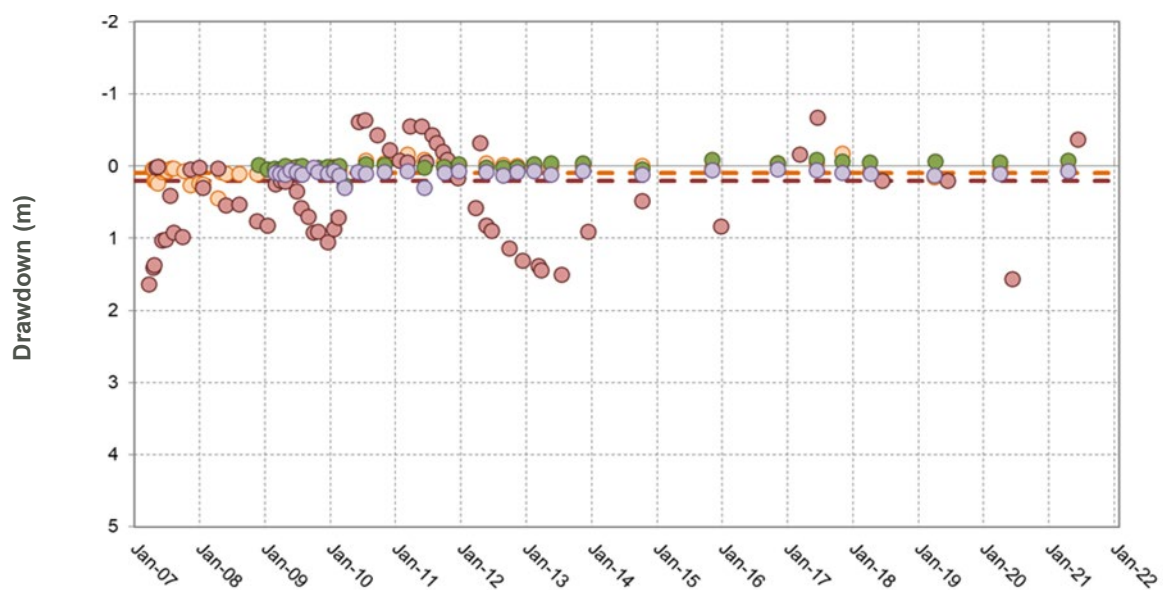


Figure 4.26 | Regional drawdown (Non-artesian Eromanga Aquifer)

Billa Kalina Monitoring Well
Artesian Eromanga Aquifer

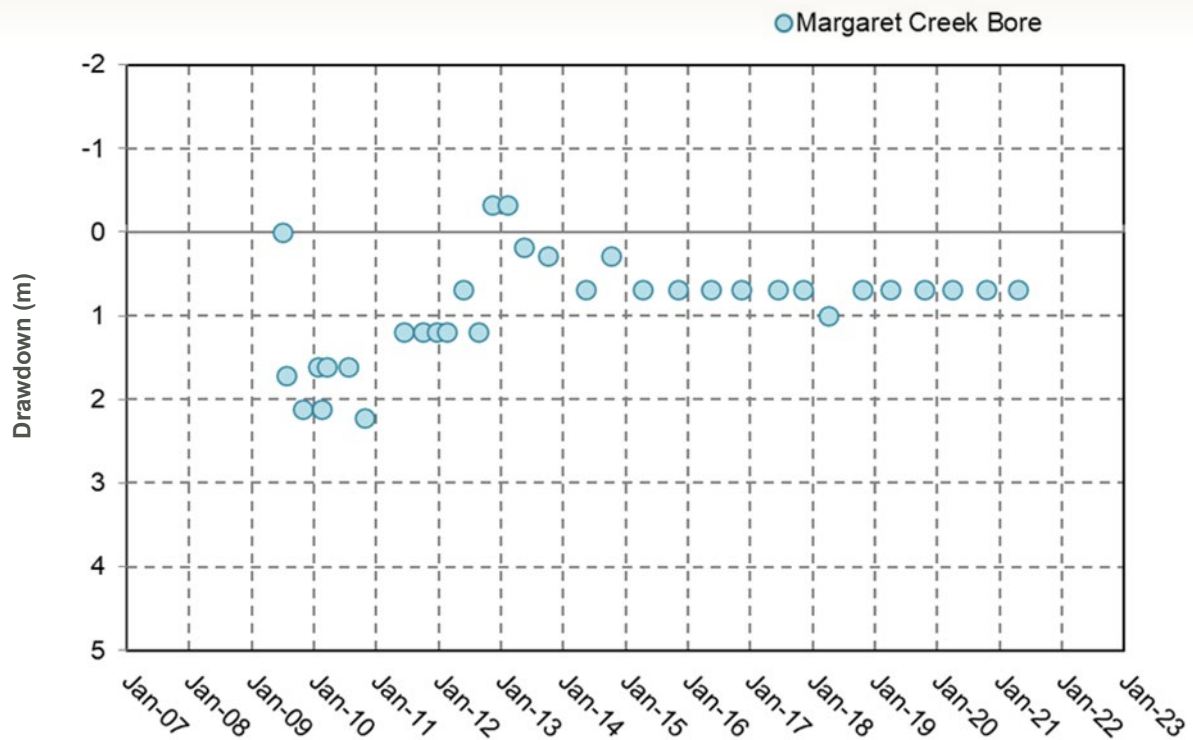


Figure 4.27 | Margaret Creek bore drawdown (Artesian Eromanga Aquifer)

Aries Leading Indicator Wells
Boorthanna Formation

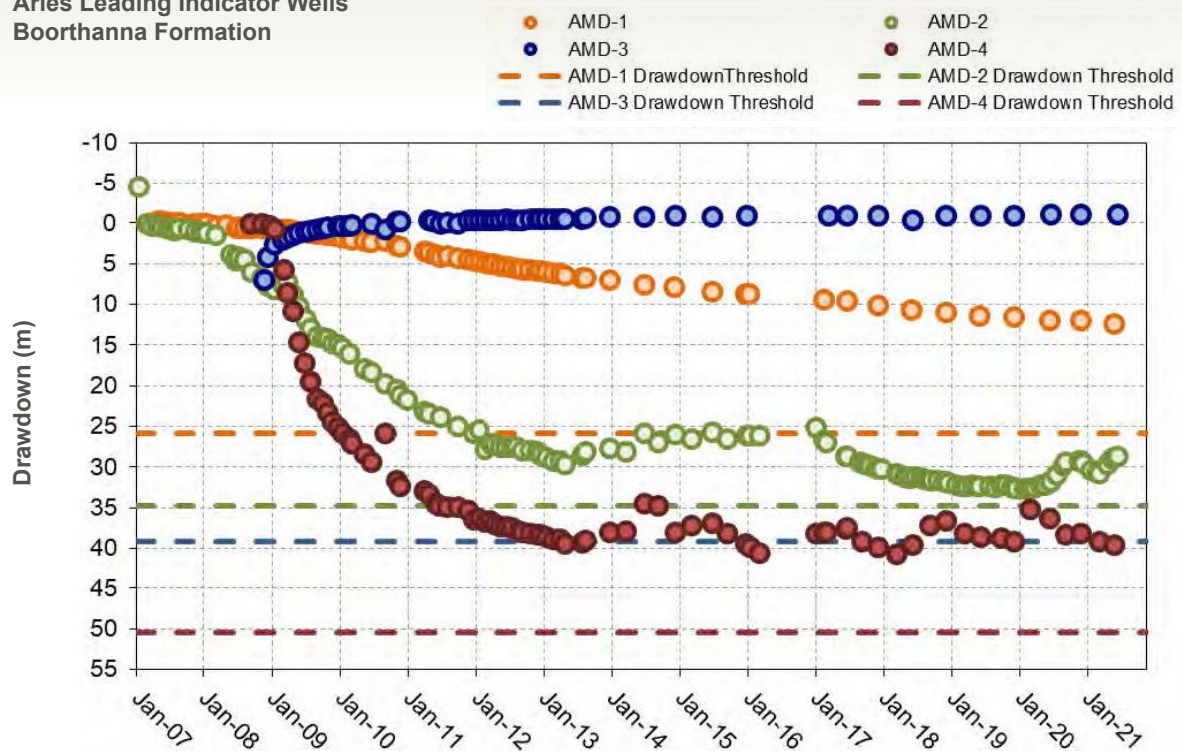


Figure 4.28 | Aries borefield drawdown (Boorthanna Formation)

Regional Leading Indicator Wells
Boorthanna and Andamooka Limestone Formations

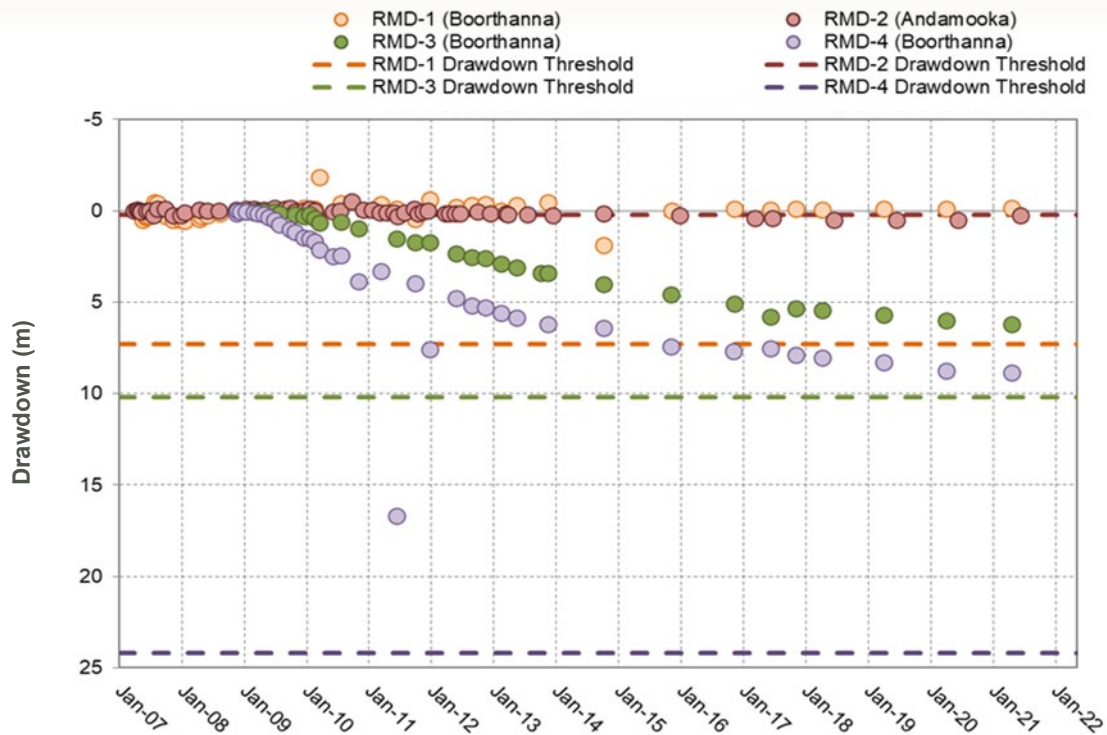


Figure 4.29 | Regional drawdown (Boorthanna Formation) – part 1

Regional Environmental Wells
Boorthanna Formation

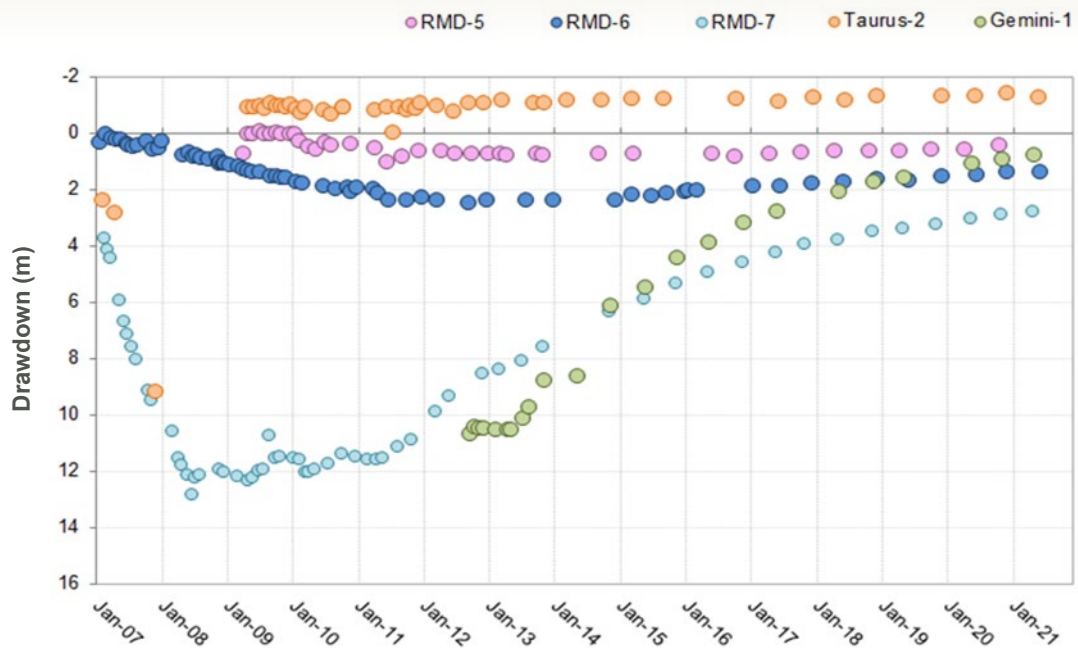


Figure 4.30 | Regional drawdown (Boorthanna Formation) – part 2

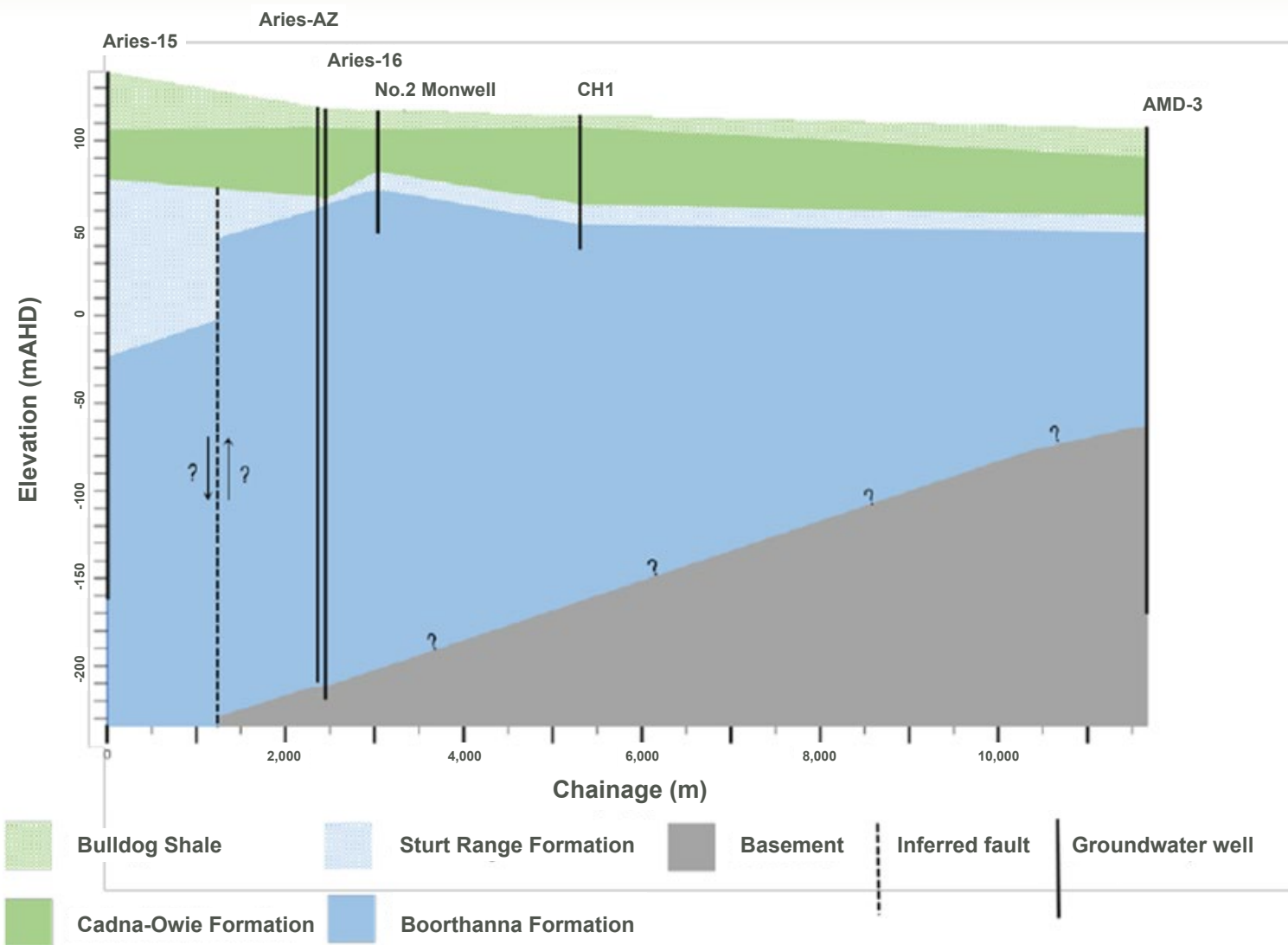


Figure 4.32 | Localised Billa Kalina geological features

4.4.3.3 Updates to groundwater model

Updates to the groundwater model since its development are summarised in Table 4.5.

Table 4.5 | Groundwater model update

Model	Model date	Model Description
Prominent Hill Regional Groundwater Model	February 2006	First model developed to assess the likely impacts of abstraction from the proposed water supply borefield on the underlying groundwater aquifers and the Great Artesian Basin (GAB) springs located to the east of the Project Area.
Prominent Hill Regional Groundwater Model (PH2)	February 2008	Conceptual ideas from PH1 were built upon and refined to produce an updated model, with calibration against data collected from the construction borefield.
Prominent Hill Regional Groundwater Model (PH3)	December 2008	The basement layer was deepened to account for the proposed underground mining levels, and the model performance was validated against water level monitoring data to date.
Prominent Hill Regional Groundwater Model (PH4)	October 2009	The western boundary of the model was moved 30 km to the west. New drilling and monitoring data was used to refine the model. Hydraulic conductivity values were adjusted so that the model values matched the latest data from field measurements.
Prominent Hill Mine Groundwater Model Update (PH5)	September 2010	Recalibrated, with an additional model layer added. Model boundary conditions and assigned aquifer parameter values were also recalibrated in order to improve model calibration performance.
Prominent Hill Mine Groundwater Model Update (PH5.2)	March 2011	Model updated to include data up to January 2011.
Prominent Hill Mine Groundwater Model Update (PH5.3)	August 2012	Model updated to include data up to January 2012.
Prominent Hill Mine Pit Groundwater Flow Model	November 2013	New model built to simulate the influence of the open pit, tailings storage facility and waste rock landforms on groundwater.
Prominent Hill Mine Groundwater Model Update (PH5.5)	January 2014	Local calibration in the region of AMD-4 as previous models were under-predicting the groundwater drawdown.
Prominent Hill Mine Groundwater Model Update (PH5.6)	July 2016	Model updated to include data up to January 2016 and updated LOM.
Prominent Hill Mine Groundwater Update (PH5.7)	June 2018	Model updated to include data up to June 2018 and updated LOM.
Prominent Hill Mine Groundwater Update (PH5.8)	October 2020	Model update to include data up to 2020.
Prominent Hill Mine Groundwater Update (PH6.0)	August 2021	Model updated to include data up to August 2021 and updated LOM/PHOX data to show mine scale predictions and regional scale impacts.

4.5 Surface water

4.5.1 Surface water overview

This description of the existing surface waters in the Project Area and surrounds focuses on catchment systems, surface drainage patterns, waterways or other wetland habitat (natural or artificial, ephemeral or permanent, including springs and mound springs) that may be affected by the project. It includes information on surface water aspects of conservation significance (e.g., GAB springs, Ramsar listed wetlands), current surface water uses, surface water quality, surface water flows, discharge rates, and the likelihood of flooding. A summary of surface water is provided in the subsections below. The surface water catchment boundaries are shown in Figure 4.33 with local pre-mine surface water drainage shown on Figure 4.34.

Region

As for most parts of South Australia's arid north, the normal condition for creeks and lakes in the region is dry. No stream flow gauging stations are located within 50 km of the Project Area and little information exists regarding the hydrological regime of the local temporary streams. Runoff is ephemeral, occurring only after significant and intense rainfall events.

Warriner Creek

The Warriner Creek from about 3 km upstream of the project pit area is as a drainage line or eroded channel. In the mine area and further downstream, the Warriner Creek drainage line is joined by a few other minor drainage lines. Downstream of the pit area the frequency of tributaries increases, the channel capacity of the creek begins to increase, and the channel develops an identifiable bed and banks. The creek catchment system flows north east due to the surface elevation as detailed in Figure 4.34.

Localised bank-full flows in Warriner Creek are thought to occur every one to two years in response to storm events, with a typical probability of occurrence of 50% in any one year. Flows after these events could extend downstream for up to 50 km, to an area where mapping shows that the Warriner Creek stream network becomes less well defined for a short distance, before again regaining definition. Larger flows in Warriner Creek would occur less frequently, with a probability of occurrence of perhaps 10% to 20% in any year. These larger flows may extend downstream as far as Francis Swamp (about 100 km), and larger flows again may extend as far downstream as Lake Eyre South (about 150 km) with a lower probability of occurrence in any one year, in the order of 5%.

Wattiwarriganna Creek

The Wattiwarriganna Creek flows roughly north-east towards the Prominent Hill landmark. The creek is similar to Warriner Creek in having poorly defined bed and banks in the mine area. From due west of the Prominent Hill landmark, and further downstream, Wattiwarriganna Creek is joined by a few minor drainage lines and develops an identifiable bed and banks within a small floodplain.

Millers Creek catchment

Millers Creek drains in an easterly to south-easterly direction into the Peephabie and Devils Playground swamps. These are part of a larger swamp complex incorporating Bamboo Swamp, Midway Swamp and Curdlawidny Lagoon. During periods of heavy rainfall, these water bodies can become hydrologically connected. A number of other creeks including Brians Watercourse, Paisley Creek and No. 10 creek drain into Millers Creek.

Margaret Creek

Margaret Creek, with a total catchment area of 8,640 km², drains in a north easterly to easterly direction towards Lake Eyre South, approximately 117 km from the head of the creek. Margaret Creek and its tributaries are naturally saline and generally dry.

Other surface water features – lakes

Lake Eyre lies approximately 200 km north-east of the Project Area. The lake consists of two sections, Lake Eyre North (144 km long and 77 km wide) and Lake Eyre South (64 km long and 24 km wide), joined by the narrow Goyder channel. Many of the intermittent rivers in the Far North Region of South Australia drain toward the lake, which is the lowest point in the state at around 16 m below sea level. Lake Eyre is a playa lake, acting as a collection area for surface water flows and a discharge zone for groundwater flows.

Creeks to the south and west of Lake Eyre South, i.e., Warriner, Dillon, Margaret, Stuart, Alberrie, Welcome and Morris creeks, represent the dominant inflows to Lake Eyre South. Rivers more likely to fill Lake Eyre North lie to the east, draining a vast area extending to the highlands of central Queensland. These rivers, which include the Georgina and Diamantina rivers and Cooper Creek, exhibit considerable variability in flow, being generally dry but occasionally carrying sufficient volumes of water to flood the lake. Minor flooding of Lake Eyre occurs on average every couple of years, with most of the playa floor covered with water about once every eight years.

These drainages are recognised as being among the most temporally variable systems in the world and represent an ecological 'boom and bust' phenomenon with few parallels. Lake Eyre is listed as a significant area on the National Estate register, containing rare plant and uncommon bird species. Coongie Lakes, located further east and upstream of Lake Eyre on the Cooper Creek River system, is the only Ramsar listed wetland in the Far North Region.

Other surface water features – GAB springs

Groundwater from the GAB naturally reaches the surface where fractures overlie the aquifer beds, forming springs. These GAB springs can range in form from mound springs to soaks. They form permanently wet areas in an otherwise dry landscape and support a considerable diversity of endemic flora and fauna. GAB springs are listed as endangered ecosystems under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) and the *National Parks and Wildlife Act 1972* (SA) (NPW Act). To protect these ecosystems, conditions apply to the taking of water to maintain groundwater pressures around the springs.

The closest GAB springs to Prominent Hill occur approximately 97 km east-north-east of the proposed mine and about 70 km north-east of the borefield (refer to Figure 4.15) As per the FNPWA WAP, the GAB springs are identified as being located in Zone A.

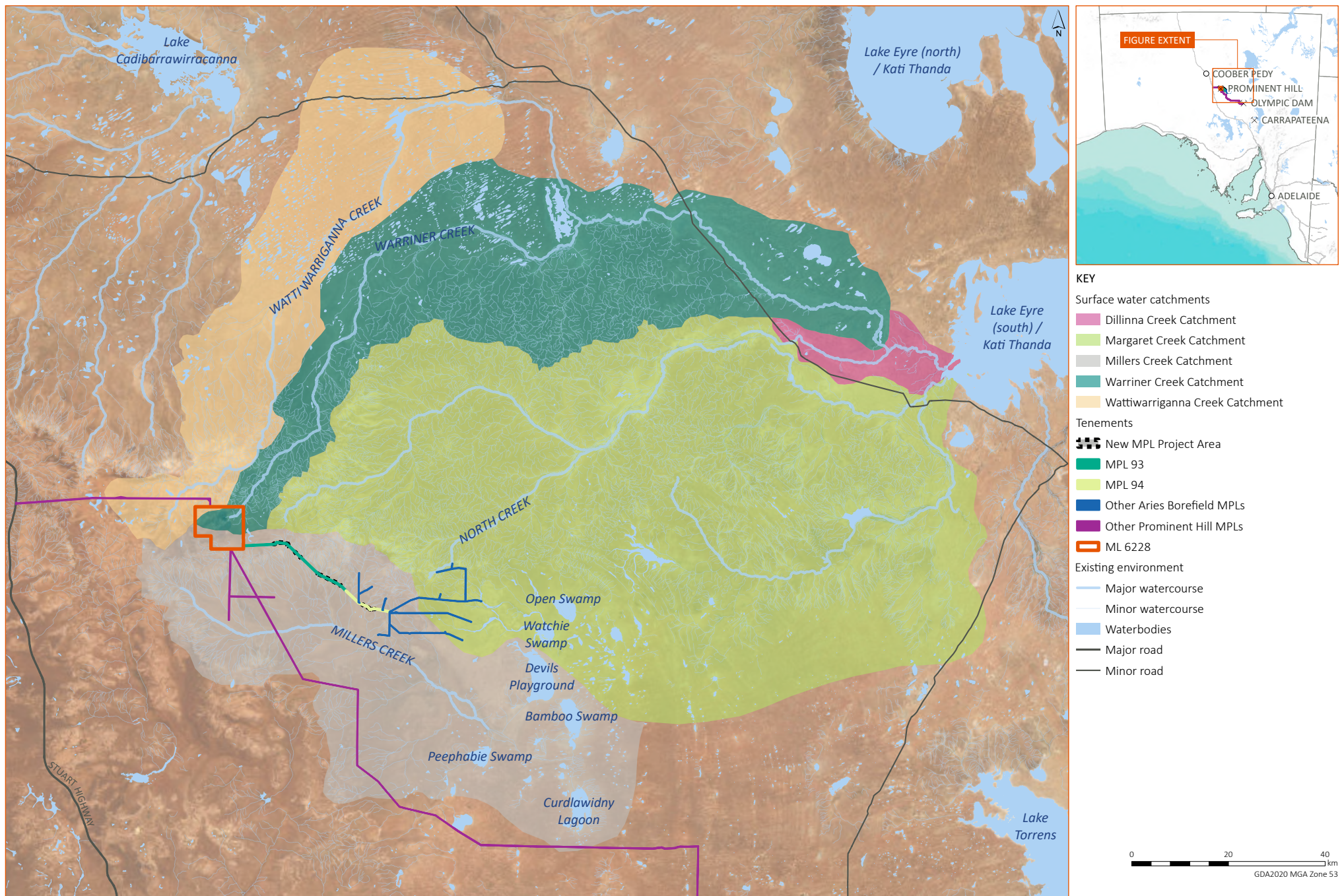


Figure 4.33 | Surface water catchment boundaries and drainages

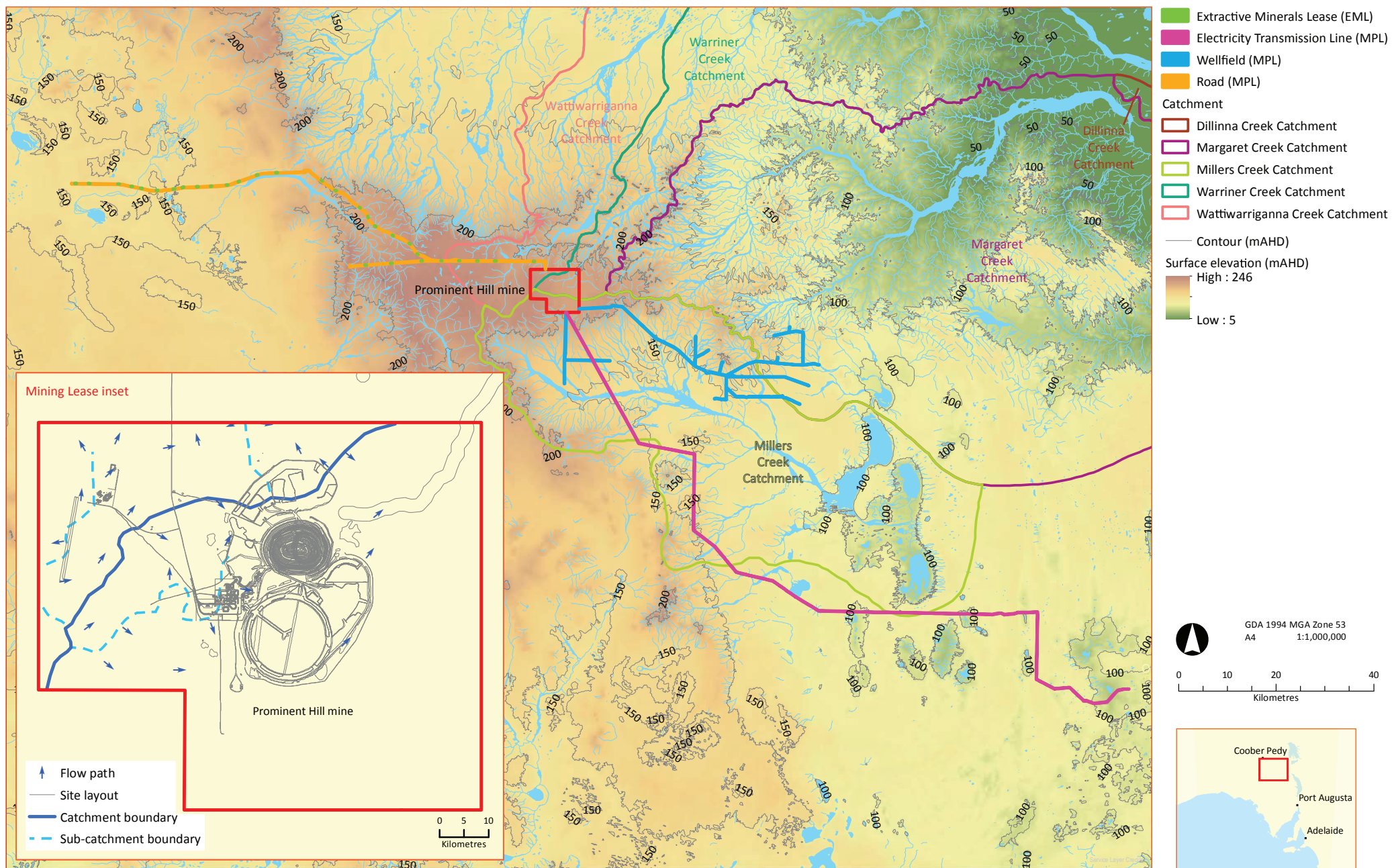


Figure 4.34 | Pre-mine surface water drainage

4.5.2 Surface water users

Due to the low yields and higher salinity of groundwater often found in the region, large dams capturing surface runoff during intermittent large rainfall events can often form the main source of water particularly for pastoral activities. Where groundwater quality and quantities are found to be of high enough quality groundwater can be the main water source reducing the reliance on the unpredictable nature of the rainfall patterns and resulting ephemeral nature of surface water bodies in the area. Surface water users are summarised in the subsections below.

4.5.2.1 Far north region

The Project Area lies within the South Australian Arid Lands Region, which is fundamentally different from other regions in South Australia. The climate of this region is arid and biological processes are driven by episodic weather events that do not follow predictable annual cycles. In many areas of the region, groundwater from large aquifers like the Great Artesian Basin offers the only source of reliable water in much of the region.

4.5.2.2 Environment

The limited presence of water within streams in the Project Area restricts their use to those aquatic ecosystems which can tolerate lengthy dry periods. Streams would also provide a drinking water source for livestock and wildlife and have aesthetic appeal after significant rainfall events.

The remoteness of arid zone systems from major population centres has hampered an understanding of the ecology of these systems, including life cycles and life histories of resident biota and general ecological processes. However, it is known that considerable variation occurs in the faunal composition of these streams. Most aquatic communities inhabiting arid zone temporary streams typically have short reproductive cycles and/or long dormant stages, such as desiccation-resistant eggs and burrowing habits. Some species can halt life processes until stream rewetting occurs, while other species take refuge in remnant damp areas. Species that are mobile (which may be achieved by an aerial life-stage) may migrate to permanent water bodies. These waters rarely support truly aquatic macrophytes.

The fauna found in arid zone ephemeral streams is therefore a combination of animals that are resident prior to flow and resistant to desiccation and those that can recolonise from adjacent refuges. These streams are also recognised as having natural high variability in both ecological condition and water quality.

4.5.3 Surface water quality

Surface water quality data for the Project Region is summarised in the following sections.

4.5.3.1 General water quality

Opportunistic sampling of Warriner and Wattiwarriganna creeks immediately after rain occurred twice in 2005 as part of the MARP 2006/ MARP 2009.

Acidity

The Project Area streams were slightly acidic. Water had a pH 6, which is below the State water quality criteria for protection of freshwater aquatic ecosystems and potable water use. The salinity of water in the streams after the rain events was low, generally being between 40 $\mu\text{S}/\text{cm}$ and 80 $\mu\text{S}/\text{cm}$.

Turbidity

Turbidity of the water in streams after rain events was very high, being about 200 to 500 NTU, as generally expected for streams in arid areas. Concentrations of total suspended solids were up to 700 mg/L, orders of magnitude higher than the relevant Environment Protection (Water Quality) Policy criteria for protection of freshwater aquatic ecosystems and potable water use (see MARP 2006).

Ions

The dominant ions in waters of the Project Area streams were sodium and bicarbonate. Concentrations of calcium and magnesium were low. Consequently, water hardness was also low and the water in Project Area streams after rainfall events can be classified as 'soft' (see MARP 2006).

Nutrients

Nutrient concentrations were generally low. Concentrations of total nitrogen and total phosphorus in all but one sample were below the Environment Protection (Water Quality) Policy 2003 for protection of freshwater aquatic ecosystems (see MARP 2006).

Metals

Total metal concentrations were also low, particularly considering the high concentration of suspended solids in the streams. Metal concentrations were above the criteria (Environment Protection (Water Quality) Policy 2003) for protection of freshwater aquatic ecosystems (generally the most stringent of all environmental criteria) as follows:

- iron (Fe) in all samples analysed
- copper (Cu) and lead (Pb) in five of seven samples
- zinc (Zn) in four of seven samples

Concentrations of antimony (Sb), nickel (Ni) and vanadium (V) also marginally above the criteria for other environmental values, i.e., potable water or agricultural use, in a limited number of samples. The MARP 2006 detailed the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 trigger values for the protection of slightly to moderately disturbed ecosystems, which apply to filterable metal concentrations. Metal concentrations slightly exceeded these trigger values as follows:

- Cu in all seven samples
- Chromium (Cr) in three samples

- Zn in four samples
- Pb in one sample

4.5.4 Progression of understanding

Since the MARP 2009 a significant monitoring program and scientific studies have been undertaken to further understand the complex hydrology of the Prominent Hill region. The following section outlines the advancement of our understanding of the environment since that time.

4.5.4.1 Surface water response to mine development

The response of surface water within close proximity to the mining operations is summarised in the following sections.

Fugitive sediments

The operation is located in an area of low rainfall and as a result, the potential for rainfall erosivity is low, although there is potential for occasional high-intensity rainfall events to result in erosion on the slopes of the WRD/IWL. Studies have shown that levels of vegetative cover on the slopes of the WRD/IWL in arid environments are unlikely to develop to an extent that they provide significant erosion protection, thus the primary form of erosion resistance for the Prominent Hill WRD/IWL will be achieved through rock armouring of the angle-of-repose WRD/IWL slopes. During operations the WRD/IWL slopes will be progressively armoured with approximately 10 m (horizontally) of NAF armour waste rock using a dumping sequence that has allowed a period of time from the formation of the outer face to placement of the rock armour, allowing time after construction for initial settlement to occur.

In general, cover sequence rocks at Prominent Hill weather rapidly upon exposure and with handling, whereas basement rocks are durable and weather slowly. Dolomitic, Andesitic and Volcanic waste rock has been found to be highly durable during static durability test work. Further to the static durability test work, Slake Durability testing and Sodium Sulphate Soundness testing was undertaken on samples of the volcanic (Hematitic) and Andesitic rock units to confirm their suitability as rock armouring for the WRD embankments. The Slake Durability test work confirmed that all samples are regarded as having very high durability and can be classed as a competent material suitable for use in armouring outer batter slopes of the waste landform. The Sodium Sulphate Soundness test work confirmed that the Andesitic material is durable and is suitable for construction purposes in locations exposed to weathering.

Surface water run-off from angle-of-repose, rock armoured batters on the WRD is unlikely to occur as a result of the large size of the pores between the rock particles, which promote infiltration and/or evaporation of surface waters.

Surface water response to operations

Sediment sampling is undertaken on an annual basis at seven locations within and outside of the ML. Sampling is undertaken at three locations at both Warriner Creek (WA sites) and Wattiwarriganna Creek (WW sites) to the north, west, and east of the mining lease. The final sampling location is at Millers Creek (MI site) to the south.

Total and dilute acid extractable metals and particle size distribution measurements are collected at each site on an annual basis, starting in 2007. Up to 2011, individual sediment samples were taken and analysed for total and dilute acid extractable metals and metalloid compounds. Following a procedure

review in 2012, a composite sample methodology was introduced. Four sediment samples are taken at no further than 1 m in distance at each site. Sediment is sampled to a maximum depth of 20 mm. The four samples are mixed and combined into one sample that is used for analysis. The resulting data are considered to be an average of the constituents sampled in the area.

Data are analysed for changes that may be attributed to effects from mining operations and compared against ANZECC (2000) guideline values for commercial/industrial land use.

Analysis of yearly sediment sampling data was undertaken in 2017 for the years 2007 to 2015. The analysis indicates that some analytes reported concentrations exceeding the ANZECC (2000) trigger guidelines during the years prior to (and including 2009). All of those analytes then decreased below the trigger value from the period 2009 to 2015. With the exception of total arsenic at site WA-3 and total copper at site WA-1 there have been no reported exceedances against the ANZECC (2000) trigger guidelines since 2009. For both the arsenic and copper levels, whilst they exceeded the lower-level trigger guidelines the values did not exceed the upper trigger guideline.

Since the 2017 analysis of data the following has been found in annual sediment analysis reports:

- 2017: results show that none of the constituents analysed have exceeded trigger levels at the compliance sites (WA-2, WA-3, WW-1, WW-2, WW-3, M1). At site WA-1, total copper concentration was 196 mg/kg which increased the trigger guideline of 65 mg/kg. Total copper concentration at this site has been increasing since February 2011, however it does not exceed the upper trigger guideline of 270 mg/kg.
- 2018: data indicates that aluminium, cadmium and lead levels were below limits in all the sites. Sites WA-1 (this site is used for internal monitoring purposes only), WW-2 and WA-3 had some metal concentrations exceeding lower trigger limits but were below the upper trigger limits. These include total concentration levels of copper and uranium at site WA1, barium and copper at site WW-2 and arsenic and beryllium at site WA-3.
- 2019: data indicates that none of the constituents analysed at the compliance sites exceeded the trigger guideline values during 2019, except for total barium concentration at Site WW-2. This site recorded a measurement of 250 mg/kg total barium, which exceeded the trigger guideline value of 240 mg/kg. This exceedance is considered a low risk in comparison to historical data recorded at WW-1 and WW-3. Other total metal concentrations that exceeded lower trigger guidelines include, beryllium at site WA-3, copper at site WA-1 and uranium at site WA-1. Total concentration of uranium at this site has been increasing yearly since 2015.
- 2020: data indicated that none of the constituents analysed have exceeded upper trigger levels at the compliance sites (WA-2, WA-3, WW-1, WW-2, WW-3 and MI-1). Total concentrations of aluminium, cadmium and lead were below trigger guidelines. Total metal concentration levels of arsenic and beryllium at WA-3 were above the lower trigger value but below the upper trigger value. At the internal monitoring site WA-1, metal concentrations of barium, copper and uranium exceeded the trigger limits. Specific to uranium at this site, it has been concluded in discussion with Prominent Hill Radiation Safety Officer that this result is still below the regulatory environmental thresholds for both South Australia and Australian Radiation and Nuclear Safety Agency (ARPANSA) and is therefore considered non-radioactive under all jurisdictions.

Further, Golder (2021b) have undertaken a field investigation looking at the concentration of metals within the area. The report analysed the triggered levels of barium, copper and uranium at WA-1 and developed a sampling program to field screen samples on a grid-based pattern using a portable handheld x-ray fluorescence (XRF) machine and subsequently collect for laboratory analysis of total metals and weak acid digest. The *ANZECC/ARMCANZ 2000 Sediment Quality Guidelines* were used as a reference when

reviewing results of the sampling plan. Results found that general coverage metal concentrations from the XRF screening were notably higher than those reported via the laboratory analysis, although both indicate significant ambient background metal concentrations. There was no evidence of spatial trends or identified source areas indicating metal concentrations were attributable to the mine and likely, the high levels were a result of significant mineralisation across the broader landscape. Noting this, Golder specified it was of their opinion that the potential for risk to aquatic fauna within the stretch of Warriner Creek downstream of the adjacent abandonment bund wouldn't warrant any creek bed remediation measures. Beyond this, sediment metal concentrations were below adopted guidelines or were found to be consistent with those in the northern drainage line or the wider landscape. The risk to aquatic fauna in the investigation downstream from this point was considered to be acceptably low.

In addition to the regular sediment sampling, surface water sampling had historically been undertaken at irregular (opportunistic) intervals following events of high rainfall. This strategy was employed to analyse surface water conditions in response to rain events. Data analysis followed the same methodology as sediment sampling, with recorded constituent concentrations compared against values taken from ANZECC (2000). ANZECC (2000) does not define constituent guideline trigger levels that are suitable for the environment in which Prominent Hill is located. The arid, Far North of South Australia is an environment defined by the occurrence of ephemeral streams and creeks. ANZECC (2000) presents guidelines that are more applicable for freshwater, perennial systems. The guidelines adopted in this report are defined from the freshwater standards with 95% species protection.

In 2017 analysis of data was undertaken to review years 2007 to 2015. The analysis indicated that numerous constituents had results, which exceeded the adopted freshwater 95% species guidelines, some constituents returned results below the limit of reporting, and others had varied patterns. Whilst there was variability in the results, there were no clear trends that could be used to infer a potential impact from the mining operation. The cause of the variability appears to be related to the length of time between rainfall events and the volume of that particular rainfall event. As such, data that has been obtained from surface water quality sampling does not appear to be suitable for assisting BHP in measuring compliance. The requirement to monitoring surface water through irregular surface water sampling has since been removed as a requirement of the PEPR since 2017.

4.6 Flora and fauna

4.6.1 Habitat and vegetation associations

Habitat and vegetation associations are summarised in the following sections, whilst vegetation association descriptions are described in Table 4.6.

Table 4.6 | Prominent Hill vegetation associations

Vegetation association	Description
1	<i>Atriplex vesicaria</i> (Bladder Saltbush) and <i>Maireana astrotricha</i> (Low Bluebush) low, very open shrubland on clay soils with a shale surface strew
2	<i>Atriplex vesicaria</i> (Bladder Saltbush) low shrubland on clay soils with a silcrete, laterite surface strew, or shale surface
3	<i>Atriplex vesicaria</i> (Bladder Saltbush) low, very open shrubland on clay soils with a shale surface strew
4	<i>Eucalyptus socialis</i> (Beaked Red Mallee) low open woodland on stony residuals (breakaways)
5	<i>Acacia aneura</i> (Mulga) open woodland on stony water courses and outwash plains

Vegetation association	Description
6	<i>Atriplex nummularia</i> spp. <i>omissa</i> (Oodnadatta Saltbush) low open shrubland with numerous gilgais and a surface strew of silcrete gibbers
7	<i>Maireana aphylla</i> (Cottonbush) / <i>Minuria cunninghamii</i> (Bush Minuria) low open shrubland or hummock grassland vegetation associated with watercourses
8	<i>Eucalyptus coolabah</i> (Coolibah) low open woodland fringing shallow ephemeral wetlands
9	<i>Melaleuca glomerata</i> (Inland Paperbark) tall open shrubland fringing saline depressions

4.6.1.1 Mining lease

Based on the Biogeographic Regionalisation for Australia (IBRA), which groups land-systems of similar climate, geomorphology, landform, and flora and fauna, Prominent Hill is situated in the Stony Plains Rangeland bioregion. Under this broad bioregion, Prominent Hill falls within the subregion of Oodnadatta and is situated on the edge of the Breakaway subregion; both subregions are categorised by the broad land-system of hills and uplands and fall under the Marla-Oodnadatta District of the South Australian Arid Landscape Board. The Marla-Oodnadatta district is characterised by gibber tablelands, flood out plains, dune systems, and breakaway country.

The ML area is characterised by low open chenopod shrublands dominated by *Atriplex vesicaria* (Bladder Saltbush) and *Maireana astrotricha* (Low Bluebush) and *Acacia aneura* (Mulga) low open woodlands on stony watercourses and outwash plains, with occasional breakaway areas.

Six different broad vegetation associations have been identified as being present within the Prominent Hill ML area (see Table 4.6 and Figure 4.35).

4.6.1.2 Borefields

Six broad vegetation associations have been identified within the Aries Borefield area. Habitat types are typically low, very open chenopod shrublands dominated in areas by *Atriplex vesicaria* (Bladder Saltbush), *Maireana aphylla* (Cottonbush), *Neobassia proceriflora* (Desert Glasswort), *Maireana sedifolia* (Pearl Bluebush) and *Maireana eriantha* (Woolly Bluebush). Other important habitat types within the area include grasslands, silcrete and strew plains, cracking clays and multiple shallow drainage lines associated with scattered low open woodlands. Sections of open mallee, dominated by *Eucalyptus socialis* (Beaked Red Mallee) were also observed extending into the area. Most of the Aries Borefield infrastructure corridor consists of very low open and open low shrublands dominated by *Atriplex vesicaria* (Bladder Saltbush) (see Figure 4.36)

Three broad vegetation associations have been identified in the Virgo Borefield area. These vegetation groups generally comprise low chenopod shrubland vegetation on soils with a shale surface strew, with small sections of mulga woodland associated with Millers Creek drainage lines. *Atriplex vesicaria* (Bladder Saltbush) and *Maireana astrotricha* (Low Bluebush) are the most common species, with *Rhagodia spinescens* (Spiny Saltbush), *Senecio lanibracteus* (Inland Shrubby Groundsel) and *Ptilotus obovatus* (Silver Mulla Mulla) also prevalent (see Figure 4.37).

4.6.1.3 Concentrate export road

Five broad vegetation associations have been identified within the concentrate export road corridor. Habitat types found in the eastern section of the concentrate export road corridor include undulating chenopod shrubland stony plains with gilgais and low chenopod shrubland (see Figure 4.38). Central sections of the corridor include low chenopod shrubland, riparian habitat near Carringalana and Brumby Creeks and sandy mulga. The western section of the corridor is mixed low woodland with mulga on sandy soils.

Vegetation along the concentrate export road corridor changes from low open chenopod shrublands dominated by *Atriplex vesicaria* (Bladder Saltbush) and *Maireana aphylla* (Cottonbush) on the plains of the eastern end of the corridor, to tall shrubland characterised by *Acacia aneura* (Mulga) and *Acacia tetragonophylla* (Dead Finish) on sandy soils in the central parts and low open mulga woodland at the western end. A distinct vegetation association dominated by *Eucalyptus coolabah* (Coolibah) was observed for a short distance (approximately 150 m) along the corridor where it crosses Carringalana Creek. Separate vegetation association figures have not been provided for Borrow Pits associated with the Concentrate Export due to their proximity to the infrastructure corridor.

4.6.1.4 Electricity transmission line

Six broad vegetation associations have been identified within the electricity transmission line corridor. Habitat types of the northern section of the transmission line include mixed chenopod shrublands, cottonbush gilgais on stony plains, mixed mulga woodlands, mulga creeklines and cracking clay gilgais, while the central section of the electricity transmission line is dominated by saltbush gibber plains habitat (see Figure 4.39). The southern section of the electricity transmission line corridor traverses an area dominated by sand ridges, which run in an east to west direction. The broad, dominant habitat types across the revised alignment are woodland vegetation on the sand ridges and low shrubland on the swales.

Vegetation along the electricity transmission line corridor changes from low chenopod shrublands dominated by *Atriplex vesicaria* (Bladder Saltbush) and *Maireana astrotricha* (Low Bluebush) on the plains of the northern parts of the corridor, to low chenopod shrubland in the central parts of the corridor, which occurs on soils with silcrete gibber cover and gilgais, or on country with a sandy veneer over the gibbers. Other vegetation groups occur along the electricity transmission line corridor in canegrass swamps, on stony ridges with no shrub cover and around tea-tree swamps. Over the southern sections of the transmission line, *Acacia* sp. Low woodlands and chenopod shrublands are the dominant, broad vegetation types.

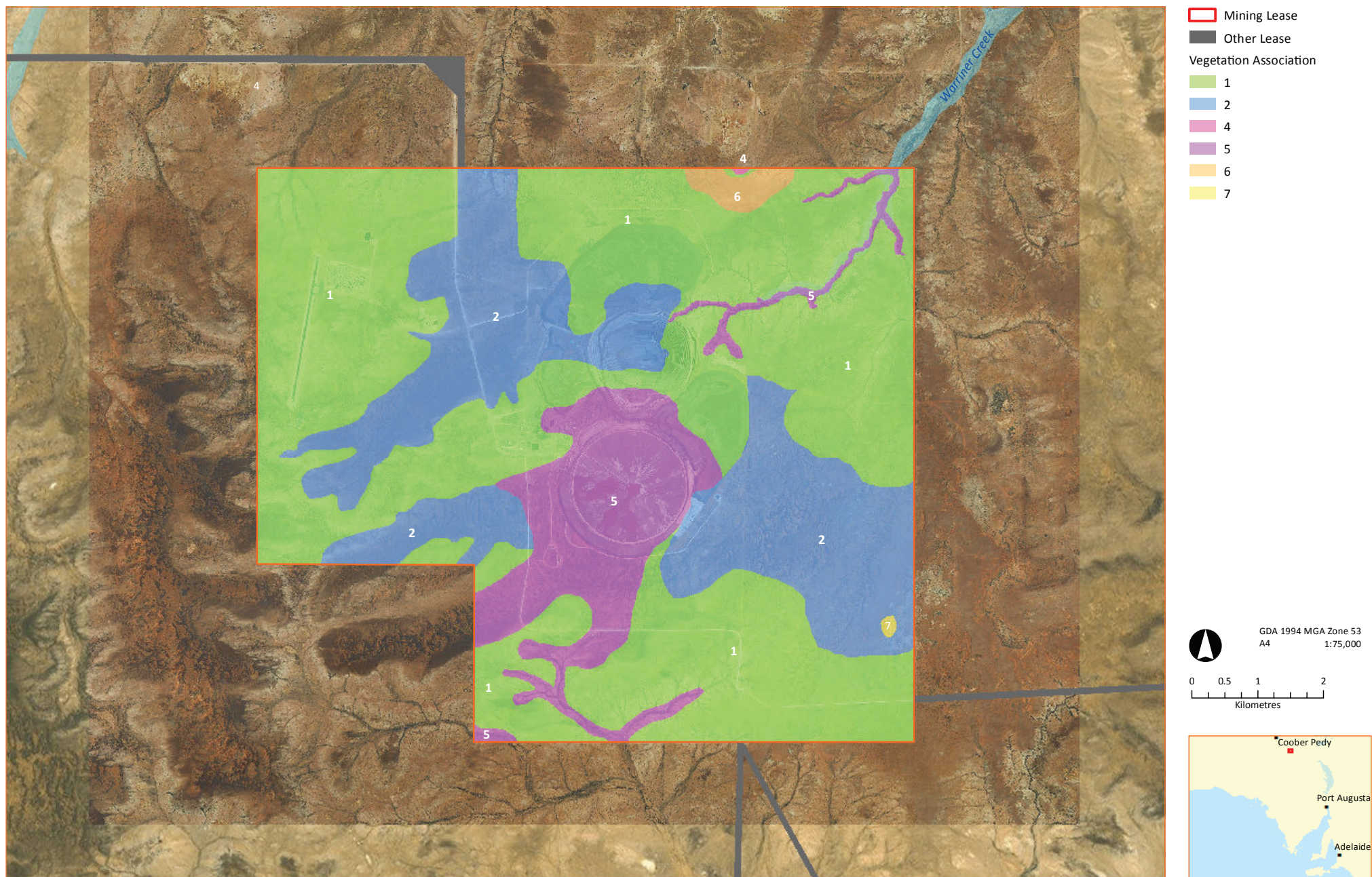
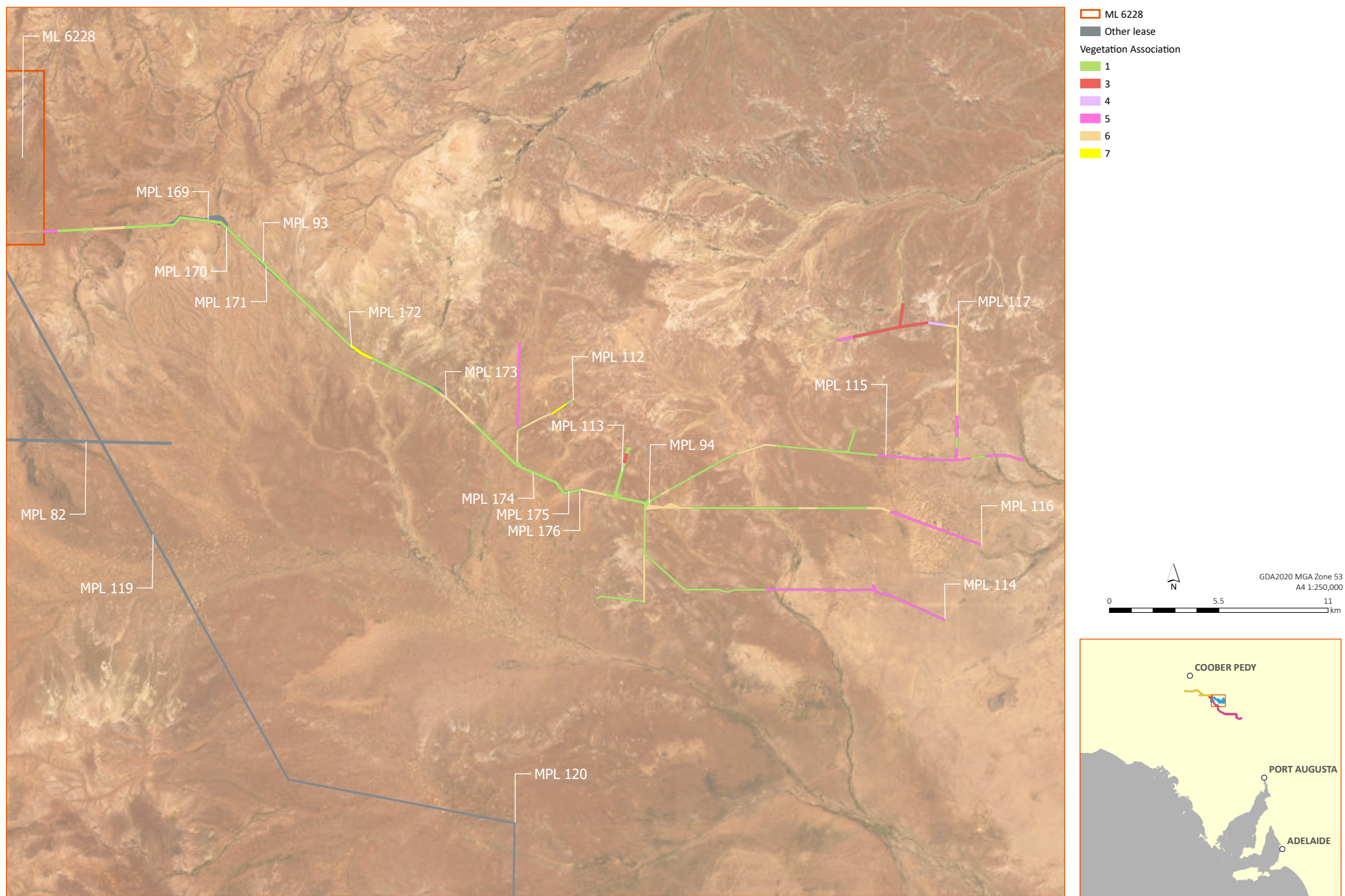


Figure 4.35 | Mining Lease and SEB vegetation associations



An updated vegetation assessment was done to support new Aries Borefield MPL tenements (Lathwida 2023)

Figure 4.36 | Aries Borefield MPL vegetation associations

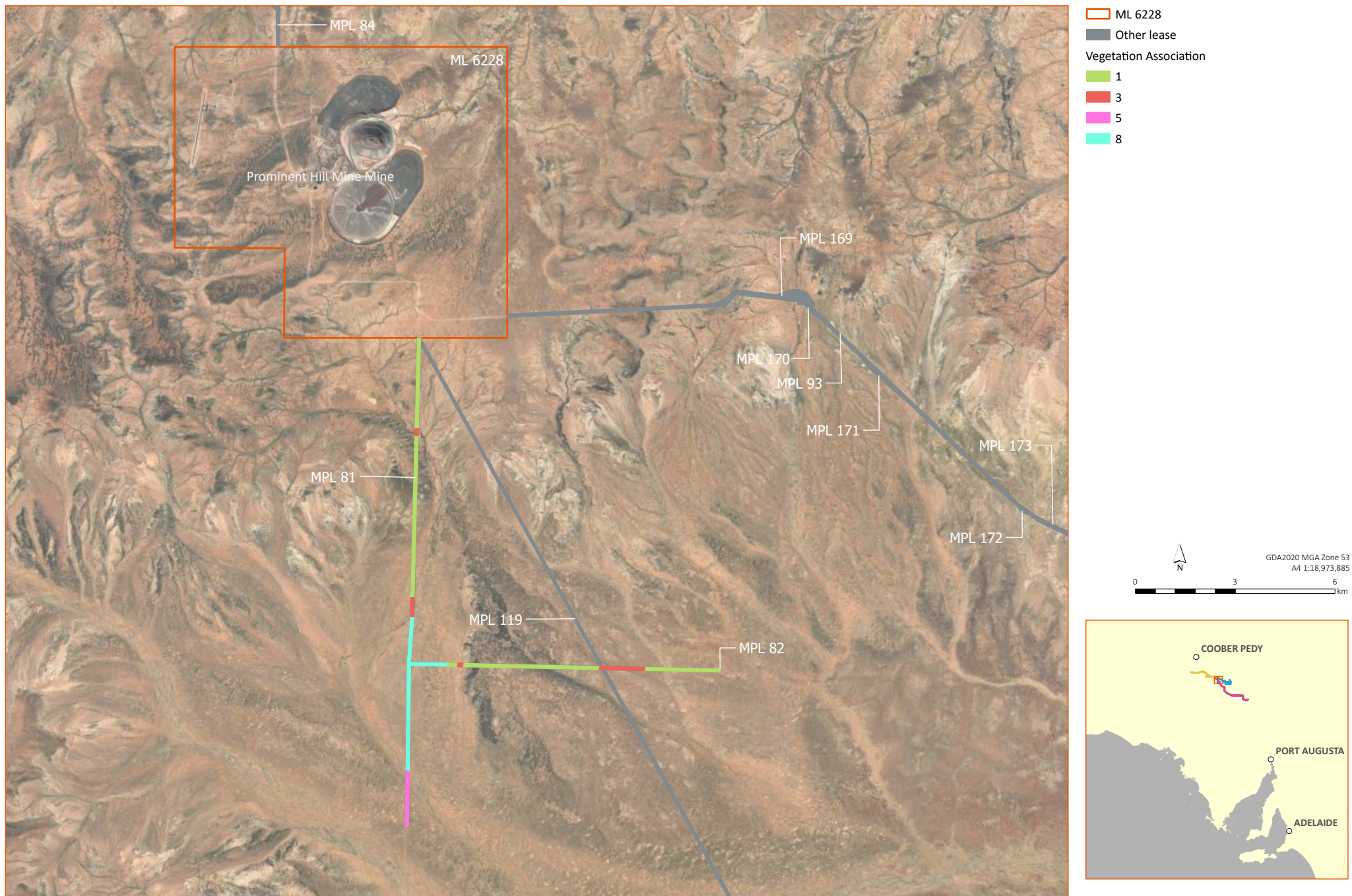


Figure 4.37 | Virgo Borefield MPL vegetation associations



Figure 4.38 | Concentrate Export Road MPL vegetation associations

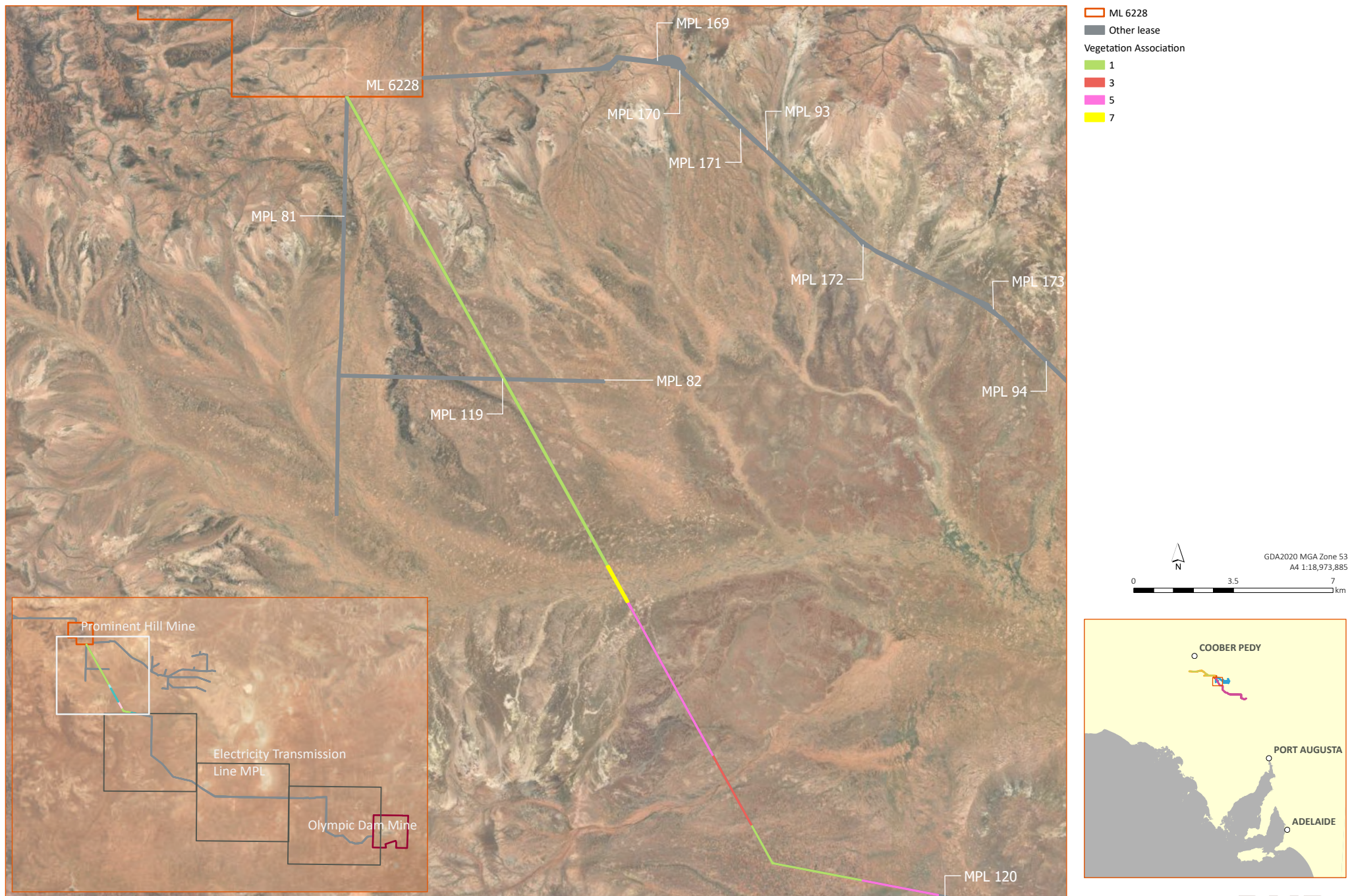


Figure 4.39 | Electricity Transmission Line MPL vegetation associations (part 1)



Figure 4.40 | Electrical Transmission Line MPL vegetation associations (part 2)

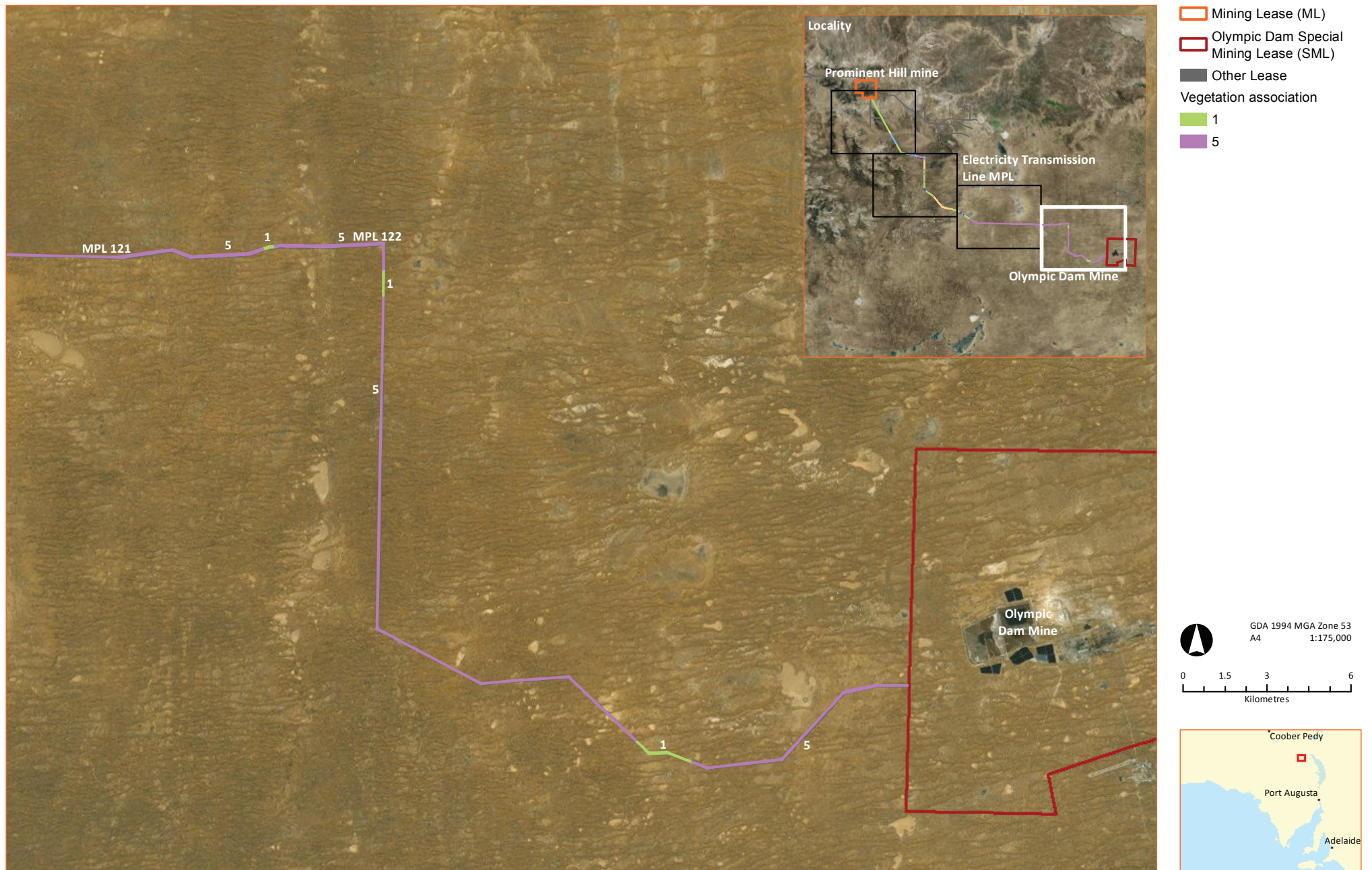


Figure 4.42 | Electrical Transmission Line MPL vegetation associations (part 4)

4.6.2 Flora

Moseby (2005) undertook a desktop assessment of flora and fauna at the Prominent Hill site, identifying a number of threatened species with the potential to occur in the area. In 2005, Badman reviewed these early findings and reported specifically on the status of threatened plant species in the Prominent Hill area. In 2006, he conducted a baseline vegetation survey of the proposed ML and proposed borefield area to support the earlier desktop work.

The vegetation of the mine area generally comprises low open to very open chenopod shrubland and mallee and mulga woodland, while the vegetation of the borefield and haul road areas generally comprise of low chenopod shrubland, with shrubland and hummock grassland, generally associated with watercourses in this area.

No vegetation communities of declared conservation significance at either the national or state level are known to occur in the mine, borefield or haul road areas. Four threatened flora species listed under the *National Parks and Wildlife Act 1972* (NPW Act) have been recorded in field surveys undertaken in these areas including: *Brachyscome eriogona* (rare), *Santalum spicatum* (vulnerable), *Sclerolaena blackiana* (rare) and *Roepera crassissima* (rare). No EPBC Act listed flora species have been observed.

Few weed species are present in any of the areas, although those that do occur are considered to be well established.

Table 4.7 | Prominent Hill listed threatened flora species

Specie name	Common name	Conservation status		Likelihood within leases
		National	State	
Listed threatened – <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)				
<i>Frankenia plicata</i>	Sea-heath	EN	V	Likely (ML) Likely (Borefields)
<i>Maireana melanocarpa</i>	Black-fruit Bluebush	V	R	Possible (ML) Possible (Borefields) Possible (Concentrate Export Road) Possible (Electricity Transmission Line)
<i>Stemodia haegii</i>	Haegi's Stemodia	E	R	Possible (Borefields)
<i>Austrostipa nullanulla</i>		V	R	Possible (Concentrate Export Road) Possible (Electricity Transmission Line)
Listed threatened – <i>National Parks and Wildlife Act 1972</i> (SA)				
<i>Atriplex eichleri</i>	Eichler's Saltbush		R	Possible (Borefields)
<i>Atriplex morrisii</i>			V	Possible (Borefields)
<i>Brachyscome eriogona</i>			R	Known (ML)
<i>Embadium johnstonii</i>	Johnston's Slipper-Plant		V	Likely (Aries Borefield)
<i>Eremophila pentaptera</i>	Small-leaf Emubush		R	Possible (ML) Possible (Aries Borefield)
<i>Eryngium vesiculosum</i>	Prostrate Blue Devil		R	Possible (Borefields)

Specie name	Common name	Conservation status		Likelihood within leases
		National	State	
<i>Gilesia biniflora</i>	Western Tar-vine		R	Possible (All)
<i>Goodenia chambersii</i>			R	Possible (ML)
<i>Goodenia lobata</i>			R	Possible (Virgo Borefield) Likely (Aries Borefield)
<i>Lepidium pseudoruderale</i>			R	Possible (All)
<i>Ptilotus barkeri</i>	Barker's Mulla Mulla		R	Possible (Borefields)
<i>Roepera crassissima</i>	thick twinleaf		R	Known (ML) Possible (Borefields) Possible (Access Road)
<i>Roepera humillima</i>	small fruit twinleaf		R	Possible (All)
<i>Roepera hybrida</i>			R	Possible (All)
<i>Santalum spicatum</i>	Sandalwood		V	Known (Electricity Transmission Line)
<i>Sclerolaena blackiana</i>	Black's Bindyi		R	Known (ML) Possible (Access Road) Possible (Borefields)
<i>Sclerolaena holtiana</i>	Holt's Bindyi		R	Possible (ML) Possible (Aries Borefield)
<i>Swainsona oligophylla</i>			R	Possible (All)
<i>Tecticornia cupuliformis</i>			V	Possible (All)
<i>Wurmbea stellata</i>	Star Nancy		R	Possible (ML) Possible (Access Road)

National: Australia (*Environment Protection and Biodiversity Conservation Act 1999*); State: South Australia (*National Parks and Wildlife Act 1972*); EN: Endangered; V: Vulnerable; R: Rare.

4.6.3 Fauna

Early baseline surveys (Moseby 2005; 2006) described an environment in good condition with minimal weed and feral animal infestation, impacted by a history of only light grazing. Moseby (2006) notes good riparian habitat with extensive grass and shrub coverage throughout due to a lack of phosphorus effect from waterpoints.

Four nationally threatened fauna species, as listed under the EPBC Act, were identified as potentially occurring at the Prominent Hill ML area by the desktop review (Moseby, 2005); the Dusky Hopping Mouse (*Notomys fuscus*), the Bronzeback Legless Lizard (*Ophidiocephalus taeniatus*), the Thick-billed Grasswren (*Amytornis textilis modestus*), and the Plains Mouse (*Pseudomys australis*).

The Dusky Hopping Mouse and Bronzeback Legless Lizard have not been identified on site over ten years of field surveys, and Moseby (2006) suggests that they are unlikely to be present due to a lack of suitable habitat and a currently known distribution which does not overlap with the mine lease area. The plains mouse and the Thick-billed Grasswren have been recorded periodically in field surveys. A Threatened Fauna Management Plan (OZ Minerals, 2018) has been developed to manage the protection

of these species and their habitat and has been registered with the Commonwealth Department of Agriculture, Water and Environment (DAWE) under the obligations of the EPBC Act.

Introduced species identified at the site during baseline surveys include the house mouse, feral cat, fox and rabbit. Introduced fauna species recorded within the ML, MPLs and EMLs are detailed in Table 4.18.

Table 4.8 | Prominent Hill threatened and migratory fauna species

Specie name	Common name	Conservation status		Likelihood within leases
		National	State	
Listed threatened – <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)				
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V		Known (ML) Possible (Concentrate Export Road) Possible (Electricity Transmission Line) Possible (Aries Borefield) Possible (Virgo Borefield)
<i>Acanthiza iredalei iredalei</i>	Slender-billed Thornbill	V	V	Possible (Aries Borefield)
<i>Amytornis modestus indulkana</i> (previously <i>Amytornis textilis modestus</i>)	Thick-billed Grasswren	V	R	Known (ML) Known (Concentrate Export Road) Known (Electricity Transmission Line) Possible (Virgo Borefield) Known (Aries Borefield)
<i>Macrotis lagotis</i>	Greater Bilby	V		Possible (Electricity Transmission Line)
<i>Ophidiocephalus taeniatus</i>	Bronzeback Snake-lizard	V	V	Possible (ML) Possible (Aries Borefield)
<i>Pedionomus torquatus</i>	Plains-wanderer	V	E	Possible (ML) Possible (Concentrate Export Road) Possible (Aries Borefield)
<i>Pseudomys australis</i>	Plains Mouse	V	V	Known (ML) Likely (Concentrate Export Road) Likely (Electricity Transmission Line) Possible (Virgo Borefield) Likely (Aries Borefield)

Specie name	Common name	Conservation status		Likelihood within leases
		National	State	
Listed migratory – <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)				
<i>Apus pacificus</i>	Fork-tailed Swift	Mi		Possible (Aries Borefield)
<i>Ardea alba</i>	Great Egret	Mi		Possible (Aries Borefield)
<i>Charadrius veredus</i>	Oriental Plover	Mi		Possible (Aries Borefield)
<i>Merops ornatus</i>	Rainbow Bee-eater	Mi		Known (ML) Likely (Concentrate Export Road) Known (Electricity Transmission Line) Likely (Aries Borefield)
Listed threatened – <i>National Parks and Wildlife Act 1972</i> (SA)				
<i>Anas rhynchotis</i>	Australian Shoveler		R	Possible (Aries Borefield)
<i>Aphelocephala pectoralis</i>	Chestnut-breasted Whiteface		R	Known (ML) Known (Concentrate Export Road) Known (Electricity Transmission Line) Known (Virgo Borefield) Known (Aries Borefield)
<i>Ardeotis australis</i>	Australian Bustard		V	Known (ML) Possible (Concentrate Export Road) Possible (Aries Borefield)
<i>Cacatua leadbeateri</i>	Major Mitchell Cockatoo		V	Possible (ML)
<i>Coturnix ypsilophora</i>	Brown Quail		V	Known (ML)
<i>Falco hypoleucos</i>	Grey Falcon		R	Known (ML)
<i>Falco peregrinus</i>	Peregrine Falcon		R	Possible (ML)
<i>Hamirostra melanosternum</i>	Black-breasted Buzzard		R	Possible (ML) Possible (Concentrate Export Road) Possible (Aries Borefield)
<i>Lophoictinia isura</i>	Square-tailed Kite		V	Possible (ML)
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V	Possible (ML) Possible (Concentrate Export Road) Possible (Aries Borefield)

Specie name	Common name	Conservation status		Likelihood within leases
		National	State	
<i>Neophema splendida</i>	Scarlet-chested Parrot		R	Possible (Concentrate Export Road)
<i>Phaps histrionica</i>	Flock Bronzewing		V	Likely (ML) Possible (Concentrate Export Road) Possible (Aries Borefield)
<i>Pyrrholaemus brunneus</i>	Redthroat		R	Possible (ML) Known (Concentrate Export Road) Possible (Aries Borefield)
<i>Stictonetta naevosa</i>	Freckled Duck		V	Possible (Aries Borefield)

National: Australia (Environment Protection and Biodiversity Conservation Act 1999); State: South Australia (National Parks and Wildlife Act 1972); EN: Endangered, V: Vulnerable, R: Rare Mi: Migratory.

Table 4.9 | Prominent Hill ML, MPL and EML recorded pest and feral animal species

Specie name	Common name	Conservation status		
		National	State	NRM
<i>Canis lupus familiaris</i>	Dingo/Wild Dog		D	
<i>Felis catus</i>	Feral Cat	KTP, TAP	D	K
<i>Mus musculus</i>	House Mouse		D	
<i>Oryctolagus cuniculus</i>	European Rabbit	KTP, TAP	D	K
<i>Passer domesticus</i>	House Sparrow		D	
<i>Vulpes vulpes</i>	Red Fox	KTP, TAP	D	K

National: Australia (Environment Protection and Biodiversity Conservation Act 1999 and Australian Pest Animal Strategy 2007); State: South Australia (declared animal pests Landscape South Australia Act 2019, NRM region: South Australian Arid Lands (key pest species of the SAAL Region))

KTP: Key Threatening Process, TAP: Threat Abatement Plan, D: Declared K: Key Pest Species.

4.6.4 Progression of understanding

Since the MARP 2009 a significant monitoring program and scientific studies have been undertaken to further understand the complex ecology of the Prominent Hill region. The following sections outlines the advancement of our understanding of the environment since that time.

4.6.4.1 Fauna monitoring response to mining operations

Biannual fauna monitoring commenced in autumn 2007 and continued through until 2010 when a stand-alone analysis of data collected up until that time was undertaken. Early reports in the monitoring program note that any trends in data could not be reliably attributed to the introduction of the mine into the region, since variations in seasonal conditions, rainfall patterns and natural fluctuations can influence population

trends. In autumn of 2009, the total number of fauna species detected was 61, compared with 60 in the previous two autumns, suggesting no apparent change in overall species diversity (EBS, 2009). No comparison is made with baseline data collected before the establishment of the mine, meaning data is effectively being assessed from within the mine disturbance period only. Clarification of adverse change is attempted via comparison between control (remote from the mine operation) and impact sites (adjacent to the mine operation). No clear trends are reported during early monitoring events (EBS, 2009; 2010a), indicating either a lack of sufficient data for statistical analysis, or that there is no significant adverse impact upon fauna as a result of the mine.

In 2010, a comprehensive stand-alone analysis of the monitoring data collected to date (2007 – 2010) was undertaken (EBS, 2010b). Importantly, the key target species, the Nationally Vulnerable Thick-billed Grasswren, was identified during every survey event at between six and 18 sites. The spring of 2009 recorded the fewest observations (22 individuals across 6 sites); however, this was followed by a marked increase in autumn of 2010 with 46 individuals recorded across 12 sites. The report suggests a trend in the data indicating an overall increase in mean site abundance of Thick-billed Grasswrens since 2007, and that Thick-billed Grasswrens may be in higher abundance at impact sites than at control sites. However, the graphical representation of data distributions would suggest that these trends are not statistically significant. The State Rare Chestnut-breasted Whiteface data followed a similar trend to Thick-billed Grasswren. Chestnut-breasted Whiteface were identified in all survey periods with the exception of Spring 2009 (followed by a return to similar numbers in 2010 as previously recorded in 2007 and 2008). A decline in total number of observations was reported from spring 2008 through 2009, with numbers increasing again in autumn of 2010. No notable difference in data was observed between control and impact sites for Chestnut-breasted Whiteface.

Overall, total fauna diversity indicated no clear difference between control and impact sites. Time series data for fauna at key gibber gilgais and sandy creek line habitats indicated no decline of any fauna group over time at impact sites without a corresponding decline at control sites. As such, there is no indication from the data collected through until 2010 that proximity to the mine operation is resulting in a reduction in overall species diversity.

The biannual monitoring continued in 2011, with the Nationally Vulnerable Plains Mouse (*Pseudomys australis*) first recorded at the site in Spring of 2011 with 46 records, then subsequently in Autumn 2012 (10 records) and then by a single individual in Autumn of 2013. Both the autumn and spring of 2011 showed a significant increase in the abundance of mammals with a corresponding spike in mammal species richness. The abundance and richness of birds also spiked in autumn of 2011.

A second stand-alone, comprehensive review of the data was undertaken in following completion of the 2012 monitoring (EBS, 2013a). This review refers to the 2009 MARP Objectives (as criteria), but does not specifically reference the established assessment criteria, such as comparison with baseline data for threatened fauna and for introduced animals. The assessment again indicates that fauna data in particular is difficult to meaningfully interpret due to low capture rates resulting in low statistical power, particularly for individual species, but also even when fauna data is clustered into functional groups. The data suggest that a number of species, including the Thick-billed Grasswren, were more abundant in impact sites closer to the mine pit than control sites further away, with no clear indication of differences between control and impact sites for species abundance or richness.

Monitoring continued following the stand-alone data review in 2013 until the spring of 2016. The autumn of 2016 showed a slight increase in mean abundance per site of mammals compared with the spring of 2015, but the marginal increase was a return to numbers seen during the previous autumn. Mean species richness of mammals at control sites rose in autumn of 2016 without a corresponding increase at impact sites, however, the previous three survey events have seen greater mean species richness at impact

sites compared with control sites. This oscillating trend in mean species richness and abundance between control and impact sites has been apparent throughout the whole monitoring program for mammals, birds and reptiles. It implies there is no clear trend of impacts to fauna at impact sites in close proximity to the mine.

In line with recommendations made in the 2017 Review of Prominent Hill Ecological Monitoring and as noted in the revised outcome and measurement criteria for flora and fauna in the PEPR 2017, fauna monitoring, particularly for the presence of threatened fauna, is not regarded as a reliable tool for determining threats to the species from mining activities. Instead, the key focus since 2017 has been on monitoring and reporting on habitat quality, particularly habitat that is used by the threatened species known to be present.

4.6.4.2 Flora monitoring response to mining operations

As per fauna, biannual vegetation monitoring during the operational phase of the mine commenced in autumn 2007 and continued initially through until 2010 when a stand-alone analysis of data collected up until that time was undertaken. The initial monitoring undertaken in autumn of 2007 by EBS (2007) assessed the composition and structure of vegetation at the site from quadrats chosen to represent the key vegetation groups in the ML area (or just beyond). These consisted of sites at varying distances from the mine and infrastructure to enable assessment of potential impacts as a result of disturbance. Methods employed included standard Biological Survey 100m x 100m quadrats, Jessop transects targeting perennial species and small 5 m x 2 m plots to interrogate presence and abundance of smaller forbs and grasses. Three main vegetation community types were identified; low open chenopod shrublands dominated by *Atriplex vesicaria* (Bladder Saltbush), Acacia low open woodlands within drainage channels, and Eucalypt low open mallee in thin bands of breakaway country. Only a single conservation listed species was detected during the first round of monitoring, the State Rare *Roepera crassissima* (Thick Twinleaf), recorded at the same location as reported by Badman (2006).

Whilst control sites remote from the impact areas reported slightly higher species diversity than impact sites in close proximity to disturbance, EBS (2007a) report that it is too early in the monitoring program to draw any conclusions. The initial monitoring report suggests that data sets of at least 3 to 5 years are required to meaningfully detect change in flora species abundance and diversity.

Following the summary of data from 2007 to 2010, biannual monitoring continued at the site. Average species diversity (richness) recorded within all 100 m x 100 m survey plots (impact and control) was the highest recorded to date in Autumn of 2011 (with an average of 62.08 species recorded per plot), followed by a slight drop in Spring of 2011 with 52.32 species per plot. In autumn of 2012 numbers were back at nearly the highest recorded values again with 60.36, followed by another decrease in spring to 50.4. These species richness numbers recorded during 2011 and 2012 were significantly higher than values recorded during the earlier part of the monitoring program which ranged between 11.85 mean per plot in spring of 2007 to 38.08 in spring of 2009. These numbers suggest a seasonal influence, supported by the highest rainfall records of the monitoring program during 2010 and 2011.

In 2013, the second comprehensive analysis of data collected to date was undertaken, encompassing the monitoring from autumn 2007 until spring of 2012, six complete years of monitoring (EBS, 2013). Again, EBS (2013) suggest that longer term monitoring, of up to 10 years, is required to meaningfully elucidate whether real trends are occurring. The report again indicates no apparent difference in flora species diversity between control and impact sites, with 206 and 209 native species recorded respectively. Annual and perennial species diversity is reported as directly attributable to recent rainfall events which is not unexpected. Perennial and annual species had shown substantial variability in cover abundance between seasons and between years, however, the mean cover abundance of perennials,

annuals and ephemerals had shown little difference between control and impact sites. The State Rare *Sclerolaena blackiana* and *Gilesia biniflora* (Western Tar-vine) had been identified at the site.

In the autumn of 2015, two control and two impact sites were introduced for monitoring of the threatened species *Roepora crassissima* (Thick Twinleaf). There was no significant change in mean abundance between autumn 2015 and spring 2015, or between spring 2015 and autumn 2016, but a higher incidence of juveniles at impacts sites in 2016 compared with previous surveys.

With the shift in flora monitoring in 2015 to smaller plots targeting indicator species and a focus on comparison between the SEB offset area and external sites, the assessment against historic data trends (from 2007 between control and impact sites) was effectively restarted. Since the revised method commenced in Autumn 2015 the mean abundance of indicator species plants per plot has been markedly lower in SEB sites compared with sites outside of the SEB area, which is counter intuitive but cannot be attributed to the mining operation given the comparison was only first undertaken in 2015. Overall species richness was slightly higher in SEB sites compared to sites outside of the SEB area, despite the overall lower abundance. Outside sites showed high richness of perennial grasses compared to SEB sites, despite the presence of grazing pressure outside of the SEB area. Functional indices were universally higher in SEB sites compared with sites outside, as expected.

In line with recommendations made in the 2017 Review of Prominent Hill Ecological Monitoring and as outlined in the outcome and OMC for flora and fauna in the PEPR 2017, the methodology for the measurement of changes in habitat quality indicators was changed in 2017.

Results from August 2017 (ELA, 2017) were variable with species number, species cover and recruitment proportions all higher at control sites compared with impact sites. Cover percentages for litter, bare ground and grasses were collectively higher at impact sites across all vegetation types except for mallee woodland where covers were greater at control sites. A total of 121 flora species were recorded across all monitoring sites, including one state threatened species, *Roepora crassissima*.

In 2018 (ELA, 2018) results were variable though with a common trend when comparing 2017 and 2018 data. Across all sites and vegetation types, there was a decrease since the previous survey in most values including species number, cover and recruitment. There was also a consistent decrease in cover percentages for litter, bare ground and grasses since the previous survey in 2017. The reasons for the decrease trends are likely due to considerably less rainfall and potentially an increase in dust accumulation from drier conditions, which shows that seasonal variation plays a large role. The state and territory listed threatened flora species, *Roepora crassissima* (Thick Twinleaf) was again recorded as well as one Commonwealth listed threatened bird, *Amytornis modestus* (Thick-billed Grasswren).

In 2019 (GHD, 2019) the total number of species declined over the past three years of monitoring, where no annual species were recorded. Changes in perennial diversity, total cover percentage and recruitment of species has likely occurred as a result of drought conditions experienced which included less than 60 mm of annual rainfall over a two-year (2018-2019) period. grazing and the low sample size (sites). Reduced covers were recorded in the Acacia Woodland control site for many grass species such as *Ptilotus obovatus* ((Silver Mulla Mulla) and for the introduced *Malvastrum americanum*.

During the 2020 survey (ELA, 2020), a total of 121 plant species were recorded, which is the highest number of species recorded at the site since the current monitoring program commenced in 2017. This is likely as a result of the heavy rainfall experienced at the mine site in early 2020. The vegetation is in a better condition in 2020 compared to 2019, with an increase in species diversity, vegetation cover, proportion of species recruiting, grass cover and litter cover, and a reduction in grazing pressure and bare ground. However, there is evidence of a reduction in perennial diversity in Acacia Woodland and Chenopod Shrublands and dieback was observed at several the sites.

Weed species were reported in low abundance throughout the period between 2007 and 2010 at flora monitoring sites. All species recorded were present within the landscape prior to mining activities, suggesting no adverse impact in terms of weed species diversity because of the mine. It is noted that *Carrichtera annua* (Wards Weed) and *Marrubium vulgare* (Horehound) were reported at the accommodation village during this period and subsequently controlled. Weed species remained in low numbers across the landscape through until the 2012 monitoring period, with seven species recorded from control sites and eight species from impact sites. Two new weed species were identified in the 2016 survey. *Cenchrus ciliaris* (Buffel Grass) was observed in low numbers at the Wirrida rail siding with a large outbreak approximately 9 km west of the Stuart Highway underpass. *Senna occidentalis* (Coffee Bean Senna) was identified at the rail siding growing in ballast. Both species were removed.

The presence of weeds increased in distribution in 2020 (ELA, 2020) from the previous year, however weed abundance was generally lower than previous surveys. Four species of weeds were observed during the survey including *Heliotropium europaeum*, *Malvastrum americanum*, *Sisymbrium erysimoides* and *Sonchus oleraceus*. Due to heavy rainfall in early 2020 this result is not unexpected as most growth for *Malvastrum americanum* occurs during the warmer months, particularly following heavy rains or floods. No new weed species were detected in 2020.

4.7 Noise, air quality and radiation

A summary of noise, air quality and radiation is summarised in the following sections.

4.7.1 Noise

A noise and blasting assessment was conducted for the Project by Holmes Air Sciences in March 2006. No on-site ambient noise data was collected prior to the Project. However, no significant, permanent man-made noise sources existed at or near the Project Area. The only source of noise was wind blowing over vegetation and noises from insects and birds, predominantly in the creek areas. The background noise levels were estimated to be less than 30 dB(A) during the night and in non-windy periods during the day.

4.7.2 Air quality

Prior to the commencement of mining operations, the most significant background atmospheric contaminant in the Project Area would be particulate matter from wind erosion of natural and disturbed surfaces. The vegetation cover and the soil conditions in arid South Australia are such that background ambient concentrations of particulate matter are low under most circumstances, however, on occasions, there are elevated concentrations of dust suspended and transported by high winds from areas further west of the Prominent Hill region. Prior to the development of the Prominent Hill operations, the Project Area contained no significant man-made sources of air pollution. The closest significant industrial development is the BHP Olympic Dam mining operation, located 150 km to the south-east. Additionally, there are numerous small-scale opal mining operations at and around Coober Pedy, located approximately 100 km from the Project. The arid nature of the area means that material that is disturbed by pastoral activities (including stock, vehicles and/or earthmoving equipment) also has the potential to generate significant quantities of dust.

4.7.3 Radiation

A radiation assessment for the Project was conducted by Papari Radiation Services in 2006.

The results of aerial radiometric surveys carried over the Project Area and surroundings show that uranium soil concentrations are generally in the range of 2 to 5 ppm. These concentrations are typical of normal soils, with the worldwide average being about 3 ppm.

Approximately 600 gamma measurements were obtained over transects within the Project Area. Measured dose rates (gamma results) were 0.11 Gy/hr compared with average dose rates in Australia of 0.09 Gy/hr.

Background uranium data were obtained from the analysis of 13 samples of soil and creek sediment. Results indicate that uranium (U-238) concentrations were in the range 1.5 to 3.5 ppm (average of 2.1 ppm). These results are lower than, but consistent with, those obtained from the aerial radiometric surveys. Thorium (Th-232) averaged 9.3 ppm, which is typical of normal soils.

Overall, the existing radiation environment is consistent with typical background conditions and there is no evidence of any significant enhancement due to the presence of the deposit, or from any other source.

4.7.4 Progression of understanding

Since the MARP 2009 a significant monitoring program and scientific studies have been undertaken to further understand the air quality and radiation systems of the Prominent Hill region. The following section outlines the advancement of our understanding of the environment since that time.

4.7.4.1 Air quality response to operations

Baseline and operational monitoring summary

Limited baseline data was collected prior 2007 and impacts were predicted based on modelling. An air quality monitoring system has been implemented since 2007, consisting of radon monitors, passive dust deposition gauges and high-volume air samplers (HVAS) in order to understand the contribution of the operation to regional air quality.

The current air quality monitoring system comprises the following monitoring equipment:

- 1 x meteorological monitoring station
- 5 x passive radon monitoring stations (co-located with what once was the dust deposition monitoring stations up to 2017, after which dust deposition monitoring was no longer required).

Ground level particulate concentrations

Up until January 2018, there were two HVAS monitors operated for 24-hours every sixth day in accordance with the relevant Australian Standard. 24-hour PM₁₀ and averages have been generated since August 2007, with TSP monitoring commencing in January 2010. Results from the HVAS units (located near the site accommodation complex) indicate that PM₁₀ 24-hour averages are generally low, with between zero and five days per annum over 50 µg/m³, with the exception of 2008 during open pit surface stripping activities, when 16 occurrences over 50 µg/m³ were recorded. Annual averages for TSP ranged between 33-79 µg/m³, averaging around 55 µg/m³ for all years, including TSF contributions. Annual average PM₁₀ concentrations ranged between 18-37 µg/m³, with an average of around 37 µg/m³ for all years. Typical background concentrations of PM₁₀ and TSP in arid and semi-arid areas of Australia

are around 10 – 15 $\mu\text{g}/\text{m}^3$ and 20 – 30 $\mu\text{g}/\text{m}^3$, respectively, implying an operational contribution to ambient PM_{10} and TSP concentrations at the accommodation village of around 8 – 22 $\mu\text{g}/\text{m}^3$ and 13 – 49 $\mu\text{g}/\text{m}^3$, respectively.

Given the low results for PM_{10} and TSP and that HVAS monitoring has never been a compliance requirement for the operation, the decision was made to cease monitoring, and it no longer occurs at the operation.

Dust deposition rates

Dust deposition rates were recorded at 21 sites from early 2007 to early 2013, when the system was refined back to five sites within the lease. Average dust deposition results (all data) from the system are between 2 and 26 $\text{g}/\text{m}^2/\text{month}$. Higher values correspond to sites located directly adjacent to operational areas (specifically on or around the ROM pad, WRDs or adjacent to the primary crushers). Sites further away from dust-generating activities receive lesser dust deposition. This indicates that the increase in dust deposition rate over background is localised, decreasing to background levels (measured at around 2.5 – 3.5 $\text{g}/\text{m}^2/\text{month}$) within around 5 km of the operation.

Since 2017 Prominent Hill no longer undertakes dust deposition monitoring however any complaints relating to dust are recorded in the sites management database and handled in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.

4.7.4.2 Radiation response to operations

Ground level radon concentrations

Radon monitoring was undertaken quarterly at six sites from late 2006 until late 2012, when these sites were replaced with five stations, co-located with the five dust deposition monitoring sites. Averages of all data collected under both monitoring regimes indicates radon concentrations consistent with typical background radon concentrations in arid South Australia (10–25 Bq/m^3), noting that the majority of radon results returned levels less than the minimum detection limit. This suggests no effect from the operation on regional radon concentrations. Individual radon measurements have all varied between 10–25 Bq/m^3 , with only three recorded measurements outside of this range at 39, 47 and 59 Bq/m^3 . There is no correlation between measured radon concentrations and distance from the operation.

Non-human biota radiation exposure

In 2019, Radiation Consulting Australia undertook an Environmental Radiation Impact Assessment to determine the radiation related impacts specific to non-human biota. This study used the Environmental Risk from Ionising Contaminants Assessment and Management (ERICA) assessment tool. The ERICA tool provides a method of assessing the impact of radiological contaminants to the natural environment. Measurements were taken over locations similar to the baseline survey for comparison coupled with soil samples for radionuclide and uranium concentrations. Additionally, dust deposition averages for uranium were analysed from 2017. The assessment was based on a host of organisms inclusive of, but not limited to, birds, mammals, amphibian, lichen, mollusc, grasses, shrubs and trees.

The results from the tool found no referenced animals or plants received a dose above 10 $\mu\text{Gy}/\text{h}$ indicating that there are no impacts from a radiological perspective due to current operations.

4.8 Population and demographics

Prominent Hill and the associated MPLs and EMLs are in a remote region of South Australia (see Figure 2.1). The closest towns are Coober Pedy, about 100 km from the ML, and Roxby Downs (about 150 km from the ML). Although both are mining towns, Coober Pedy and Roxby Downs differ in their history, culture and demography.

Mining in Coober Pedy consists of small-scale opal mines, generally operated by only a few people. In contrast, Roxby Downs is the base for the BHP Olympic Dam operation, one of Australia's largest mining projects. Numerous pastoral properties are also located throughout the region and, together with mining and conservation, represent the most significant land uses in the region. Population and demographics of the region are summarised in the subsections below. The data contained on population and demographics is inclusive of the most recent census (2016) data.

4.8.1 Population

In the most recent Census (ABS 2016), the population of the Coober Pedy Local Government Area (LGA) was 1,762, with the Roxby Downs LGA being 3,884. The population variation in both towns since 1991 is shown in Table 4.10.

The number of people residing at the surrounding pastoral stations varies throughout the year but is generally around five people per station. This can increase to around 30 during shearing activities, which occur for approximately three weeks per year.

Table 4.10 | Populations in nearby communities

Year	Population	
	Coober Pedy	Roxby Downs
1991	2,313	2,353
1996	2,668	2,707
2001	2,296	3,488
2006	1,916	4,056
2011	1,695	4,702
2016	1,762	3,884

4.8.2 Demographics

Key demographic indicators for Coober Pedy and Roxby Downs Local Government Areas (LGAs) in the context of the South Australian average as of the 2016 Census are summarised in Table 4.11.

Table 4.11 | Key demographic indicators (2016 Census)

Indicator	Coober Pedy	Roxby Downs	South Australia
Indigenous population (%)	17.1	3.0	2.8
Australian-born (%)	57.9	77.6	66.7
Median age (years)	46	30	38

Indicator	Coober Pedy	Roxby Downs	South Australia
Male: Female ratio	1:0.83	1:0.75	0.49:0.51
Private dwellings (no.)	1,144	1,633	731,024
Vacancy rate (%)	39.7	27.9	12.6
Unemployment rate (%)	9.9	3.5	6.9
Post-school qualifications (%)	9.5	14.7	22.7
Median weekly individual income (\$)	497	1,547	662
Major employment industries	Accommodation (10.4%)	Mining (44.2%)	Hospitals (4.1%)
	Education (6.8%)	Building and other industrial cleaning services (3.7%)	Aged care residential services (3.0%)
	Local Government Administration (5.8%)	Education (2.6%)	Supermarket and grocery stores (2.9%)

4.8.3 Age

The median age of people in Coober Pedy was 46 years. Children aged 0–14 years made up 15.9% of the population and people aged 65 years and over made up 22.8% of the population. The median age of people in Roxby Downs was 30 years. Children aged 0–14 years made up 26.4% of the population and people aged 65 years and over made up 1.3% of the population.

4.8.4 Ethnic and religion

In Coober Pedy, 57.9% of citizens were born in Australia, with Greece, Sri Lanka, England, Germany and Philippines representing the country of birth of between 1.9 – 3.2% of the population each. The most common ancestries were Australian 23%, English 18.7%, German 5.9%, Irish 5.3% and Greek 4.9%. The most common responses for religion in Coober Pedy were No Religion 30.5%, Not stated 18.4%, Catholic 16.8%, Eastern Orthodox 7.1%, and Anglican 6.5%.

In Roxby Downs, 77.6% of people were born in Australia. The other most common countries of birth were New Zealand 2.5%, England 2.1%, Philippines 1.6%, South Africa 1% and Zimbabwe 0.8%. The most common ancestries were Australian 34.1%, English 26.6%, Scottish 6.5%, Irish 5.8% and German 5.4%. With regards to religion, 38.8% followed no religion, with the other most common responses being Catholic (20.7%), Not stated 10.9%, Anglican (9.3%) and Uniting Church (7.9%).

4.8.5 Education

In Coober Pedy, 32.2.% of people were attending an educational institution. Of these, 20.6% were in primary school, 7.9% in secondary school and 9.7% in a tertiary or technical institution. In Roxby Downs, 32.5% of people were attending an educational institution. Of these, 34.7% were in primary school, 15% in secondary school and 14.6% in a tertiary or technical institution. In Coober Pedy, 9.5% had a post-school qualification which includes technical or further education institution and university or tertiary institution. The South Australian average is 22.7%. Residents of Roxby Downs had a higher post-school qualification of 14.7%.

4.8.6 Accommodation

In Coober Pedy, 60.3% of private dwellings were occupied and 39.7% were unoccupied. Of occupied private dwellings, 94.6% were separate houses, 1% were semi-detached, row or terrace houses, townhouses etc., and none were flats, units, apartments or other dwellings. Of occupied private dwellings, 36.7% were owned outright, 18.3% were owned with a mortgage and 36.5% were rented. The average monthly mortgage repayments in Coober Pedy were \$556, with average weekly rents of around \$150.

In Roxby Downs, 72.1% of private dwellings were occupied and 27.9% were unoccupied. Of occupied private dwellings, 83.6% were separate houses, 11.9% were semi-detached, row or terrace houses, townhouses etc., 4.0% were flats, units or apartments and 0.3% were other dwellings. Of occupied houses, 5.8% were owned outright, 22.2% were owned with a mortgage and 69.9% were rented. The average monthly mortgage repayments in Roxby Downs were \$2,000, with average weekly rents of around \$198.

4.8.7 Employment

There were 709 people who reported being in the labour force in the week before 2011 Census night in Coober Pedy. Of these 56.6% were employed full time, 24.1% were employed part-time and 9.9% were unemployed. Of the employed people in Coober Pedy, 10.4% worked in accommodation. Other major industries of employment included education (6.8%), Local Government administration (5.8%), supermarket and grocery stores (5.3%) and hospitals (except Psychiatric Hospitals) (4.6%). The median weekly personal income for people aged 15 years and over in Coober Pedy was \$497. 38.3% of households had a weekly household income of less than \$650 and 4.9% of households had a weekly income of more than \$3,000.

In Roxby Downs, 2,283 people reported being in the labour force in the week before Census night, of which 71.4% were employed full time and 18.7% were employed part-time. The unemployment rate in Roxby Downs was 3.5%. Unsurprisingly, industries related to mining (such as Copper Ore Mining, Gold Ore Mining and Other Metal Ore Mining) were the major employers in Roxby Downs, with 44.2% employed directly. Building and other industrial cleaning services were (3.7%) and education (2.6%) were the other major employers. The median weekly personal income for people aged 15 years and over was \$1,547. 3.7% of households had a weekly household income of less than \$650 and 34.5% of households had a weekly income of more than \$3,000.

4.9 Proximity to infrastructure and housing

4.9.1 Residential housing

The Project Area is quite remote, being located on the Mount Eba pastoral lease. The closest houses are 35 km (The Twins homestead) and 50 km (Millers Creek homestead) from the mine.

4.9.2 Community services and facilities

Health services at Coober Pedy and Roxby Downs are operated by The Northern and Far Western Regional Health Service. The Coober Pedy health service is located closest to the Project Area and has a 24-hour accident and emergency service, with visiting specialists catering for a variety of needs. Some of the local pastoralists also visit Port Augusta for their health services. Coober Pedy's police and emergency services include ambulance, police, fire and mine rescue/ SES services. Roxby Downs also

has similar services. The Royal Flying Doctor Service (RFDS), which operates bases in Adelaide, Port Augusta and Uluru/Ayers Rock, is expected to be available in emergency situations. The pastoralists in the Project Area maintain their own airstrips, which are used by the RFDS during emergencies.

Community services and shops in Coober Pedy include a post office, bank, supermarkets, service stations, pharmacy, hardware and newsagent. The town also has a bookshop, art gallery, a number of opal businesses and a pottery gallery. No taxi services are available, although car hire is available. Roxby Downs also has a range of shops and services including a community library, auditorium, cinema, bakery, post office, supermarket and service stations.

Coober Pedy has a range of recreational opportunities including the annual Opal festival, golf course, soccer field, BMX track, tennis courts, seasonal swimming pool and adventure playground. Service clubs include Lions, RSL, Italo-Australian Miners, United Yugoslav Australian Association, Croatian Club and Serbian Club, and the town has a variety of different churches to cater for the range of religious affiliations.

Roxby Downs also has a range of recreational and service clubs including shooting, football, horse and pony, regional cadets, RSL and Bible reading. There is also a leisure centre, hockey field and golf course.

4.9.3 Electricity supply

Prior to the Prominent Hill Copper-Gold Project, the Project Area and surrounds were not connected to grid power. The Prominent Hill exploration camp was powered by diesel generators and pastoralists in the area also obtain their electricity via generators, supplemented by some solar power.

The closest grid power in the area was 150 km south-east of the Project Area at the Olympic Dam mine, which is serviced by a 275-kV line. This line also provides electricity to Roxby Downs, with electricity distribution being the responsibility of Roxby Power, a business run by Roxby Downs Council. Electricity in Coober Pedy is generated by hybrid diesel / wind/ solar, operated by Energy Generation Pty Ltd (EDL), with the District Council of Coober Pedy being responsible for distribution and retailing.

4.9.4 Water supply

Pastoralists in the area obtain their water requirements from underground bores, with some rainwater collection. However, water in the area varies in quality, particularly in regard to salinity.

Water for stock was originally obtained via natural water sources such as waterholes and springs, and later, dams. Polythene pipe is commonly used to reticulate water to places where permanent water was previously unavailable. The closest above-ground water point to the project site is Fitzgeralds Dam, located approximately 4 km west of the western boundary of the Project Area. Warriner Creek and Wattiwarriganna Creek, which run through the Project Area, are ephemeral.

The Olympic Dam mine uses artesian water that is extracted from the Great Artesian Basin and pumped to site. Water in Roxby Downs is purchased from BHP by Roxby Water, a business run by Roxby Downs Council. The water requires purification in a desalination plant before it is suitable for drinking. Coober Pedy's water is sourced from artesian bores that are situated 23 km north-east of the town.

4.9.5 Roads

A network of sealed and unsealed roads, which vary in quality and purpose, service the Project Area and surrounds. The Stuart Highway, a sealed, two-lane highway maintained by the Department for Infrastructure and Transport (DIT), is the major road in the region and connects Adelaide and Darwin. 2024 traffic survey data indicates, for the section of highway between Pimba and Coober Pedy, that the estimated annual average daily traffic was 440 of which 36.5% were commercial (heavy) vehicles (LocationSA, 2025).

Other roads are generally unsealed and single lane, predominantly used by pastoralists for farming and private purposes.

The Project Area is approximately 150 km by road (or two hours' drive) from Coober Pedy, while Roxby Downs is 400 km by road (or four hours' drive away).

4.9.6 Rail

The nearest railway to the Project Area is the Adelaide to Darwin Railway, which is a standard gauge line operated by the Asia Pacific Transport company, with Freight Link Pty Ltd as its operating company for freight services. A railway siding is located at Wirrida, and this will serve as a transfer point for concentrate between the mine haul trucks and rail cars. The Project Area is approximately 116 km from Wirrida siding.

4.9.7 Port

Concentrate will be transported via rail from the Wirrida siding to Port Adelaide and the Port of Darwin, which are existing ports with established infrastructure suitable for export purposes.

4.9.8 Air

The closest commercial airport to the Project is at Coober Pedy and is serviced by Regional Express. The next closest commercial airport is at Olympic Dam, which is serviced by Alliance Airlines. Private unsealed airstrips are located on various pastoral stations, the closest being at The Twins homestead approximately 35 km from the Project Area. These airstrips are maintained by the pastoralists for private use, and to provide access for the Royal Flying Doctor Service if required.

4.9.9 Communication

Telstra supports GSM and CDMA phone networks in both Coober Pedy and Roxby Downs. There was no existing mobile phone service in the Project Area prior to the project. Internet access is available at Coober Pedy and Roxby Downs. Telstra provides phone services to local pastoralist via microwave dishes.

4.9.10 Other infrastructure

A dog fence is located about 30 km north-east of the Project Area. The fence is understood to have existed since the 1930s and was constructed to prevent the entry of dingoes into pastoral and agricultural areas. Sheep grazing is generally restricted to south of the fence, where dingoes have been excluded, whereas cattle grazing occurs mainly north of the fence. It is the duty of the owner of any part of the dog fence to ensure that it is properly maintained and to take reasonable steps to destroy dingoes in the vicinity of the fence. The fence is maintained and monitored through the Dog Fence Board.

4.10 Aboriginal heritage

4.10.1 Historical background

Surveys have shown that the sites relating to Indigenous occupation in the Project Area most commonly include scatters of stone artefacts and stone quarries. The area is also traversed by various creation stories and strong historical connections and oral traditions to the area are maintained by the Aboriginal communities. The Project Area, borefield areas, access roads, haul roads and electricity transmission line corridor contain culturally significant sites.

Prominent Hill operations and associated infrastructure interacts with three native title groups determination areas:

- Antakirinja Matu-Yankunytjatjara People (*Native Title Determination*: 11/5/2011)
- Arabana People (*Native Title Determination*: 4/12/2012)
- Kokatha People (*Native Title Determination*: 1/9/2014)

4.10.2 Archaeological significance

The artefact scatters typically comprise small, discrete deposits, the majority of which probably formed during single events. A smaller number of sites contain evidence of repeated or sustained occupation, in the form of large and diverse artefact assemblages.

The scientific significance of the archaeological sites recorded during the surveys is assessed on their research potential, which in turn is based on their content, structure and integrity, as well as representativeness, i.e., how many sites of its type occur in the region.

4.10.3 Anthropological significance

In addition to the archaeological sites recorded in the Project Area, there are a number of anthropological sites considered to be of significance to the Antakarinja Matu-Yankunytjatjara People within whose claim boundary the Project Area lies. In addition, many water courses, clay pans, cane grass swamps, rocky outcrops, hills and escarpments together with trees and some other flora have cultural significance and are areas/sites of significance for the purpose of heritage legislation. These cultural sites may also have relevance to other Indigenous groups.

4.10.4 Aboriginal significance

Cultural surveys were undertaken with traditional owners prior to any land disturbance activity during construction and are reflected in the Prominent Hill Cultural Heritage Management Plan.

4.10.5 Cultural significance

Areas of cultural significance (under the *Aboriginal Heritage Act 1988* (SA)) were identified through work clearances conducted during the exploration phase of the Project with Antakarinja Matu-Yankunytjatjara, Kokatha and Arabana People. These clearances identified the Prominent Hill landmark and Warriner Creek and tributaries as areas of cultural significance.

4.11 European heritage

4.11.1 Historical background

Limited European movement from Adelaide into the north-west had occurred prior to 1940 due to the harsh conditions and impenetrable salt lakes extending north of the Flinders Ranges. Government and privately sponsored expeditions in 1858 located several mound springs west and south of Lake Eyre. The discovery of springs south of Lake Eyre prompted rapid pastoralism development in nearby areas and the establishment of several stations and leases in the late 1800s. However, leases were periodically abandoned due to drought and logistical difficulties in maintaining supply to remote stations and were subsequently occupied by Government caretakers.

Post-contact Aboriginal histories are linked with the histories of exploration and subsequent pastoral activities. Explorers relied on the navigational and diplomatic skills of Aboriginal guides, and pastoralists monopolised water and resources for stock irrevocably impacting on the livelihoods of Aboriginal people. From the 1880s onwards, many pastoralists encouraged Aboriginal people to live on their properties to hunt rabbits, dingos and other vermin, often in exchange for food rations. The pastoral industry at that time was underpinned by unpaid or low paid Aboriginal labour.

The Woomera Prohibited Area (WPA) was declared in 1946, because of a need for Britain to develop its military capability following a number of attacks by long range ballistic missiles towards the end of World War II. The WPA was subsequently used by Britain, the United States, and the European Launcher Development Organisation (a collaboration between France, West Germany, Italy, Belgium, Netherlands, Britain and Australia) for missile and nuclear testing. Today it is still used as a testing ground by the Department of Defence (DoD).

4.11.2 Survey results

No major structures of non-Indigenous cultural heritage significance were recorded in the Project Area. However, three sites related to pastoral history during the mid-1900s were recorded along the site access road. Other sites related to pastoral history are in and around the Project Area and include fences (including sections of vermin proof fencing), tracks, dams and other pastoral infrastructure. Fragments of 'space-junk' from missile testing were also located during the survey. None of the non-Indigenous sites are considered to have heritage value according to the *Heritage Places Act 1993* (SA).

4.12 Proximity to conservation areas

The nearest Crown Land to Prominent Hill is associated with the municipal areas of Coober Pedy township (commencing around 60 km north west of the Prominent Hill ML), the Kanku-Breakaways Conservation Park located around 105 km north west of the ML and Lake Cadibarrowirracanna, located around 88 km north of the ML.

The Kanku-Breakaways Conversation Park covers almost 15,000 ha and forms part of traditional country of the Antakirinja Matu-Yankunytjatjara people. It is co-managed by the Antakirinja Matu-Yankunytjatjara Aboriginal Corporation (AMYAC), the District Council of Coober Pedy and the DEW.

Lake Cadibarrowirracanna, meaning the stars were dancing in Arabana language, is a Salt Lake which covers approximately 220 km² and is located on Anna Creek Pastoral Lease.

Whilst Lake Cadibarrowirracanna does not have a DEW-adopted management plan, the Kanku-Breakaways Conservation Park finalised one in 2017. The Kanku-Breakaways are also subject to the provisions of the *National Parks and Wildlife (Breakaways Conservation Park) Regulations 2013*.

5. Description of the operations

The following section summarises the Prominent Hill mining and processing operations, as well as all associated activities undertaken within ML 6228, MPLs and EMLs discussed in Section 2.

5.1 Project summary

The Prominent Hill Copper-Gold Project currently produces a high-quality copper-gold concentrate from ore sourced from open pit surface stockpiles and underground sub-level open stoping (SLOS) operations. The Project commenced in September 2006 with concentrate first produced from ore sourced from the open pit in February 2009 and from ore sourced from underground in March 2012.

Ore is processed using a conventional crushing, grinding and flotation circuit. Ore was processed at a rate of approximately 9 Mtpa until surface stockpiles were depleted. Post 2025, ore will be processed at a rate of approximately 6 Mtpa, increasing to approximately 7.5 Mtpa once the shaft is operational. Currently, concentrate contains an average of 40–50% copper, 15–20 g/t of gold and 80–100 g/t of silver and is exported to customers in Australia and overseas.

A summary of the Prominent Hill operations is provided in Table 5.1, and shown in Figure 2.2.

Table 5.1 | Prominent Hill key project characteristics

Activity	Description
Project footprint	Total project-related disturbance is 2,053 ha, consisting of: • 1,440 ha associated with activities within ML 6228 • 209 ha associated with the Concentrate Export Road • 148 ha associated with Aries Borefield, including 35.77 ha proposed to be disturbed as a result of the implementation of the Aries Transfer Pipeline Replacement Project • 151 ha associated with the Electricity Transmission Line • 38 ha associated with the EMLs • 60 ha associated with the Site Access Road • 7 ha associated with Virgo Borefield.
Mining operations	Underground SLOS mining with ore trucked to surface. Shaft hoisting of ore to occur from 2026/27 onwards supported by trucked ore as necessary.
Open pit dimensions	The open pit excavation was completed in Q1, 2018. Upon completion the excavation is 482 m deep, 1.5 km long and 1.6 km wide (as at December 2018).
Processing operations	Conventional crushing, grinding and flotation process to produce copper concentrates containing gold and silver.
Annual production	Approximately 6 Mtpa, increasing to 7.5 Mtpa after Wira Shaft commissioning.
Operating hours	Continuous operation (i.e., 24 hours per day, seven days per week).
Estimated mine life	Open pit operations finished in Q1 2018. Underground and processing operations to finish in 2036, to be followed by a period comprising decommissioning, closure and rehabilitation activities.

Activity	Description
Tailings and waste rock management	Underground waste rock material is currently transported to the bottom of the open pit. This is also supplemented with remaining capacity in the WRDs located on surface to the south of the open pit. Tailings are placed into a dedicated surface tailings storage facility (TSF) with embankments constructed of waste rock and integrated with the Southern WRD in a structure referred to as the Integrated Waste Landform (IWL).
Site access and logistics	Vehicle access to and from site is via a dedicated Site Access Road from the Stuart Highway Concentrate export is via a dedicated Concentrate Export Road to Wirrida railway siding or Pimba Intermodal via Stuart Highway.
Raw water source	Raw water for Prominent Hill operations is supplied from the Aries Borefield under the conditions of Water Licence No. 396811, Water Resource Works Approval No. 396907. Water is sourced from the Boorthanna Formation aquifer of the Arckaringa Basin. Raw water for the Concentrate Export Road (CER) for dust suppression is supplied from two extraction points under the conditions of Water Licence No. 396809, Water Resource Works Approval No. 396904. Water is sourced from the non-artesian Eromanga aquifer of the Eromanga Basin.
Raw water licence limit	26.6 ML/d under Water Licence No. 396811, Water Resource Works Approval No. 396907, 1 ML/d under Water Licence No. 396809, Water Resource Works Approval No. 396904.
Raw water consumption	Up to 18 ML/d for Water Licence No. 396811, Water Resource Works Approval No. 396907 at Aries Borefield, this will reduce to up to 13 ML/d from 2025 onwards.
Water management	Water recycling initiatives on-site include: - up to 3.2 ML/d returned to the processing plant from the TSF decant system - approximately 0.8 ML/d and 1.3 ML/d returned from underground and open pit mine dewatering activities, respectively.
Electricity source	The 132 kV transmission system supplying the Prominent Hill mine and processing facilities comprises approximately 160 km of overhead transmission line owned by OZ Minerals Prominent Hill that connects to the Electranet owned and operated 132kV line at structure F1881-0491 which is supplied from Mount Gunson South. The 132 kV voltage at Prominent Hill is converted to 11kV via three 45 MVA 132/11 kV transformers, the 132kV asset power stability is managed by an on-site reactive power plant, comprising of two 11kV 16MVA STATCOM's.
Electrical consumption	Currently up to 370 GWh (45 MW) per annum with forecast this will increase to 55 MW for PHOX.
Greenhouse gas emissions	Greenhouse gas emissions have varied between 197,000–425,000 t of CO ₂ -e per annum (directly from the operation of mobile fleet, and indirectly from the consumption of purchased electricity) since the commencement of operations.
Workforce	Prominent Hill has approximately 1200 workers with around 70% of these located onsite and visiting site on various fly-in fly-out rosters. There is an average of approximately 650 personnel on-site at any one time, with increase of an additional approximate 350 personnel for major shutdowns.
Accommodation	On-site accommodation village with a total of 1,178 rooms available. Of these, 318 rooms are allocated to shutdowns and are not utilised during non-shutdown periods. Further, accommodation is provided on commercial terms for the workforce from Peculiar Knob mining operation (owned by Peak Iron Mines) which is located approximately 30 km from the village.
Workforce logistics	Regular flights operate between Prominent Hill, Adelaide and Port Augusta, with frequencies and additional specific locations as determined by business needs.

5.2 Project schedule

The high-level project schedule for the Prominent Hill operation to FY2036 is summarised in Table 5.2. Due to the nature of the Project, the schedule and timing of activities may alter as it develops.

Table 5.2 | Prominent Hill operations indicative project schedule

Aspect	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Northern WRD development															
Northern WRD progressive rehabilitation															
Malu open pit operations															
In-pit WRD dumping															
Southern WRD development															
Southern WRD progressive rehabilitation															
TSF operations						Wall lift				Wall lift					
Underground operations	Mine expansion and Wira Shaft installation														
Processing plant operations															
Commencement of closure (post-2036)															

5.3 Reserves, production rates and products

5.3.1 Ore reserves and mineral resources

The Prominent Hill Mineral Resources and Ore Reserves are detailed in Additional Information, Section 6, of the Annual Report 2025, available at www.bhp.com/-/media/documents/investors/annual-reports/2025/250819_bhpannualreport2025.pdf and the total Mineral Resources and Ore Reserves are repeated in Table 5.3 and Table 5.4, respectively.

Table 5.3 | Prominent Hill Mineral Resources (as at 30 June 2025)

Ore type	Measured Resources				Indicated Resources				Inferred Resources				Total Resources			
	Mt	% Cu	g/t Au	g/t Ag	Mt	% Cu	g/t Au	g/t Ag	Mt	% Cu	g/t Au	g/t Ag	Mt	% Cu	g/t Au	g/t Ag
UG Sulphide	44	1.18	0.60	3	48	0.96	0.85	3	53	0.87	1.02	2	144	1.00	0.84	3
SP Sulphide	0.1	0.44	0.65	1	1.6	0.11	0.57	0.3	-	-	-	-	1.7	0.13	0.58	0.4
SP Low-grade	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.4 | Prominent Hill Ore Reserves (as at 30 June 2025)

Ore type	Proved Reserves				Probable Reserves				Total Reserves			
	Mt	% Cu	g/t Au	g/t Ag	Mt	% Cu	g/t Au	g/t Ag	Mt	% Cu	g/t Au	g/t Ag
UG Sulphide	26	1.07	0.59	3	20	0.84	0.79	2	46	0.97	0.68	2
SP Sulphide	0.1	0.44	0.65	1	1.6	0.11	0.57	0.3	1.7	0.13	0.58	0.4
SP Low-grade	-	-	-	-	-	-	-	-	-	-	-	-

5.3.2 Material movements

Historical ore and waste rock movements for Prominent Hill are summarised in Table 5.5. Forecast material movement rates are provided in Section 5.5.

Table 5.5 | Historical ore and waste rock movement (as of June 2021)

Year	Ore (t)		Waste rock (t)	
	Malu open pit operations	Underground operations (Ankata and Malu)	Malu open pit operations	Underground operations (Ankata and Malu)
2009	9,120,226	0	38,467,993	0
2010	10,037,624	0	53,353,057	17,554
2011	11,333,854	19,949	57,683,667	295,133
2012	7,329,430	424,965	73,009,951	527,960
2013	8,280,952	1,205,026	78,507,746	796,479
2014	14,358,935	1,353,871	67,956,871	968,632
2015	12,283,044	1,858,439	37,985,268	869,895
2016	15,093,084	2,138,617	14,736,506	693,593
2017	13,589,846	2,477,913	6,493,883	527,628
2018	2,226,145	2,906,425	602,401	840,615
2019	0	3,365,932	0	870,994
2020	0	3,889,897	0	949,286
2021	0	4,147,028	0	1,063,694
2022	0	3,979,027	0	1,086,507
2023	0	4,381,162	0	1,234,966
2024	0	4,594,483	0	1,615,703
Total	103,653,140	36,742,734	428,797,343	12,358,639

Table 5.6 details waste rock mined as at June 2021, categorised according to geochemical classification.

Table 5.6 | Waste rock movement by geochemical classification (as at June 2021)

Waste rock	In waste rock dump (Mbcm)
NAF	171.5
UPAF	35.2
PAF	37.8
Total	244.5

Extractives as defined by Section 6 of the Mining Act will leave the lease only from the EML locations (which have already been granted) for the purposes of road maintenance.

5.3.3 Production rates and products

Ore extracted from the open pit and the underground operations (previously referred to as the Ankata and Malu underground operations) is processed into a copper concentrate containing gold and silver. Current process plant capability is approximately 200,000–250,000 tpa of dry concentrate containing an average of approximately 40–50% copper, 15–20 g/t of gold and 80–100 g/t of silver. Historical concentrate production and grade information is summarised in Table 5.7. From 2025 onwards, forecast concentrate production rates are predicted to range from 75,000 to 135,000 dmt/year.

Prominent Hill concentrate is used as feed stock in copper smelters in Australia and overseas.

It is noted that there is approximately 100,000 m³ of remanent ore which exists in the pit floor and ramps which may be extracted in future.

Table 5.7 | Prominent Hill concentrate production (as at June 2021)

Year	Contained Cu (t)	Cu (%)	Contained Au (oz)	Au (g/t)	Contained Ag (oz)	Ag (g/t)	Concentrate production (dmt)
2009	96,310	54	75,535	13.2	700,177	122.3	178,066
2010	112,171	50.9	196,400	27.7	615,835	86.8	220,589
2011	107,744	52.8	160,007	24.4	612,903	93.3	204,225
2012	101,737	50.3	140,746	21.6	721,998	111.0	202,355
2013	73,362	47.5	128,045	25.8	613,499	123.6	154,369
2014	92,615	52.5	148,192	26.1	652,988	115.1	176,519
2015	130,401	50.9	112,960	13.7	750,222	91.1	256,142
2016	116,881	48.7	118,327	15.32	842,666	109.1	240,086
2017	112,008	46.4	126,713	16.3	791,404	102.0	241,224
2018	110,111	42.4	130,857	15.7	702,702	84.1	259,799
2019	102,480	43.7	122,703	16.3	630,420	83.6	234,451
2020	61,375	49.5	198,586	49.8	421,049	105.6	124,012
2021	32,110	50.3	70,654	34.4	209,247	101.9	63,898
Total	1,249,305	-	1,729,725	-	8,265,110	-	2,555,735

5.4 Exploration activities

5.4.1 Operations

During the project lifecycle BHP will continue its exploration activities on the ML, which will be undertaken in accordance with the DEM guidelines with a view of expanding the Resource estimates. BHP also maintains a number of Exploration Licence (EL) tenements on and surrounding ML 6228 for the purpose of understanding the surrounding geology and identifying opportunities to extend the mine life (these licences are not covered under this PEPR).

Diamond drilling is typically adopted to conduct exploration works, with Reverse Circulation Percussion (RCP) occasionally utilised. Geophysical techniques employed include:

- downhole surveys
- surface magnetics
- surface gravity
- surface seismic
- surface induced polarisation, and
- potential also exists for airborne surveys including magnetic, gravity and electromagnetic.

Where exploration activities are undertaken distant from existing infrastructure, a track may be established to permit access, and sumps for the containment of drilling water are installed. In some instances, creek crossing upgrades are constructed to allow all-weather access. An assessment of the potential for environmental impacts (generally related to surface water management) as the result of the installation of exploration-related infrastructure is undertaken for each EL. In general, the following equipment is required to conduct exploration activities:

- diamond and RCP drill rigs (up to 30 tonnes in weight)
- support vehicles to transport drill rods
- fuel for day's usage
- water tanker for drill water supply and dust suppression
- light vehicles for personnel transport and drill core recovery
- ground gravity or magnetic surveys
- large thumper trucks for seismic surveys and support vehicles
- graders
- front end loaders
- backhoes and
- a bulldozer for sites with difficult access and for crossings.

All exploration activities undertaken within or outside of the ML, including rehabilitation will be in accordance with the conditions of the ML or EL, respectively.

5.4.2 Exploration closure

All exploration activities have been rehabilitated in accordance with relevant guidelines and approval conditions; with exploration monitoring holes and production bores capped to allow future re-use, unless otherwise agreed. Drill pads and sumps have been filled (where necessary) and scarified.

Disturbance associated with exploration drilling is progressively rehabilitated by the OZ Minerals Exploration Department at the completion of exploration activities. All rehabilitation activities will be documented within future Exploration Compliance Reports.

In general, rehabilitation activities include:

- removal of plastic sump liners, filling of sumps and covering with topsoil, followed by scarification
- cutting of drill collars below ground level
- capping or backfilling of wells in accordance with relevant guidelines and standards
- closure of exploration-specific roads unless otherwise agreed with stakeholders and
- rehabilitation of sites in-keeping with surrounding landscape and topography.

5.5 Description of mining operations

5.5.1 Types of mining operations to be carried out

The project previously undertook mining of the open pit via conventional drill and blast methods; currently underground operations occur through SLOS operations.

Both of these types of mining are further described in Section 5.5.2 and 5.5.3 respectively.

5.5.2 Open pit

The near surface section of the ore body was mined in four stages by conventional open pit methods of drilling, blasting and then loading onto haul trucks for removal from the pit (Figure 5.1). Material was mined in benches, historically drilled and blasted to a depth of 15 m for completed benches above 10,100 mRL, and 12 m for current development below this level. Material is then collected by hydraulic excavators. Access to the pit is via one of two open pit access ramps and a surface haul road that allows transport of extracted materials to the northern and southern WRDs and the ROM stockpile (see Section 5.8). Table 5.8 provides indicative pit design physical attributes for the as-constructed open pit. Open Pit mining operations ceased at the end of Q1 2018.

Figure 5.2 shows the now completed open pit which is approximately 1.6 km long by 1.5 km wide and 482 m deep.

Table 5.8 | As-built wall angles for Malu Open Pit

Open pit aspect	Batter height (m)	Berm width (m)	Batter angle (degrees)
Cover sequence	15	15	55
North wall	24/12	10	65
South wall	24	10	65
West wall	24	12	75

Open pit aspect	Batter height (m)	Berm width (m)	Batter angle (degrees)
Eastern upper wall	24	12	75
Eastern lower wall	24	10	65
North wall below 9,860 mRL	24	10	70
South wall below 9,860 mRL	24	10	65
West wall below 9,860 mRL	24	10	70
East wall below 9,860 mRL	24	10	70

With the conclusion of mining in the open cut pit in Q2 2018, a Program Notification (significance level 3 as outlined in MG2b) was submitted and approved by DEM on 16 March 2018. Following this approval, the eastern portion of the abandonment bund was constructed in accordance with the *Safety Bund Walls Around Abandoned Open Pit guidelines* (DoIR 1997) (the Guideline). This section of the bund is approximately 1500 m in length and joins the Northern WRD with the IWL, both of these landforms represent a structure that is equivalent to an abandonment bund. In accordance with the Guideline the bund is at least 2 m in height and 5 m wide, measured at the base, and constructed with unweathered, feely draining end dumped NAF. The location of the Eastern Abandonment Bund is detailed in Figure 5.3

Geotechnical analysis was undertaken to assess the minimum standoff distance required from the crest of the open pit. An angle of 20° was used for weathered rock rather than the 25° quoted in the guidelines, this is considered conservative and is based on previous geotechnical knowledge of the stability within the open pit. The 45° angle recommended within the Guideline was applied for the basement rock. Using this method, it was determined that the minimum distance from the pit crest in the vicinity of the proposed location for the bund construction would be approximately 80 – 120 m. Cross-sections detailing the construction of the Eastern Abandonment Bund are detailed in Figure 5.4 to Figure 5.6.

The western portion of the abandonment bund will be completed at the conclusion of mining. It is estimated that approximately 26,000 t of NAF waste rock would be required for construction of the final section of the bund, which would be set aside for this purpose prior to the cessation of mining activities. It is not currently possible to construct the Western Abandonment Bund due to current access requirements. A conceptual diagram detailing how the Western Abandonment Bund will be constructed is detailed in Figure 5.7. It should be noted that final location of the western portion of the abandonment bund, between the northern and southern WRD, will be detailed in a future update of the PEPR.

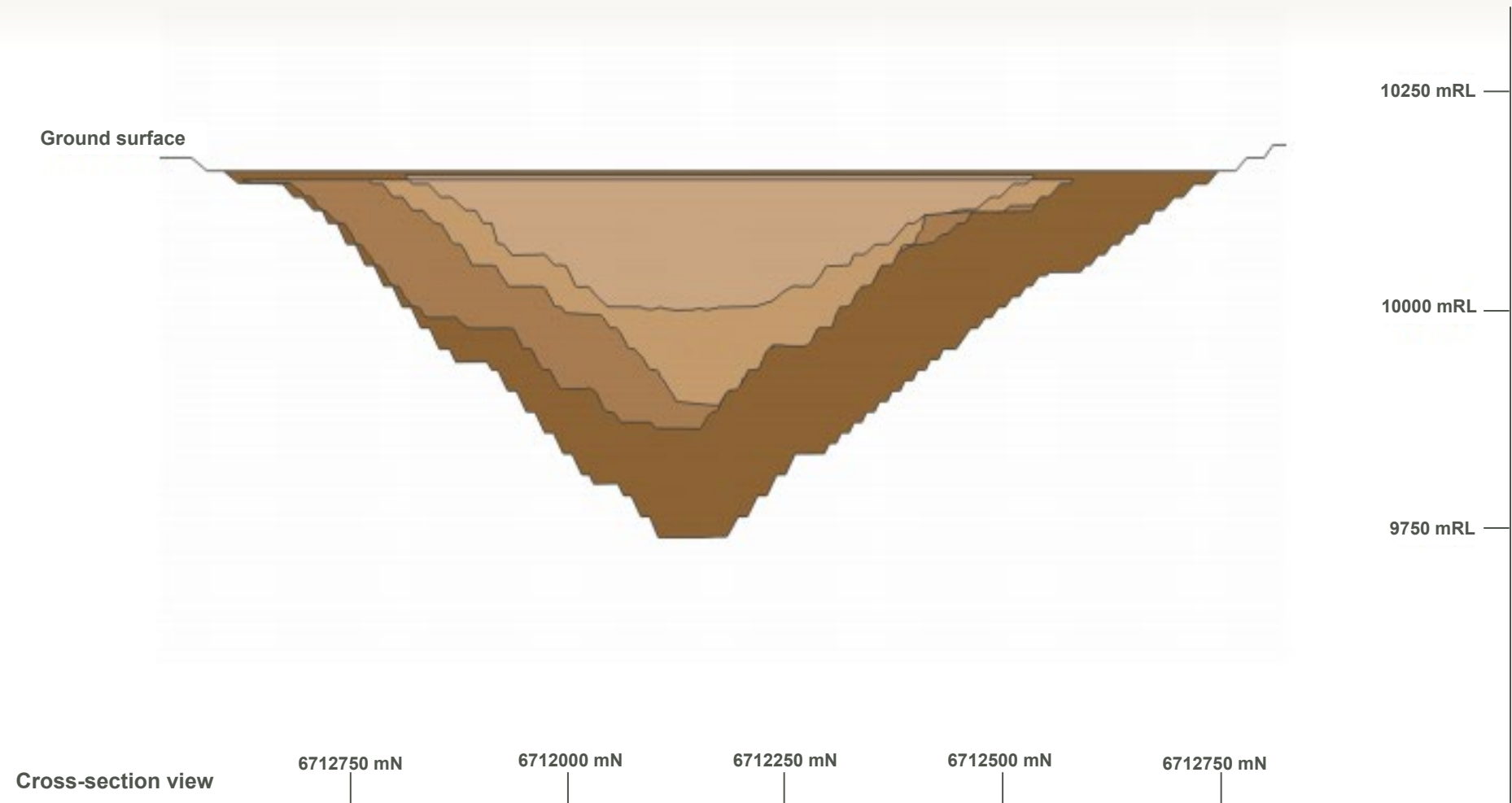


Figure 5.1 | Malu open pit

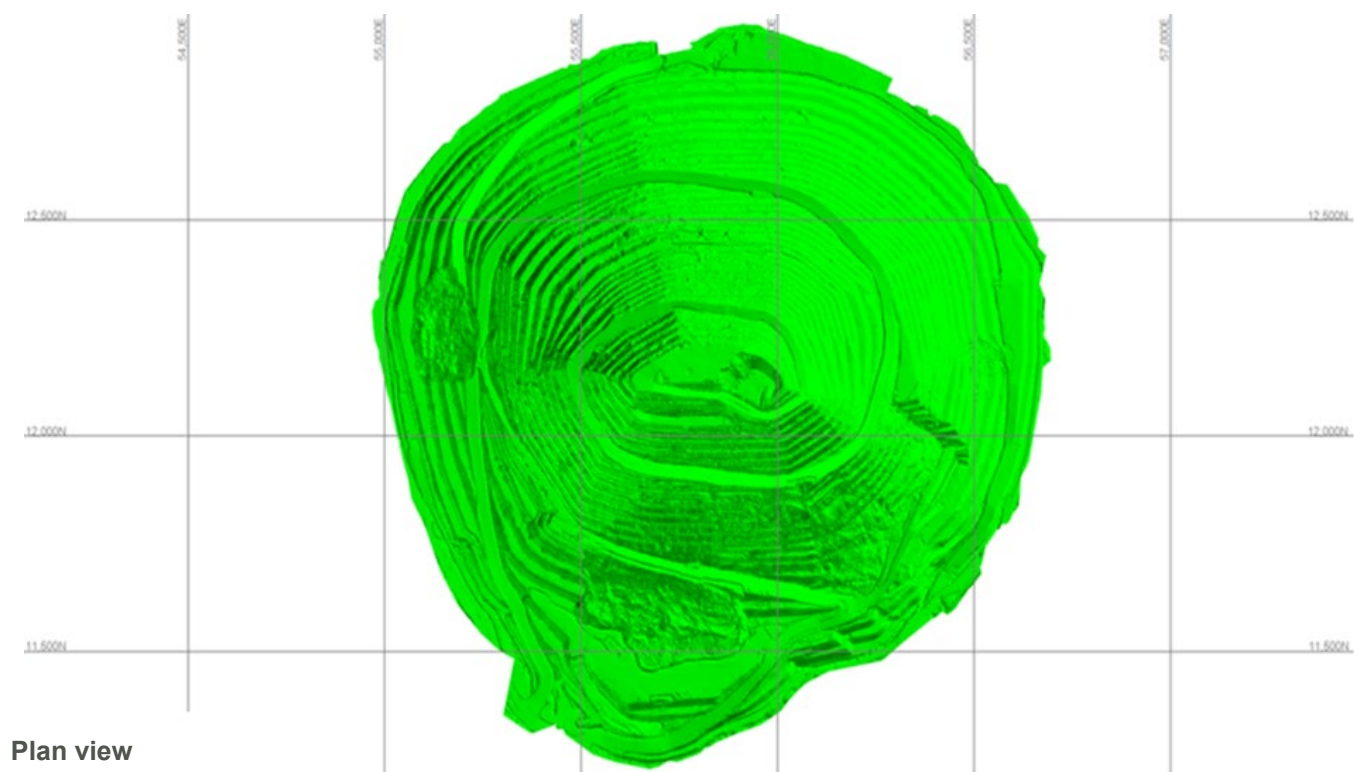
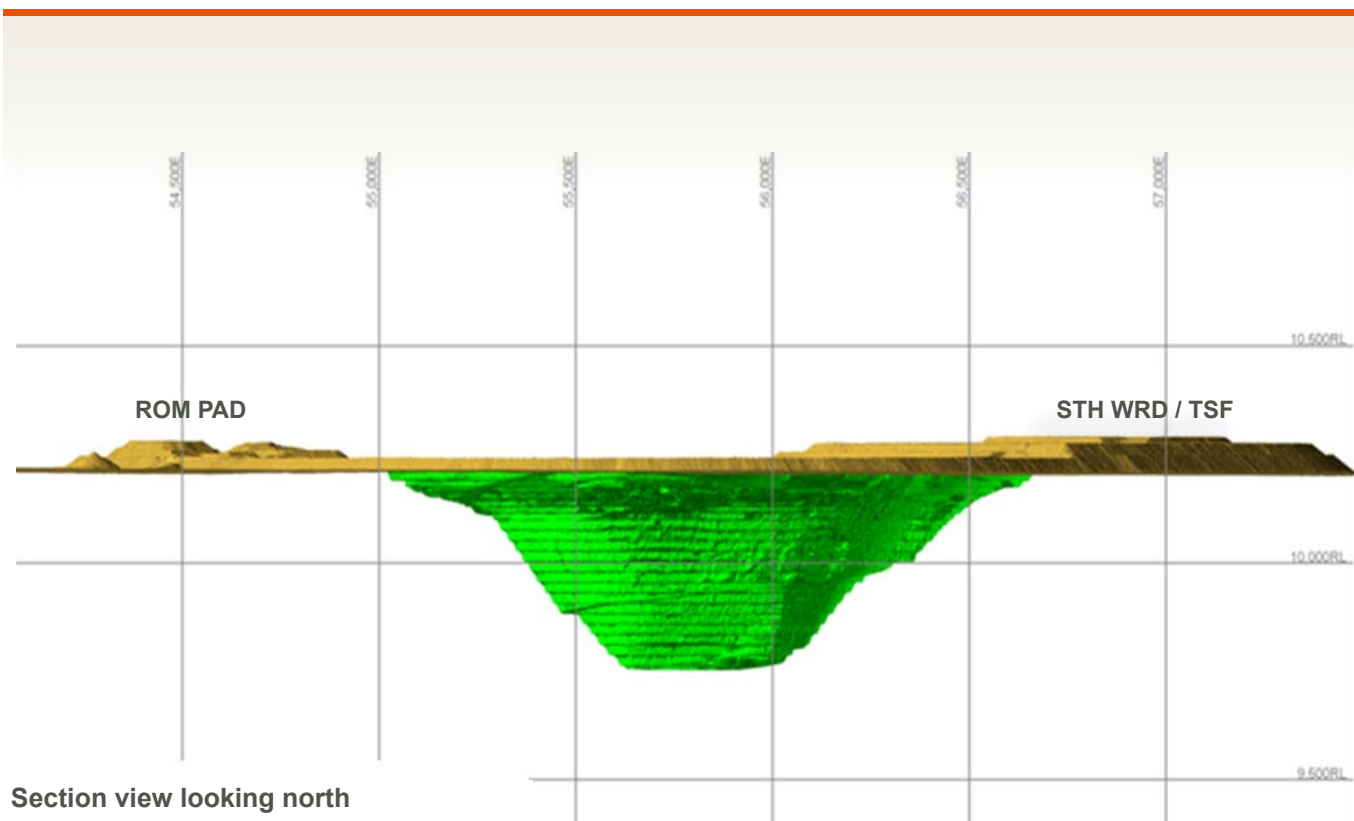


Figure 5.2 | Completed Malu open pit



- Minimum Bund Distance
- Abandonment bund



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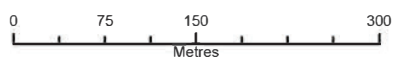


Figure 5.3 | Prominent Hill eastern abandonment bund location

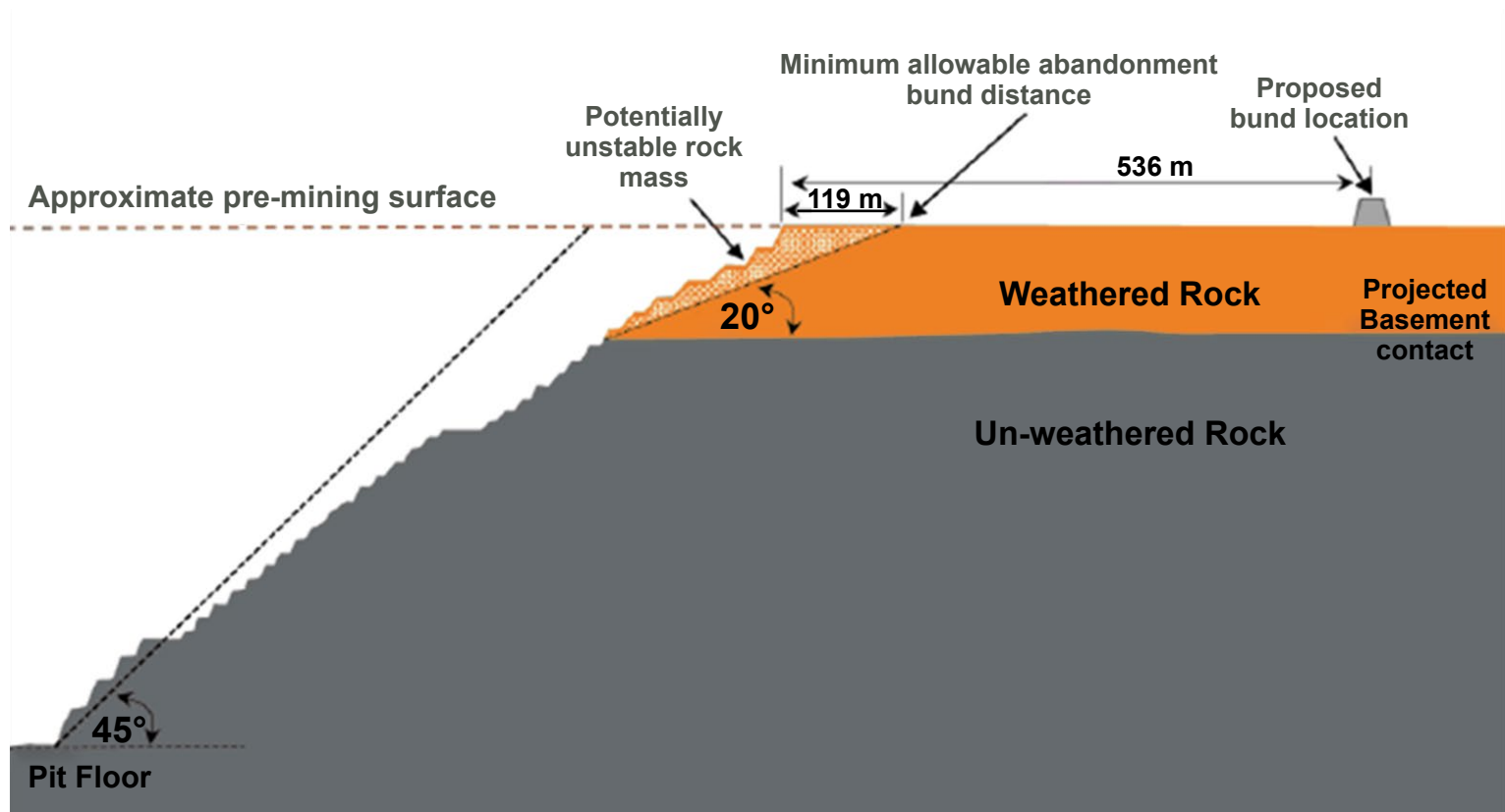


Figure 5.4 | Cross-section 1 of eastern abandonment bund

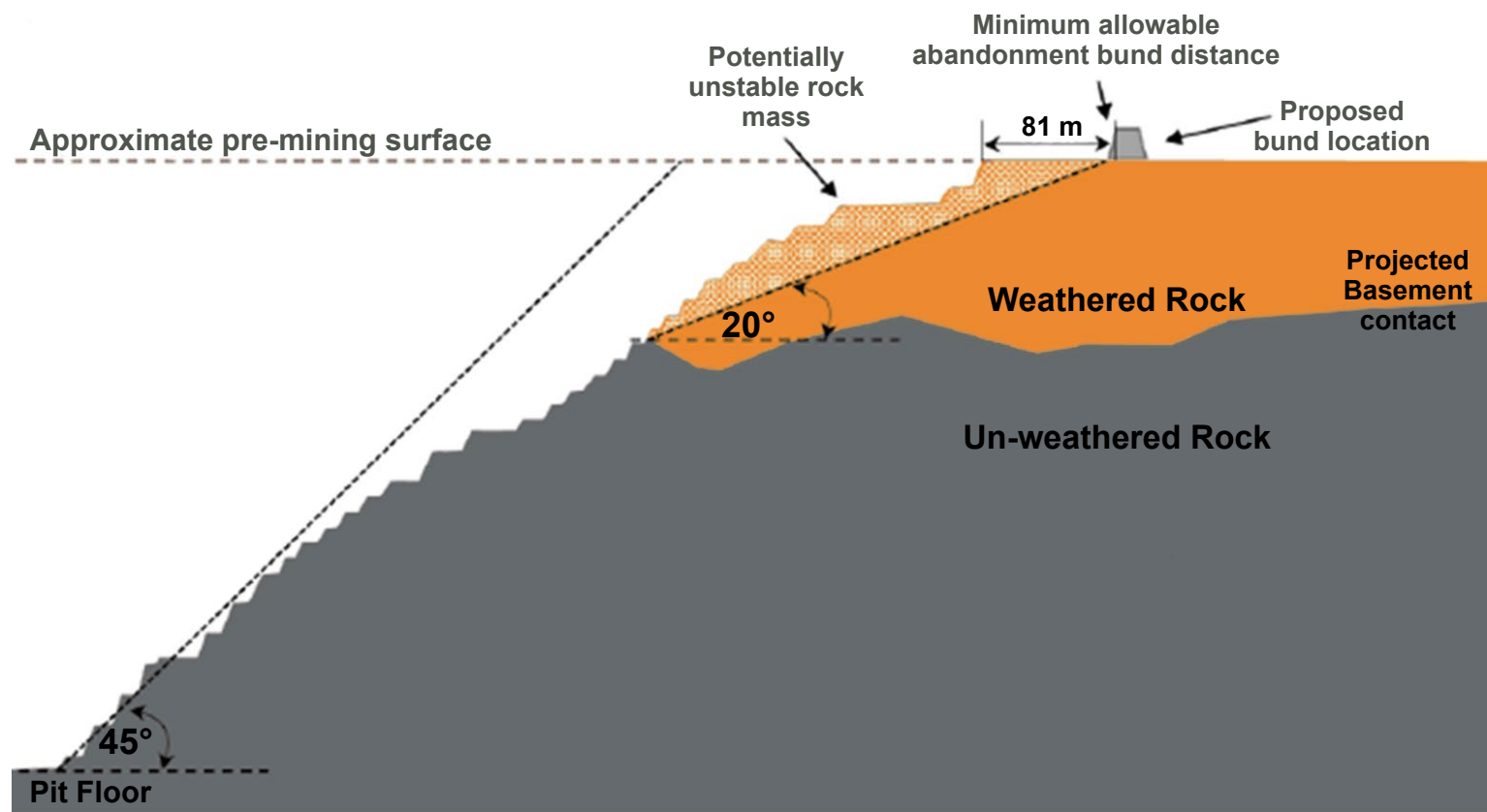


Figure 5.5 | Cross-section 2 of eastern abandonment bund

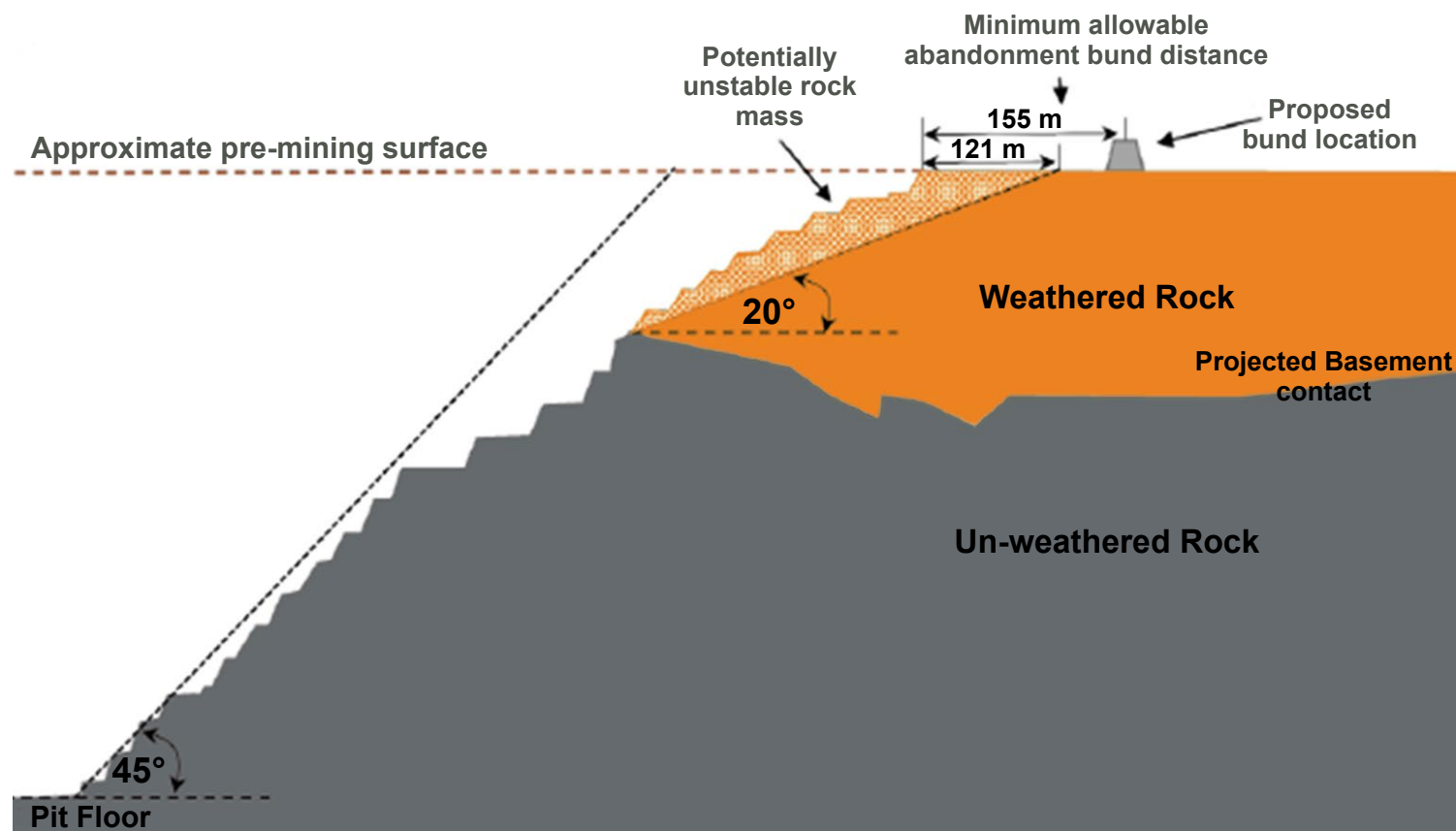


Figure 5.6 | Cross-section 3 of eastern abandonment bund

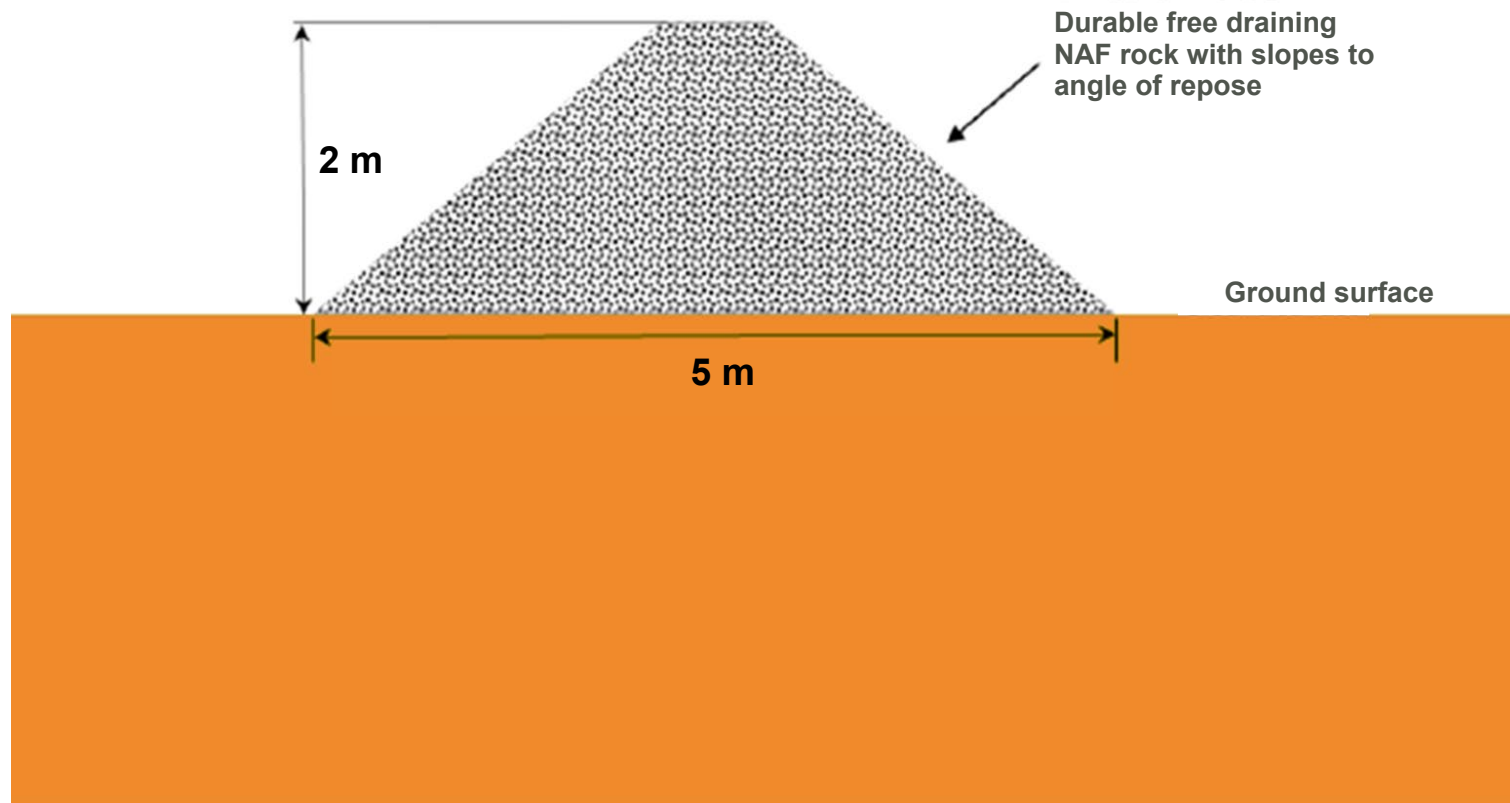


Figure 5.7 | Conceptual diagram of abandonment bund construction

5.5.2.1 Open pit safety

In 2020, a review of the vehicle strike incidents/ near misses from the highwall FO1 zone of the open pit was undertaken due to rocks falling from height. During this review it was identified that there was a level of risk due to rockfall which is unacceptable.

A number of options were considered to mitigate the risk including bench cleaning, larger windrows, maintaining a single line access and fences. It was concluded that a Geobrugg modular 100 KJ fence system was the most practicable method of risk reduction and as such was the preferred option. The system incorporates a mesh fence and post arrangement utilising sea containers to modularise the system. It is anticipated that the system will commence instalment in Q3 2021 to control the material risk by reducing events where the ramp cannot be used due to strike potential and reduce events of material bouncing onto the FO1 ramp.

5.5.2.2 Open pit stability

Open pit wall stability activities are undertaken as part of active management of the open pit asset to maintain conditions of stability over the projected life of the underground operation. Multiple monitoring systems are utilised to measure the effectiveness of the stability activities (Figure 5.9).

Since the excavations of the original Stage 3 and 4 pit stages, stabilisation activities have involved the following:

- unloading: including cutbacks, dump unloads or deferred dumping in planned areas
- buttressing: the placing of dense material at the toe of a slope to inhibit movement and
- dewatering: drilling of vertical wick drains, the installation of pumps where high flows are encountered (dewatering wells) and drilling of deep horizontal wells.

Cutbacks have occurred behind the south wall failure and on the east wall in order to enhance the stability of areas of moving slopes. A buttress was installed in the southeast of the pit in order to arrest pit slope movement due to surcharge loading from the south dump. In addition, this area was unloaded by the relocation of a 10 m thick slice of the south waste dump. Further to this, pit slope movements have occurred in the south-east, north-west and northern areas of the pit in response to dumping of material on the waste rock dumps. These areas of the dump were isolated for about 18 months and have recently been reopened for dumping at a reduced rate and capacity so as not to cause any slope stability issues.

In addition to these cutbacks, wick drains (open holes) have been drilled through Bulldog shale into the Cadna-owie Sandstone. They are cased with perforated pipe from 6 m below surface to end of hole and gravel packed on the outside of the perforated pipe to 5m below surface. The top 6 m has solid PVC pipe attached to the perforated pipe. A bentonite plug is installed from the top of the gravel pack to surface. The holes with minimal flow are left to drain to Cadna-owie Sandstone and then flow to the pit wall in which case they are referred to as “wick drains”. Holes that encounter significant flows (greater than 0.5 L/s) have air well pumps installed in which case they are referred to “dewatering wells”. Excluding the five dewatering wells installed in the TSF causeway to enhance water recycling from the decant structure, and those wick drains that have been destroyed by the cutbacks mentioned above, there are currently 115 active wick drains of which 30 have pumps installed (dewatering wells). The 35 pumped dewatering wells currently deliver 0.65 ML/day to a standpipe with excess water being returned to the mill for use in the circuit. The yield obtained from the dewatering wells has been decreasing over time.

Horizontal wells are approximately 100 mm holes drilled approximately horizontally to depths up to 500 m from the pit face. They have been installed within basement and overburden lithologies at Prominent Hill, however the overburden horizontal holes remain the only active installation. Perforated casing is pushed to the toe of the hole to keep the holes open over their service life. They have collar pipes installed with taps and fittings. The purpose of these holes is to depressurise the upper bulldog shale unit. The water is drained by gravity and groundwater pressures at the toes of the hole from the horizontal wells. Water is collected in a sump and pumped to a standpipe for pit dust suppression with excess water being returned to the mill for re-use in the circuit. There are 23 horizontal wells which have been drilled to various depths between 150 and 500 m. The horizontal wells currently produce approximately 1.14 ML/day. Similar to the dewatering wells the yield from the horizontal wells is reducing indicating that they are having the desired effect.

Reducing yields from the dewatering and horizontal wells is an ongoing trend, which suggests that aspects of the network could be decommissioned without having a significant impact on pit wall stability. The strongest cases for decommissioning are dewatering wells that are closest to the pit slope.

In conjunction with the stabilisation activities described above an extensive pit wall stability monitoring system is installed at Prominent Hill, consisting of:

- Approximately 500 prisms, monitored via two stations located on the north and south pit crest, and an additional 30 prisms monitoring the TSF embankment via a central monitoring station and highlighting areas of relative movement over time. The pit prisms cover the overburden areas of the pit.
- Three radar units monitoring the entire pit wall.
- Three uniaxial inclinometers and six biaxial inclinometers, mostly located between the south pit crest and the TSF embankment, with one on the northern pit wall to monitor deformation of the overburden slopes.
- A multi-point borehole extensometer has been installed between the underground portal bench and the pit to monitor any deformation that could affect the underground portal bench. Another two multi-point borehole extensometers have also been installed between the pit floor and future Malu stoping areas to monitor ground responses in the crown pillar structure.
- There is an array of 20 nested vibrating wire piezometers (VWPs) that measure water pressures within the oxidised Bulldog Shale, fresh Bulldog Shale and Cadna-owie Sandstone. A limited number of sensors also measure pressures within the basement. Several of the VWPs have been mined out in cutbacks and approximately 13 VWPs remain active on the south wall.

Current monitoring trends indicate that there are no significant overburden areas moving within the pit (i.e., all movement monitored is less than 0.1 mm/day) and movement rates are continually reducing over time. Water pressures within all formations have continued to reduce and are now at about pre-mining levels. The reduced pit slope movements are the strongest demonstration that the stability activities are achieving their desired outcome.

In 2015 because of the isolation of areas of the dump, an alternative strategy was developed which resulted in the construction of a new NAF cell located on the Southern WRD. The new cell was located well outside of the standoff zone. This new NAF cell is approximately 14 m higher than the original dump profile covering an area of approximately 35 ha with a volume of approximately 4.5 Mm³.

During 2017, due to monitoring trends showing anomalous movements and potential instability in the overburden slopes, dumping was ceased in two small areas of the north dump and one larger area of the south dump. These areas are located on the WRDs in the north west, north and south east areas of the

pit. The area in the south east underwent construction of a hard rock buttress at the toe and a 10 m unload on the adjacent south dump. These areas have now been excluded from the waste tipping plan and will not be used in the future.

The objective was to find the best balance between physical stability of the coupled pit slope and dump slope, maintain chemical stability with respect to the closure completion criteria and to leave the dump faces rock armoured and with a neat, planned appearance.

Further, monitoring over the 2019-2020 period have shown an increase in movement rates of near-surface slope at the northern wall of the pit. While the magnitude of the rate increase was small, the increased ranged from approximately 1.2 to 2 times the prior trend. Whilst the slope did not fail cracks have been observed in the area on the surface and below the berms. 2D geotechnical modelling was undertaken which suggested the factor of safety (FoS) was approximately 0.96. It was considered at that point in time, the probability of failure was almost certain, with early indications of failure timing to occur between July and September 2020.

Due to this finding, modification to the northern WRD and pit was required and resultantly, a Program Notification (significance level 3 as outlined in MG2b) was submitted and signed off by DEM in April 2020. This Program Notification outlined design changes to the northern WRD and pit for medium to long-term remediation to prevent future failures of the northern wall of the open pit. This included unloading cutbacks, which have now been undertaken. The cutbacks removed approximately 2.5 benches from the as-built surface to 10175 mRL. To provide a location for the cutback material (totalling approximately 1.4 Mbcm), a lift-by-lift progression with an angle of repose at 37 degrees has been undertaken in the northern WRD, giving a further design capacity of approximately 2.3 Mm³ (Figure 5.8). These cutbacks ensured the operation could achieve the FoS design acceptance level.

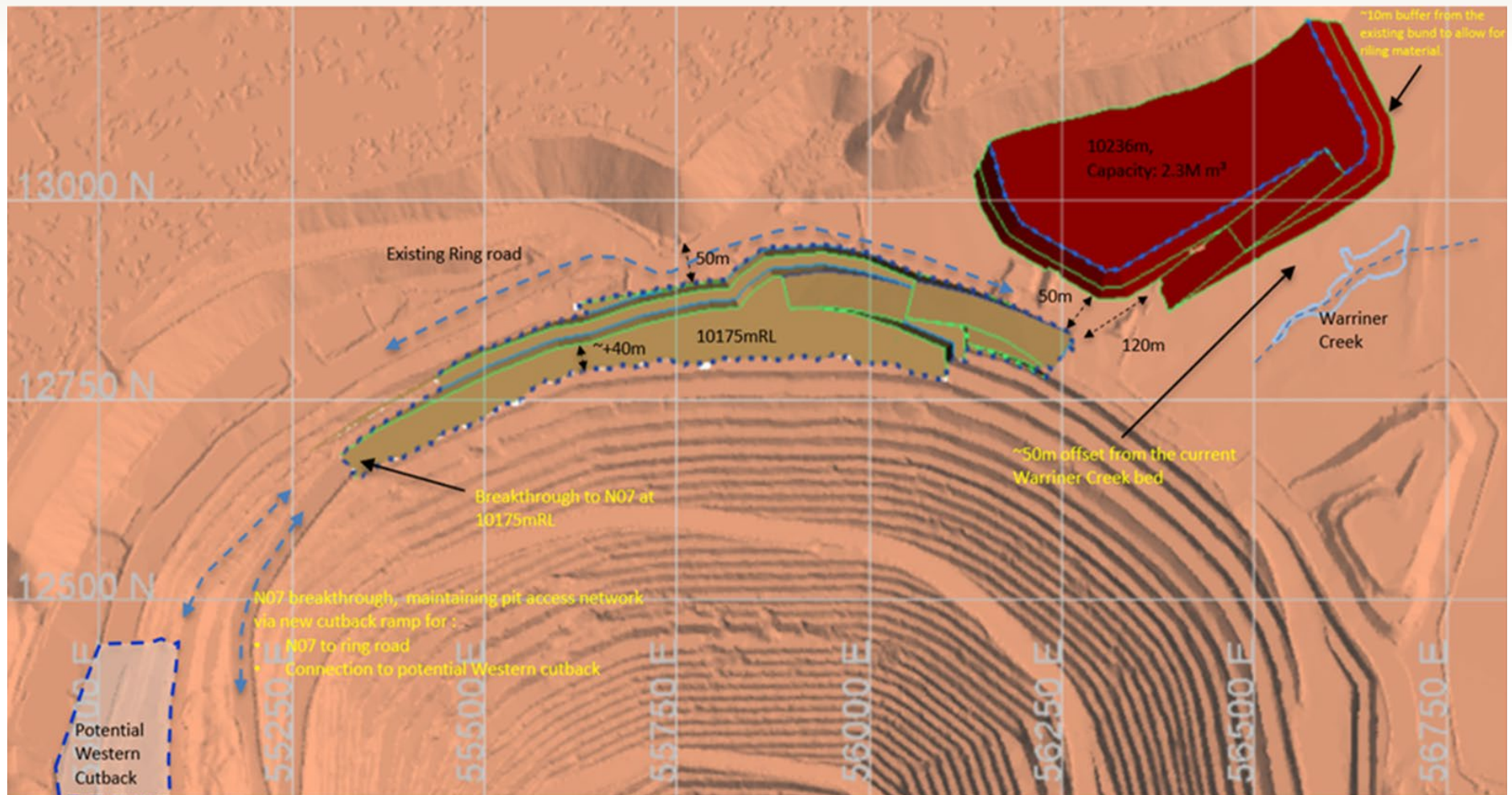
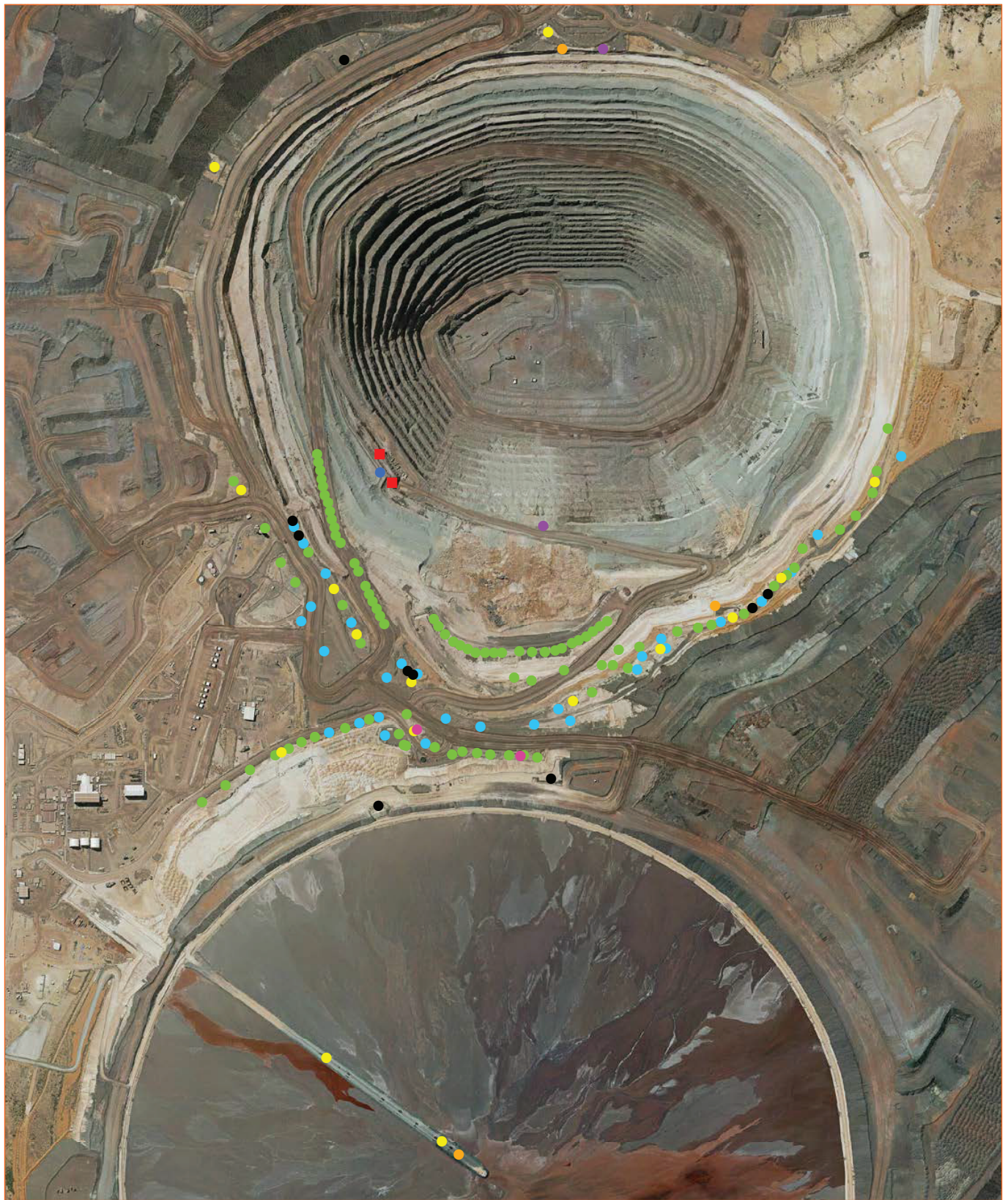


Figure 5.8 | Cutback locations in open pit and further design capacity for WRD



- Ankata Underground Portal
- Inclinometer
- WVPs
- Wick Drain
- Dewatering Wells
- GPS Station
- Extensometer
- Prism Monitoring Base Station
- Radar Monitoring Unit

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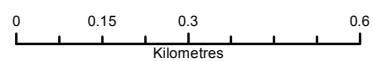


Figure 5.9 | Open pit infrastructure

5.5.3 Underground workings

Underground mining areas, including the Ankata and Malu underground operations (refer Figure 5.14) are extracted through a SLOS technique (refer Figure 5.12). The SLOS mining method involves the mining of stopes between at least two levels that are reached from the access decline. Ore is extracted from the open void of a stope after drilling and blasting. A load-haul-dump loader transfers the ore onto trucks where it is hauled to the surface for processing. Once all ore has been mined from the stope, the void is filled with cemented process tailings or waste material to ensure geotechnical stability. In general, stope filling commences as soon as the void has been abandoned (once mining has been complete), however the mine sequence does dictate filling priorities. Any change to this methodology will be implemented on a risk-based approach. Backfilling of the stope minimises the potential for surface subsidence.

5.5.3.1 Wira shaft mine expansion

In 2020, mine design and scheduling optimisation work confirmed the opportunity to increase the underground mining rate and reduce operating costs through a shaft haulage system to replace the current truck haulage fleet, and the project received internal approval to proceed in August 2021 as the Prominent Hill Operation Expansion (PHOX) Project.

The design comprises a 1,329 m deep concrete lined shaft with a diameter of 7.5 m. Construction of the shaft was via conventional strip and line method and the sinking period approximately two years.

In recognition of our traditional owners, the Antakirinja Matu-Yankunytjatjara peoples, and their cultural history in the area of Prominent Hill, the core piece of project infrastructure has been named by representatives of the AMY peoples, the Wira hoisting shaft. “Wira” (pronounced wi-rah) is a small bowl traditionally used by indigenous women as a bowl and as a digging tool.

The Wira shaft and associated infrastructure is being commissioned in stages. A high-level overview of the stages is provided below:

- Bulk earthworks to construct the shaft pad within the pre-existing footprint of the ROM. This includes works surrounding the shaft collar, sinking shaft winders, placing crushed rock, and works surrounding surface water management. Approval for these Early Works was obtained through a Program Notification (significance level 3 as outlined in MG2b) which was submitted and approved by DEM in August 2021.
- PHOX construction work undertaken early-2022 for establishment of a site office/ crib room, workshop slab for the shaft sinking contractor, pre-sink equipment set up and earthworks for the refrigeration plant was submitted as part of a Program Notification (significance level 3 as outlined in MG2b) and approved by DEM in December 2021.
- A pre-sink, first to approximately 110 m depth below surface and excavated and progressively lined with pre-cast concrete segments. Pre-sinking occurred using a Herrenknecht VSM9000. This work was undertaken in early-2022 and, to adhere to project timelines, was submitted to DEM for approval as part of a Program Notification (significance level 3 as outlined in MG2b) in November 2021.
- Shaft sinking via raised boring has occurred via a Robbins 123RHC Machine. Raise boring occurred in two stages, stage 1 (pre-sink to mid shaft) and stage 2 (mid shaft to shaft bottom)

- The permanent headframe and sinking infrastructure was installed in the second half of 2022. This included the installation of four off stage hoist winders (50 t line pull, 55 kw each) and one conveyance hist winder (22 t line pull, 1200 kW)
- The installation of permanent shaft surface services occurred in early 2023 into 2024
- Shaft sink and lining (permanent) was completed in 2024 and 2025
- Installation of most permanent services are planned to occur in 2025.

The location of the shaft collar was chosen as a compromise between distance from the underground mine workings at depth and the mined out open cut pit to ensure stability of the Wira shaft in the long term. A shaft geotechnical hole drilled to ~1.5km and geotechnical modelling of long-term pit stability confirmed the suitability of the preferred shaft location.

Geotechnical drilling, rock strength and stress measurements and numerical modelling have been carried out to support risk management in the transition to mining at greater depths. As the underground mine extends beyond 1,000 m below the surface, the current primary secondary stoping sequence will transition to a continuous extraction sequence to control dilution and maximise ore recovery.

As part of the installation of the Wira shaft, and the expansion of the mine more broadly, the methods for the handling of ore material will change over time. Key aspects of the materials handling system are discussed below and detailed in Figure 5.10:

- ore passes have been designed to feed truck loading chutes on a dedicated trucking horizon
- material is trucked from the base of the ore passes to the underground crushing, conveying and shaft infrastructure
- material is then transported via the four-rope friction winder hoisting system, with slew loading conveyor
- material is then transported via the surface overland conveyor to existing processing plant.

The design allows for an increase in the efficiency of mining activities, enabling an increase in stope turnover rate to support the scheduled mining rate of 7.5 Mpta.

The design of the Wira shaft is similar to those currently in operation at other operations in Australia and allows Prominent Hill to benefit from lessons learned in the safe and efficient design, construction and operation of this infrastructure. The surface materials handling system is designed to work alongside existing infrastructure including the existing surface crusher and coarse ore stockpile.

Infrastructure such as the main access decline to the crushing station and shaft collar area clearance, along with additional ventilation infrastructure development, commenced in early 2021. Progressing these items early presented an opportunity to debottleneck the existing operation and accelerate the Wira shaft expansion construction schedule.

The underground crusher and a series of ore passes will be established from 2025 to 2027, with the system to be commissioned in 2027. This will ramp the mines annual ore production up to approximately 7.5 Mt over the life of mine.

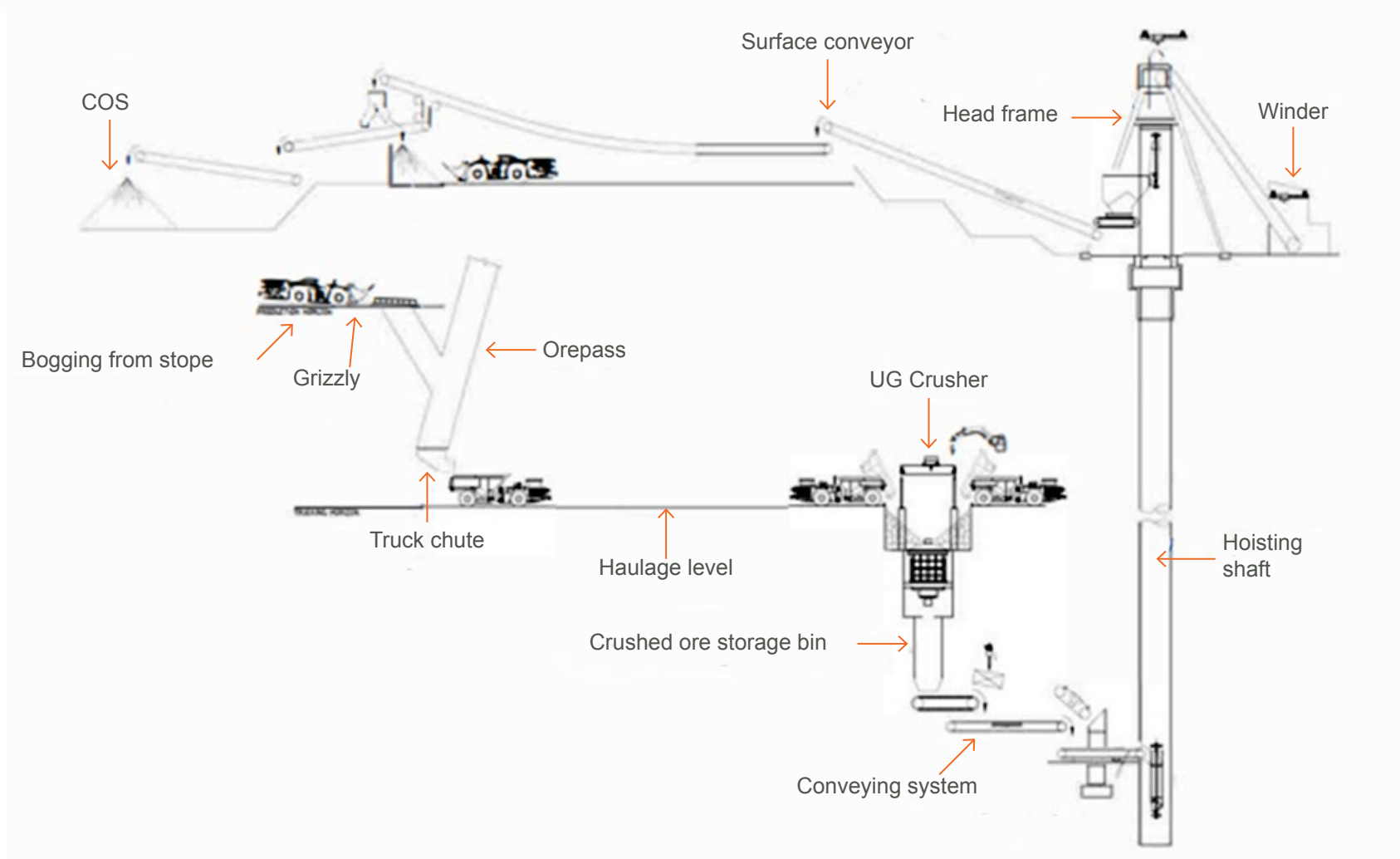


Figure 5.10 | PHOX underground and surface materials handling system

5.5.3.2 Ore material movement

The current strategy for moving ore from the underground operation to the surface involves using underground dump trucks which take ore from the stopes and stockpile it in the bottom of the open pit. A fleet of surface trucks then rehandle the ore from the pit floor and transport it to the ROM.

The Wira hoisting shaft is the key enabler that will facilitate an uplift in ore material movement from the underground, producing an average of approximately 7.5 Mtpa over the life-of-mine (Figure 5.11).

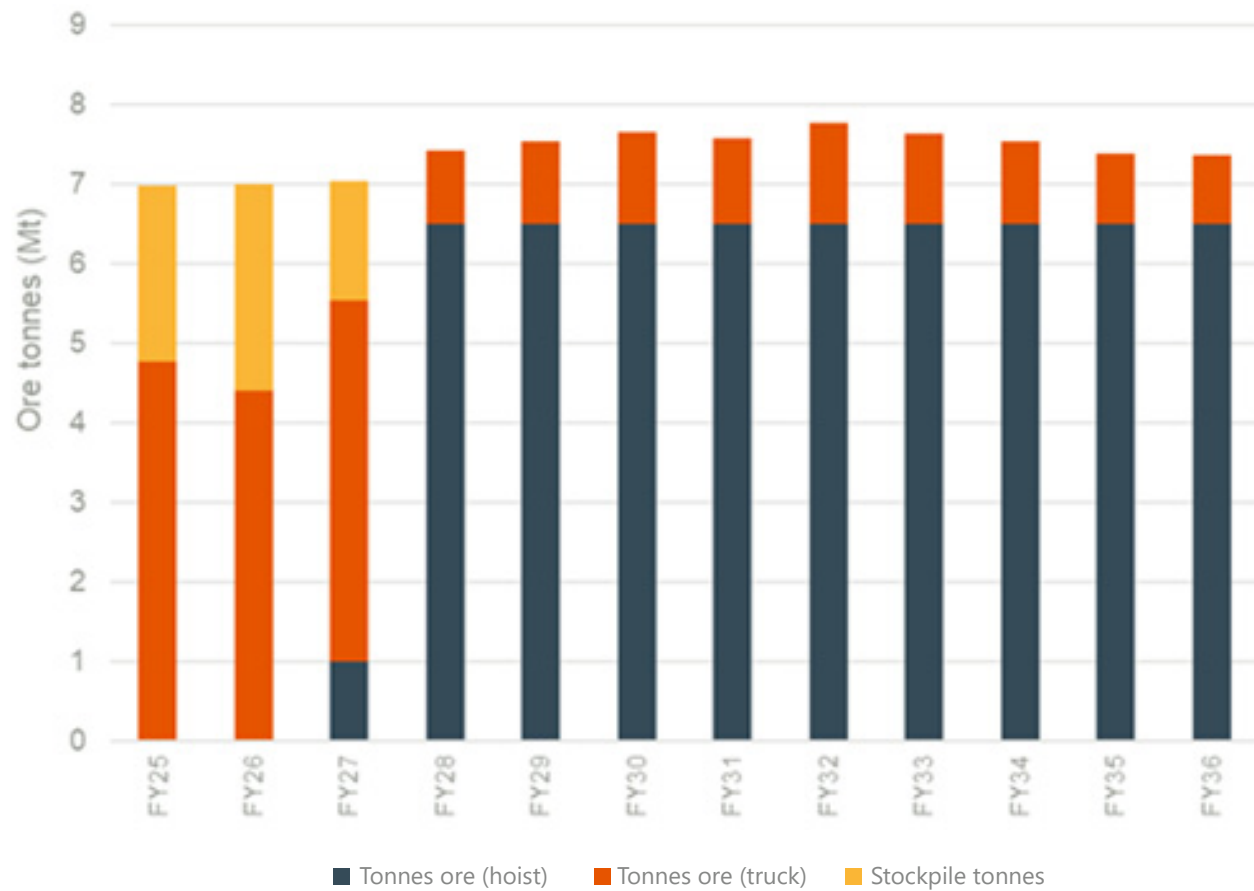


Figure 5.11 | Indicative ore material movement schedule

5.5.3.3 Management of potentially acid forming material

Wira shaft construction waste

As part of the initial Wira shaft sinking, the pre-sink, approximately 3,000 m³ of PAF material was excavated. This PAF material exists within the Bulldog Shale, from depths of approximately 27 to 78 m below surface. This material was excavated utilising a vertical boring machine, Herrnknecht VSM. The VSM uses a rotary cutting head to cut and grind the material to a gravel consistency. The bottom of the shaft where the cutting action occurs is flooded, with the water being used as the carrying medium to deliver excavated material to the surface via a slurry pumping system. At the surface the excavated material is separated from the water via cyclones and dewatering screens, to a paste like consistency.

The excavated PAF material was subsequently transported via truck and end tipped into the TSF at a suitable discharge point. The PAF material will progressively be encapsulated via the ongoing tailings deposition.

The tailings material has a mean (95% UCL) ANC of 97 kg H₂SO₄/tonne, whilst the Bulldog Shale has a mean (95% UCL) MPA of 33 kg H₂SO₄/tonne. This provides an ANC/ MPA ratio of 4, which is above the 1.5 – 2.0 margin of safety ordinarily applied in acid base accounting. This suggests that there is enough inherent neutralising capacity in the tailings material, noting an assumed volume ratio of NAF to PAF within the TSF of 16,000 to 1 (this assumption is based on calculations using 3,000 m³ of PAF and 48 million m³ NAF).

In the unlikely situation in which AMD was generated, numerical groundwater modelling, using fate solute transport scenarios, has demonstrated that it would report (ultimate fate) to the open pit (see Section 4.4 and 6 for further information).

Life of mine PAF waste

Though unlikely, during the remaining LOM there could be the requirement to manage small volumes of PAF material (approximately 1,000-10,000 m³ per annum). As the PAF encapsulation cells within the WRDs have now been closed, in such an instance the PAF material would be placed at the bottom of the open cut pit and encapsulated with a minimum 10 m of NAF material.

5.5.3.4 Backfill

The geometry of the underground ore bodies requires the majority of stope voids to be filled to maintain geotechnical stability and maximise ore recovery. This is achieved through the backfilling of voids with waste rock fill or processing plant tailings, as Paste Fill (PF). The mining sequence is generally primary-secondary stoping, with equal sized primary and secondary stopes. Once the primary stope fill is sufficiently cured, development of adjacent stopes can begin (Figure 5.13).

Approximately 97% of backfill is currently completed using deslimed tailings in PF, while the remaining 3% is produced from waste rock generated from development headings. Approximately 5 to 10% of the total tailings produced is used in the production of these fill types. PF is used where the fill mass will be exposed by future mining activities. Where the fill will not be exposed by future mining activities, waste rock is placed in preference to cemented fill types. For more details on the tailings properties used in the PF refer to Section Tailings Disposal 5.6.3.

To reduce down time, decouple paste production from processing operations and address future paste requirements, a Program Notification (significance level 3 as outlined in MG2b) was submitted and approved by DEM in March 2019 to construct the new Malu Paste Plant. The Malu Paste fill system consists of a desliming circuit, dewatering circuit, binder addition and mixing system as well as a tailings filter cake stacking and reloading facility. This system integrated the previous Cement Hydraulic Fill (CHF) plant infrastructure (with modifications) to generate a grading-controlled blend of deslimed tailings slurry for paste production. The Malu Paste Plant is designed to produce paste at a rate of 177 to 215m³/hr.

Filter cake stacking is undertaken by discharging filtered tailings cake from the tailings filter onto a reversible transfer conveyor. When manufacturing of paste is not required, the conveyor is operated in reverse to transfer the filter cake to a filter cake stacking system. When not manufacturing paste, the Malu Paste Plant has the capacity to stack filter cake at a rate of 160 t/hr at 84 % solids (%w/w), therefore it is considered a dense, non-segregating slurry with little moisture.

For the Ankata underground operation, a PF system is installed to the west of the open pit with a design capacity of 100 m³/hr. The PF system is based on deslimed tailings from the process plant being pumped to the PF plant where it is dewatered by disc filter mixed with cement and mine tailings slurry to produce the required strength PF. The PF is then reticulated to the stope voids using gravity through fill holes and piping reticulation.

At full production, an average of 400,000 m³ per annum was placed in the Ankata underground operation. The Ankata mine area was transitioned across to host the Arkani Ngura Innovation and Technology Centre from 2022 onwards in parallel with the depletion of the Ankata orebody. With Ankata mining activities ceasing in 2023, the Ankata paste plant underwent refurbishment in 2024 and is proposed to be used to paste fill stopes in the Kalaya and Malu Deep West orebodies from 2025.

For the Malu underground operations, a paste plant with a capacity of approximately 215 m³/hr has been commissioned, producing PF from tailings (see Section 5.6.3 for details on tailings properties). Similar to the Ankata operation, fill is delivered underground under gravity through cased boreholes located adjacent to the backfill facility and will be reticulated to the stopes through relocatable steel and HDPE pipes. Fill is retained in stopes with arched fibrecrrete barricades designed to withstand the hydrostatic head at each level. Required fill volumes for the Malu underground operation will increase in-line with production up to an annual average of 1,000,000 m³ at full production.

In the event of a shortfall in classified tailings available for delivery to the paste plant, tailings will be reclaimed from the TSF. A dozer will be used to consolidate the tailings into a stockpile, which will then be progressively reclaimed using an excavator and articulated dump trucks.

The reclamation methodology incorporates designated exclusion zones to safeguard critical infrastructure, including the dam walls and decant causeway. The excavation design ensures appropriate drainage and effective management of the decant pond.

Reclaimed material will be transported to the paste plant stockpile area, where it will be processed through a crusher and screening unit. The screened material will then be conveyed into the existing paste plant reclaim feed hopper.

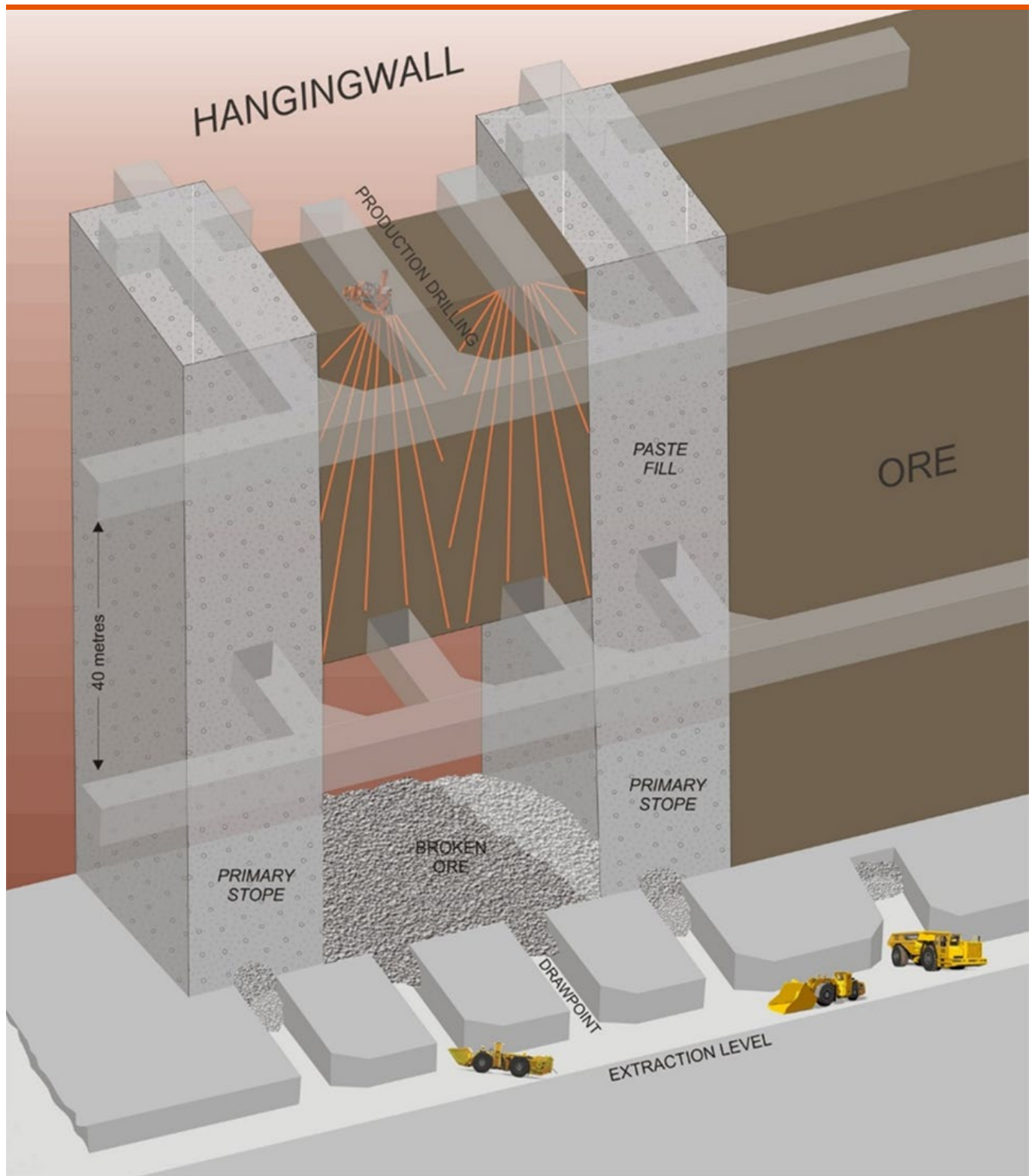


Figure 5.12 | Orthogonal view of conceptual sub-level open stope mining method



Figure 5.13 | Example of level plan showing filled and planned stopes and cross-section of A-B

5.5.3.5 Underground access

Development of the Ankata decline commenced in Q4 2010, from an interim portal located in the open pit wall. A permanent portal in the final pit wall now exists. The Malu underground area was accessed in 2011 from the existing Ankata decline (Figure 5.14). A secondary decline in the north-west of the open pit was completed in Q4 2017. Following the completion of open pit mining operations, a third decline was completed from the bottom of the final open pit in Q4 2018.

All declines and level accesses are designed to allow full extraction of the Reserve without sterilising other parts of the resource. The declines have a 6 x 6 m profile with arched backs. Underground development is usually supported with fibrecrete and rock bolts. Cable bolts are installed in large openings and where necessary.

The extent of the underground is detailed in Figure 5.14, which shows the location of the current underground stopes (yellow and described as LOM stopes) – these being Ankata and Malu, the location of PHOX stopes (purple) – these being Malu Deeps and Kalaya as well as the location of the Wira shaft.

For more details on the location of surface infrastructure relating to the underground operation please refer to Section 5.5.8.

5.5.3.6 Ventilation

The primary ventilation systems for the Ankata and Malu underground areas of the Prominent Hill underground are illustrated in Figure 5.14 and summarised in the following sections.

Ankata underground area

The Ankata underground mine is ventilated by surface primary exhaust fans from a ventilation shaft of 5 m in diameter, reaching to 280 m in depth and internal vent rises of 3.5 m and 5.0 m diameter and various lengths between levels. Fresh air is sourced from the Ankata decline portal and a 5m diameter ventilation shaft, pulled through the Ankata decline and a series of fresh air rises between levels. The working faces on the levels are ventilated by underground secondary fans with flexible ducting providing fresh air. Air exhausted from development in the ore body is directed to an exhaust airway. The system is designed to ensure any radon decay products, blast fumes and exhaust gases generated during mining activities are exhausted away from manned areas via unmanned return airways to the surface.

Malu underground area

The Malu underground area ventilation system is consistent with the philosophy of the Ankata system. To support the Malu underground area development, two additional 5 m diameter raise bore shafts have been installed up to the decline portal bench to avoid shaft-sinking through the cover sequence materials. Two underground primary fans exhaust the return air through these rises. Three portals into the Malu open pit form fresh air intakes into the mine. Additional underground exhaust and fresh air raises will be developed as the Malu underground area operations expand over time. Two additional primary exhaust fans were installed on the 9811 Level to form a parallel exhaust circuit with the existing fans.

For the Prominent Hill underground, no refrigeration of the incoming air has been required for depths less than approximately 1000 m below ground level and, as current mining activities occur above this level, no air refrigeration systems have been commissioned to date.

Malu deep west and Kalaya underground area

Two additional primary exhaust fans were commissioned in 2023. The primary fans are located underground adjacent to the Malu North Decline. The air exhausts through two return air lateral development drives which breakthrough into the Western side of the open pit. Two 5 m diameter raisebore systems are to be excavated from the primary fan stations down to an RL of 9281. Lateral and vertical branches out from the bottom of the exhaust raises to establish the return air circuit for the Malu Deep West and Kalaya orebodies.

Fresh air is sourced from two locations. A fresh air drive linking the existing VR4A raise (ex Ankata) to the two UG fresh air raises planned for the expansion and deepening. This drive enables introduction of chilled air to Malu Deeps using the existing VR4A raise. A link drive at the mid-shaft access will also enable chilled air from the planned Wira Hoisting Shaft to be introduced in the two UG fresh air raises established for the expansion and deepening.

Permanent refrigeration installation is installed at VR4a and the Wira hoisting shaft, with the system providing 9 MW of surface bulk air cooling at the fresh air intake.

The refrigeration plant is a bulk air cooler facility, containing approximately 4,000 L of anhydrous ammonia (NH₃) and an additional approximately 3,000 L of Lubrizol CP-1009-68 mineral oil in total, split evening into two refrigeration trains. The plant is powered by an 11,000 volt (V) substation located adjacent to the main building and consists of four structures: a condenser bank, a refrigeration plant and chilled water tanks, the electrical substation and the bulk air cooler (BAC) system containing the fresh air raise bore VR4a.

The ammonia refrigeration system is designed as an indirect cooling system and consists of a complete screw compressor driven refrigeration circuit with air cooled condensers and plate type evaporators. The refrigeration circuit takes off heat from a separate chilled water circuit which cools air through closed type BACs. Cooling coils, which are water/air heat exchangers, are installed in the BACs at the mine air intake shaft with warm ambient air drawn through the cooling coils, and the air temperature reducing as the air passes through the coils. The chilled air then enters the mine shaft, provided cooling to the mine. The cooling coils contain chilled water, and the water circuit is a closed loop system.

Additionally, transportable air refrigeration units are used for spot cooling of specific underground development faces as necessary.

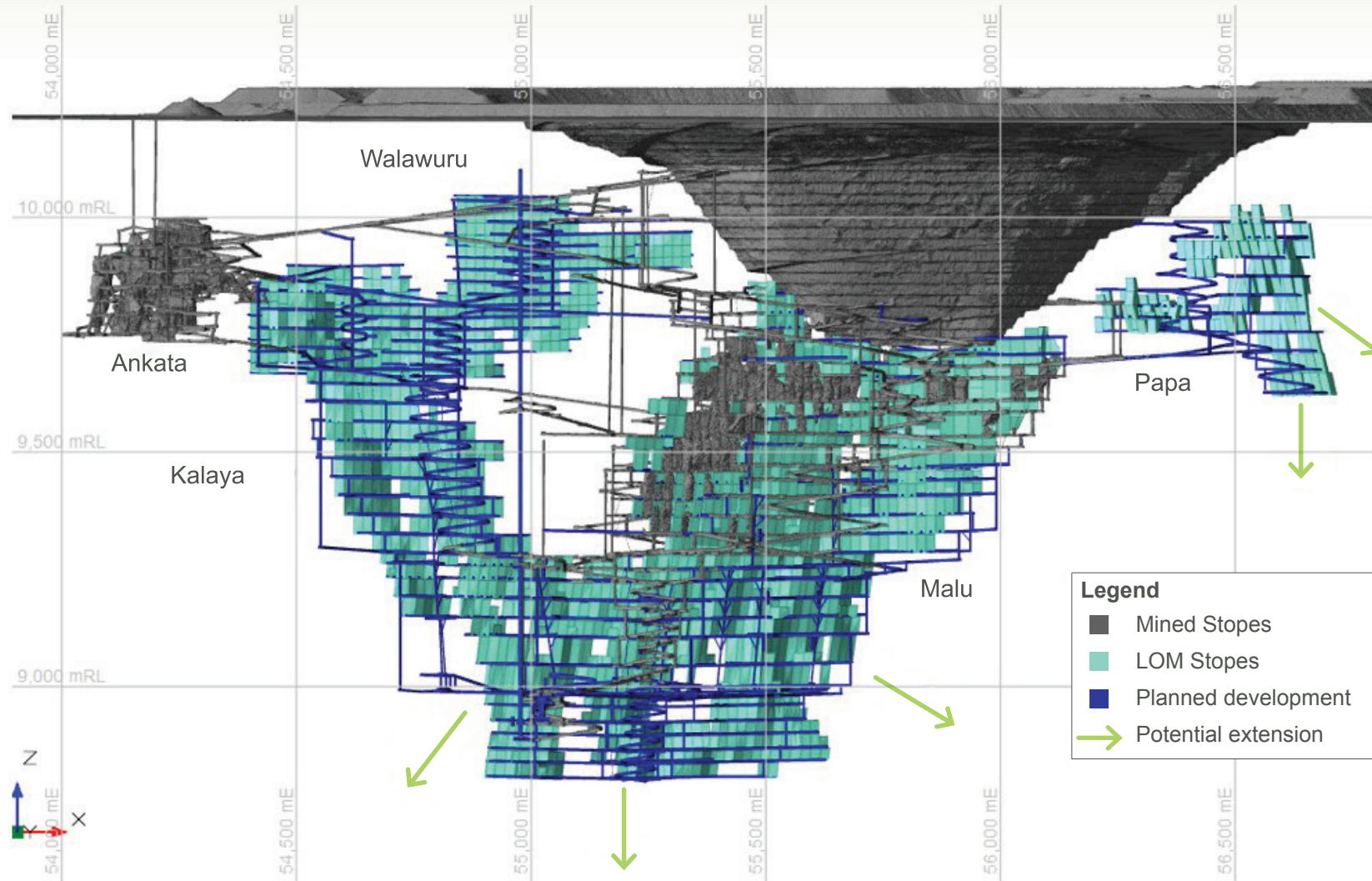


Figure 5.14 | Conceptual underground mining long section showing existing development and planned stopes

5.5.4 Mine sequencing and scheduling

The sequences of mining are described in Table 5.2. High-level details of the progression of operational activities were presented in Section 5.2, and estimations of future material movements, including geochemical classification information, and concentrate production provided in Section 5.3.

Stage 4 of the open pit was completed in Q1, 2018 and mining is now exclusively from underground. The current underground mine life extends to 2036. No sterilisation of the Ore Reserve has occurred due to the placement of any surface or underground infrastructure. The placement of mine infrastructure is continuously reviewed against resource drilling outcomes to ensure that no sterilisation of the ore reserve occurs. Opportunities for the extension of the underground mine life through additional mining areas are continually assessed.

Estimations of the quantities of material which have the potential to generate acid was detailed in Table 5.6. Approximately 37.8 Mbcm of PAF material was mined from the open pit. The waste rock materials balance remaining will contain (based on current classifications) 99% NAF, 1% UPAF and 0% PAF.

Progressive rehabilitation of the WRDs has been incorporated into the Prominent Hill mine plan as demonstrated in Table 5.2. Further information on progressive rehabilitation can be found in Section 6.

5.5.5 Use of explosives

The underground operation uses AMEX (bagged ANFO and Emulsion) as well as pre-packaged products such as stope primers and emulsion type explosives for priming and perimeter charging. Approximately 1,000 kg of packaged product and 17,000 kg of AMEX is blasted each week for combined operations of development and production. This figure will increase/ decrease as the ore production profile from underground changes over time.

Underground development blasting occurs as required (approximately once every 24-hour shift). Blasting may also occur on an as-needs basis in areas that are isolated from the rest of the operations and where ventilation reports directly to exhaust airways. Underground production blasting occurs on an as-needs basis and is fired at the same time as development blasting where ventilation reports directly to exhaust airways. Stope blasting occurs approximately every second day.

There are four licenced magazines on site. There are:

- **Orica Bulk Facility** – Surface magazine which receives bulk emulsion phase ammonium nitrate deliveries and provides ANFO for underground blasting operations. Security Sensitive Ammonium Nitrate (SSAN) Ammonium Nitrate Emulsion (ANE) is stored in one above ground 80 t relocatable tanks within a fenced and locked Surface ANE storage compound with a maximum storage capacity of 160 tonnes of emulsion. The facility is licenced to store up to 232,000 kg of SSAN ANE.
- **Open Pit Mining Magazine** – Surface magazine, once used by the Open Pit, which has three magazine units for initiating explosives – two high explosive (HE) units and one detonator unit. This magazine supplies all initiating explosives for the historical open pit blasting operations and is licenced to store up to 13,200 kg blasting explosives in two magazines and up to 200 kg (equivalent to 12,500 units of plain size No 8 detonators) in one annexed detonator magazine.
- **Underground Mining Magazine** – Surface magazine which has five magazine units – three for HE (comprising initiating explosives and 1 tonne Bulka bags of ANFO from Orica's Mobile Mixing Unit) and two for detonators and is licenced to store up to 50,400 kg of blasting explosives (HE and ANFO) and up to 400 kg (equivalent to 20,000 units) of No 10 detonators.

- **Ankata Underground Magazine** – Underground magazine located on 9905 level of the underground mine. This is supplied by the Underground Mining Magazine in accordance with operational blasting requirements and is licenced to store up to 20,000 kg blasting explosives (8,000 kg HE and 12,000 kg of ANFO) and up to 210 kg (equivalent to 10,500 units) of No 10 detonators.

5.5.6 Batch plant

To enable greater efficiency and operation performance for underground operations, a new modular Batch Plant to support concrete and shotcrete activities has been constructed within the existing mining footprint. An Application for Alterations to Plant and Equipment was submitted to the EPA in June 2021 to comply with requirements under Section 54c of the *Environment Protection Act 1993* (EP Act). The historical mobile Batch Plant has been decommissioned, and the area rehabilitated. The capacity of the new Batch Plant is 60-70 m³/hr. The plant is powered by low voltage power thereby reducing the operations carbon emissions through an immediate cessation of an estimated 100,000 litres of diesel burned/year by the decommissioned Plant.

5.5.7 Types of mining equipment

The current fixed plant and mobile fleet associated with the open pit and underground mining operations are summarised in Table 5.9, whilst future plant and mobile equipment post commissioning of the Wira shaft and related infrastructure is detailed in Table 5.10.

Table 5.9 | Current mining plant and equipment

Equipment	No.	Size	Noise output (dBA)	Fire ignition source	NOx (idle)	CO (idle)	Nox (high idle)	CO (high idle)
Surface fixed plant								
Surface ventilation fans	2	550 kW, 2.8 m diameter	-	Electrical	-	-	-	-
Ankata PF plant	1		-	Electrical	-	-	-	-
Malu PF plant			-	Electrical	-	-	-	-
Refrigeration plant (VR4) – transformer	1	2 MVA	< 85	Electrical/oil				
Refrigeration plant (VR4) – compressor	3	800 kW	< 85	Electrical				
Refrigeration plant (VR4) – condenser water pump	6	75 kW	< 85	Electrical				
Refrigeration plant (VR4) – cooling tower fan	6	45 kW	< 85	Electrical				
Bulk air cooler (VR4) – respray water pump	2	75 kW	< 85	Electrical				

Equipment	No.	Size	Noise output (dBA)	Fire ignition source	NOx (idle)	CO (idle)	Nox (high idle)	CO (high idle)
Bulk air cooler (VR4) – return water pump	3	90 kW	< 85	Electrical				
Bulk air cooler (VR4) - fans	2	200 kW	< 85	Electrical				
Underground mobile fleet								
Development drill rig	7	Twin boom	72	Electrical	53	59	48	136
Production drill rigs	5	-	127	Electrical	122	101	153	116
Cable bolter	2	-	76	Electrical	76	180	400	90
Loaders	12	21 t	120	Diesel	120	21	88	59
Haul trucks	22	63 t	121	Diesel	121	46	83	94
Light vehicles	42	-	-	Diesel	-	70	126	154
Spraymecs	3	-	-	Diesel	-	3	35	2
Charging vehicle	5	-	75	Diesel	75	11	92	12
Integrated tool carriers	8	-	109	Diesel	109	30	81	32
Graders	2	-	74	Diesel	74	28	45	60
Water cart	1	-	112	Diesel	112	26	26	33
Service trucks	5	-	112	Diesel	112	91	83	648
Agitator trucks	4	-	75	Diesel	75	13	111	30
Diamond drill rigs	5	-	-	Electrical	-	-	-	-
Underground fixed plant								
Compressor	2	-	-	Electrical	-	-	-	-
Pump station	2	-	-	Electrical	-	-	-	-
Primary ventilation fans	4	1100 kW, 3.4 m diameter x 2 1500 kW 3.8m diameter x 2	-	Electrical	-	-	-	-
Primary ventilation fans	2	1600 kW	104-114	Electrical				

Table 5.10 | Post Wira shaft commissioning indicative mining plant and equipment

Equipment	No.	Size	Noise output (dBA)	Fire ignition source
Additional surface fixed plant				
Mine winder	1	6500 kW	< 85	Electrical
Mine winder – cooling fan	1	55 kW	< 85	Electrical
Skyshaft transformer	1	2 MVA	< 85	Electrical/oil
Skyshaft skip tipping mechanism	1	55 kW	< 85	Electrical
Skyshaft bin apron feeder	1	75 kW	< 85	Electrical
Skyshaft transfer conveyor	1	150 kW	< 85	Electrical
Overland conveyor	1	220 kW	< 85	Electrical
Overland conveyor	1	1 MVA	< 85	Electrical/oil
Stockpile conveyor	1	75 kW	< 85	Electrical
Refrigeration plant (shaft) – transformer	1	1 MVA	< 85	Electrical/oil
Refrigeration plant (shaft) – compressor	3	800 kW	< 85	Electrical
Refrigeration plant (shaft) – condenser water pump	6	75 kW	< 85	Electrical
Refrigeration plant (shaft) – cooling tower fan	6	45 kW	< 85	Electrical
Bulk air cooler (shaft) – respray water pump	2	75 kW	< 85	Electrical
Bulk air cooler (shaft) – return water pump	3	90 kW	< 85	Electrical
Bulk air cooler (shaft) – fans	2	200 kW	< 85	Electrical
Revised underground mobile fleet				
Development drill rig	7	119 kW	72	Electrical
Production drill rig	5	119 kW	127	Electrical
Cable bolter	2	119 kW	76	Electrical
Loaders	12	352 kW	120	Diesel
Haul trucks	22	565 kW	121	Diesel
Light vehicles	42	151 kW	-	Diesel
Spraymecs	3	75 kW	-	Diesel
Charging vehicle	5	120 kW	75	Diesel
Integrated tool carriers	8	116 kW	109	Diesel
Graders	2	104 kW	74	Diesel

Equipment	No.	Size	Noise output (dBA)	Fire ignition source
Water cart	1	276 kW	112	Diesel
Service trucks	5	200 kW	112	Diesel
Agitator trucks	4	190 kW	75	Diesel
Diamond drill rigs	5	55 kW	-	Electrical
Additional underground fixed plant				
Grizzlies	26	800 mm aperture	< 85	NA
Truck loading station	5	37 kW	< 85	Electrical
Crushing station – primary crusher	1	450 kW	110-120	Electrical
Crushing station – rock breaker	1	94 kW	< 85	Electrical
Crushing station – transformer	1	2 MVA	< 85	Electrical
Loading station - apron feeder	1	160 kW	< 85	Electrical
Loading station – collection conveyor	1	75 kW	< 85	Electrical
Loading station – slew conveyor	1	315 kW	< 85	Electrical
Secondary ventilation fans	Multiple	55 kW	< 85	Electrical
Secondary ventilation fans	Multiple	110 kW	< 85	Electrical
Workshop air compressor	2	185 kW	< 85	Electrical
Workshop transformer	1	750 kVA	< 85	Electrical
Sump pump – shaft bottom	1	37 kW	< 85	Electrical
Sump pump – crushing station	1	37 kW	< 85	Electrical
Sump pump – haulage level	1	37 kW	< 85	Electrical

5.5.8 Surface water management infrastructure

Surface water is managed onsite through the Surface Water Management Plan (SWMP) and its primary objective is to enable effective management of on-site waters to minimise the impact of mining operations of surface water resources both on and adjacent to the mine site. The SWMP achieves this objective through:

- transfer of surface water away from high-risk areas (e.g., adjacent to the open pit)
- divert external catchments wherever possible
- detain surface water onsite, minimise infiltration, discharge and sedimentation onto external waterbodies. When available, water can be reused onsite as process water or allowed to evaporate
- avoid areas of cultural significance
- minimise earthworks and disturbance, where possible

- future proof the current SWMP.

The SWMP was originally designed for surface water to be managed via five sub-catchments, which sought to contain small to medium scale rainfall events (i.e., 1 in 2-year Average Recurrence Interval (ARI) (or 39% Annual Exceedance Probability (AEP)) and provide controlled release of events of greater than a 1 in 50-year ARI (e.g. 2% AEP) storm event. The original design also contained detention and retention ponds (five in total), as well as diversion bunds and drainage channels.

A full revision of the design criteria for surface water management was undertaken by AECOM in 2021 to inform a new design for storm events including 39% AEP, 10% AEP, 1% AEP and 0.1% AEP. The adopted design criteria included 1% AEP (24 hour) storm event for high-risk areas, minimise surface water flow into the Open Cut Pit, 39% AEP (24 hour) storm event criteria for low-risk areas and critical storm duration for drainage channels for the respective AEPs depending on the risk profile of the catchment. Areas identified as being high risk include the ROM pad (adjacent to the shaft pad), Wira shaft pad, western ring road (above the Open Pit), substation precinct and the Open Pit. Additional design parameters were also adopted which included:

- allowance of 15% increase in rainfall intensity due to Climate Change
- 50% sedimentation capacity included within the water storage sizing
- 300 mm freeboard included in the water storage sizing
- assumed all water storages are lined with impermeable material to minimise infiltration
- pumping rates estimated based on storages empty within two days from storm event, with pumping only commencing once the storm event has passed

As a result, the updated SWMP incorporates measures to minimised changes to existing flow volumes within the catchments, minimise potential for soil erosion, minimise infiltration in high-risk areas, contain sediment or other contaminants and protect mine infrastructure from flood waters. The updated SWMP strategy is based on the 2023/2024 layout and highlights 14 sub-catchments (Figure 5.15) with each having varying degrees of infrastructure (e.g., bunds, drainage channels, pumps). The applicable management measures for each sub-catchment are outlined in Table 5.11 below.

With the new design, it is anticipated no discharge from site to downstream terrestrial and/or marine environments during and up to the 39% AEP storm event. Project related water sources such as the TSF, process water dam and raw water dam have already been designed, constructed and managed to ensure no discharge to the environment. Further, water retained onsite can be made available for reuse and dust control or within the processing plant.

Table 5.11 | Surface water management strategy

Catchment	Area (m²)	Description	Design criteria	Proposed management measures
1	101,300	This catchment includes the access ramp from the Southern WRD as well as northern WRD area. Due to proximity of surface water flows to the open pit, this catchment is deemed high-risk to conveying water flows into the pit.	1% AEP	Flows are directed down the Southern WRD ramp towards the southern laydown yard via sheet flow and a designated drainage channel (cross-sectional area of 4.0 m²). Localised road raising will be required at the northern end of the ramp as well as reinstatement of the existing berm along the eastern edge of the road to prevent flow entering the open pit.
2	173,800	This catchment area includes the southern end of the ROM pad as well as ROM Access Ramp/Road and Malu Paste Plant area. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit	1% AEP	Surface water runoff from this catchment will travel as overland flow on the southern end of the ROM Pad, down the access ramp towards the low point of the catchment adjacent the Malu Paste Plant. Due to the proximity of this area to critical infrastructure, this area will require provision of a sump plus pump arrangement to redirect flow to the Environment Pond during storm events, to prevent ponding and infiltration. This interim measure is necessary until the precinct plan is implemented.
3	69,800	This catchment area includes the PHOX Shaft Pad and associated infrastructure. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit.	1% AEP	Surface water flows from this catchment will be conveyed via drainage channels and culverts to a dedicated lined storage on the southern side of the ROM Pad (adjacent the Malu Paste Plant). Surface water will then be pumped via a dedicated system to the Environment Pond for transfer to the TSF.
4	606,600	Catchment 4 includes the southern (to the west of PHOX) and northern portions of the ROM Pad. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit.	1% AEP	Runoff from this catchment will be directed via two designated drainage channels (cross-sectional areas of 2.3 m² and 6.4 m²) and the PHOX Drainage Bund towards a lined evaporation storage (106,200 m³) at the northern end of the ROM Pad. Regrading of the ROM Pad away from the Open Cut Pit will be required as well as installation of a berm on the eastern edge of the pad. Overflow of the Evaporation Storage will be required to be directed towards the area west of the ROM Pad
5	78,600	This catchment covers the portion of the Western Ring Road adjacent to PHOX Shaft Pad as well as batters from the ROM Pad and Northern WRD area. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the Pit.	1% AEP	Runoff from this catchment flows north via sheet flow and a designated lined drainage channel (cross-sectional area of 3.0 m²) towards Pond A (58,700 m³). Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.
6	48,200	Catchment 6 encompasses the majority of the western ring road as well as the Northern WRD access ramp. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit	1% AEP	Surface water flows are directed towards Pond A via regrading of the Western Ring Road as well as a designated drainage channel (cross-sectional area of 4.0 m²). Surface water is required to sheet flow either directly into Pond A or via the designated drainage channel. Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.
7	83,200	Catchment 7 includes the southern batter of the Northern WRD and associated Pond A area. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit.	1% AEP	Surface flows for this catchment comprise of sheet flow into Pond A (58,700 m³). Pond A occupies the majority of the catchment with some localised regrading required at the northern end of Pond A. Pond A is a lined pond which is required to be pumped to the ROM Pad Evaporation Pond. In order for the Pond A to be pumped dry within 2 days of the storm event, a pump rate of 227 L/s is required.
8	46,900	This catchment includes the southern batter of the Northern WRD, adjacent the access ramp. Due to proximity of surface water flows to the open pit this catchment is deemed high-risk to conveying water flows into the pit.	1% AEP	Due to this catchment comprising mostly of batters, surface water flows generated in this area are required to sheet flow into Catchment 6 with localised regrading of Catchment 6 to direct flows to Pond A.
9	210,300	Catchment 9 is located on the northeastern side of the open pit and comprises of the southern batter of the Northern WRD as well as rock stockpiles.	39% AEP	Surface water flows generated within this catchment are to be directed via regrading of the access road towards a designated lined evaporation pond (Pond B = 5,800 m³). In localised areas throughout the catchment some ponding will occur. Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.
10	11,000	Catchment 10 comprises of a small portion of the Eastern Ring Road, adjacent to the Cultural Heritage Pond.	39% AEP	Some localised regrading of this catchment will be required to direct surface water flows towards Catchment 12 located in the south-east corner of Catchment 10. Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.
11	81,600	Catchment 11 consists of a designated Cultural Heritage Pond that is to be protected from mine affected water	39% AEP	Due to the cultural significance of this pond location, a new berm is required to be constructed around the perimeter of the Cultural Heritage Pond to prevent mine affected water entering this area. This pond will have a localised catchment only impacted by direct rainfall.
12	81,900	Catchment 12 comprises of a portion of the eastern ring road as well as rock stockpile areas located on the eastern boundary of the site.	39% AEP	Surface water flows in this catchment are required to be directed toward the external site boundary (currently protected by a berm) via regrading and a designated drainage channel (cross-sectional area of 2.3 m² and minimum grade of 0.45%) at the northern end of the catchment. Ponding water in this catchment will be allowed to infiltrate into the ground. Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.
13	16,800	Catchment 13 comprises of a small, localised catchment located on the eastern side of the open pit encompassed by rock stockpiles and an existing berm.	39% AEP	Surface water in this catchment will be allowed to accumulate and infiltrate as required. A small berm is required to be installed on the southern end of this catchment to exclude external catchment flows from the south. Flows from Catchment 14 are also directed via a designated drainage channel into this catchment.
14	94,800	This catchment is located on the eastern side of the open pit and comprises of rock stockpile areas and the northern batter of the Southern WRD	39% AEP	Surface water generated in this catchment will be directed toward a central drainage channel (cross-sectional area of 2.3 m² and minimum grade of 0.40%) via localised regrading with the drainage channel discharging into the low spot of Catchment 13. Upgrades to the existing berm around the top of the open pit are required to prevent localised discharges towards the pit.

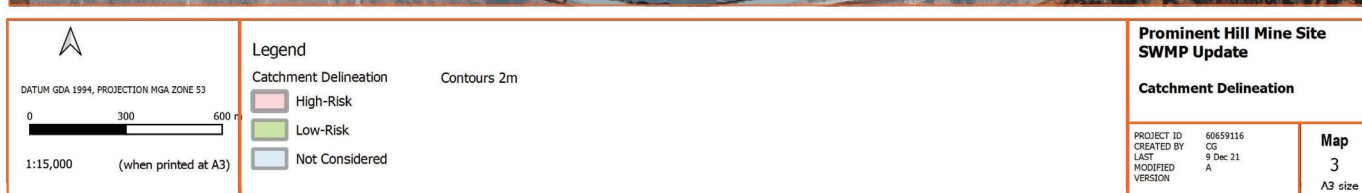
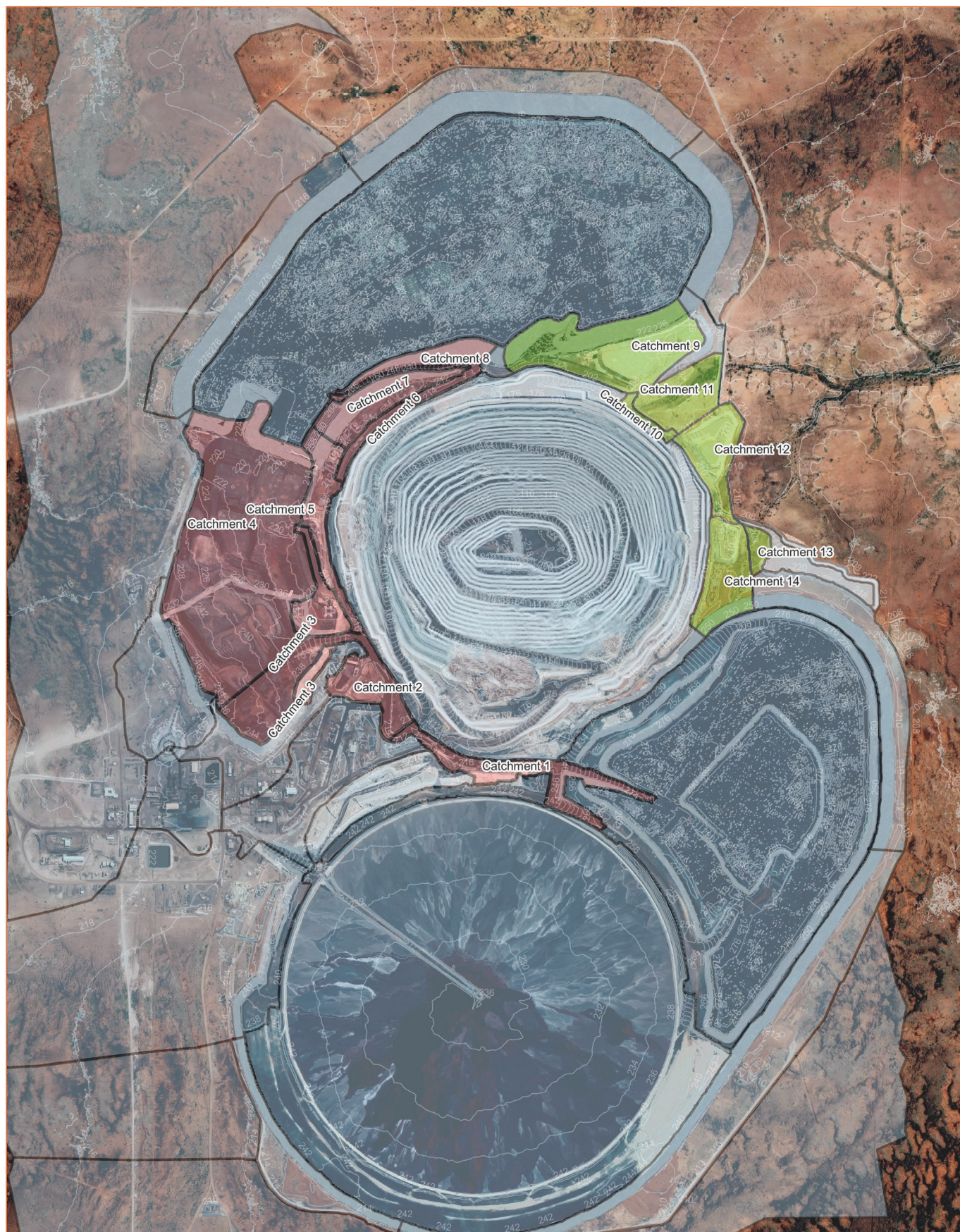


Figure 5.15 | Mine surface water management catchments

5.5.8.1 Water discharge

No discharge from site to downstream terrestrial and marine environments is expected up to the 39% AEP storm event. Some water discharge from site to downstream environments is expected for storms greater than the 39% AEP storm event. Monitoring and inspections of any discharges will be required to meet the objectives of the SWMP, in accordance with PEPR requirements (i.e., this document). Project-related water sources such as the TSF, process water dam and raw water dam are designed and managed to ensure no discharges to the environment protecting terrestrial and marine environments.

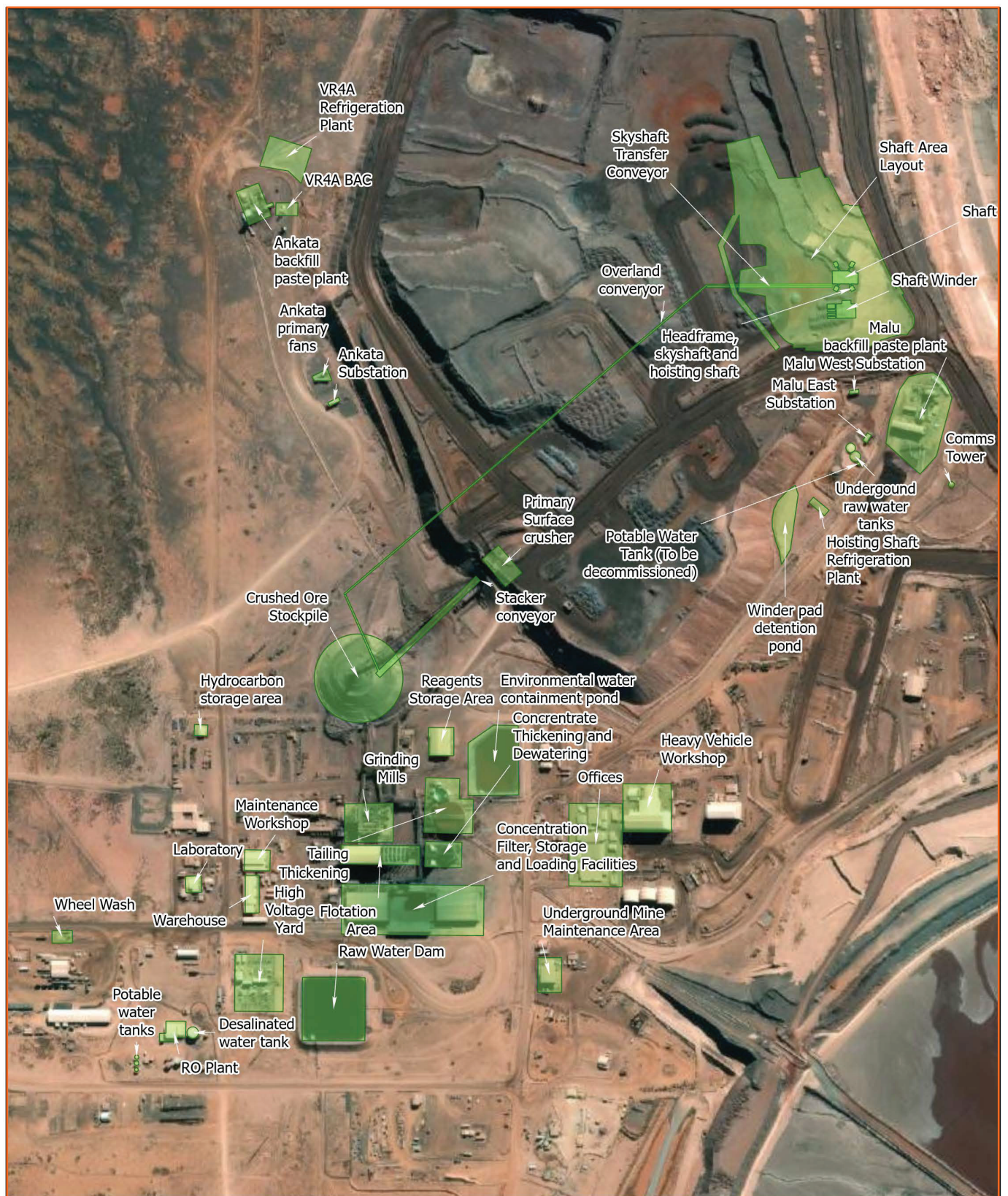
5.5.8.2 Emergency pit water discharge

It is possible that extreme rainfall events could generate volumes of pit water that may require emergency (controlled) discharge. Significant storage volume exists within the open pit should an extreme event be experienced, and it is deemed unfeasible that uncontrolled discharges will be experienced at the site.

In the event there is a requirement of emergency discharge of pit water, approval must be obtained from the DEW and DEM and a record must be kept of the approval. Upon discharge water quality parameters must be collected and analysed, as agreed with DEW and/or DEM.

5.6 Description of minerals processing operations

The layout of the Prominent Hill processing activities is shown in Figure 5.16, and a process flow diagram presented in Figure 5.17. A summary of the major processing stages is discussed in the following sections.



Surface Infrastructure



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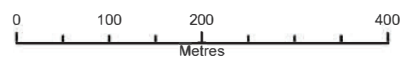


Figure 5.16 | Processing plant layout

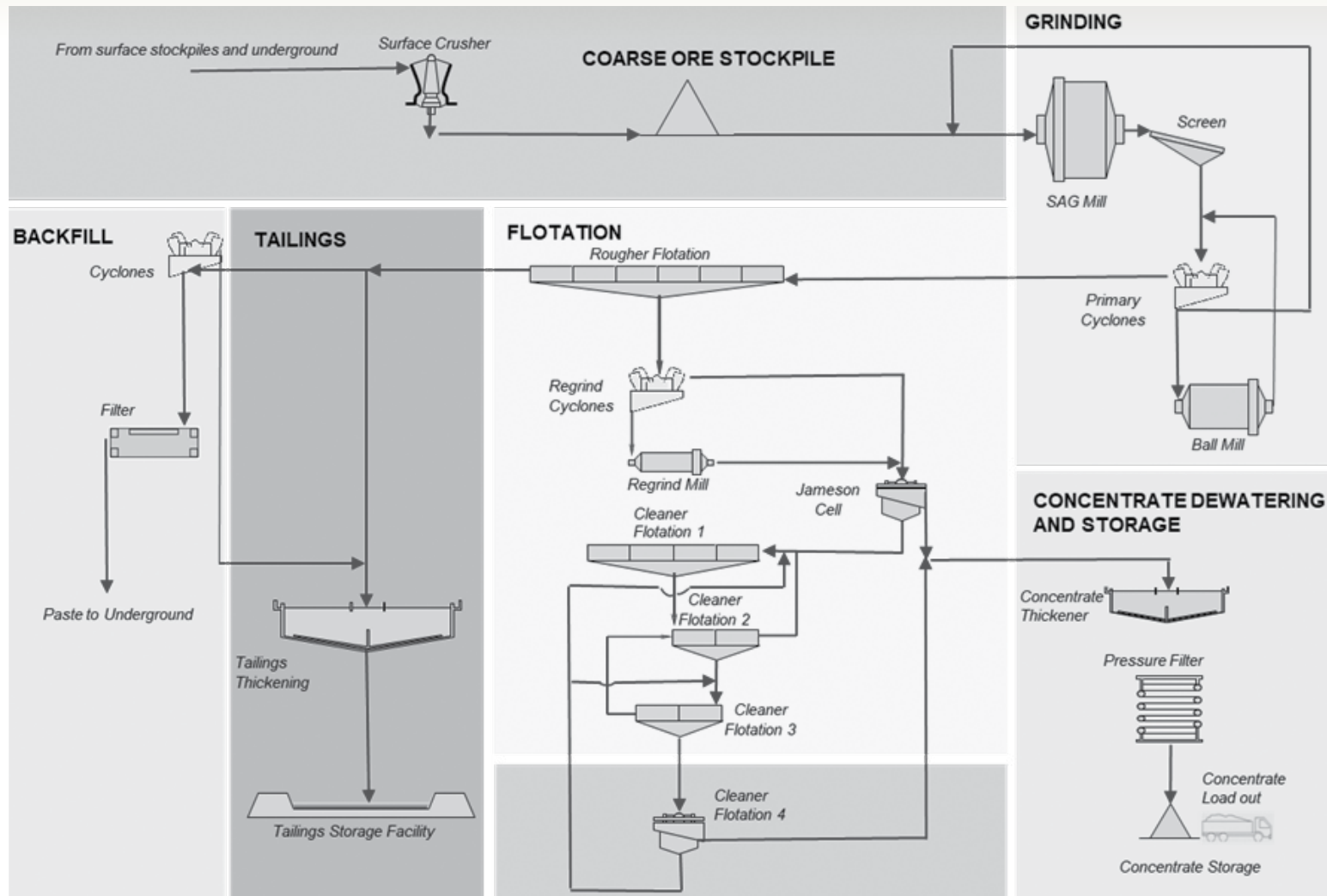


Figure 5.17 | Ore processing schematic flowsheet

5.6.1 Crushing and grinding

Currently, ore is hauled from the mine directly to the primary crusher or stockpiled on the ROM pad until such time as it can be processed. Low grade ore may be stockpiled separately and processed as required.

The ore is taken from the mine or reclaimed from the ROM stockpiles and tipped into the primary crusher, located adjacent to the ROM pad, where it is crushed to a size of less than 110 mm. The nominal crusher throughput is up to 3,600 t per hour, approximately three times the throughput of the grinding circuit. The ore is then conveyed to the crushed ore stockpile. After the commissioning of the Wira Shaft, mined material will be crushed underground prior to being brought to the surface, meaning it will bypass the surface crusher and be fed directly to the crushed ore stockpile.

Crushed material is reclaimed from the bottom of the stockpile and conveyed to the semi-autogenous grinding (SAG) mill which operates in a closed circuit with a vibrating screen and pebble recycle circuit. 125 mm grinding media are added along with water inside the SAG mill to reduce the ore to micron size contained in a slurry form. Material that doesn't pass through the 5 x 20 mm screen is recycled back to the SAG mill for further grinding.

The slurry containing the fine material that passes through the 5 x 20 mm screen is combined along with the ball mill discharge to slurry feed the primary hydrocyclone pack for classification. The primary hydrocyclone separates the material by size, where the overflow fines report to flotation, and the underflow coarse returns to the ball mill where 60/70 mm balls are added for further grinding. The SAG and ball mill operates in closed circuit with the primary hydrocyclone pack. Dust is generated during the dry stages of crushing and when transporting ore to the coarse ore stockpile (COS). Water sprays are used in the crusher pocket and at the discharge of the first conveyor (CV1) to manage the dust. The rest of the size reduction process (grinding) is a wet process where no dust is generated.

The SAG/ball milling circuit reduces the size to 80% passing 106 µm (currently) and 90 µm (post-Wira shaft commissioning).

5.6.2 Flotation processing and concentrate dewatering

5.6.2.1 Rougher flotation and concentrate regrind

In the flotation area, the primary hydrocyclone overflow enters the flotation process, passing through the rougher flotation cells. Rougher concentrate overflowing these cells, containing elevated copper and gold, and is then pumped to the regrind hydrocyclones for further classification. Tailings is also produced with a portion of the tailings stream directed to the Malu Paste Plant where it is filtered and mixed with concrete to form a paste and subsequently used to backfill the mined stopes underground. The remaining floatation tailings is processed further in the Tailings Thickener where it is thickened to about 63 % solids before being pumped to the TSF or used for the Antkata paste plant. Flotation reagents (collectors and frothers) are added at various stages throughout the flotation process to improve the recovery of copper and gold.

5.6.2.2 Cleaner flotation stage

The regrind hydrocyclones further classify the slurry with the coarse underflow feeding the ISA Mill (Regrind Mill) for further regrinding and combining with the regrind hydrocyclone fine overflow to feed the Jameson Cell. The Jameson cell produces an overflow which is final Cu concentrate. The Jameson cell tails is then further processed in 4 stage cleaning to produce a second final copper Concentrate. The two final concentrates produced are then pumped to the Concentrate Thickener for further processing.

Tailings from Cleaner 1 is also produced and is processed further in the Tailings Thickener before being pumped to the TSF.

5.6.2.3 Concentrate thickening and dewatering

The final concentrate is thickened and filtered. This process involves concentrate washing on the filters using desalinated water. Washed and filtered concentrate with a moisture content of approximately 11-11.5 % (w/w). After filtering, concentrate is transferred to the covered concrete pad for loading onto the export truck by front-end loader. It is either loaded directly into specialised containers for transport or stockpiled pending transport. The storage pad can hold between 10,000 to 20,000 t of concentrate at any one time.

5.6.2.4 Tailing thickening

Tailings from both the rougher flotation and first cleaner processes, are thickened to approximately 63 % (w/w) solids and pumped to the TSF (see Section 5.6.4).

A proportion of the thickened tailings material is filtered and mixed with concrete to form a paste and subsequently used to backfill the completed underground mine stopes (see Section 5.5.3).

5.6.2.5 Processing reagents and consumables

The processing plant at Prominent Hill predominantly utilises conventional flotation cells for the beneficiation of the valuable minerals as well as two Jameson cells and a regrind mill (IsaMill). Subsequent de-watering of the product and waste streams is facilitated by two thickeners and a Larox pressure filter.

The flotation of the desired minerals is aided by the addition of several chemicals which provide the required changes to the physical properties of the slurry. The chemicals used in the processing plant are detailed in Table 5.12.

Chemicals used in the processing plant will end up in either the concentrate stream or the tails stream (or both). The concentrate stream (product) will be transported via a combination of truck, train and ship worldwide for further refining. The tails stream (waste) predominantly reports to the TSF but a small fraction is often sent to the PF plants to produce underground fill.

Fire ignition sources inside the processing area includes Sodium Ethyl Xanthate which is a spontaneously combustible solid under certain conditions, and a range of oils and lubricants that have the potential to combust upon contact with hot equipment.

Table 5.12 | Processing reagents (based on 2020 NPI values)

Reagent	Av. monthly use (t)	Description	Final fate
Sodium Ethyl Xanthate	16	Used as a collector which attaches to the desired minerals	Majority will report to the concentrate
Huntsman Polyfroth H27 (PolyPropylene Glycol MonoButyl Ether)	10	Used to increase the surface tension of air bubbles in the slurry	Majority will report to the concentrate
CMS 2500 (N-Ethyl-o-Isopropyl-thionocarbamate)	2	Used as a collector which attaches to the desired minerals	Majority will report to the concentrate

Reagent	Av. monthly use (t)	Description	Final fate
SNF Flopam AN905SH flocculant (anionic water-soluble polymer)	12	Used to agglomerate small particles together aiding settling rates	Majority will report to the tails (waste) stream.

5.6.3 Concentrate export

Historically Copper-gold concentrate was transported via the concentrate export road to Wirrida rail siding (see Section 5.10 for further information), and then by rail to Port Adelaide (South Australia) and Tennant Creek (Northern Territory) using containers specifically designed to transport copper concentrate. Each container carries up to a maximum of 29 t of concentrate with each truck moving 145 t per trip. Typically, between 200 and 500 t of concentrate will be moved to Wirrida rail siding daily where the containers are loaded onto the rail wagons. Currently up to three road trains use the concentrate export road twice daily. In addition, smaller containers up to a maximum of 27 t of concentrate totalling five containers per truck is transported by road to Wirrida rail yard. In 2025 the Copper SA Logistics Transformation project was implemented to centralise transport of bulk materials, including concentrate, to Port Adelaide via an intermodal facility at Pimba. From 2025 concentrate will be transported via the concentrate export road and site access road to Pimba intermodal facility via the Stuart Highway and by rail from the Pimba intermodal facility. The Wirrida rail siding may continue to be used as required.

5.6.4 Types of process equipment

5.6.4.1 Mobile fleet

The surface mobile fleet associated with the processing and concentrate export operations are summarised in Table 5.13.

Table 5.13 | Non-mining surface mobile equipment

Equipment	Number
Commercial (trucks)	3
Forklift	3
Excavator (<450 kW)	2
Wheeled loader	3
5 trailer Road train	3
Light vehicles	23
Ancillary (miscellaneous)	4
Electric Gator	1
Gator	4
Coaster bus	5
Skid steer loader	2
20t crane	1
100t crane	1

5.6.4.2 Conveyors

There are two main conveyors in operation at Prominent Hill, transporting ore from the primary crusher to the crushed ore stockpile (CV1 conveyor; approximately 220 m long) and from the crushed ore stockpile to the grinding mills (CV2 conveyor; approximately 120 m long). Both conveyors are open (i.e., not enclosed), with dust suppression misting sprays fitted to the output end of the CV1 conveyor, and water added to the grinding mills at the end of the CV2 conveyor prior to grinding operations. Water sprays are used in the crusher pocket and at the discharge of the first conveyor (CV1) to manage the dust. The rest of the size reduction process (grinding) is a wet process where no dust is generated.

As part of the mine expansion and installation of the Wira Shaft, an additional conveyor has been constructed. This conveyor will transport crushed ore from the shaft collar to the crushed ore stockpile and will be commissioned at the same time as the shaft.

A radiation dust sampling program is in place to monitor the dust quality on the mining lease, further details of the results of this program can be found in Section 4.7.

5.7 Description of the TSF operations

5.7.1 Context

5.7.1.1 Current status

The TSF is circular in shape and has a nominal diameter of 1,700 m and an initial storage surface area of approximately 227 ha. Access to the facility is via a ramp located on the western side of the IWL, which also houses the tailings discharge pipework. Capacity of the TSF is increased through progressive raising of the perimeter embankment, utilising the downstream construction method. The starter embankments and subsequent embankment raises have been constructed using a minimum 6 m wide compacted clayey mine waste zone and a 3 – 6 m wide filter zone materials placed against the perimeter mine waste rock dump.

The initial storage capacity design for the starter embankment was of 12.7 Mm³ or 23.5 Mt, equivalent to 18 months assuming an initial tailings dry density of 1.5 t/m³ and a final estimated settled tailings dry density of 1.85 t/m³. The starter embankment had a nominal height varying between 5 – 9 m above ground level, depending on the site topography, with a crest elevation 10221 mRL.

Tailings material generated and thickened within the processing plant is pumped to the on-site TSF, which is integrated into the Southern WRD to form the IWL.

Since Q1 2013, a proportion of sand tailings (2.5%) has been diverted to the paste plant for production of underground backfill. Commissioning of the previous CHF plant in Q3 2015 had increased sand tailings delivered to backfill operations to approximately 17.5%. Further requirements for backfill delivery underground allowed development of the Malu paste plant, commissioned in Q3 of 2020. The Malu paste plant incorporated the CHF plant infrastructure with significant upgrades, resulting in 25% of sand tailings being used for backfill operations in 2021.

The original design concept detailed the undertaking of four lifts, with each lift raising the TSF embankment height by approximately 5 m to provide further storage capacity. Since commissioning, Stages 2 to 5 have been completed, with Stage 5 completed in late 2020. The Stage 5 lift provides sufficient storage for the anticipated tailings production until 2025. Approximately 104 Mt of tailings has been placed in the TSF as of Q4 2020.

Table 5.14 | Total tailings production to Q4 2024

Year	Tailings production (t)	Cumulative tailings placement (t)
2009	6,360,209	6,360,209
2010	8,999,655	15,359,864
2011	9,687,595	25,047,459
2012	9,445,970	34,493,429
2013	9,321,906	43,815,335
2014	9,386,150	53,201,485
2015	10,004,455	63,205,940
2016	8,254,879	71,460,783
2017	8,338,646	79,799,465
2018	8,283,117	88,082,582
2019	8,167,262	96,249,844
2020	7,478,308	103,728,152
2021	~7,000,000	110,728,152
2022	~7,000,000	117,728,152
2023	~5,800,000	123,528,152
2024	~5,150,000	128,678,152

5.7.1.2 Future strategy

Two additional TSF perimeter embankment raises (Stage 6 and 7) will be undertaken to the respective heights of 10246 mRL and 10249 mRL (below the approved final design height of 10256 mRL (Stage 8)), requiring additional waste rock to be imported to continue with the existing embankment construction method.

5.7.2 Embankment materials requirements

Table 5.15 indicates the approximate volume of material required in Stage 6 and 7 embankment lifts to provide storage capacity until 2036.

Clay material will be readily sourced from multiple stockpiles around the IWL. Waste rock material will be sourced from the existing southern IWL. PAF cells within the IWL limit potential waste rock stockpiles, as a result the material will be won by reducing the external embankment slope from the angle of repose to a 2:1 slope. The overall footprint of the IWL will not change.

BHP is investigating concept designs for the final uplift. The investigation will further consider embankment raise methodology and future technologies with the potential to reduce the volume of tailings reporting to the TSF.

The approved designs for the final stage uplift will lead into the finalised closure plan. This body of work will be investigating the nature and need for a cover system for the Prominent Hill TSF, the details of this investigation will be presented to DEM prior to TSF closure. The placement of topsoil and active revegetation will not be undertaken on the TSF surface or embankments.

Table 5.15 | Volume of material required for embankment lift stages and closure

Description	Volume (m ³)
Stage 6	
Mine waste	~600,000
Clay	~215,000
Causeway	88,700
Buttress	~240,000
Stage 7	
Mine waste	551,800
Clay	159,300
Causeway	66,200
Closure	
Mine waste for 1 m cover system	1,580,000

5.7.3 Tailings properties

Typical properties of Prominent Hill tailings are described in the following sections.

5.7.3.1 Physical properties

Particle size distribution, settling and air-drying tests are routinely undertaken to provide up-to-date information on tailings properties for both the thickened tailings leaving the processing plant, and the de-sanded tailings after removal of a portion of the sand material for use in mine backfill. Results of the 2017 test work are summarised in Table 5.16. The main intent of the settling and air-drying tests is to provide the designer with density and settling parameter estimates for use when there is no site data. OZ Minerals complete an annual aerial survey in addition to tracking density and volumes via instrumentation to complete tails reconciliation, which is considered to be a more accurate method than laboratory testing. Based on the limited accuracy/ use of laboratory test results, settling and air-drying testing of the tailings will be undertaken periodically or when process changes occur. Periodical test work will be conducted as part of the 2021 annual audit.

The annual 2021 aerial survey continued to validate strong tailings consolidation performance withing the TSF, achieving an in-situ dry density of 2.2 t/m³, higher than the original design criteria of 1.85 t/m³.

Table 5.16 | Measured tailings properties (2017)

Parameter	De-sanded tailings	Tails thickener tailings
Solids (% w/w)	58.3	65.7
Passing 75 micron (%)	84	75
Passing 1 micron (%)	7	8
Dry density – undrained settling (t/m ³)	1.45	1.63
Dry density – drained settling (t/m ³)	1.67	1.75
Dry density – air drying (t/m ³)	1.74 (after 72 hours)	1.92 (after 5 days)
Water liberated – undrained settling (%)	43.8 (after 72 hours)	35.8 (after 72 hours)
Water liberated – drained settling (%)	52.3 (after 24 hours)	30.4 (after 6 hours)

5.7.3.2 Geochemical properties

In order to understand the geochemistry of the tailings, acid base and single addition net acid generating (NAG) analysis was undertaken on ten laboratory-generated tailings samples. The samples represented combined rougher and cleaner tailings and included representative examples of the four main ore types mined at Prominent Hill; gold only, chalcocite/bornite, chalcopyrite/bornite and chalcopyrite. Ore samples were selected to represent the range of carbonate contents expected in the ore feed.

Total sulphur values of the tailings were all less than 1 % S, ranging from 0.07 % to 0.66 % S. Barium analysis indicates generally high barite contents, with barite accounting for all total sulphur in five samples and most of the total sulphur in the other samples. The non-barite sulphur is low, ranging from 0.00 to 0.26 % S. Acid Neutralising Capacity (ANC) values varied from 5 to 257 kg H₂SO₄ /t.

The non-barite Net Acid Producing Potential (NAPP) values (based on using non-barite sulphur in the NAPP calculation) are all negative. When the NAPP calculation was conservatively made on total sulphur, only three samples are NAPP positive with a relatively low capacity of less than or equal 10 kg H₂SO₄ /t. All NAG pH values were greater than 4.5. Further details of the tailings geochemistry test work are presented in the Geochemical Assessment of the Prominent Hill Project report, which is Appendix 10A of the MARP 2009 (OZ Minerals, 2009); as listed in Table 13.1.

The results of the test work indicate that all tailings samples are classified as NAF.

5.7.4 Construction and operation

5.7.4.1 Footprint and embankments

Prior to construction of the starter embankment, the TSF deposition footprint and embankment footprint was cleared of vegetation and topsoil (100 mm nominal depth). A cut-off comprising compacted weathered Bulldog Shale was constructed under the perimeter embankment with the remainder of the embankment footprint having a layer of subsoil and any soft material removed before being watered and proof-rolled. The TSF base did not require compaction. An underdrainage and decant system was installed as part of the initial construction.

The perimeter containment embankments of the TSF comprises a starter embankment (Stage 1) constructed using compacted clayey weathered Bulldog Shale (with fines content greater than 15 %).

Subsequent lifts (Stages 2 - 5) have been undertaken using the downstream raise methodology (refer Figure 5.20) to raise the embankment to 10,241 mRL. At this level, the embankment crest width is approximately 60 m. The inner slope of the embankment will be constructed at a gradient of 1 V:1.5 H, while the outer or downstream slope will be formed by NAF waste rock, constructed to angle of repose.

Stage 6 will adopt previous methodology, with the outer or downstream slope being reduced to a 1 V:2 H gradient to win NAF waste rock from the outer circumference of the IWL. Further studies will be conducted in the following year to determine the best design methodology for Stage 7.

5.7.4.2 Tailings discharge

Tailings enter the facility via sub-aerial spigot discharge points spaced at 108 m intervals around the perimeter of the TSF. The spigots comprise tee-pieces with valves connected to a pipe inserted in a slotted conductor pipe, known as a diffuser. The diffuser is founded on a geotextile mat in order to reduce erosion at the spigot points and reduce the spray back that can occur during windy conditions. The required tailings beach angle is achieved through planned activation or deactivation of perimeter spigots to prevent channelling and facilitate the formation of uniform beaches.

5.7.4.3 Decant and water recovery

Tailings decant water and rainfall on the TSF is collected in a decant structure located centrally in the TSF, and comprising concrete pipes stacked vertically with slots in the pipe walls. The concrete pipes are surrounded by competent waste rock which acts as a filter for supernatant water entering the decant tower. An earth-fill decant access way provides access to the decant pumping infrastructure and allows the progressive raising of the decant structure.

The average composition of the decant water is detailed in Table 5.17.

Table 5.17 | Average decant water composition

EC (mS/cm)	pH	Temp (°C)	Cl (mg/L)	Ca (mg/L)*	Mg (mg/L)*	Mn (mg/L)*	K (mg/L)*	Na (mg/L)*	CaCO ₃ (mg/L)^
31.79	7.02	19.5	8060	925	346	0.36	311	3750	127

Notes: *dissolved; ^total alkalinity

A submersible pump is deployed within the decant structure, automatically delivering reclaimed water back to the process water dam for re-use within the processing plant (see Section 5.9.1). The process water dam is approximately 60 m by 60 m in size, holds approximately 2.7 ML of water, is lined with a High-Density Polyethylene (HDPE) liner with a minimum freeboard of 600 mm maintained (though is generally maintained at a level as low as practicable). This provides continuous management of the decant pond area, which is maintained between one and two hectares. The location and layout of the process water dam can be found in Figure 5.16. The average composition of the process water dam water is detailed in Table 5.18.

Table 5.18 | Average process water dam composition

EC (mS/cm)	pH	Temp (°C)	Cl (mg/L)	Ca (mg/L)*	Mg (mg/L)*	Mn (mg/L)*	K (mg/L)*	Na (mg/L)*	CaCO ₃ (mg/L)^
18.35	7.55	24	5990	614	334	0.22	89	3090	104

Notes: *dissolved; ^total alkalinity

The annual water return has historically been between 15-18% whilst depending on seasonal temperatures, evaporation rates, pump availability, and duration of embankment raises.

A targeted operational program was implemented in 2013 to optimise water management practices within the TSF to capitalise on rainfall runoff, in turn mitigating water losses associated with seepage and evaporation. In addition to increasing water return, efforts were also made to improve pumping reliability to the plant. Early years saw a significant increase in the water being recycled back on the processing plant.

In 2017, implementation of an improved deposition strategy combined with priority maintenance on decant infrastructure once again saw an increase in water recovery. Since the implementation of these strategies water recovery has plateaued, resulting for 2020 in approximately 15.8% water return (3.2ML/d of TSF decant going to the environment containment pond). Figure 5.18, shows the water recovery volumes over the last ten years with significant milestones including the decommissioning of the decant infrastructure during the stage 5 embankment raise in 2020 and 2021, resulting in no water return for three months.

By enhancing the facilities water recovery and recycling process, the operation has reduced dependence on groundwater to sustain its operation, whilst improving embankment and adjacent pit wall stability through a reduction in the facility of seepage.

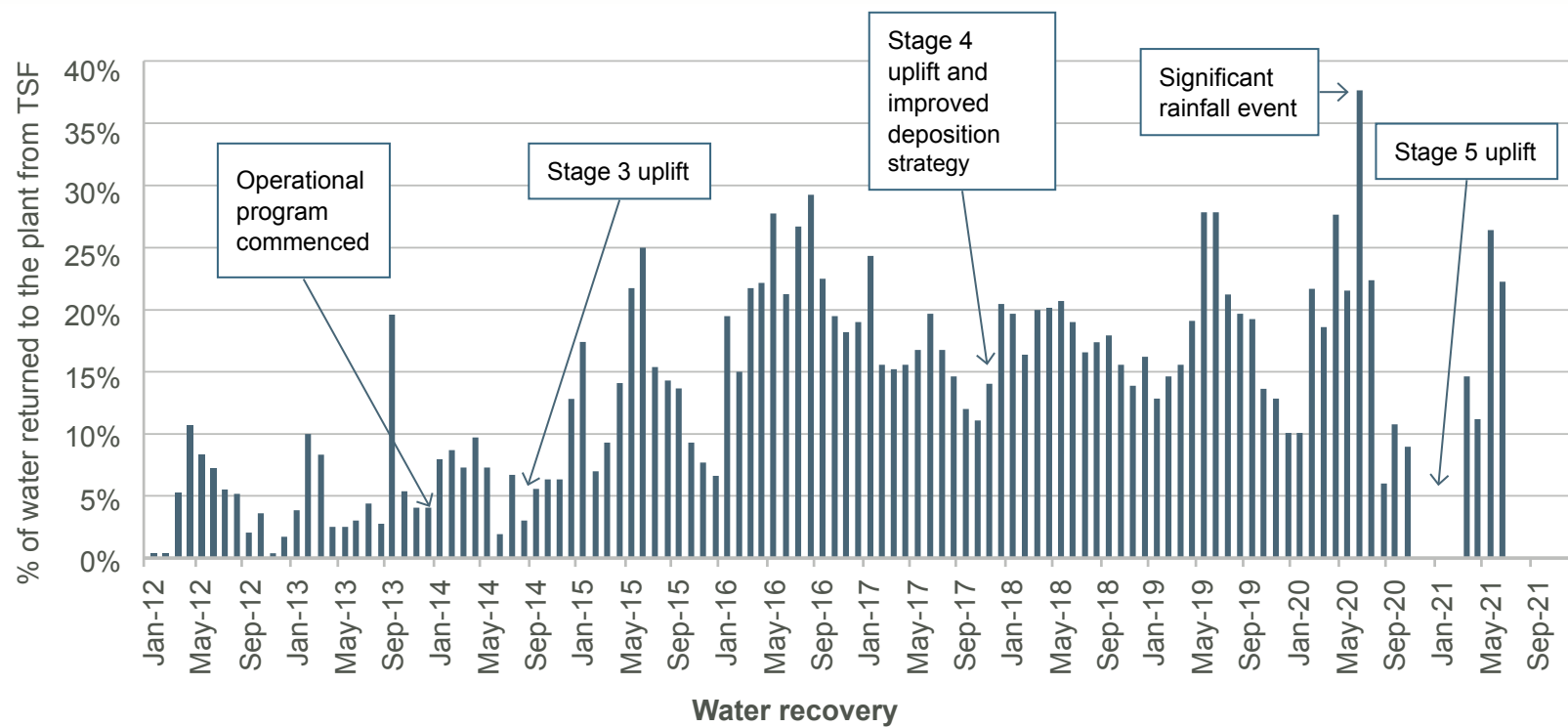


Figure 5.18 | Water returned to the plant from the TSF

5.7.4.4 Freeboard

Inflows to the TSF are water contained in deposited tailings, process waste streams, open pit dewatering systems and incidental rainfall captured within the TSF surface area catchment. The TSF was designed in accordance with Australian National Committee on Large Dams (ANCOLD 2012) and Western Australian Department of Mines and Energy (DME, 1999) guidelines as a significant hazard category storage facility. The minimum operational freeboard of 0.3 m has the capacity to store a 72-hour Probable Maximum Precipitation (PMP) event or a 1 in 10,000,000 annual exceedance probability (AEP) flood event.

5.7.4.5 Underdrainage

The TSF is located on a layer of approximately 70 m of weathered and unweathered Bulldog Shale. This shale has been categorised as being of very low permeability, and therefore acts as a confining layer to vertical seepage from the TSF.

A HDPE lined pond was located beyond the eastern embankment of the TSF, which provided storage for water recovered from the underdrainage system during the commissioning phase of the TSF operation. Perforated pipework installed beneath the medium-permeability near surface material placed on the TSF floor collected water from the tailings beach when it was initially forming, limiting the potential for lateral seepage. The underdrainage system is no longer operational and the pond decommissioned as part of the progressive rehabilitation strategy on cessation of the open pit

5.7.4.6 Seepage

Numerical groundwater modelling of the TSF and WRDs indicates that the open pit will act as a localised groundwater sink both during mining and post-closure. Particle tracking predicts that majority of potential contaminants from TSF or WRDs seepage during and post-mining will be captured by the pit. For more information refer to Section 4.4.3.1 and Figure 4.21.

5.7.4.7 Water balance

BHP maintains records on the quantity of tailings deposited into the TSF, the density of the tailings slurry being deposited, the volume of water recovered via the decant and dewatering systems, and climatic data for the site. This information is used to maintain a water balance model for the TSF.

The water-balance model is completed for the TSF each month to determine water losses associated with the tailings operation. The water-balance model considers the following inflows and outflows to the TSF system:

- Inflows:
 - slurry water
 - rainfall runoff.
- Outflows:
 - water retained in tailings (entrainment)
 - water return to process plant from decant pond and dewatering bores
 - evaporation from TSF beaches and decant
 - seepage.

The water fed to the TSF is calculated using the flow meter and density gauge on the tailings feed pipe to the TSF. The return water is also measured using a flow meter. A weather station is used to monitor rainfall on site.

The water balance calculations are reviewed as part of the TSF annual audit. A breakdown of the water outputs from the TSF operations in 2020 is presented in Figure 5.19. Whole site water balance information can be found in Section 5.9.1.

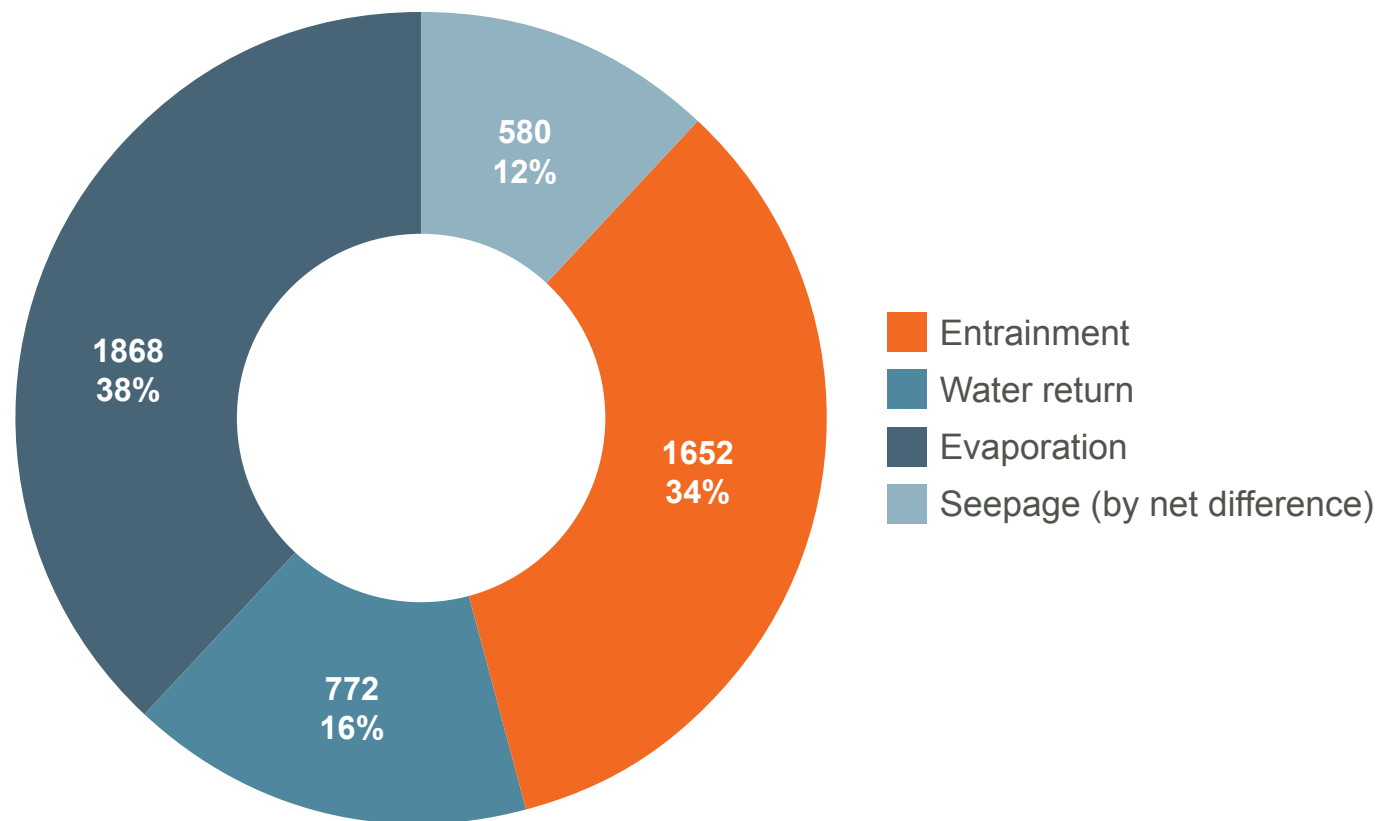


Figure 5.19 | Breakdown of 2020 water output from the TSF (the numbers represent ML of water)

5.7.4.8 Slope erosion management

The long-term objective for erosion management of the TSF is to cap the deposited tailings material with durable NAF material. The NAF material that will be used is the same NAF material utilised for the WRD's. For more information on erosion management please refer to Section 5.8.1.

5.7.4.9 Stability

The stability of the external embankment of the TSF is assessed periodically as part of staged embankment design reviews and the results reported in the annual Tailings Storage Facility Audit. Cone Penetration Testing (CPTu) and a stability analysis was conducted in Q2 of 2022, aligning with ANCOLD 2019 guidelines.

A stability analysis was conducted in 2019 based on the approach presented in ANCOLD (2012) under static loading conditions and under conditions where the strength of the embankment, tailings and foundation materials are reduced accordingly based on the potential for liquefaction during/post an earthquake. The TSF was assessed using the 'significant' hazard classification (design based on ANCOLD 1999 guidelines, see Section 3.1.3). The material parameters from the 2019 analysis is summarised in Table 5.19, comprising of foundation and WRD information from the design review report by Coffey, 2013. The effective cohesion and effective friction angle are conservative 'common values' used by the engineers for each material type. The values have been used since the original design and referenced throughout the tailings dam lifecycle. The tailings shear strength and unit weight have been determined from previous test work. The periodic updates of these parameters are used to inform tailings lifts and stability requirements.

Table 5.19 | TSF stability analysis material parameters

Material type	Unit weight (kN/m ³)	Effective cohesion c (kPa)	Effective friction angle ϕ (degrees)	Undrained shear strength ratio
Oxide bulldog shale	18	200	33	-
Sandy gravel (cemented)	20	200	33	-
Compacted clay	20	10	30	-
Oxide bulldog (loose)	18	10	30	-
Tailings (deposited)	25.7	-	-	0.2
Tailings (residual)	25.7	-	-	0.1

The stability assessment was undertaken using embankment configurations derived from the September 2018 survey. Two cross sections located on the northern and north-western perimeter embankment of the IWL were selected to assess the stability of their slopes and deformations. These sections were selected as they represented the locations where the waste rock material placed around the TSF was thinnest. Cone Penetration Testing (CPTu) and pore pressure dissipation tests were conducted in September 2018. The results indicated that the tailings were saturated, but a phreatic surface was not present. The standing groundwater levels in monitoring bores in the time of testing ranged from 10,118 mRL to 10,209 mRL. The phreatic surface for the purpose of the stability analysis was assumed to be the average of the groundwater levels at 10,203 mRL in the foundation.

The two scenarios were assessed against the following three geotechnical conditions in accordance with ANCOLD 2012 requirements as detailed in Table 5.20.

Table 5.20 | TSF stability analysis scenarios

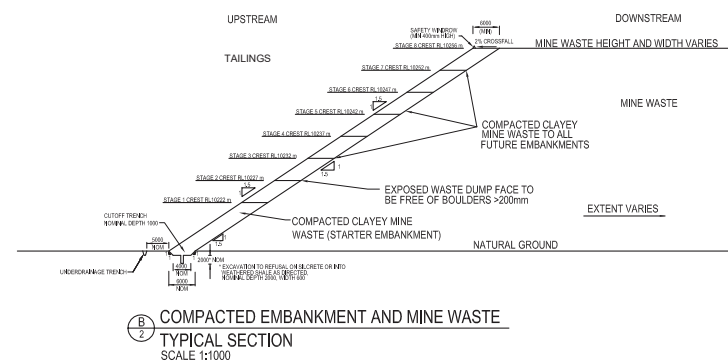
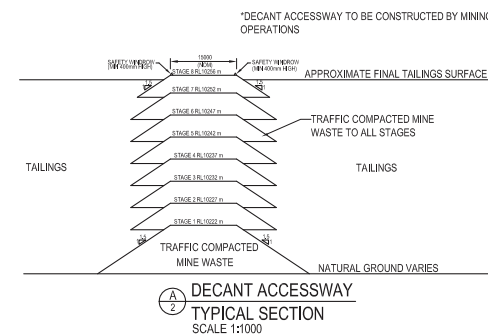
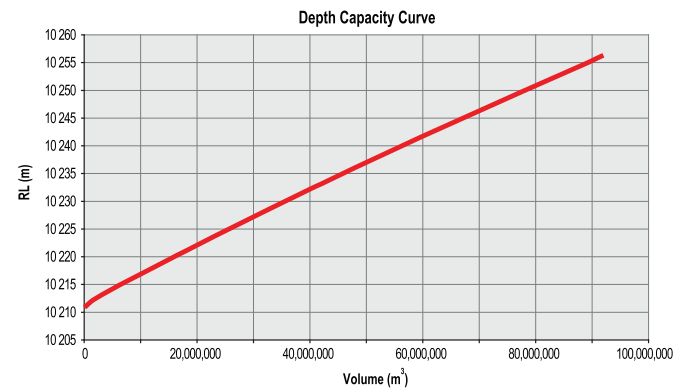
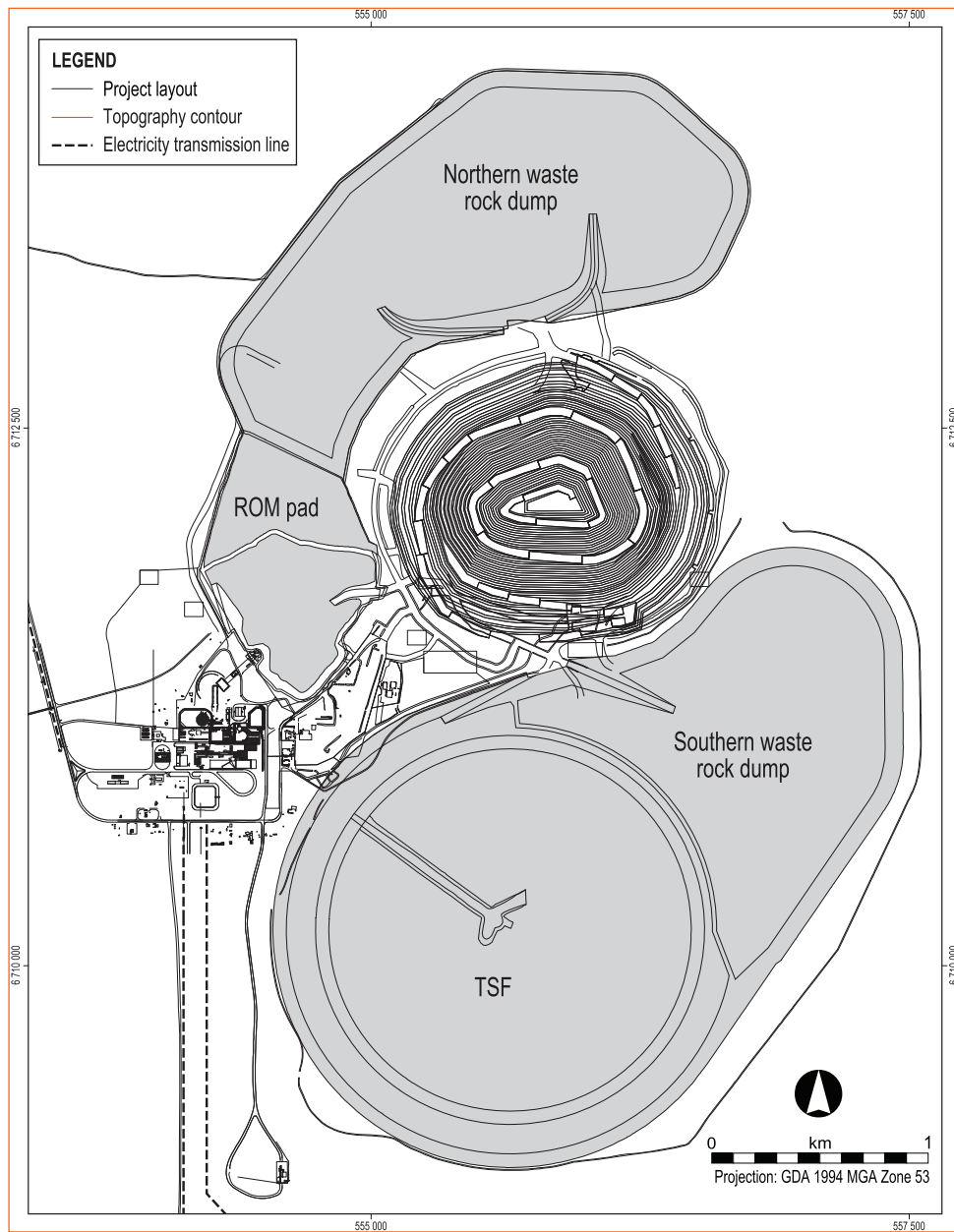
Case	Description	Target minimum FoS
1	Undrained loading conditions where failure surface may lead to loss of containment	1.5
2	Undrained loading conditions where failure surface will not lead to loss of containment	1.3
3	Post seismic conditions	1.1

Results for the stability analyses are presented in Table 5.21. The results of the stability analysis indicate that the risk of the northern and/or north-western embankments failing under static or post-seismic conditions is very low. Overall, the results of the stability analysis show that local stability of the TSF embankment is not critical. High FoS, which exceed the recommended minimum FoS in ANCOLD (2012), are achieved for each case and scenario. These results are consistent with previous assessments.

A consequence category assessment was conducted in 2017 in accordance with ANCOLD (2012) guidelines and determined that the 'Significant' consequence category should be assigned to the IWL. Golder (2019) further reviewed the consequence category and determined a 'High C' is suitable given the population at risk, despite the failure of the IWL is considered very unlikely.

Table 5.21 | TSF stability analysis results

Cross-section	ANCOLD (2012) criterion	Factor of safety	Outcome
Northern embankment			
No loss of containment slip surface	1.3	2.5	Acceptable
Loss of containment slip surface	1.5	3.9	Acceptable
North-western embankment			
No loss of containment slip surface	1.3	5.0	Acceptable
Loss of containment slip surface	1.5	5.8	Acceptable



NOTE: CONSTRUCTION OF RAISES WITHIN THE DESIGN CONCEPTS CAN BE VARIED TO SUIT MINE REQUIREMENTS AND MATERIALS MOVEMENTS.

Figure 5.20 | TSF embankment and decant cross-section

5.8 Materials handling and management

The types of stockpiles are described below with locations illustrated in Figure 5.21.

5.8.1 Waste rock dump

Over the life of mine, approximately 577 Mt of waste rock will be mined, comprising 572 Mt from the open pit operations and a further 5 Mt from the existing underground operations. This material has historically been stored in either the Northern WRD or Southern WRD, with footprints of approximately 257 ha and 551 ha, respectively. The Southern WRD area is larger than the Northern WRD as it incorporates the TSF; together referred to as the Southern IWL.

More recently the placement of underground waste rock into a designed WRD in the bottom of the open pit commenced in July 2018, approximately three months after completion of open pit mining. All material scheduled to be mined from the underground for LOM and stored within the in-pit WRD is classified as NAF.

The dump will be built up on one side further than the other with the final RLs up to the 9,859 and 9,814. NAF waste rock material will be placed in-pit in stages until 2036, the following details the approximate volumes of each stage:

- stage 1 – 206,077 m³
- stage 2 – 278,647 m³
- stage 3 – 353,637 m³
- stage 4 – 293,180 m³
- stage 5 – 393,146 m³
- stage 6 – 79,350 m³
- stage 7 – 527,255 m³
- stage 8 – 753,894 m³
- stage 9 – 1,186,365 m³

The in-pit WRD has been designed in the first instance to ensure that annual rainfall events can be managed using a combination of catchment sumps and a dedicated decant well. Across LOM, the design will allow sufficient catchment to contain a 1 in 100-year rainfall event for the region but still maintain sufficient freeboard to the nearest underground mine flood footprint.

Approximately one month after the commencement of the in-pit WRD, sufficient area at the bottom of the pit was established to enable the construction of stockpiles for the underground ore. These ore stockpiles are rehandled daily by a larger surface fleet to the run of mine ore facility and form a part of ongoing mill feed. Both initiatives have significantly improved operational efficiencies for the underground mine.

A cross-section showing the final profile of the in-pit WRD at LOM is detailed in Figure 5.22.



Figure 5.21 | Stockpile locations

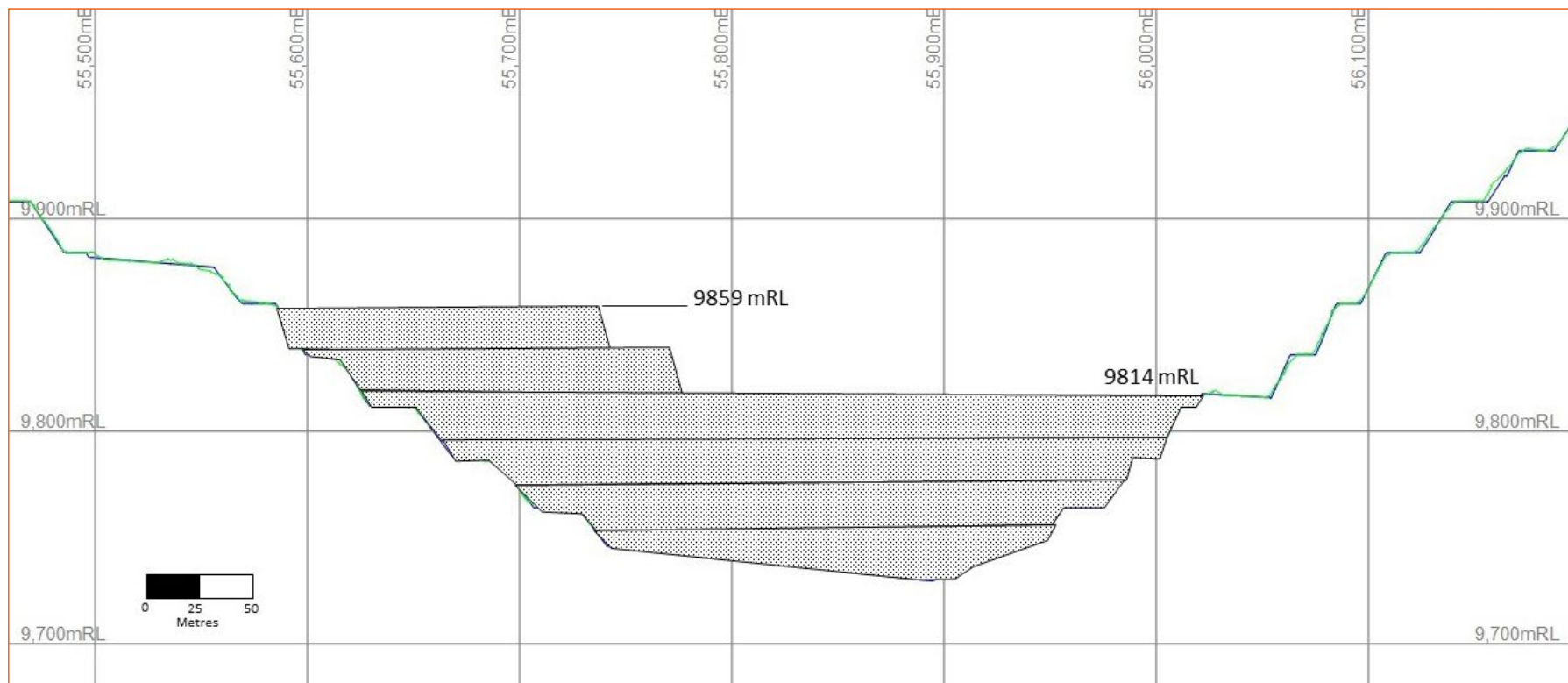


Figure 5.22 | Cross-section of the in-pit WRD at LOM and closure

5.8.1.1 Geochemical waste rock classification

The current (to date) and LOM materials balances by geochemical classification were presented in Section 5.3. The basis of this information is presented below.

A geochemical assessment involving the analysis of 188 representative samples was presented in the MARP 2009 and was used as the basis for the WRD design. The assessment used assays of sulphur, calcium and barium to calculate the acid-generating capacity of the rock materials in accordance with the following equations:

- potential acid (PA) = $30.6 \times [\text{sulphur concentration (\%)} - (0.233 \times \text{barium concentration (\%)})]$
- acid neutralising capacity (ANC) = $45.95 \times \text{calcium concentration (\%)}$.

The waste materials are then categorised according to the classification system described in Table 5.22.

Table 5.22 | Waste rock geochemical classification

ANC/PA ratio	Material classification
Greater than 3	NAF
From 1 and 3	Undifferentiated PAF (UPAF)
Less than 1	PAF

This assessment indicated that most of the waste rock will be NAF. A considerable portion of the cover sequence (i.e., the unweathered Bulldog Shale) and a minor portion of the Proterozoic host waste rock, is considered PAF. The unweathered Bulldog Shale has a high acid generating capacity and is the main acid producing unit at Prominent Hill. The Cadna-owie Sandstone has only a low acid generating capacity and is classified as UPAF.

Material previously extracted from the open pit was described by geochemical classification in Table 5.6 which details waste rock mined categorised according to geochemical classification. The waste rock materials balance remaining will contain (based on current classifications) 99 % NAF, 1 % UPAF and 0 % PAF.

Multi-element analysis of the rock samples indicated elevated concentrations of some metals (Ag, As, Be, Co, Cu, F, Fe, Mo, S, Sb, Se and U). Some of these elements were solubilised from the Bulldog Shale and Cadna-owie Sandstone samples when flushed with water. The other waste rock samples had circumneutral pH values and showed very little metal mobility; apart from elevated Al and Mo when flushed. Column leach results indicated that, in the absence of mitigation and management measures, there is potential for some poor-quality seepage from the Bulldog Shale and Cadna-owie Sandstone waste rock. Test work also indicated that the waste rock materials may be saline and would initially flush NaCl-dominated salts.

5.8.1.2 Management of potentially acid forming material

NAF materials from the cover sequence and Proterozoic host are not expected to pose an acid mine drainage (AMD) or contaminant-leaching hazard and will not require infiltration control. The remaining UPAF material (approximately 1% of LOM rock) and any reclassified PAF material is assumed to require some infiltration control.

The basis for the design of the WRDs was the deep isolation of the short-lag reactive PAF rock units (mostly unweathered Bulldog Shale) from rainfall infiltration (vertically) and potential thermally-driven, convective oxygen pumping (laterally) through pyrite oxidation. This material was encapsulated within either NAF and/or mix of NAF and UPAF materials (which have longer lag times and are less reactive) and then overlain with NAF material on all sides. A store-and-release cover over a low permeability infiltration control layer will complete the encapsulation of the PAF and UPAF material. Key features of the as-built WRD design include:

- Topsoil removal (where present) to a depth of about 100 mm prior to the commencement of waste rock placement.
- A NAF foundation of between 7 m and 13 m placed onto the stripped ground to provide a level surface for dumping, and additional mitigation of any potential preferential flow pathways.
- Placement of PAF material in cells to minimise the available surface area, with a low permeability traffic compacted surface layer. These cells were placed inside the final crestline of the WRDs to prevent the development of convection cells that may accelerate AMD reactions.
- Encapsulation of PAF cells in NAF or mixed NAF–UPAF rock, with approximately 10 m of NAF rock coverage.
- A store-and-release cover constructed on top of a traffic-compacted low permeability layer to discourage infiltration.
- Placement of NAF armour rock at angle of repose to a horizontal distance of 10 m for erosion control.
- Final height of the Northern WRD is 10,276 mRL.
- Final height of the Southern WRD is 10,289 mRL.

Cross-sections of the as-built Northern WRD and Southern WRD structures are presented in Figure 5.24.

Operationally, average grades of sulphur, calcium and barium are used to calculate the average ANC/PA ratio for each blast, and all material from each blast is classified similarly. This data is recorded in the site block model which is used to catalogue the placement of various types of waste rock, including PAF, NAF armour, NAF and UPAF, from the open pit to the WRDs. Geochemical waste rock classification is determined by interrogating the block model for sulphur, calcium and barium content to calculate the potential acid-generating and acid neutralising capacity of the rock material based on individual concentrations. Using this method, NAF, UPAF or PAF areas are identified and marked on mining plans or HPGPS projects and provided to the excavator operator. Visually defined materials such as Fresh Bulldog Shale may be classified entirely as a PAF block.

The point of origin and destination for each load are tracked and recorded on the mine operating system via HPGPS for plotting at a later date.

5.8.1.3 Rainfall infiltration and seepage

Numerical groundwater modelling of the TSF and WRDs indicates that the open pit will act as a localised groundwater sink both during mining and post-closure. Particle tracking predicts that majority of potential contaminants from TSF or WRDs seepage during and post-mining will be captured by the pit. For more information refer to Section 4.4.3.1 and Figure 4.21.

5.8.1.4 Landform stability

In August 2012 cracking was observed on the Northern WRD, then at a height of approximately 54 m above ground level. The cracking was located approximately 16 m back from the dump crest, which was assumed to be indicative of potential instability in the WRD wall. Subsequent investigation found that the cracking was likely to be the result of both the over-steepening of the upper lift face during dumping, and the settlement of material in the upper lift of the WRD; caused by frictional drag forces generated during the dumping of rock armour from the top of the WRD lift to the lift below (approximately 20 m). No evidence of instability was noted at the toe of the WRD. A decision was made to progressively place rock armour as the WRD developed, rather than end-tipping the rock after lift completion. This would mitigate future potential for settlement-related cracking.

Stability analyses were undertaken in August and October 2012 to assess a number of options aimed at understanding the stability FoS for the Northern WRD, and to inform the design of the Southern WRD. The outcomes of these analyses recommended that a 12 m berm be added to the Southern WRD to maintain stability above and FoS of 1.2. As the development of the Northern WRD had progressed to almost final height, the retrofitting of a berm to the Northern WRD was not considered feasible. A FoS criterion of 1.2 was previously established as the criteria for Prominent Hill WRD stability based on research undertaken by Khandelwal et al (1992) and Miller (1979) taking into account variability in the waste rock materials that may result in local fluctuations in the FoS. Khandelwal et al (1992) found that generally, waste rock slopes designed with a (static) factor of safety of 1.10 to 1.15 have only a minor risk of failure.

At the completion of waste rock placement activities on the Northern WRD, an as-built stability analysis was undertaken in January 2014. The changes to the design and construction of the Northern WRD and Southern WRD (with the as-built 12 m berm), resulted in a worst-case assumption FoS of 1.23 for the Northern WRD (see Figure 5.25). The October 2012 analysis of the Southern WRD was not changed and reflects an FoS of 1.27 (see Figure 5.26). The as-built Southern WRD will have further stability analysis undertaken upon completion. The results of the analyses indicated that, although unlikely, a slope failure on either dump would not progress sufficiently to expose PAF material due to the extensive encapsulation of that PAF material with NAF rock inherent in the WRD design.

Material properties and assumptions for the stability analyses are detailed in Table 5.23.

Table 5.23 | WRD stability analysis material parameters

Material type	Bulk density (kN/m³)	Effective strength parameter	
		Cohesion c (kPa)	Friction angle φ (degrees)
WRD material strength parameters			
Oxide Bulldog Loose	14.80	10	30
Bulk mine waste	24.48	0	40
Rock armour	26.31	0	45
Metasediments	21.36	5	40

The as-constructed WRD design used rock armour to prevent erosion of the slopes and installation of a store-and-release cover system preventing surface water flows. As a result, it is considered unlikely that the FoS would change over time post-mine closure, and therefore the structures would remain stable for the long-term.

5.8.1.5 Slope erosion management

The Prominent Hill operation is in an area of low rainfall, and as a result, the potential for rainfall erosivity is low. However, there is potential for occasional high-intensity rainfall events to result in erosion on the slopes of the WRDs. Levels of vegetative cover on the slopes of the WRDs, in arid environments, are unlikely to develop to an extent that they provide significant erosion protection (Appendix 10B of the MARP 2009 (OZ Minerals, 2009); as listed in Table 13.1). The primary form of erosion resistance for the Prominent Hill WRDs will be achieved through rock armouring of the angle-of-repose WRD slopes. Therefore, the WRD slopes will be progressively armoured with 10 m (horizontally) of dolomitic, andesitic and volcanic waste rocks that are durable and have the appropriate size distribution for armouring purposes. The armouring process will use a dumping sequence from the formation of the outer face to placement of the rock armour which allows time after construction for initial settlement to occur.

In general, cover sequence rocks at Prominent Hill weather rapidly upon exposure and with handling; whereas basement rocks are generally durable and weather slowly. Table 5.24 summarises the typical static durability characteristics of the Prominent Hill waste rock units.

Table 5.24 | Static durability of waste rock units

Unit	Typical static durability	Comments
Weathered Bulldog Shale	Slight to medium deterioration	-
Unweathered Bulldog Shale	High to total deterioration	Rapid desiccation to soil-like consistency
Cadna-owie Sandstone	Total deterioration	Essentially free-running sand after handling
Permian Siltstone	Medium deterioration	-
Permian Diamicite	Slight deterioration	-
Footwall Andesite	No deterioration	-
Dolomite	No deterioration	-
Hanging wall Skarn	Slight deterioration	-

Slake Durability testing and Sodium Sulphate Soundness testing was undertaken on samples of the volcanic (hematitic) and andesitic rock units to confirm their suitability as rock armouring for the WRD embankments (Appendix 10B of the MARP 2009 (OZ Minerals, 2009); as listed in Table 13.1). The Slake Durability test work confirmed that all samples are regarded as having very high durability and can be classed as a competent material suitable for use in armouring outer batter slopes of the waste landform. The Sodium Sulphate Soundness test work confirmed that the andesitic material is durable and is suitable for construction purposes in locations exposed to weathering. Lithology durability is presented in Table 5.25.

Table 5.25 | Durability of lithologies

Sample	Dominant lithology	Durability
A	Andesite- Volcanic (Andesite) Hematic Alt.	Very high
B	Porphyritic – Vesicular Andesite	Very high
C	Volcanic (Andesite) Hematic Alt.	Very high
D	Volcanic (Andesite) Hematic Alt.	Very high
E	Andesite	Very high

Angle-of-repose, rock armoured batters on the WRD are designed such that, the large size of the pores between the rock particles promote infiltration and /or evaporation of surface waters. Additionally, the lack of fine material (topsoils) and the durability of the rock armouring will result in the production of little, if any, dust as a result of wind erosion.

5.8.1.6 Cover system

The cover systems will be through construction of a store-and-release cover system for the WRDs. The basis of these systems is that incipient rainfall is stored within the pore space of a layer of non-compacted rock material during periods of high precipitation to subsequently be removed by evaporation and/ or transpiration. Stored rainfall is maintained in the cover through the development of a lower permeability layer below the cover that discourages infiltration of rainfall into the WRD mass (often termed an enhanced store-and-release cover). Store-and-release covers are particularly well suited to the closure of WRDs in arid and semi-arid areas, where annual average rainfall is less than 1,000 mm/year and evaporation rates are significantly greater than annual average rainfall; a ratio of greater than 2:1 (O’Kane et al., 2012). The annual average rainfall at Prominent Hill is approximately 173 mm, with average annual evaporation of approximately 3,100 mm, a ratio of approximately 18:1. Evaporation rate is at a minimum in June, at approximately 80 mm/month, where rainfall averages about 18 mm/month, a worst-case ratio of approximately 4:1.

The construction of the cover system for the Northern and Southern WRD commenced in mid-to-late 2013 and are currently approximately 95 % completed. The construction has been based on the design specified in Figure 5.24. Figure 5.23 has compiled aerial images of the mine since 2009 to show the progression of the WRD development, including the cover system, over time. A layer of approximately 2 m of well-graded NAF meta-sediments (material from the upper basement of the ore body) were initially placed, using a tight paddock dump approach, with a transition to other NAF lithologies occurring as the open pit deepened and the availability of meta-sediments decreased. The NAF layer was placed over a heavily compacted reduced permeability layer to promote the storage and subsequent evaporation of captured incipient rainfall. Beneath the reduced permeability layer, approximately 8 m of NAF waste rock overlays the closest UPAF material cell, itself providing a further 10 m of coverage over the closest PAF cell, resulting in the top of the closest-to-surface PAF cells being around 20 m below the WRD cover surface (refer Figure 5.24).

Additionally, a heavy vehicle bund of approximately 2.1 m in height has been placed around the upper crest of the Northern WRD as a further prevention to run-off flows eroding the rock-armoured outer slopes of the structure. A vehicle access track around the perimeter of the Northern WRD of 10–15 m width remains to facilitate access as required. Paddock dumping creates mounds and hollows that prevent surface water flow (and hence erosion) on the surface and slopes of the WRD and ultimately will provide areas of additional moisture for the potential establishment of vegetation. A schematic of a typical cross-section of the cover as applied to the Northern WRD is shown in Figure 5.27.

The Northern WRD is currently closed, though may require some post-mining waste excavation prior to completion. The Southern WRD will undergo a closure review after any required material extraction is complete.

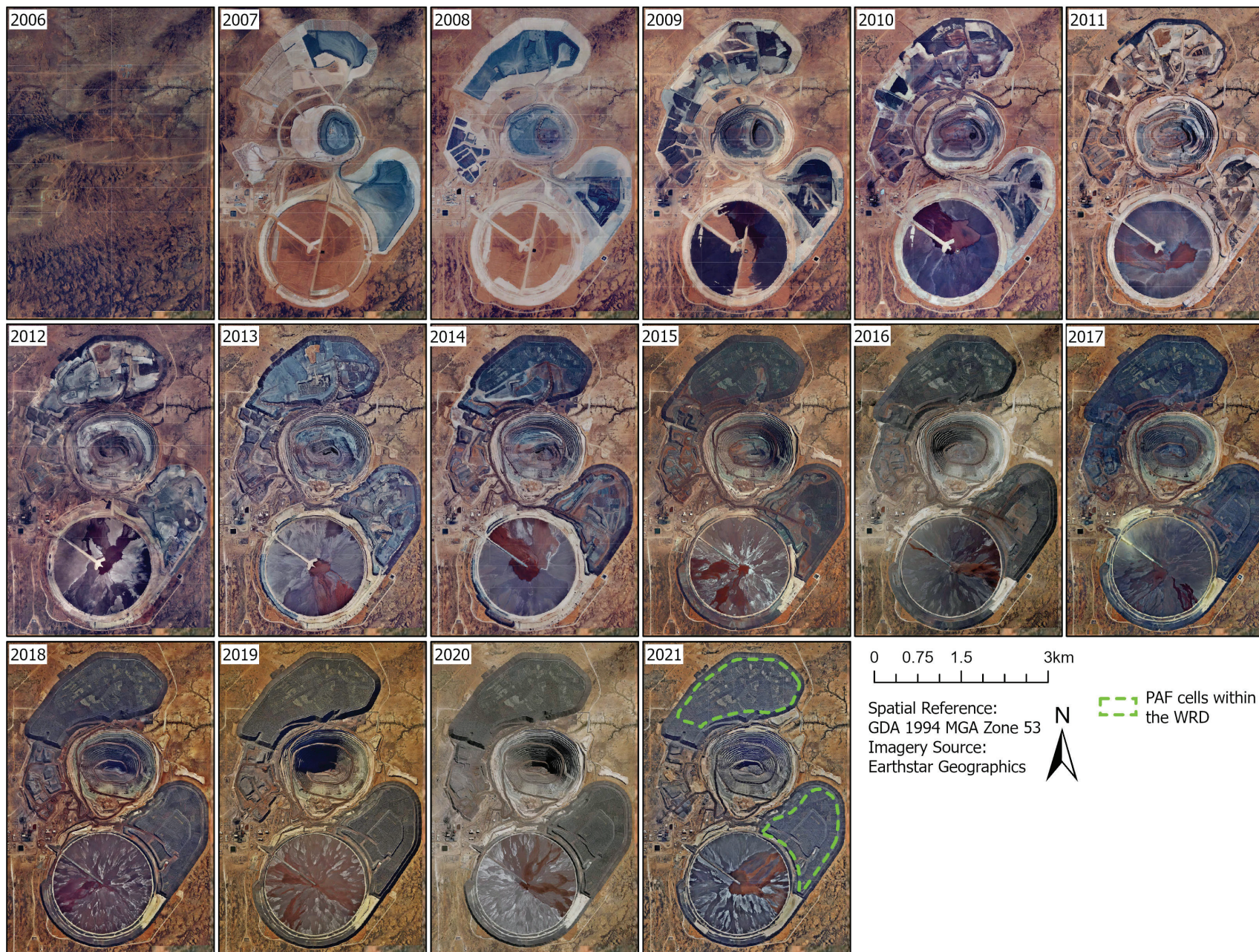
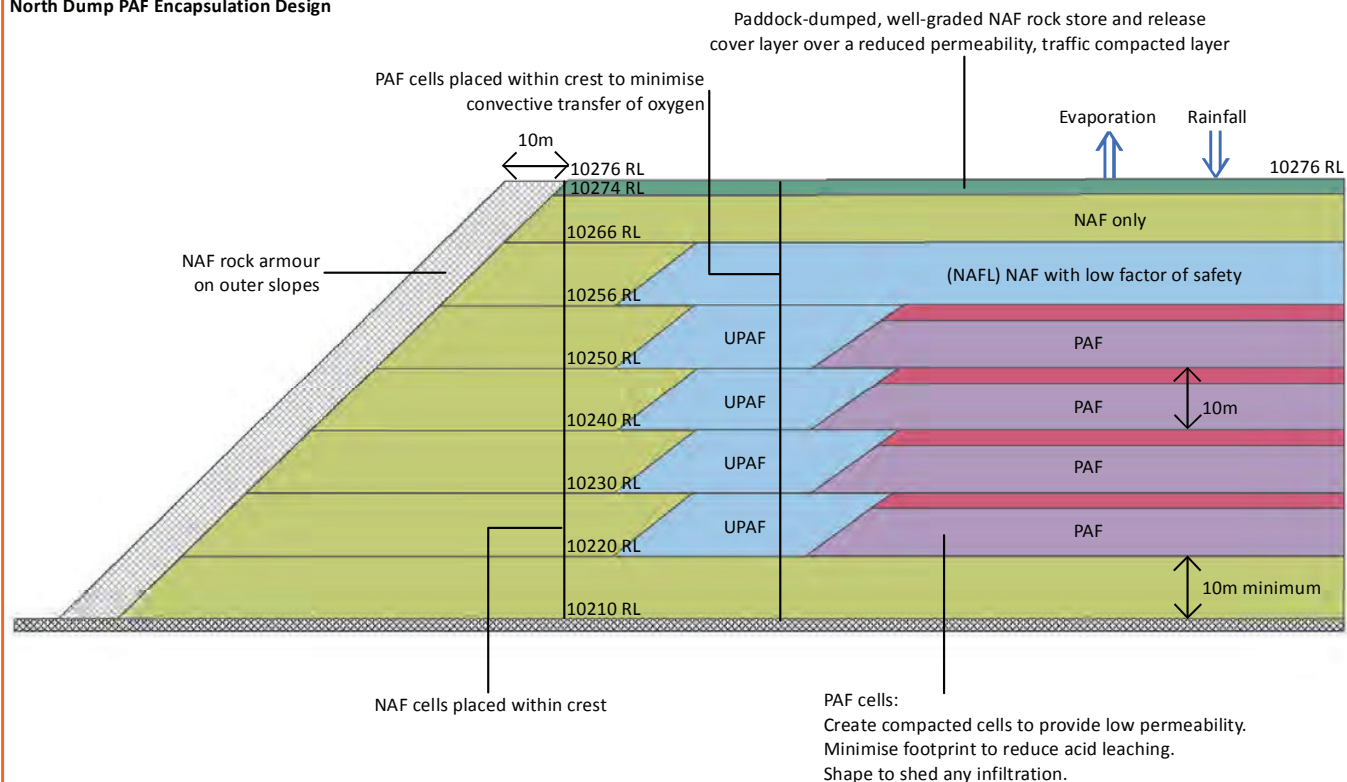
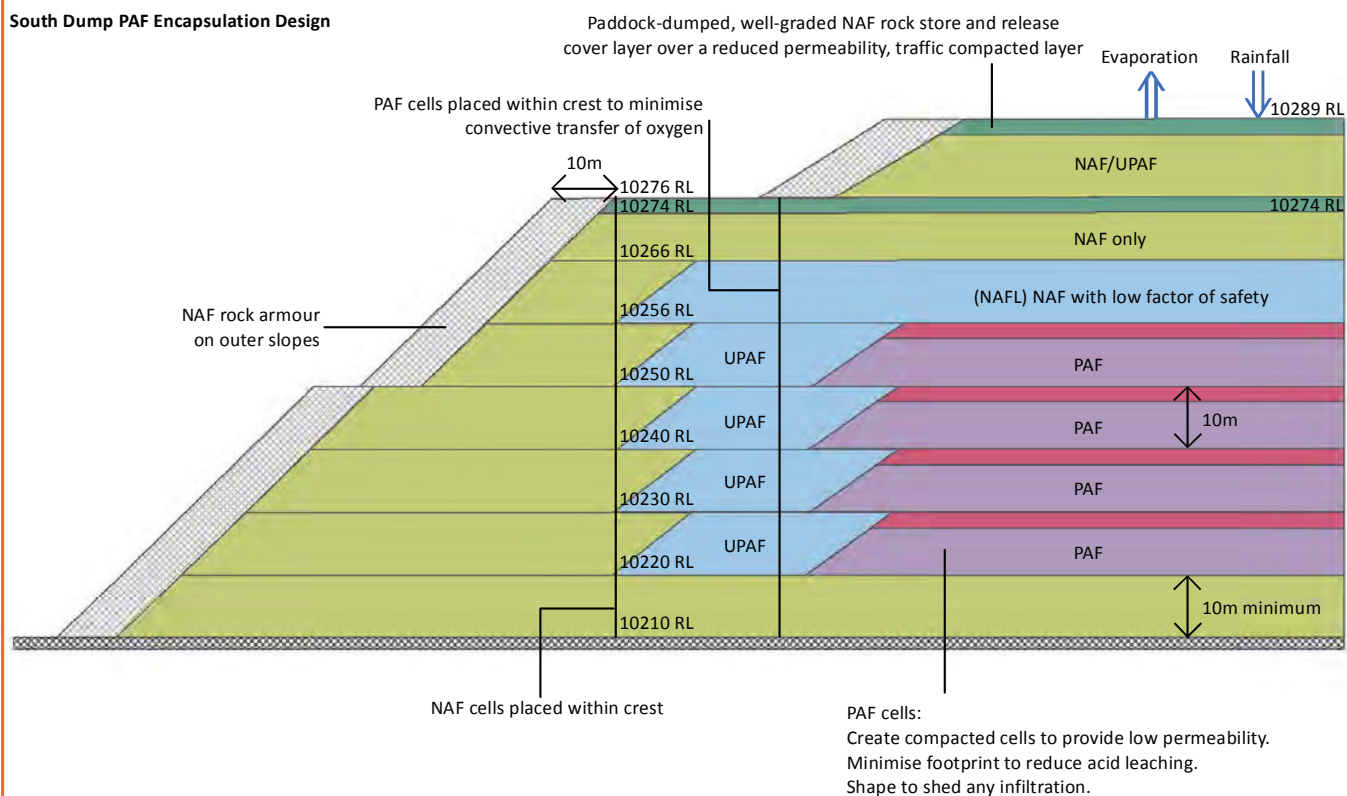


Figure 5.23 | WRD progressive development

North Dump PAF Encapsulation Design



South Dump PAF Encapsulation Design



- NAF
- NAFL
- PAF
- NAF rock armour on outer slopes
- Ground level

Figure 5.24 | Northern WRD and Southern WRD cross-sections

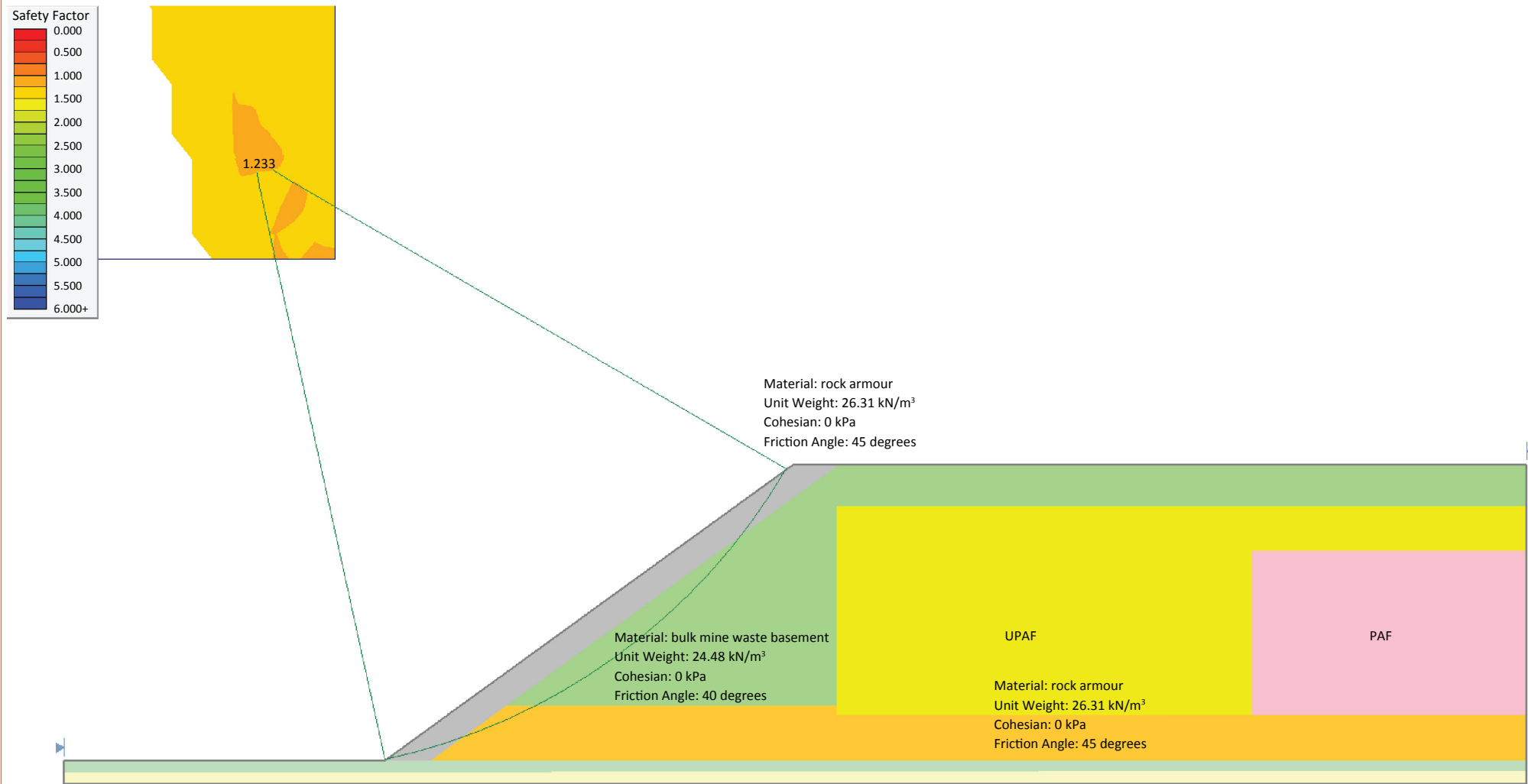


Figure 5.25 | Northern WRD stability analysis cross-section

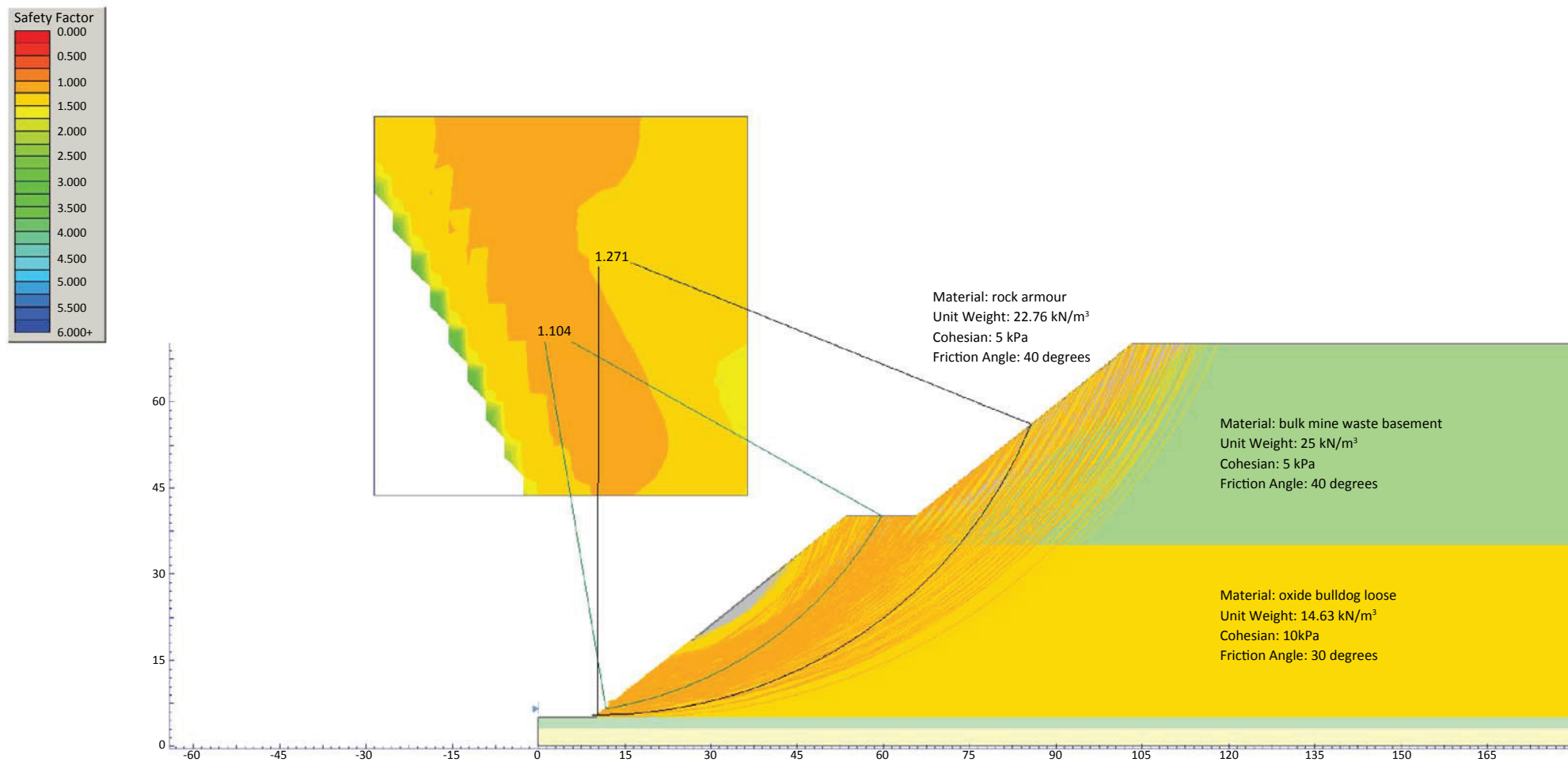


Figure 5.26 | Southern WRD stability analysis cross-section

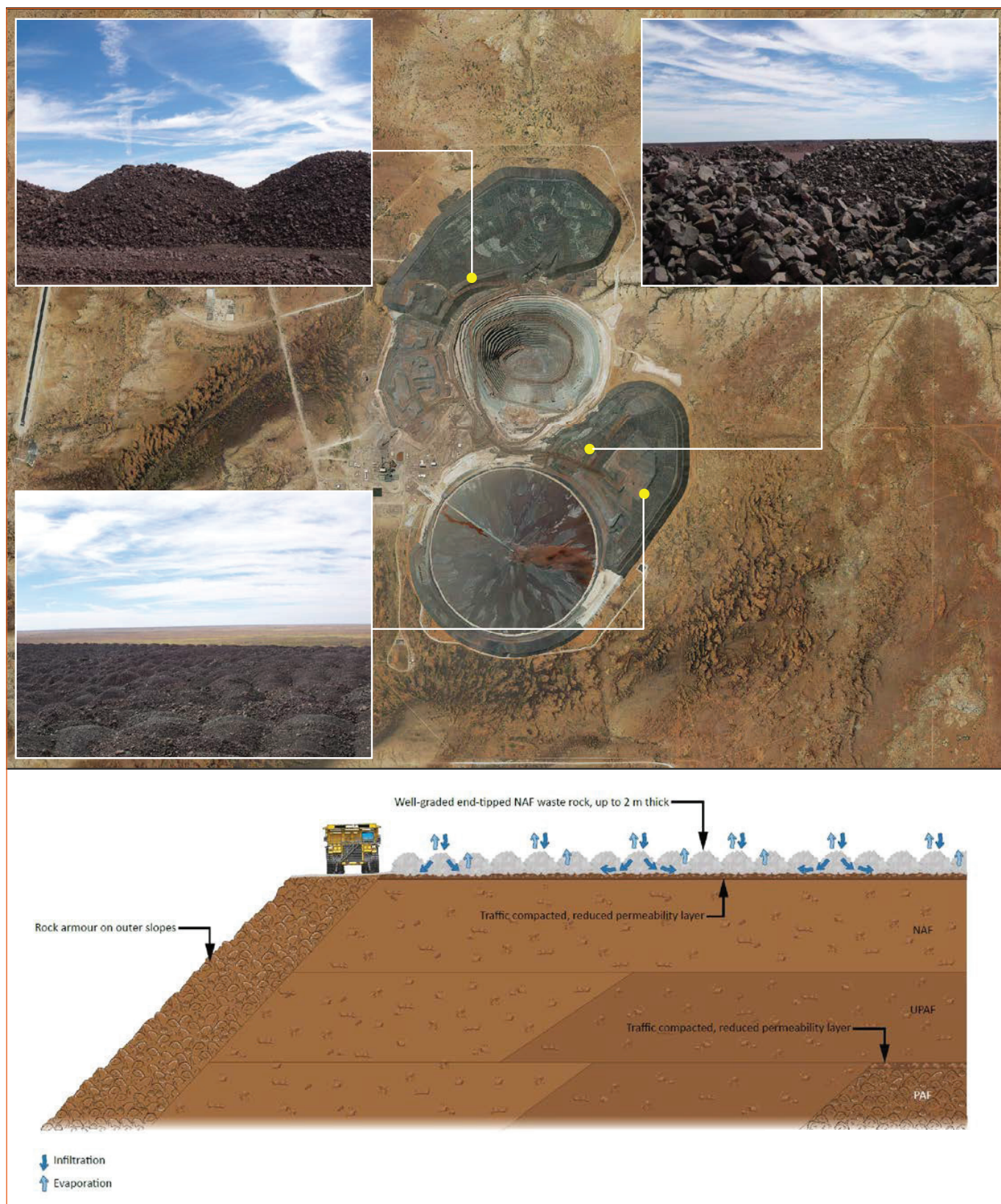


Figure 5.27 | WRD cover system

5.8.1.7 WRD completion audit

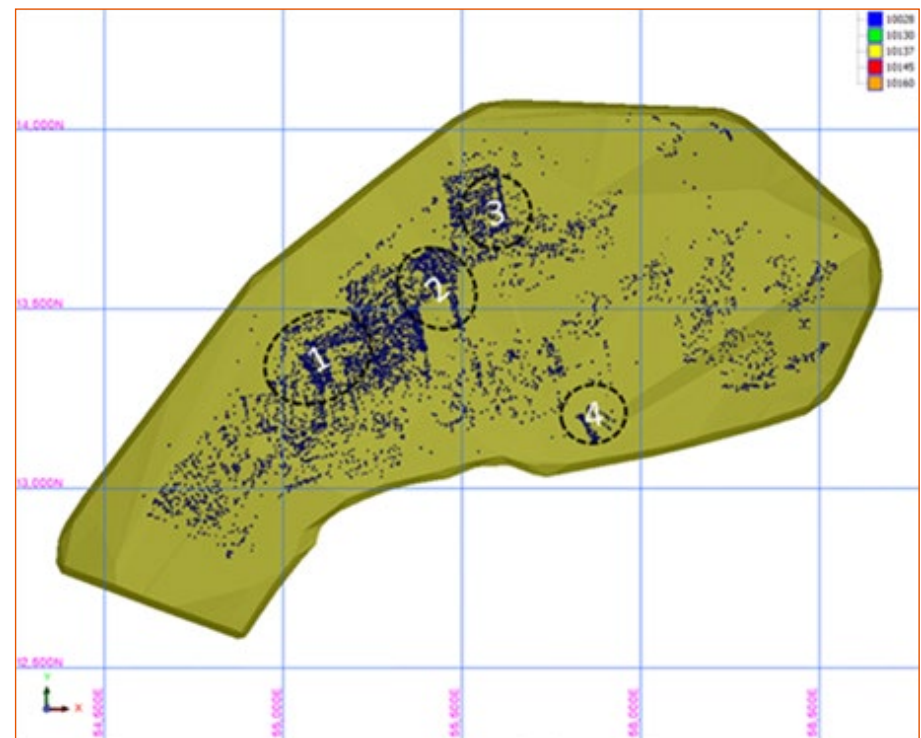
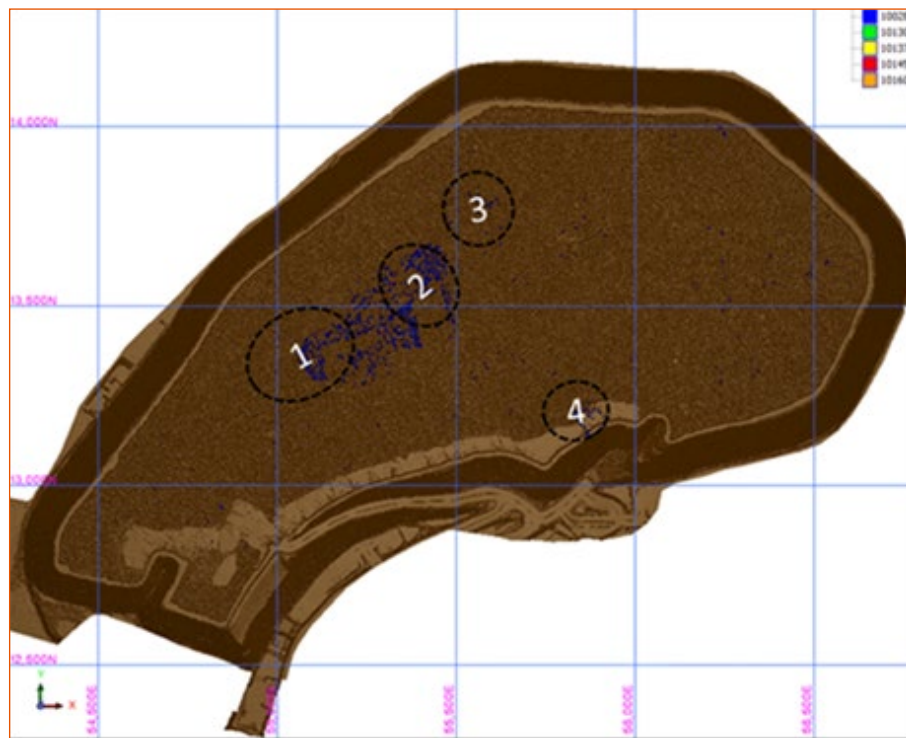
In 2021, Mining Plus was engaged to undertake an audit of the current as-built WRDs. The audit included a review of the following data:

- jigsaw data review, validation and cleanse
- block model attribute assignment
- block model review
- material placement assessment (nearest neighbour).

Jigsaw load-dump details were the main source of information used in the audit however information was also sourced from production plans (daily, weekly and monthly), surveys of the as-built, aerial photography and IWL design validating data.

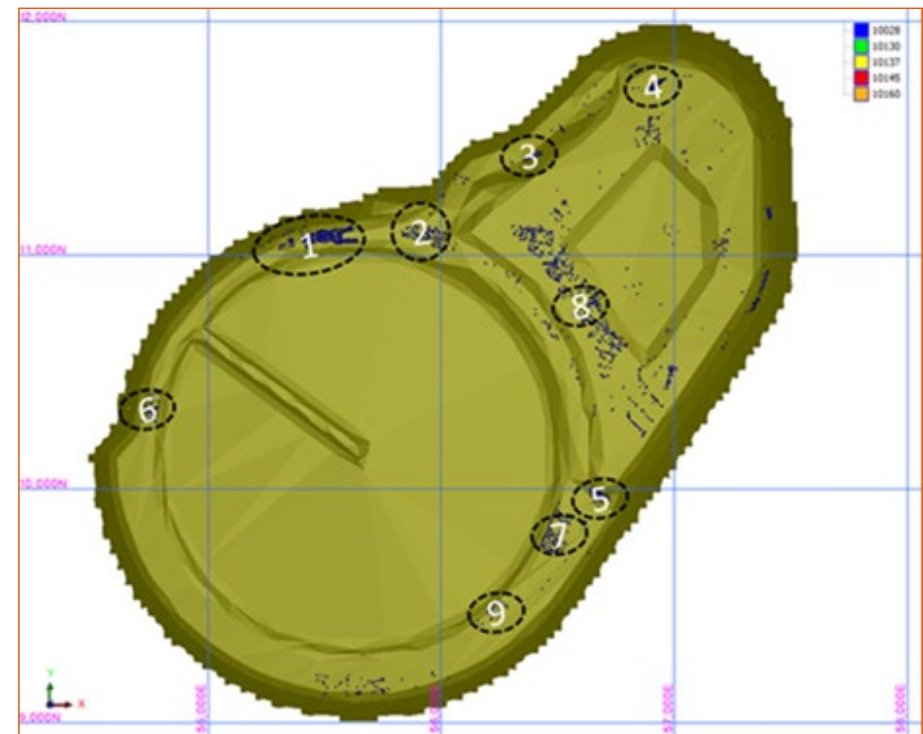
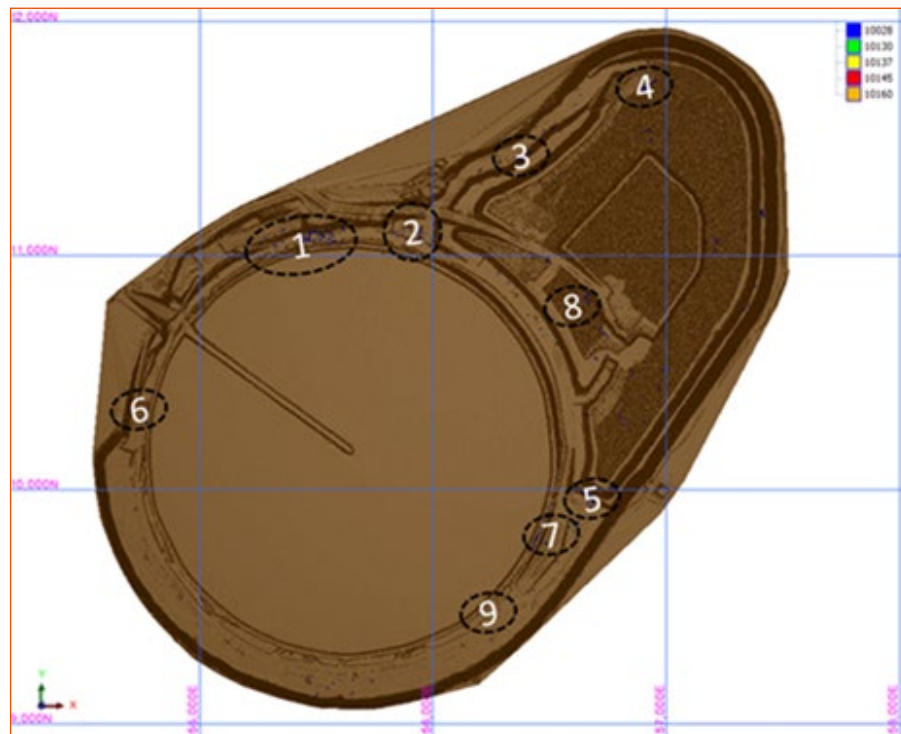
The audit outcomes included:

- High PAF encapsulation compliance to the guidelines outlined in the PEPR(s) and WRD designs.
- Lateral coverage of PAF is greater than 10 m.
- However, areas exist on the upper levels in the centre of the Northern WRD and various areas on the Southern WRD in which the vertical PAF coverage is less than 10 m. The results found 95.4% compliance of the Northern WRD and 97.8% compliance in the Southern WRD when modelling more than 10 m NAF coverage of PAF material. The majority of these instances are single loads/points, however there are some areas where clusters (i.e., more than five loads inside a 25 m radius) occur. These locations are detailed in Figure 5.28 (for the Northern WRD) and Figure 5.29 (for the Southern WRD). The numbers on both of these images identify a cluster area.



north_dump_180128 asbuilt
 < 5m cover surface
 < 10m cover surface

Figure 5.28 | Result of audit of as-built for the Northern WRD (depth of cover to PAF)



south_&_tails_180324 asbuilt
 < 5m cover surface
 < 10m cover surface

Figure 5.29 | Result of audit of as-built for the Southern WRD (depth of cover to PAF)

5.8.2 Run of mine (ROM) pad

This stockpile caters for surges in mine production and enables continuity of feed to the processing plant in the event of interruptions to mining. The pad has an approximate footprint of 1,200 m by 600 m with a height of approximately 60 m and a capacity of approximately 25–30 Mt.

Associated with the commissioning of the Wira shaft, an overland conveyor is under construction on the ROM, transporting crushed ore from the Wira hoist to the existing COS. This eliminates the requirement for stockpiling of underground material on the ROM under normal operating conditions. The overland conveyor has a side casting facility next to the surface crusher to stockpile crusher ore from underground. The purpose of the side casting facility is that allows the flow of ore from underground to continue in the event the processing plant is down. The stockpiled material would then be fed back into the existing surface crusher once the processing plant was running again. The size of the temporary discharge stockpile is not expected to exceed 100,000 t.

The pad itself is constructed of around 110 Mt of durable NAF rock and has approximately 7.6 ha of embankment area. At closure, the surface of the ROM pad may be removed and processed to negate the need for an additional NAF rock cover layer. Additionally, NAF rock may be reclaimed from the ROM pad for use in the construction of closure-related infrastructure including the open pit abandonment bund (50,000 t), TSF embankment armouring (410,000 t) and TSF capping (if required, 7.7 Mt). Final closure design will be determined through progressive closure planning.

5.8.3 Topsoil and subsoil

Topsoil material was stockpiled during land-clearing activities associated with the construction of site infrastructure. Where possible, topsoil and shrubs were stripped back in one operation and transported to stockpiles for storage. In practice, very little topsoil was found to be available for harvesting outside of the Southern WRD footprint. The total volume of topsoil harvested for rehabilitation is 370,000 m³, and the location of the stockpiles is provided in Figure 5.21. The topsoil stockpiles range between 19,000 m³ and 71,000 m³. Topsoils would be used where necessary to provide an enhanced medium for the natural re-establishment of vegetation, allowing the site to progress toward achieving a landscape function equivalent to that of the pre-mining landscape in areas outside of the open pit abandonment bund. For more information, please refer to Section 6.

5.8.4 Coarse ore stockpile

After primary crushing the ore is conveyed to an open COS prior to being reclaimed from the bottom of the stockpile via a conveyor belt up to the SAG mill and ball mill for grinding. Water sprays are fitted to the stacking end of the feed conveyor for dust control, and ore residence times on the stockpile are short (in the order of hours to a few days).

The COS is conical in shape and contains approximately 80,000 m³ of material.

5.8.5 Concentrate storage

Concentrate is collected from the concrete pad by front-end loader and either loaded directly into containers for transport or moved to the concentrate stockpile with capacity for up to one month's production of concentrate (around 50,000 m³). The concentrate stockpile is housed in a partially enclosed and covered storage shed, and contains around 11–11.5% moisture, and thus does not require on-going dust management.

5.8.6 Borrow pits

5.8.6.1 Access road

The construction and ongoing maintenance of the Access Road (from Prominent Hill to the Stuart Highway) has required the use of borrow pits to provide material for the road base.

There are eight EMLs located within the 100 m wide corridor (as defined by the site Access Road on MPLs 83 and 84) adjacent to the road alignment.

Approximate dimensions for each pit and estimated extraction volumes (as per MARP approval) along with the current status of each borrow pit is detailed in Table 5.26. The locations of the Access Road EMLs is detailed in Figure 5.30.

Table 5.26 | Estimated pit dimensions and volumes (access road)

EML No.	Chainage *(m)	Depth (m)	Width (m)	Length (m)	Volume (m ³)	Status
6234	3,200	2	40	120	9,600	Open – Still active for material extraction.
6236	8,500	2	40	150	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6237	14,400	2	40	120	9,600	Open – No active extraction occurring. Repair works required for relinquishment.
6238	18,800	2	40	75	6,000	Open – No active extraction occurring. Repair works required for relinquishment.
6239	22,500	3	40	150	18,000	Open – No active extraction occurring. Repair works required for relinquishment.
6240	26,700	3	40	210	25,250	Closed – No active extraction occurring. Rehabilitation completed; tenement not yet relinquished.
6241	29,900	3	40	150	18,000	Open – Still active for material extraction.
6242	37,800	3	40	240	28,800	Open – No active extraction occurring. Could potentially be used again.

Notes:*Chainage measured east from Stuart Highway

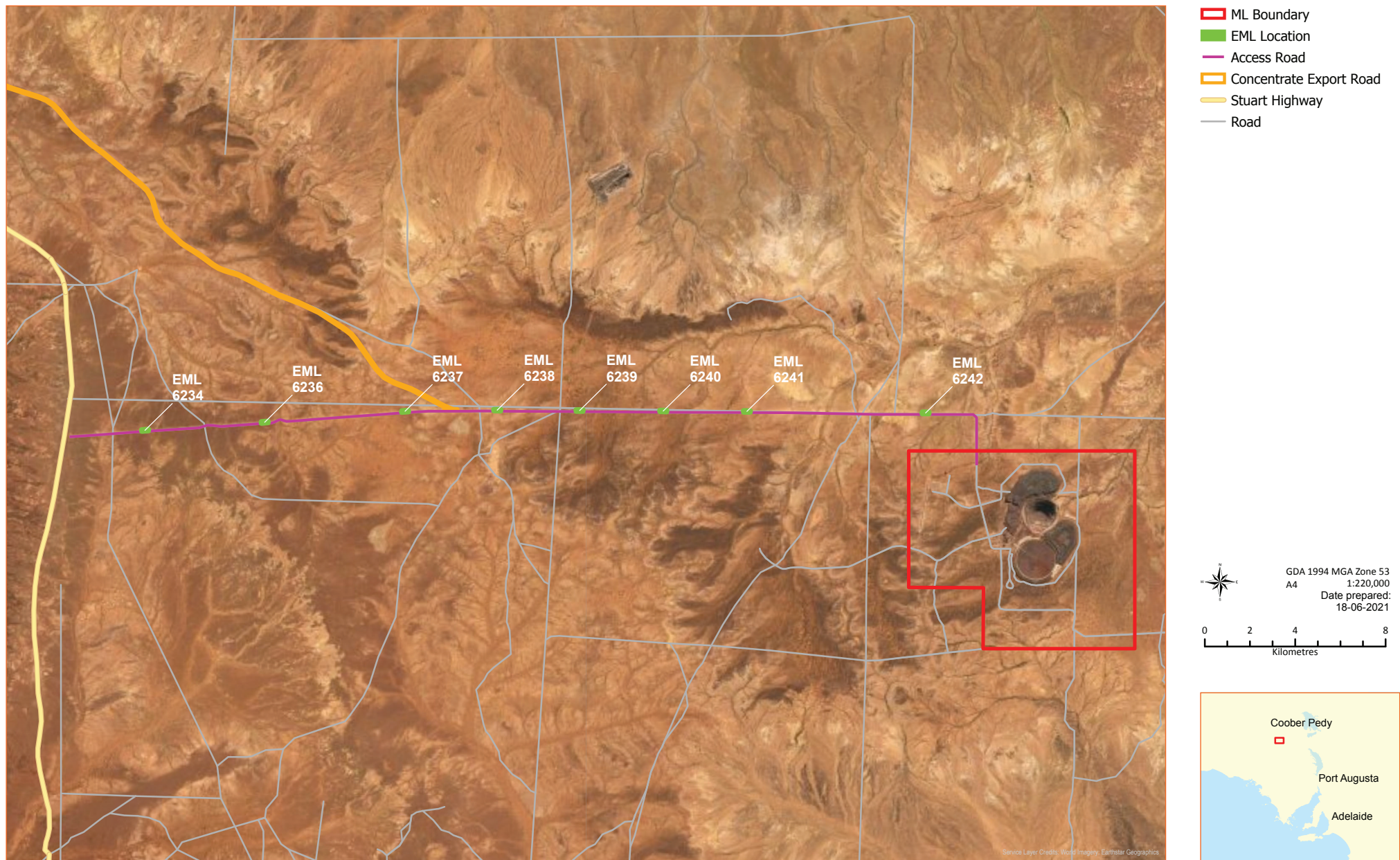


Figure 5.30 | Access road EML locations concentrate export road

5.8.6.2 Concentrate export road

The construction and ongoing maintenance of the Concentrate Export Road (from Prominent Hill to the Wirrida railway siding) has required the use of borrow pits to provide material for the road base.

There are 22 EMLs located within the 100 m wide, 83 km long corridor (as defined by the Concentrate Export Road on MPLs 91, 96, 97 and 101) adjacent to the road alignment.

Approximate dimensions for each pit and estimated extraction volumes (as per MARP approval) along with the current status of each borrow pit is detailed in Table 5.27. The locations of the Concentrate Export Road EMLs is detailed in Figure 5.31 and Figure 5.32.

Table 5.27 | Estimated pit dimensions and volumes (concentrate export road)

EML No.	Chainage *(m)	Depth (m)	Width (m)	Length (m)	Volume (m ³)	Status
6299	5,050	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6300	7,700	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6301	11,600	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6278	15,650	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6279	18,150	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6280	20,750	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6281	26,850	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6282	30,450	2.5	40	120	12,000	Closed – No active extraction occurring. Rehabilitation completed; tenement not yet relinquished.
6283	40,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6284	44,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6285	48,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6286	51,000	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6287	54,300	2.5	40	120	12,000	Closed – No active extraction occurring. Rehabilitation completed; tenement not yet relinquished.
6288	57,150	3	40	120	14,400	Open – No active extraction occurring. Repair works required for relinquishment.
6289	60,100	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6290	62,500	2	40	120	9,600	Open – No active extraction occurring. Repair works required for relinquishment.
6291	65,500	2	40	120	9,600	Open – No active extraction occurring. Repair works required for relinquishment.

EML No.	Chainage *(m)	Depth (m)	Width (m)	Length (m)	Volume (m ³)	Status
6292	68,750	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6293	70,750	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6294	73,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6295	79,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.
6296	82,500	2.5	40	120	12,000	Open – No active extraction occurring. Repair works required for relinquishment.

Note: * chainage measured east from Stuart Highway

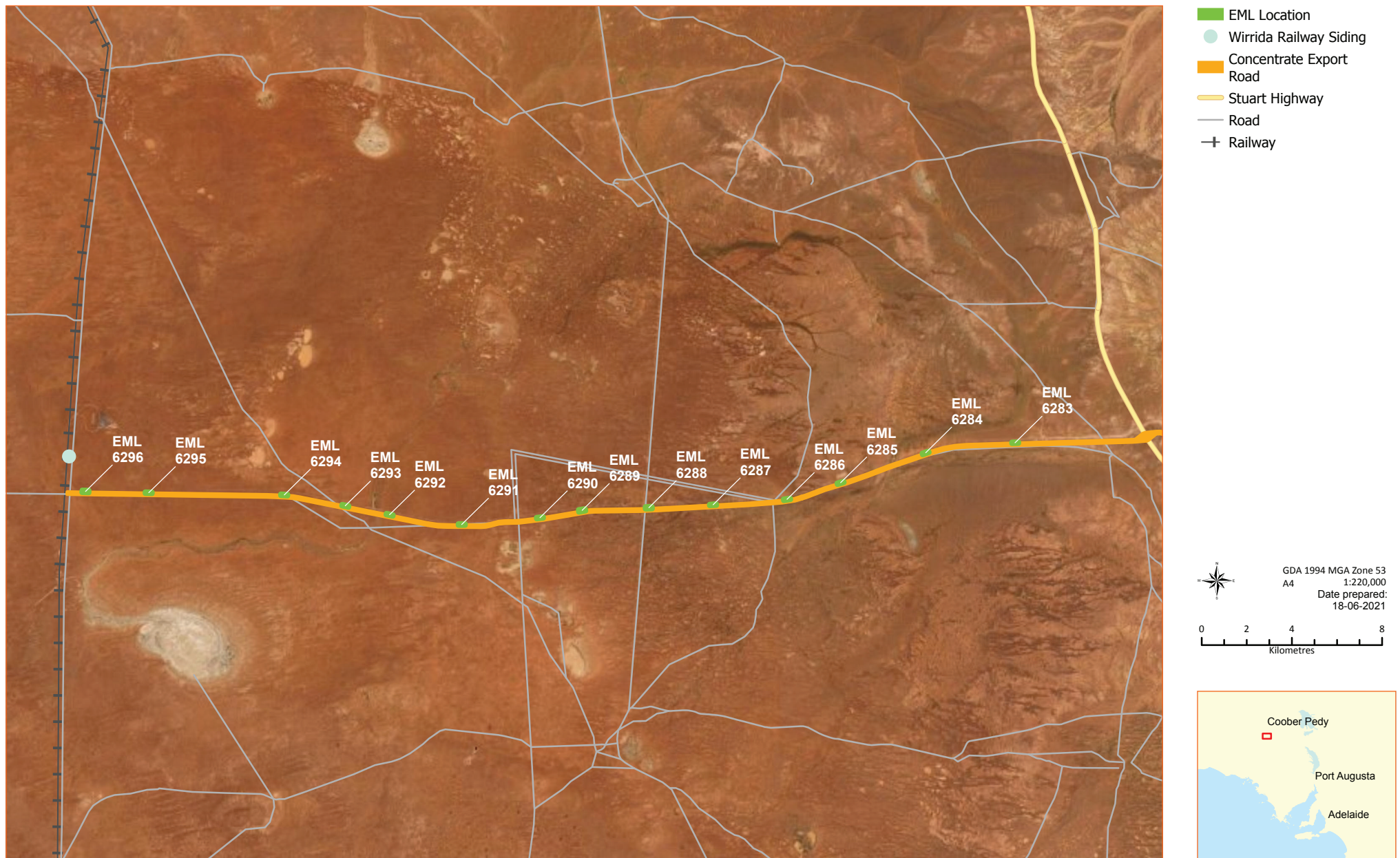


Figure 5.31 | Concentrate export road EML locations (part 1)

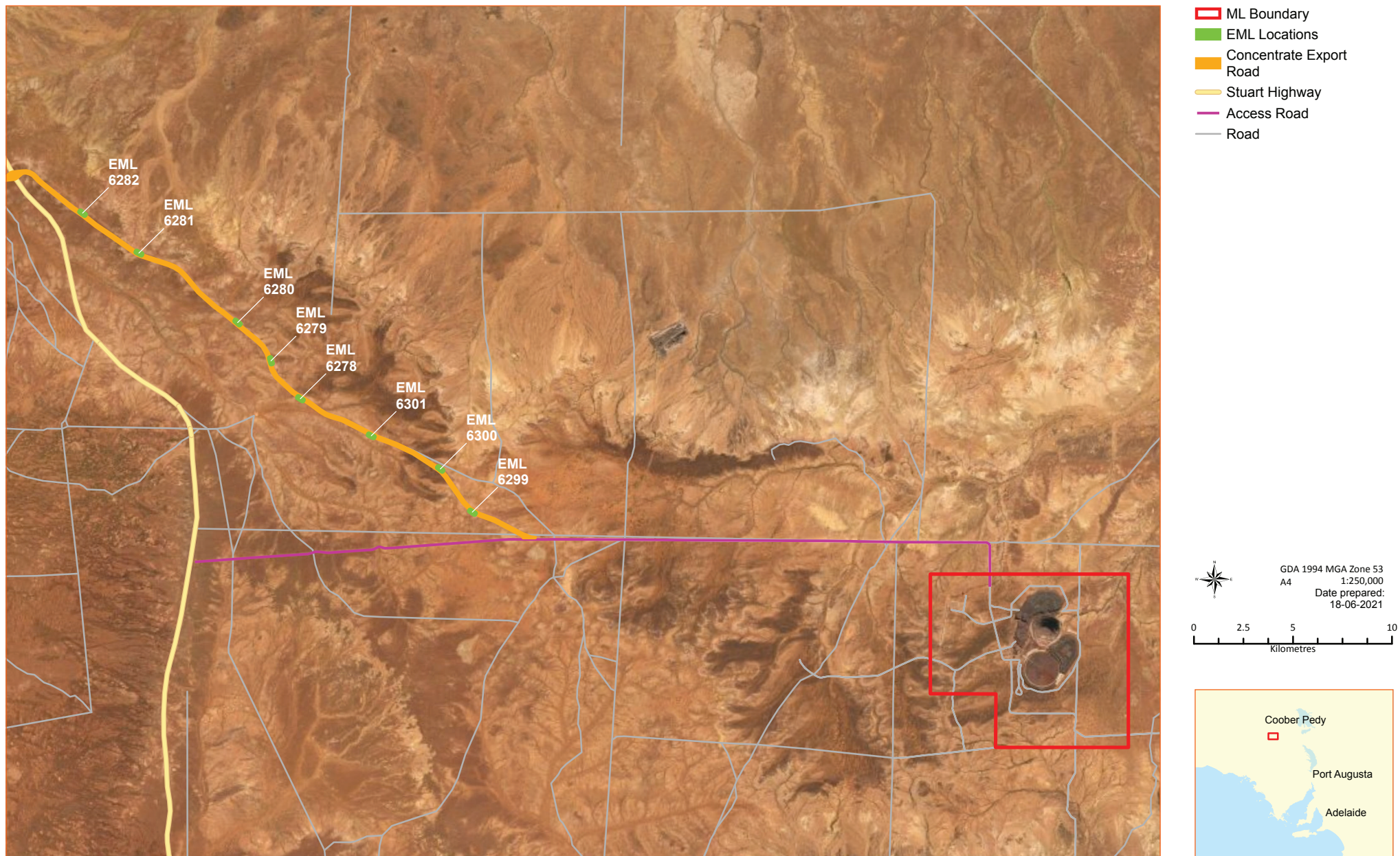


Figure 5.32 | Concentrate export road EML locations (part 2)

5.8.6.3 EML methods

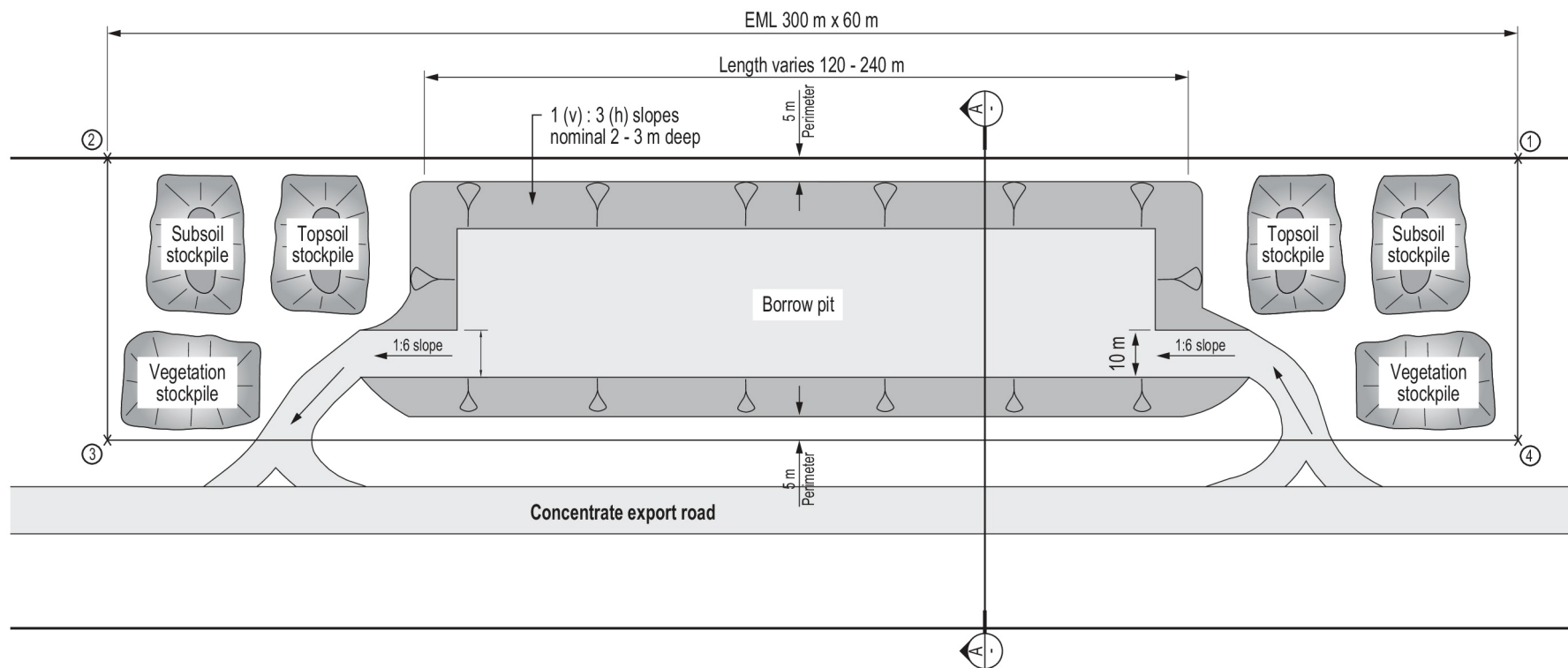
All vegetation, topsoil and subsoil is pre-stripped and stockpiled separately at either end of the borrow pit in areas which will not interrupt drainage patterns. Clearing is restricted to EMLs. Where practical, all trees and large shrubs are left intact.

The exact method for extracting materials from the borrow pits is assessed on an individual basis, though will generally involve a 20-t excavator.

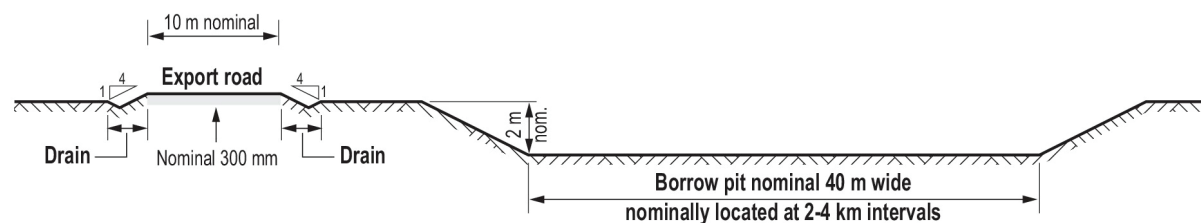
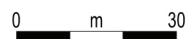
Groundwater is not expected to be encountered during excavation.

Any fuel required will be stored in accordance with EPA guidelines within the approved ML. If small quantities are required on the EML these may be stored in spill pallets for short periods of time.

The layout of a typical borrow pit is detailed in Figure 5.33.



TYPICAL BORROW PIT PLAN



SECTION A TYPICAL SECTION ALONG CORRIDOR



Figure 5.33 | Typical borrow pit plan

5.9 Resource input

Mining and processing operations at Prominent Hill rely on several material inputs, specifically:

- water
- electricity
- fuels (hydrocarbons) and chemical reagents and
- personnel (workforce).

These are discussed in detail in the following sections.

5.9.1 Water management

5.9.1.1 Water demand

Prominent Hill uses water for the following activities:

- minerals processing plant uses
- dust suppression and vehicle washdown water
- potable water for domestic uses and
- low-chloride water for concentrate washing.

The raw water demand forecast for Prominent Hill is as follows:

- Raw water demand (sourced from the Boorthanna Formation) is currently approximately 17-18 ML/d, however has reduced with a decrease in ore throughput as stockpiled ore has been depleted, with a further reduction expected after the Wira shaft is commissioned. Water demand is, thereafter, expected to be approximately 12-13 ML/d until end of mining.
- Raw water demand (sourced from the non-artesian Eromanga aquifer) is up to 1 ML/d, with an average of approximately 0.2 ML/d.
- Up to 2.1 ML/d of the raw water demand will be desalinated via the site reverse osmosis (RO) plant to produce high quality process water.

5.9.1.2 Water supply

Water supply for Prominent Hill mining and processing operations is sourced from:

- Aries Borefield
- mine dewatering

Water from the Mount Sandy Well and the Ingomar Coal Pit are used to support maintenance of the Concentrate export road.

Virgo Borefield

The Virgo Borefield was originally established to meet construction water demand (under Water Licence No. 41027, which was amalgamated as part of Water Licence No. 41028, then updated to Water Licence No.396811, Water Resource Works Approval No. 396907). The Borefield is located approximately 16 km

south of the project area on Mount Eba Crown Lease, The Virgo borefield is comprised of eight production wells, two transfer tanks and a pipe network. By the end of 2009 only four of the wells were operational with the other wells no longer in use due to low yields, pump problems and/ or lack of maintenance. The four remaining wells access water of varied salinity ranging from 18 mS/cm up to 90 mS/cm, too high for any beneficial use by pastoralists.

In 2014 the Virgo borefield was used to supplement raw water supply from the Aries 10 well to ensure there was no short fall in demand. It has not been used since this time and most of the pipeline has been removed. The Virgo Borefield access road is approximately 16 km long. Parts of this road were constructed, and others utilised existing pastoral tracks.

The borefield is still monitored to observe recovery of the aquifer system.

Aries Borefield

The Aries Borefield was established to supply up to 26.6 ML/d (under Water Licence No. 396811, Water Resource Works Approval No. 396907) throughout the mine's operation and closure. Located approximately 37 km south-east of the operation on the Millers Creek Crown Lease, there are 16 production wells, located between 3 km and 6.5 km apart (see Figure 5.34). The wells are connected by 87.5 km of 100–350 mm diameter pipeline comprising the collector system that feeds the central staging tank. Aries Borefield wells are typically equipped with pumps, flow meters, telemetric controls, pole-mounted transformer, contactors and a motor starting panel.

Mine dewatering

Mining activities extend below the water table and hence there will be groundwater inflows from both underground and open pit operations, however any inflows are low, at rates of approximately 1 L/s and 6 L/s respectively.

In the instance of mine water entering the underground operation dewatering will be undertaken through establishment of pumping and pipeline infrastructure that transfers water either into the Process Water Tank, for the concentrator, or into the process water dam and used in processing. When it is required, pump and pipeline infrastructure is used to transfer water to the TSF or directly to the site process water tank, depending on operational requirements. To prevent over-topping in the event of high-intensity rainfall events or other abnormal situations that may result in the process water tank reaching capacity, water may be transferred to the site surface water sedimentation ponds, via drainage channels, for management prior to discharge into existing watercourses. Emergency discharge of water would only occur after approval from DEM.

Concentrate export road maintenance water supply

Water for maintenance of the Concentrate Export Road (CER) is sourced from groundwater under Water Licence No. 396809, Water Resource Works Approval No. 396904 and is extracted from the Mount Sandy Well and the Ingomar Coal Pit; both of which access the non-artesian Eromanga Basin aquifer. The total allocation for road maintenance under the water licence is 1 ML/d.

Groundwater from the Mount Sandy Well is pumped to a lined storage dam, where it is piped approximately 6 km east to a truck fill-point on the road. Water from the Ingomar Coal Pit is extracted from the pit lake and pumped via a 13 km pipeline to a lined storage dam and truck fill-point adjacent to the road. Figure 5.35 shows the CER water supply infrastructure.

5.9.1.3 Water quality

The average composition of the raw water dam water is described in Table 5.28.

Table 5.28 | Average raw water dam composition (2020)

EC (mS/cm)	pH	Temp (°C)	Cl (mg/L)	Ca (mg/L)*	Mg (mg/L)*	Mn (mg/L)*	K (mg/L)*	Na (mg/L)*	CaCO ₃ (mg/L)^
18.35	7.88	24.02	6310	593	330	0.25	109	3215	181

Notes: *dissolved; ^total alkalinity

5.9.1.4 Aries Borefield water distribution and infrastructure

Staging complexes

The Aries Borefield has several staging complexes that provide central balancing storage before the water is transferred to the mine site. The total capacity of each staging complex is approximately 4.5 ML, made up of 1 or 2 tanks, an emergency outflow reservoir, a series of pumps and transformer. The footprint of the staging complex is approximately 200 m by 200 m.

Aries Transfer Pipeline

The 43.8 km long 500–600 mm ductile iron cement lined water pipeline from the Aries Borefield is buried along its entire length to a depth of approximately 600 mm. Approximately 10 km from Aries Borefield, a surge mitigation station has been established comprising two 32 kL tanks, with a footprint of approximately 30 m by 20 m. Water from the Aries Borefield is transferred to the mine site's raw water dam along the infrastructure corridor. The raw water dam is approximately 120 m by 120 m in size, lined with a HDPE liner and holds approximately 25,000 kL of water, with a minimum freeboard of 750 mm. The location and layout of the raw water dam can be found in Figure 5.16.

Aries Borefield catchment dam

The construction of a catchment dam supporting the Aries Transfer Pipeline has enabled water in the pipeline between isolation valves IV3 and IV7 to be temporarily stored during maintenance and repairs and reclaimed back into the circuit upon completion of the works. The dam dimensions are 63 m x 63 m with a depth of 4 m comprised of a 3 m cut and a bund wall of approximately 1 m height. The storage volume is approximately 4 ML excluding freeboard of 800 mm, and the dam is HDPE-lined to ensure the water remains free of sediment when re-entering the pipeline system.

A kangaroo proof fence with an approximate height of 2 m has been installed to prevent fauna and stock access.

Aries Transfer Pipeline Replacement Project

The Aries Transfer Pipeline Replacement Project has been initiated to replace portions of the existing pipeline that had reached the end of its design life with a new pipeline adjacent to the existing pipeline. This would be undertaken in stages, with the first stage involving the replacement of the first 20.7 km of the pipeline, commencing at the existing Transfer Pump Station and extend west towards Prominent Hill, where it would tie into the remainder of the existing pipeline. Future stages of the project may replace further portions of the existing pipeline as required.

The replacement DN559 water supply pipeline transfer main (mild steel cement lined, or MSCL) would be installed below ground through open trench construction, to a minimum depth of 600 mm (non-trafficable), 750 mm (trafficable) or 1,000 mm (watercourse crossings and valves).

The MSCL pipe thickness would be nominally 5 mm for majority of replacement, except for watercourse crossings and isolation valve locations (6 mm). The MSCL internal lining would be nominally 12 mm, compared to a nominal 5 mm internal lining for the current buried infrastructure. The internal diameter of the replacement pipeline would be nominally 525 mm. A sulphur resistant cement type would be used with an internal coating. Cathodic protection has been determined to not be required.

Alignment of the replacement pipeline is offset approximately 10 m to the south of the existing pipeline, which would remain in place following commissioning of the replacement pipeline in accordance with the approved Prominent Hill Closure Plan.

Bends and tees would also be MSCL, with valves to be constructed from ductile iron fusion bonded epoxy (DIFBE). Thrust blocks at bends are included where pipe deflection limits are exceeded. Pipe lengths would be joined with rubber ring joints along main replacement alignment, but with flanged connections at tie in point and isolation valve assemblies. DN500 metal seat gated isolation valves would be provided to limit the amount of water that needs to be drained, should a repair need to take place. The valves would be located immediately after the transfer station, at the Maria's Gate holding dam and at the mine end of the replaced section. Scour tees would be located at designated low points in the pipeline to allow for planned draining. Three new scour pits are proposed, and two existing dams would also be used to support pipeline operations.

Material excavated during pipeline installation would be screened, stabilised with cement (where required), and re-used for bedding and backfill.

Scour pits

To support maintenance activities during operation of the Aries borefield, three new scour pits shall be established along the pipeline corridor. Scour pits are infrequently used for maintenance or emergency purposes to drain the Aries pipeline at topographic low points, but outside of drainage lines. The scour pits are an environmental management measure designed to contain the water in preference to allowing water to drain to natural surface from failure locations.

In addition, one existing dam at the Transfer Station (approved in the original MPL 93 and MPL 94 MARP Addendum (Oxiana 2007b), then referred to as the overflow reservoir) and the existing Maria's Gate dam will be utilised as scour pits as required during emergency situations. In total, this will raise the number of scour locations from 1 to 5.

Material generated during construction of the new pits will be shaped to form a turkeys' nest-style embankment around the pits with operational capacity provided below surface and the spoil providing freeboard; the scour pits will be fenced with stock/vermin proof mesh.

The new scour pits are approximately 40m x 40m (overall footprint) and approximately 1.5 m deep and between 283 to 360 kL in volume. The pits have sufficient capacity to drain the line with ~500 mm freeboard without risk of overtopping (Figure 5.34).

Electricity distribution

Electricity is transferred to the Aries Borefield from the substation at the mine site via a 43.8 km long, single circuit, 33 kV electricity distribution line. The distribution line utilises 225 support poles, with span lengths between 150 m and 250 m depending on the terrain. The poles consist of both line and strain poles at an approximate height of 13 m, although some poles are lifted to span a ground feature.

An 87.5 km long, single circuit, 33 kV electricity distribution line connects to the electricity distribution line from the mine site. Within the Aries Borefield, this distribution line passes with the infrastructure corridor alignment to each of the well compounds. Pole-mounted transformers were installed at each well to drop the electricity supply from 33 kV to 433 V, thereby enabling power to be supplied to each well compound pump.

No overhead earth wires or fibre optic cables were installed in association with the distribution line within Aries Borefield. The poles are smooth sided and earthed. The line required approximately 470 support poles, with span lengths between 150 m and 250 m depending on the terrain.

There is no backup electricity generation within the Aries Borefield, rather backup electricity is generated from the Prominent Hill on-site backup supply.

Borefield access

Access to Aries Borefield is via a service road passing along existing pastoral tracks within the infrastructure corridor together with power and water services. The corridor passes in an east-south-east direction to meet Aries Borefield at a total corridor length of 43.8 km.

The access roads are unsealed and suitable for light trucks. Sections of the existing tracks were straightened, repaired and maintained (graded) as required. Where routes crossed drainage lines, appropriate crossings (such as flood crossings) were installed.

Access to each of the well compounds within the borefield is via unsealed service tracks which are suitable for light trucks and are predominantly aligned over existing pastoral tracks.

5.9.1.5 Water treatment

Potable water

The RO plant is located west of the raw water dam, and south-west of the processing plant as illustrated in Figure 5.16. It has a capacity of 2.5 ML/d and generates product water with a salinity concentration of 100 mg/L. The brine stream from the RO plant is transferred to the Raw Water Dam for recirculation in the system with the option to transfer to the TSF when necessary. The brine stream is not metered.

Waste water treatment

A waste water treatment plant (WWTP) which is operating under SA EPA Licence No. 22764 and Department for Health and Wellbeing Licence No. WCS 2259, is located approximately 1 km north of the accommodation village. The WWTP collects sewage and waste water from the mine process area and accommodation villages.

Sewage and waste water is reticulated into individual wet well pump stations and pumped to the WWTP where it undergoes both secondary treatment and nutrient removal. Both aerobic and anaerobic processes are utilised with the aim of minimising the quantity of sludge generated. Treated effluent is

gravitated from the WWTP to a 12 ML lined, reuse storage pond where a 500 mm freeboard is maintained at all times. Reclaimed water is used for dust suppression on road works and earthworks. Sludge is collected periodically and disposed of by a licenced contractor in accordance with EPA liquid waste transports and disposal requirements.

The WWTP conforms to the requirements of the *South Australian Public Health Act 1987* (SA) and produces treated effluent suitable for Class B irrigation as defined by the EPA's Reclaimed Water Guidelines (SA). A licence for the use of recycled water for dust suppression on roads has been granted by the Department for Health and Wellbeing (Licence No. WCS 2309). Remote septic systems with appropriate installation approvals are utilised in more remote areas of ML 6228, specifically:

- Ankata PF plant
- security gate house
- concrete batch plant and
- mining contractor yard.

To support the increased workforce capacity of PHOX the WWTP may be upgraded. Discussions have commenced with the Department for Health and Wellbeing and the WWTP management plan is being updated to reflect the change.

The average composition of the WWTP water is detailed in Table 5.29.

Table 5.29 | Average WWTP water composition in 2020

Median total chlorine (mg/L)	Mean BOD (mg/L)	Mean SS (mg/L)	Median E. coli (cfu/100mL)
0.4	31.67	284.33	0

5.9.1.6 Water balance

The project area is located in an arid environment where evaporation far exceeds rainfall. Water conservation principles of minimising water consumption (in particular raw water consumption) and maximising water recycling are integral to the project design and ongoing water management. A typical water balance for Prominent Hill is illustrated in Figure 5.36, which demonstrates that supply meets demand (with a minor net gain in the raw water dam).

Approximately 912 ML of water a year (approximately 2.5 ML/day) is currently recycled back into the processing plant.

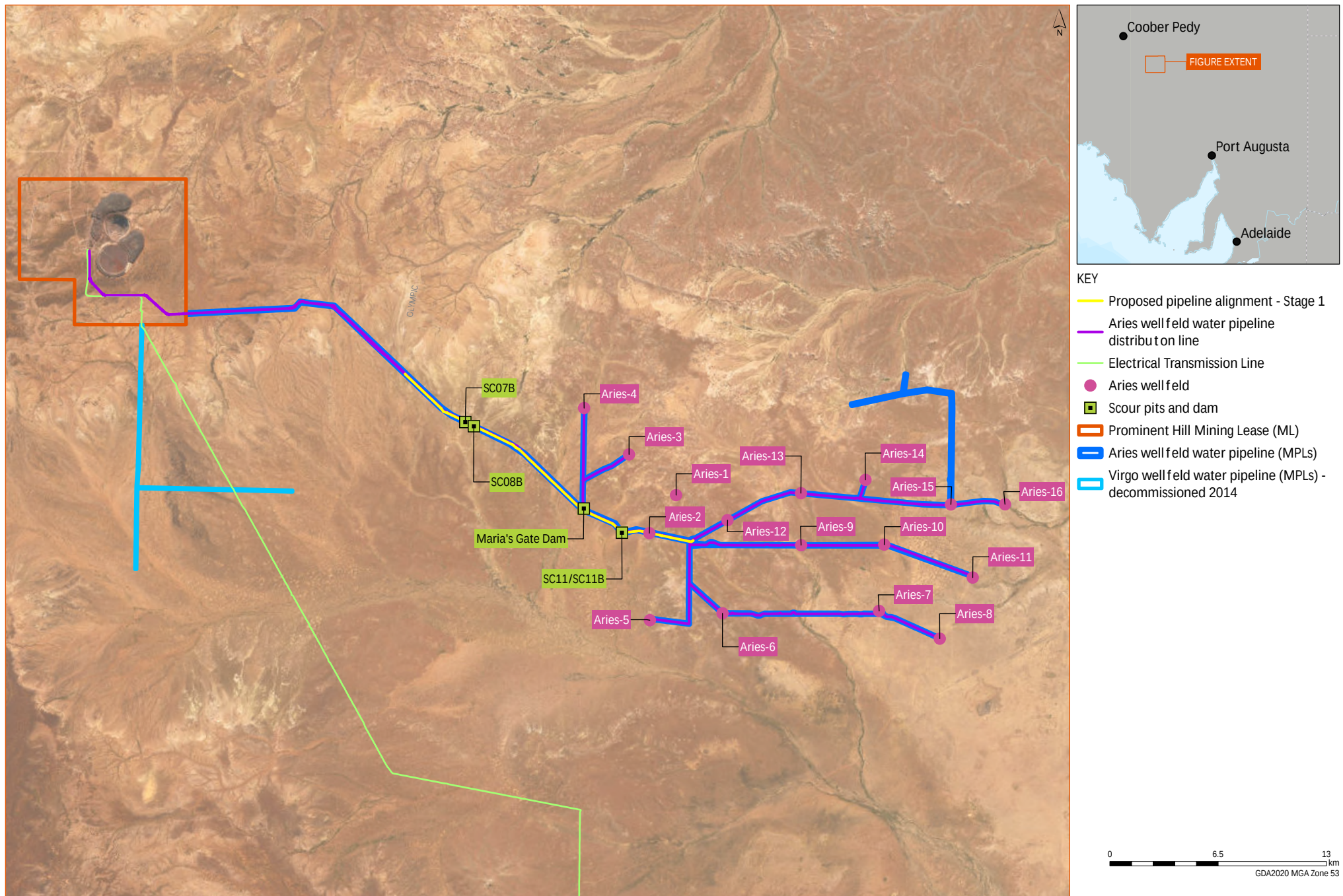
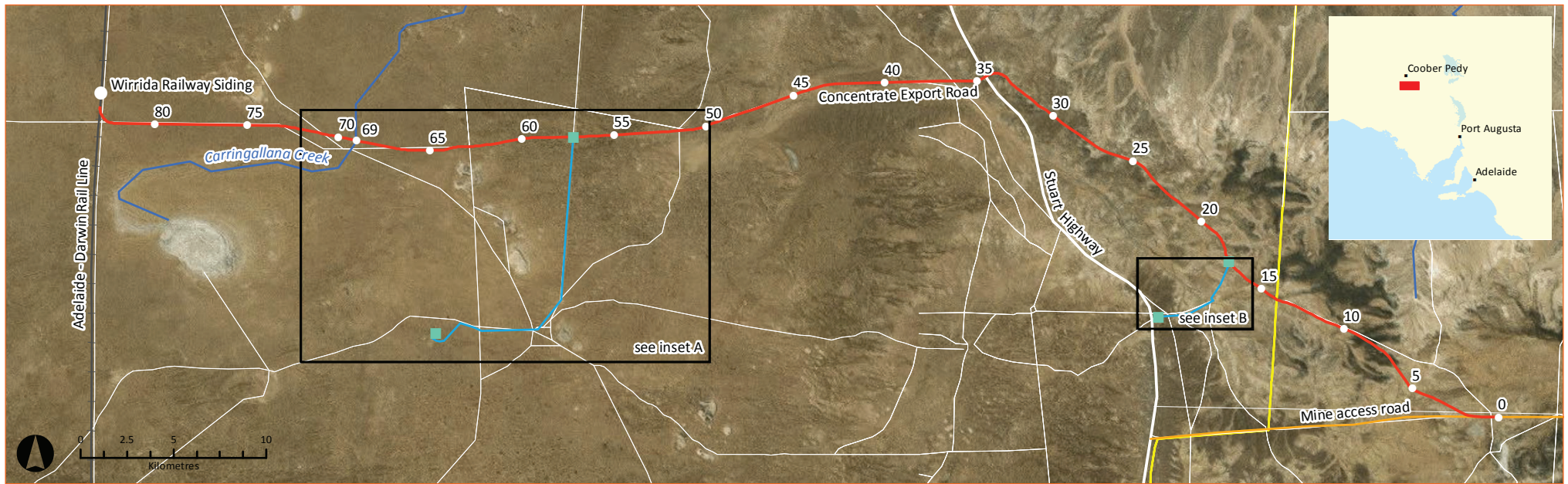
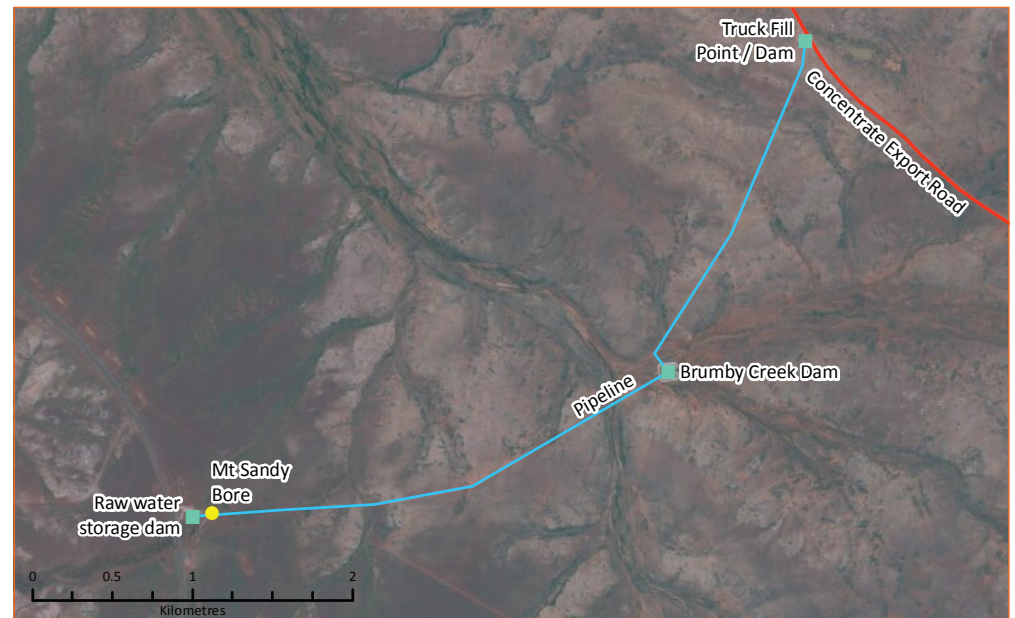


Figure 5.34: Water and electricity supply infrastructure



Inset A: Ingomar Coal Pit Infrastructure



Inset B: Mt Sandy infrastructure

Figure 5.35 | Concentrate export road water supply infrastructure

5.9.2 Energy management

5.9.2.1 Electricity

Electricity demand

The major site electricity users are:

- grinding mills
- primary crushers and
- underground mine ventilation systems.

The largest consumer of energy at Prominent Hill is the primary crushers and grinding mills, which reduce the ore material down to a size of approximately 20 µm. Any potential for large energy gains will therefore be obtained by continuing to optimise these processes in order to get the most efficient energy usage whilst maintaining output.

Electrical energy currently used at Prominent Hill is approximately 370 GWh per year and is expected to increase to approximately 460 GWh upon commissioning of the Wira shaft.

To ensure the stability of the power supply and to allow for the increased load from the Wira shaft, an additional four capacitor banks have been installed at the main substation as part of the PHOX infrastructure works.

No zero emissions energy sources or carbon offsets are currently utilised; however BHP is currently undertaking a review of its energy strategy which is focused on optimising demand management capabilities and exploring regional renewable energy opportunities.

Indicative site electricity consumption is summarised by area in Table 5.30.

Table 5.30 | Indicative Prominent Hill electricity consumption by area

Area	Current electricity consumption (MWh/annum)	Post 2025 electricity consumption (MWh/annum)
Open Pit Mining offices and workshops	19,500	20,000
Maintenance workshop, store and labs	5,200	6,000
Accommodation village	6,200	6,000
Borefield / water distribution	9,000	9,000
Utilities – RO Plant	2,000	2,000
Processing plant	250,000	200,000
Underground mining	75,000	100,000
Underground materials handling system including refrigeration	Nil	121,000
Total	366,900	464,000

Electricity supply

The 132 kV transmission system supplying the Prominent Hill mine and processing facilities comprises approximately 160 km of overhead transmission line owned by BHP that connects to the ElectraNet owned and operated 132 kV line at structure F1881-0491 which is supplied from Mount Gunson South. The 132 kV voltage at Prominent Hill is converted to 11 kV via three 45 MVA 132/11 kV transformers, the 132 kV asset power stability is managed by an on-site reactive power plant, comprising of two 11 kV 16MVA STATCOM's.

The Prominent Hill owned transmission line towers comprise both line and strain towers that have been specifically designed for this project. Strain towers are stronger than line towers and are used for angle and end points where the forces on the towers are greatest. The strain towers have four guyed lines to provide additional strength. The four-legged line towers are free standing and are generally used between strain towers to support straight sections of the transmission line. The line towers and strain towers are the same height (i.e., approximately 31 m to 33 m high), although some towers are higher to span particular ground features.

Service tracks supporting on the on-going maintenance and inspection of the track have been established, and these largely follow pre-existing pastoral tracks and the borefield infrastructure corridor in the northern sections. Periodic aerial visual and thermographic inspections ensure that conductors, hardware and structures are in a safe operating condition, that the access track remains accessible for emergency vehicles, and that trees and vegetation do not present a fire hazard.

Currently the mine site has an on-site diesel backup power generation system available with a maximum output of 5.25 MW. The system comprises five engines, each with a rating of 1.05 MW. The engines are designed to run continuously at 80% of their maximum output. The system is operated according to the design output, equating to a running capacity of 4.2 MW for the five-engine system. This backup power generation system has and can continue to provide backup electricity on-site for essential services and for the Aries Borefield.

5.9.2.2 Fuel and chemical supply

Reagent management

A summary of processing reagents and consumables and their indicative annual consumption is presented in Table 5.31. Chemical reagents are stored in a dedicated reagents storage area (see Figure 2.2), with other materials stored in site warehouse facilities as appropriate.

Table 5.31 | Indicative Prominent Hill reagents and consumables (as at June 2021)

Description	Annual consumption
Sodium ethyl xanthate (collector)	227 t
CMS2500 (collector)	194 t
H27 (frother)	122 t
Anti-Scalant	120 kL
Lubricants and general consumables	750 t

Diesel management

Two bulk diesel storage facilities located in the processing plant area are established for heavy vehicles and a separate one for other site uses including environmental and site services. The facilities consist of a series of self-bunded tanks, concrete slabs, bowser/discharge hosing, lighting and pumps. The tanks range in size between 50,000 L and 100,000 L with a combined storage capacity of approximately 886,000 L. Current site diesel consumptions are summarised in Table 5.32.

A bunded elevated diesel storage of approximately 3,500 L capacity is provided at Wirrida railway siding for the fuelling of on-site diesel generators.

Table 5.32 | Indicative Prominent Hill diesel consumption as at FY2020

Description	Annual consumption (kL)
Surface mining mobile fleet	6,904
Underground mining mobile fleet	6,988
Underground explosives manufacture	14
Miscellaneous mobile fleet	1,400
Total	15,452

5.9.2.3 Greenhouse gas emissions**Emissions and emissions intensity**

BHP reports on its greenhouse gas emissions and energy use through its annual reports, National Greenhouse and Energy Reporting (NGER) to the Clean Energy Regulator and National Pollutant Inventory (NPI) reporting to the SA EPA.

Greenhouse gas emissions have varied between 197,000–425,000 t of CO₂-e per annum (directly from the operation of mobile fleet, and indirectly from the consumption of purchased electricity) since the commencement of operations. In more recent year's emissions relating to the operation have been approximately 200,000 t of CO₂-e per annum.

Following commissioning of the Wira shaft, and the associated transition to hoisting as the primary method of vertical haulage in place of diesel fuelled trucks, it has been demonstrated that the greenhouse gas emissions intensity of each tonne of material processed will likely decrease from approximately 22×10^{-3} to 16×10^{-3} . Scope 1 emissions are expected to reduce by approximately 20,000 t CO₂-e with the introduction of the Wira shaft. Figure 5.37 shows the emissions profile of the current operations against those anticipated following commissioning of the Wira shaft.

This is further demonstrated in Figure 5.38 which shows that despite the increase in energy consumption required for the operation due to the shift to electric haulage it is still expected that overall, the operation will see a reduction in Scope 1 emissions by 56% and total emissions by 30%.

Energy efficiency

Currently diesel trucks have been assumed as part of PHOX, however installation of enabling infrastructure may occur to minimise any future disruptions when switching to an electric fleet, with such a development contributing further to a reduction in Scope 1 emissions.

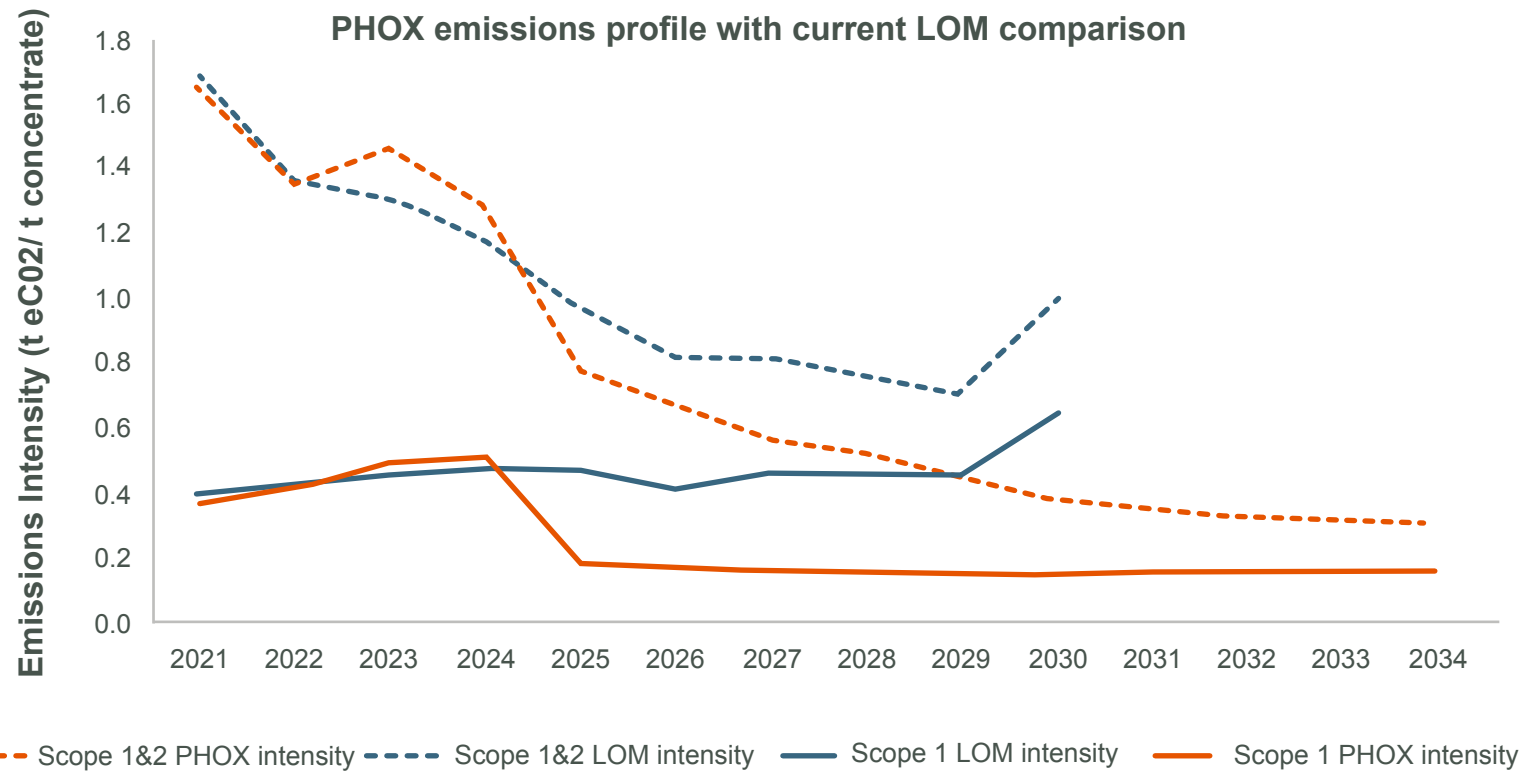


Figure 5.37 | Forecasted emissions profile

(a) Impact of shaft vs extended trucking (CY25 - CY35)

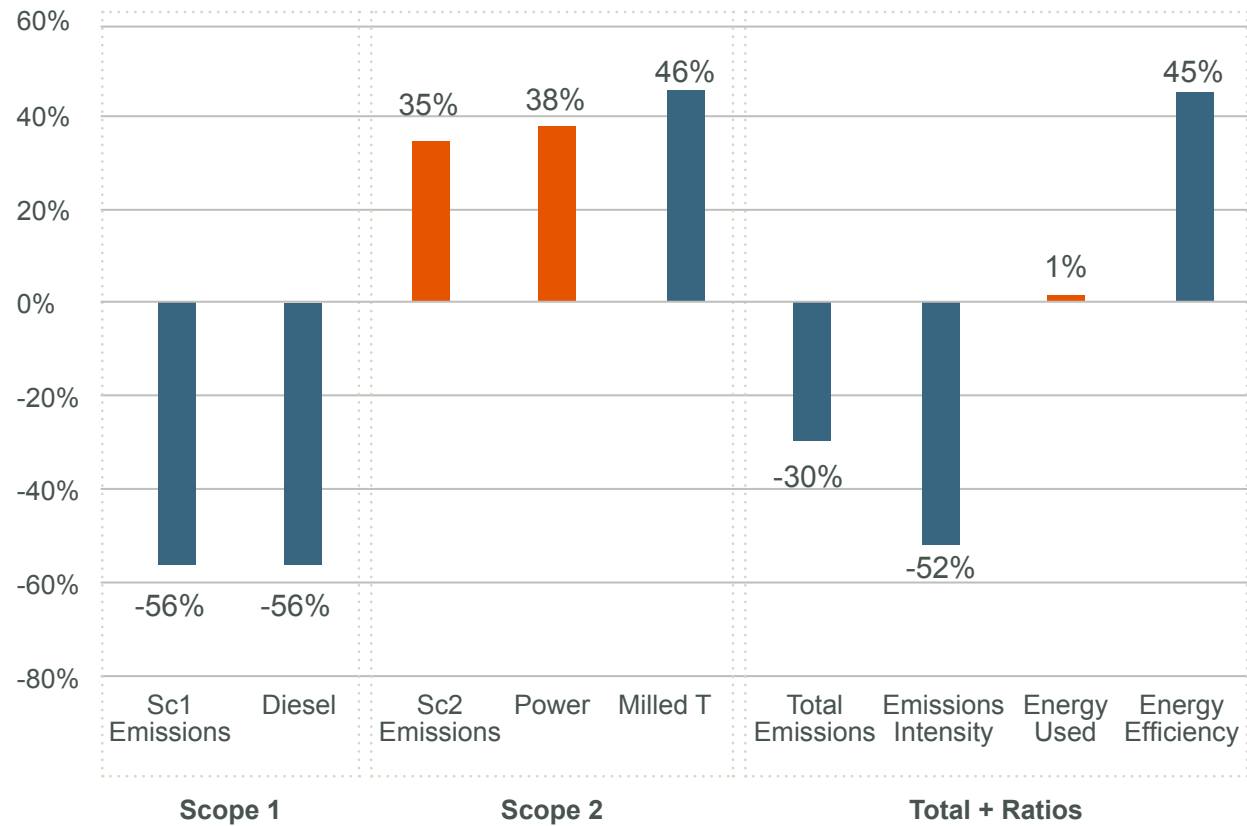


Figure 5.38 | Energy efficiency gains

5.9.3 Workforce

The operations workforce will vary during the life of mine, depending on the level of mining activity. Where possible, employees are recruited in and from the local area, (and South Australia more broadly), but additional recruitment from the rest of Australia may at times be necessary. A summary of the on-site workforce by work area for Prominent Hill (as of July 2021) is provided in Table 5.33.

Table 5.33 | Prominent Hill full time equivalent workforce by work area (July 2021)

Work area	Workforce		
	OZ Minerals	Contractors	Total
Underground Mining Operations	25	558	583
Processing Plant Operations	68	111	179
Technical Services (Geology, Ventilation and Survey)	22	83	105
Support Services and Administration	28	308	335
Total	142	1060	1202

Table 5.34 presents a breakdown of the source of employees and contractors working both on-site and off-site, noting that numbers fluctuate depending on operational needs. Details regarding the on-site accommodation are provided in Section 5.10.2.

Table 5.34 | Prominent Hill full time equivalent workforce by source (July 2021)

Work area	Workforce		
	OZ Minerals	Contractors	Total
Coober Pedy	2	22	24
Other local areas	0	6	6
Upper Spencer Gulf	13	72	84
Other SA Country	29	266	295
SA Metropolitan	78	510	588
South Australian Total	121	876	998
Victoria	4	38	42
New South Wales	4	34	38
Queensland	8	62	70
Western Australia	2	17	19
Tasmania	2	23	26
Northern Territory	0	5	5
Australian Capital Territory	1	1	2
International	0	4	4
Total	142	1,060	1,202

5.10 Supporting surface infrastructure

5.10.1 Site access

5.10.1.1 Hours of operation

The project operates 24 hours per day and seven days per week. The workforce operates on 12-hour shifts, generally an eight days on, six days off or two weeks on, two weeks off roster, although many positions have alternative shift arrangements as part of OZ Minerals' program to offer flexible work.

5.10.1.2 Access

Vehicle access to the Prominent Hill site is via Site Access Road (see Figure 2.3). The Site Access Road is a heavy-vehicle road leading in from the existing Stuart Highway (see Figure 5.40). Constructed in 2008 along the general alignment of an existing pastoral station track, the Site Access Road passes east from the Stuart Highway along a fence line, then south from this alignment to the mine site. The road crosses the Wattiwarriganna Creek and a number of drainage lines. Floodway crossings were constructed to minimise disruption to natural surface water flows.

Access is restricted only to that necessary for mine construction and operations, as well as for pastoral lease management. No public access is permitted.

The intersection with the Stuart Highway and the Site Access Road was constructed in accordance with the Department for Planning Transport and Infrastructure (DPTI) requirements with reference to the guidelines for Environmental Best Practice for Outback Roads (ARRB Group Limited, 2000) and other relevant guidelines. It is operated in accordance with an on-going Deed of Agreement (2005/09587) with the Commissioner of Highways.

Current road traffic movements are approximately 16,600 vehicles per year.

5.10.1.3 Concentrate export road

The Concentrate Export Road allows road transport of copper-gold concentrate from Prominent Hill to the Wirrida railway siding (see Figure 5.40).

The Concentrate Export Road follows the existing Site Access Road, as a shared access and haul road with dual carriage way, for the section between the mine site and the intersection of the Site Access Road and Concentrate Export Road. From the intersection to Wirrida Railway Siding, the Concentrate Export Road is an exclusive, one lane haul road. This road carries two-way traffic and has approximately 13 wider points for vehicles to pass. Radio communication and continuous monitoring of vehicle position using global positioning system ensures traffic safety.

The sealed containers of concentrate are transported to the Wirrida Railway Siding along the Concentrate Export Road using road trains, each with five trailers (quad road trains). Each road train carries up to 5 containers (i.e., total up to 145 t) of concentrate. Road trains make an average of approximately four return trips per day and run seven days per week.

The Concentrate Export Road crosses the Stuart Highway via an underpass as illustrated in Figure 5.39. Key features of the underpass include:

- concrete barriers anchored to the bridge

- sacrificial concrete barriers along the section of road near the underpass to take the impact of a vehicle collision, rather than the underpass and
- placement of the lowest part of the Concentrate Export Road away from the underpass to minimise drainage issues and water collection at this point.

The Concentrate Export Road is elevated with side drains along its entire route. Rock fill causeways with pipes and/or culverts, sized to accommodate 1-in-20-year storm events, have been constructed at all major creek crossings, such as Carringalana Creek. Cross-drains have been constructed at regular intervals (nominally 500 m distance) along the route using pipes suitable for 1-in-5-year storm events to allow surface water to pass under the road (see Figure 5.40).

5.10.1.4 Wirrida railway siding

At the Wirrida Railway Siding, the containers of concentrate are transferred from the road trains to rail cars using front-end loaders which are fitted with specialised handling equipment. The concentrate remains in the same containers until it reaches existing port or unloading facilities, reducing double handling and potential for spills during loading transfers. The location of the Wirrida Railway Siding is shown on Figure 5.41.

Once a week, 72 containers are secured onto a freight train service to Berth 29 at Port Adelaide, where the containers are stored awaiting the arrival of a chartered vessel. A vessel will typically load between 5,500 and 11,500 t. Additionally, once a week, 24 containers are secured onto a freight train service to Tennant Creek.

The containers are loaded into the vessels using a container tippler system mounted off a mobile harbour crane at Berth 29. The tippler removes the lid as it lowers into the vessel, then rotates the container in the hold of the vessel emptying the contents. By rotating the container to release the concentrate directly into the hold of the ship, the system removes risk associated with transferring concentrate between concentrate shed and traditional port loading facilities, maintaining a high environmental standard during ship loading.

A new hardstand area, about 560 m long, and compound was constructed at the Wirrida Railway Siding, providing space for road trains to park beside the train, forklift trucks to load containers and temporary container storage. A maximum of 12 containers are stored in the temporary container storage area, of approximately 10 m by 5 m, at any given time. A truck turning area of 80 m by 80 m is located at the northern end, and solar powered light poles, which are 10 m high, have been installed at 50 m intervals along the area. The existing service track is used for loading concentrate onto trains but has been extended to accommodate the full length of the concentrate train. Minor works to the pre-existing passing loop have also been made to accommodate new and relocated turnouts from the service track.

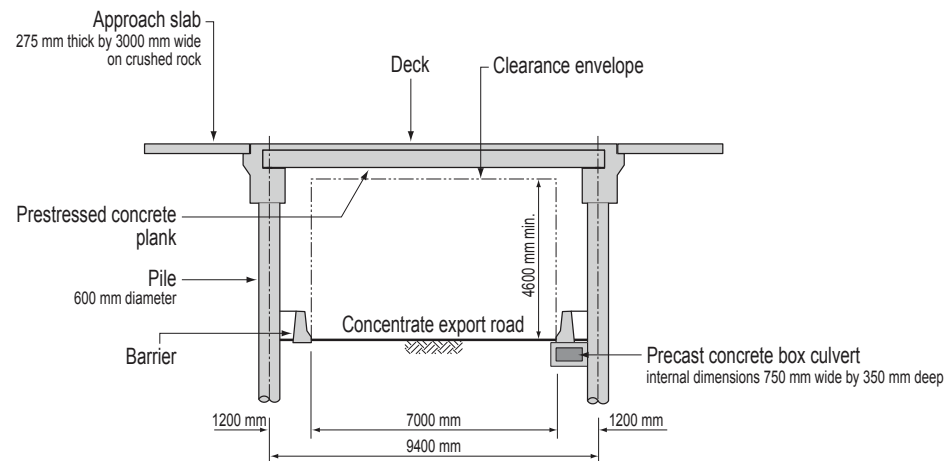
There is no overnight accommodation at the Wirrida Railway Siding, personnel use the facilities at Prominent Hill as required.

5.10.1.5 Site security

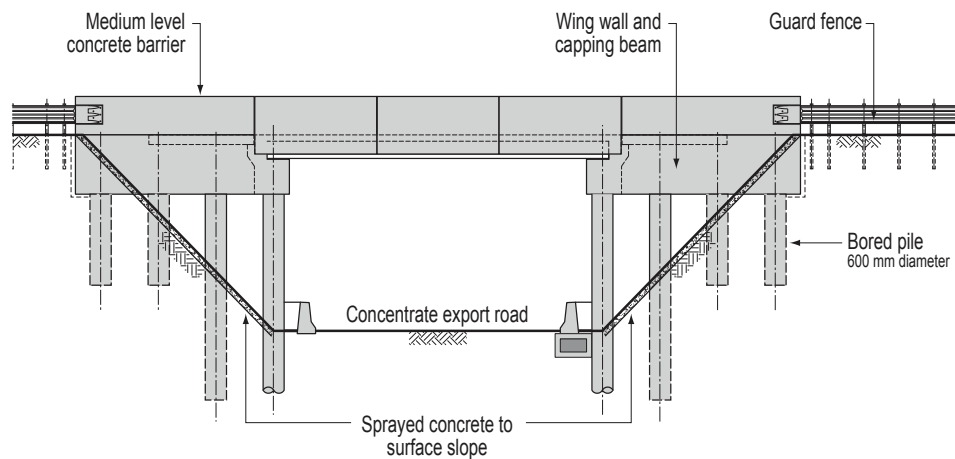
The project area, Site Access Road, Concentrate Export Road, Wirrida Railway Siding, individual wellheads and the borefield staging complexes have been fenced where necessary (e.g., at vehicle access points and fence line intersections) to discourage stock access. Security gates were constructed to control access to and from the ML area.

5.10.1.6 Vehicle wash down

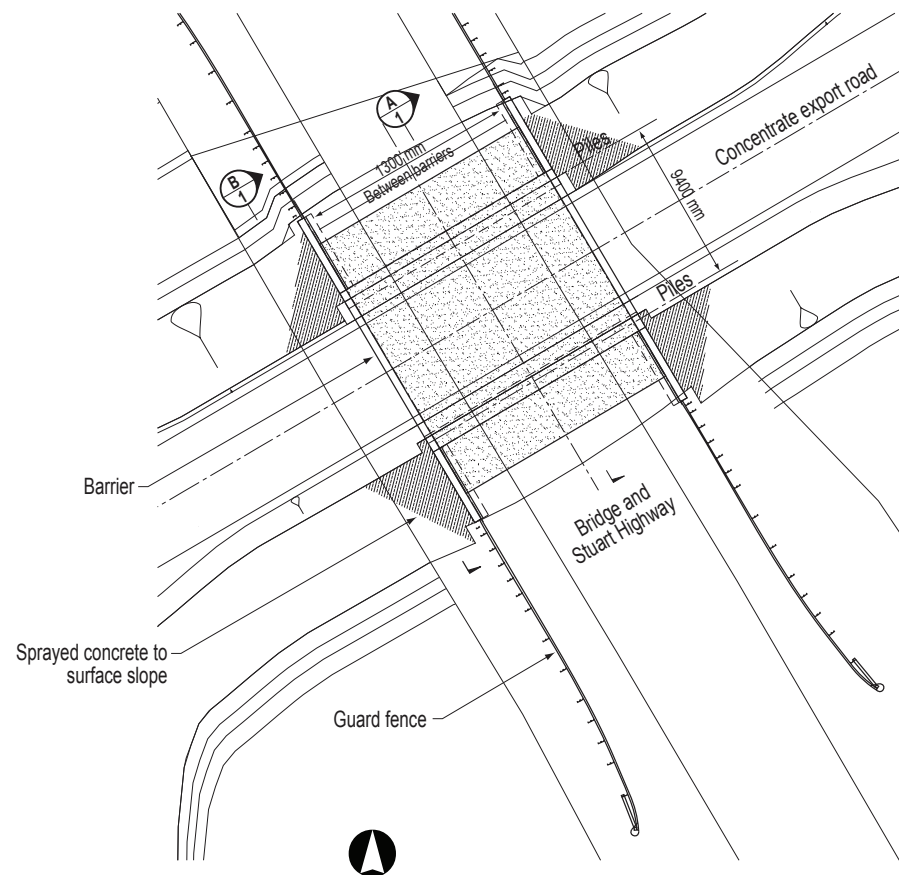
Both heavy vehicle and light vehicle wash down facilities have been established. The facility consists of a high-pressure hose and self-bunded concrete platform. Water used in the facility is captured in the processing plant's drainage system and returned to the process water dam.



SECTION A
1



SECTION B
1



PLAN

Figure 5.39 | Concentrate export road and Stuart Highway underpass

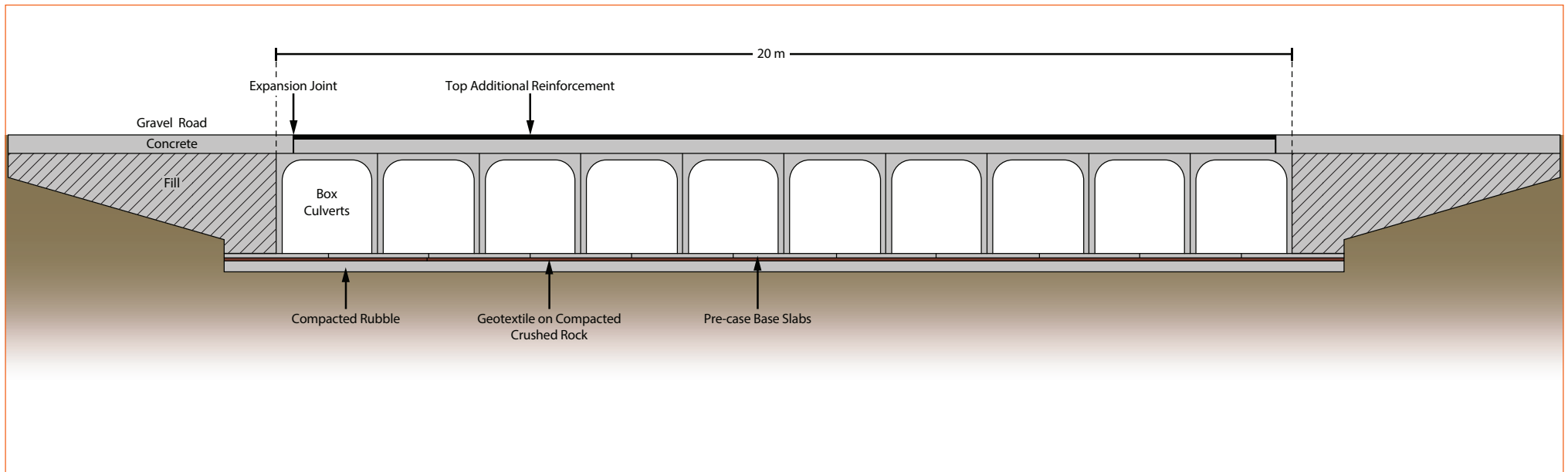


Figure 5.40 | Concentrate export road crossing at Carringallana Creek



Figure 5.41 | Wirrida Railway Siding

5.10.2 Accommodation and offices

5.10.2.1 Offices and workshop facilities

The main service area is located adjacent to the mine and processing plant (see Figure 2.2) and comprises:

- operations office
- processing plant office
- processing plant workshop and store
- emergency services building
- laboratory and
- warehouse and other ancillary buildings

The laboratory provides support for mining and processing operations by routine analyses for mine grade control, processing plant metallurgical control and accounting and on-site metallurgical test work. The emergency services building contains a fully equipped first aid facility staffed by a nurse/ paramedic and complete with emergency services vehicles.

Mining contractor facilities, including vehicle parking and maintenance areas, are located immediately south-west of the open pit, between the plant site, TSF and ROM pad. The large mobile equipment fleet required for mining works is supported by a workshop facility adjacent to the processing plant. Facilities include office and workshop buildings, washdown bay, tyre change facility and warehouse storage for parts, supplies, tyres and general consumable items. Fuel and lubricant storage and delivery services are located adjacent to the workshops. An additional office and workshop has also been established to support the underground operation.

5.10.2.2 Accommodation village

The permanent accommodation village (see Figure 2.2) is designed so that the number of accommodation units can fluctuate with workforce changes. The village currently includes 1,178 individual rooms, majority with self-contained bathrooms. Of these rooms, 318 are allocated for shutdowns and are not actively used during non-shutdown periods, leaving 860 rooms available during these times. Additionally, approximately 200 more rooms were established to cater for the PHOX construction workforce.

The village contains recreational facilities including a swimming pool, tennis courts and a basketball court, gyms, laundry facilities, kitchen / dining complex, a wet mess, village offices and training / meeting rooms, dry and refrigerated storage, water tanks, a power station, four car parks (with only two being in active use, northern parks have been closed to traffic), covered common areas, a first aid room, a bus shelter, telephone blocks, and a utilities room.

All buildings are prefabricated and were imported to site. Concrete pathways exist throughout the village.

5.10.2.3 Visual screening

No visual screening plantings has been undertaken at the operation or camp facilities due to the remote location of the operation. Where possible existing native vegetation has remained.

5.10.3 Airstrip and terminal facilities

An airstrip was constructed approximately 200 m west of the accommodation village (see Figure 2.2) to provide all-weather day access to the project site and to accommodate occasional unscheduled or emergency night landings. The airstrip is certified CASA Class 3C, comprising a sealed 30 m wide runway more than 1,800 m long. A terminal building provides for check-in and departures, security and receiving arrivals. Lighting is provided in accordance with CASA requirements. A refuelling facility with a capacity of approximately 20,000 L of JET A1 fuel is located adjacent to the airstrip in a bunded area.

In 2018 the airstrip was fenced with a chain link kangaroo exclusion fence to prevent fauna from entering the airstrip.

5.10.4 Non-process waste management

Waste management is governed by a hierarchy philosophy that in order of preference, aims to minimise, reuse, recycle and finally dispose of. The project generates the following categories of waste:

- domestic waste from accommodation and office facilities in the accommodation village and off-site
- tyres, industrial and construction waste
- hazardous materials and dangerous goods from workshop activities, water treatment, clean-up of spills
- medical waste and
- waste material that has come into contact with the ore body (potentially radioactive wastes) which is addressed in the next section.

Approximately 1,000 tonnes of solid waste and 580,000 litres of liquid waste is produced onsite each year. Details of the composition of all wastes produced are in Table 5.35 and Table 5.36.

For more information on waste management please refer to Appendix D.

5.10.4.1 Non-hazardous wastes

Non-hazardous waste largely comprises general residual waste, including all organic food waste and recyclables. A list of the major non-hazardous waste streams and recyclables including collection and disposal methods is provided in Table 5.35.

Table 5.35 | Prominent Hill non-hazardous and recyclables waste management

Material	Description	Collection points	Disposal
Non-hazardous residual waste			
General residual waste	General waste (refuse and rubbish) and materials not able to be viably recovered or recycled. At the present time this includes all organic food wastes from on-site crib rooms as it is not considered practicable to process this stream on-site.	Small Items: A combination of red lid 140 L Residual Waste MGBs and 60 L multi-sort bins located throughout the village, mess, mine site and crib rooms. Larger Items: Employees to place in designated collection locations at, Recycling Yard or as required around site.	Residual waste mobile garbage bins to be collected by the waste services contractor
Construction and demolition	Concrete and similar inert construction and demolition wastes	Generally collected in bulk from site where generated or delivered to bulk skip in close proximity.	SHEC Department to coordinate disposal of excess concrete to landfill.
Operational waste	Poly pipe offcuts containing hard set paste fill not suitable for future use or recycling	Employees to place in a designated storage location in mining laydown area or skips appropriately located in mining laydown area.	Waste services contractor or mining contractor to consolidate for periodic disposal at base of pit within waste rock stockpile.
Aluminium			
Beverage containers subject to Container Deposit Legislation – Container Deposit Legislation (CDL)	Aluminium beverage containers.	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multi-sort bins located throughout the village, mess, mine site and crib rooms.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area for waste services contractor to collect. All CDL products are sorted, baled and stored at the RRC for transport to a licensed recycler.
Glass			
Beverage containers subject to Container Deposit Legislation – (CDL)	Glass soft drink or beer bottles. NOT wine or spirit bottles	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mess, mine site and crib rooms.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area for waste services contractor to collect. All CDL products are sorted, baled and stored at the RRC for transport to a licensed recycler.
General	Glass products no longer suitable for use. Includes jars wine bottles, large juice bottles, windows etc. NOT crockery.	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mess, mine site and crib rooms.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area for waste services contractor to collect. During sorting of aluminium cans and CDL glass all non CDL glass is blended into relative glass colour bins to a maximum of 2% by content to reduce landfill.
Laboratory	Glass products used in laboratory tests and no longer suitable for use.	Designated Spin bin for laboratory glass, unless otherwise designated at Laboratory.	Laboratory glass spin bin collected by waste services contractor for disposal in the site landfill.
Plastic			
Beverage containers subject to Container Deposit Legislation – (CDL)	Plastic (usually PET (Polyethylene Terephthalate) 1) soft drink, flavoured milk, fruit juice, cordial or water bottles. NOT Pure milk.	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mess, mine site and crib rooms. Converted open top IBCs for mass collection at back of kitchen.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area and processed at the RRC by the waste services contractor.
General (non CDL material)	High density polyethylene HDPE 2(Milk bottles), Rigid plastic packaging, PVC (3), LDPE (4), PP (5), PS (6).	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mess, mine site and crib rooms. Converted open top IBCs for mass collection at back of kitchen.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area and processed at the RRC by the waste services contractor.
General Plastic Scrap	Poly pipe fittings, offcuts not required and not suitable to retain for future use. Poly, IBC bladders, drums/buckets.	Employees to place in designated storage location at Recycling Yard or skips appropriately located around site as required.	Waste services contractor to consolidate for periodic transport to off-site recycling processor OR disposed of to landfill.
Liquid paperboard			
Beverage containers subject to Container Deposit Legislation – (CDL)	Liquid paperboard drink cartons, usually fruit juices or flavoured milk.	A combination of yellow lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mess, mine site and crib rooms. Converted open top IBCs for mass collection at back of kitchen.	Recyclables and CDL mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area for waste services contractor to collect. All CDL products sorted, baled and stored at the RRC prior to transport to a licensed recycler.

Material	Description	Collection points	Disposal
Recyclable paper and cardboard			
Clean paper and cardboard	Newspapers, office paper, etc.	A combination of blue lid 240 L Residual Waste MGBs and 60 L multisort bins located throughout the village, mine site and crib rooms.	Paper and cardboard mobile garbage bins to be collected by waste services contractor or village services contractor and contents disposed to site appropriate location. Village services contractor relocates from inside collection points to designated storage area for waste services contractor to collect. Paper and cardboard, baled and stored at the RRC prior to transport to off-site recycling processor.
Metals			
General metals	Metal items, scrap or off-cuts not suitable for further use on-site, including steel rigid packaging and aerosol cans.	Employees to place in designated scrap metal collections skip located at the Recycling Yard. Closest appropriate scrap metal collections skip as arranged on occasion.	Waste services contractor to consolidate for periodic transport to off-site recycling processor. Aerosol cans are stockpiled prior to transportation off-site to a recycling processor.
Large metal objects	Large metal items such as light vehicle bodies and haul truck trays	Various contractors on site	Waste services contractor to consolidate for periodic transport to off-site recycling processor. Where this is logistically difficult (e.g. oversized loads necessitating road closures) or is not justified on a life-cycle basis, these materials may be disposed of to the WRDs or otherwise suitably buried.
Food Packaging (steel cans)	Steel rigid and semi-rigid food packaging can.	Collected in converted open IBCs located at rear of kitchen.	Converted IBCs to be collected by waste services contractor. Contents baled at RRC and bales relocated into scrap steel skip.
Copper wire	Copper wire not suitable for future use on-site.	Employees to place in designated scrap metal collections skip located at the Recycling Yard. Closest appropriate scrap metal collections skip as arranged on occasion.	Waste services contractor to consolidate for periodic transport to off-site recycling processor.
Wood			
Pallets that need returning by contractual agreement	Wooden pallets supplied by CHEP and LOSCAM that are in good condition, suitable for reuse need to be returned to the supplier.	Employees are to return CHEP and LOSCAM to the BHP Warehouse for back loading	OZ Warehouse to arrange back loading to appropriate companies.
Scrap pallets	Scrap Wooden pallets in any condition that cannot be returned to the supplier.	Employees to place in designated scrap wood collections skip located at the Recycling Yard.	Waste services contractor to consolidate for either reuse by themselves to transports commodities off site. Relocated to the Emergency Response Team (ERT) burn pit. No CCA treated wood products will be burnt on-site. Wooden products are generally treated pine or hardwoods
Any other wood products.	Packaging, furniture and any other wood based items not suitable for reuse.	Employees to place in designated scrap wood storage skips at the Recycling Yard.	Relocated to the Emergency Response Team (ERT) burn pit. No CCA treated wood products will be burnt on-site. Wooden products are generally treated pine or hardwoods.
Conveyor belt			
General	Conveyor belt no longer required and general rubber items or off-cuts	Employees to place in designated storage laydowns around site.	Small amounts collected with general waste and disposed of to landfill.
Cooking oil			
General	Used cooking oil from accommodation village kitchen.	Employees to deposit in the designated IBC located at the rear of the kitchen.	Waste services contractor to collect and store on Listed Waste Facility for periodic transport to off-site by external licenced waste contractor.
Rubber			
General	Rubber items, scrap or off-cuts not suitable for further use on site, including hoses. NOT tyres	Employees to place in general waste skips at the Recycling Yard. Closest appropriate general waste collections skip as arranged on occasion.	Waste services contractor to disposal in site landfill.
Rubber boots	Rubber Boots	Placed into open top IBC and placed on the Listed Waste Facility	Sent off site for recycling

5.10.4.2 Hazardous waste

The EPA guideline 'EPA842/09 Waste definitions' defines a hazardous waste as a listed waste having a characteristic described in schedule A list 2 of the National Environment Protection (Movement of controlled waste between States and Territories) Measure (Cth). It includes any unwanted or discarded material (excluding radioactive material), which because of its physical, chemical or infectious characteristics can cause significant hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed.

In addition to the EPA guideline defined hazardous waste, BHP includes any waste listed under Schedule 1, Part B of the EP Act in its definition of hazardous waste.

A list of hazardous waste streams including collection and disposal methods is provided in Table 5.36.

Table 5.36 | Prominent Hill hazardous waste management

Material	Description	Collection points	Disposal
Waste oil / hydrocarbons	Left over oils and fuels from site processes.	Collected in IBCs or sealed steel 205 L drums located throughout site	Collected by licensed contractor and disposed of off-site. May be stored on known various appropriately banded areas around site or on the Bioremediation Pad.
Contaminated soil	Left over from the process of bogging out wash bays, or from spill clean-up where spill contaminants have been absorbed into the soil.	Collected in IBC's or other suitable container as required.	Small volumes are to be collected by licenced contractors and disposed off-site. Large volumes are to be laboratory tested to determine if they are classified as Low Level Contaminated Waste (LLCW) or High Level Contaminated Waste (HLCW). As per approval from EPA and DPC in 2016 the following had approval to occur: • LLWC may be placed within the tyre cell of the southern WRD, no treatment required. • HLCW must be treated using Rembind to reduce the leachability of the material. After further testing has demonstrated Rembind has reduced leachability the material may then be placed within the tyre cell of the southern WRD. The tyre cell is now full, closed and buried. Further negotiation with the EPA is underway for an approved process for onsite disposal.
Oil rags and filters (listed waste)	Left over oil rags and filters from site processes.	Collected in purpose built drain bins located throughout site, or placed into open top IBCs on appropriately banded areas such as the listed waste facility.	Collected by licensed contractor and disposed of off-site.
Hazardous chemicals	Waste hazardous chemicals produced / left over from site processes.	Collected in appropriate storage containers as outlined in MSDS/SDS.	Appropriately disposed of as per MSDS.
Asbestos (listed waste)	Waste PPE which has come in contact with Asbestos.	If required -Collected in spin bin located at blast crew lay down area.	Collected and buried at site landfill
Xanthate	Waste xanthate packaging	Collected in specific storage skip located adjacent Reagents Storage Shed.	Collected and buried separately at site landfill in accordance with MSDS and Disposal of Xanthate Product SOP.
Lead cupels (listed waste)	Lead cupels left over from site processes.	Collected in 205 L drums at SGS Laboratory.	Collected in 205 L drums at the on-site laboratory, sealed, labelled and strapped. Personnel and collection by Waste Management Contractor for storage adjacent to the RRC laydown area for potential off-site disposal via a licenced contractor.
Fluorescent Bulbs	Waste fluorescent bulbs left over from site processes.	Collected in IBC located at Recycling Yard and accommodation village.	Waste services contractor to consolidate for periodic transport to off-site recycling processor.
Batteries	Waste batteries left over from site processes.	Collected in wooden pallet boxes which are stored on appropriate bunding. Collection points are located at various points throughout site.	Waste services contractor to consolidate for periodic transport to off-site recycling processor.
Tyres (listed waste)	Light vehicle tyres from BHP vehicles only, and no longer suitable for use. Heavy vehicle tyres from BHP vehicles only, and no longer suitable for use.	Various contractors on site	Consolidated for periodic transport to off-site recycling processor
Tyres (listed waste)	Heavy vehicle tyres from BHP vehicles only, and no longer suitable for use.	Onsite Disposal. Approval in previous MARP/PEPR to dispose of within PAF Cells of IWL Heavy vehicle only.	Mining contractor to manage, seeking advice from SHEC Department as required.
Medical Waste (Listed Waste)	Medical wastes	Medical waste other than sharps is to be collected within clearly labelled heavy duty plastic bags. Sharps are to be disposed of in suitable sharps containers appropriately around site.	Transported by a person employed or engaged in the business producing the waste or a transporter licenced by the EPA to collect and transport such waste directly to: A waste depot licensed by the EPA to receive medical waste. A hospital (nearest hospital to Prominent Hill is the Coober Pedy Hospital).
CCA Timber	Copper chrome arsenate treated timber	No volumes of CCA Timber currently stored on site. If encountered, place in Listed Waste Facility and discuss with SHEC and EPA	Where encountered, EPA advice for disposal would be sought.

5.10.4.3 Landfill

A landfill has been constructed at Prominent Hill for the disposal of non-hazardous wastes in accordance with relevant SA EPA Guidelines for a class SB-landfill. Site access to the landfill facility is currently allowed 24 hours per day, seven days a week (see Figure 2.2). Generally, site activity is concentrated between 7 am and 6 pm, seven days a week, when waste contractors actively manage the site. Minimal activity occurs outside of this time.

The site access is limited to waste contractor and other authorised personnel. No public access is allowed within the mine site, which is strictly managed. Entry and exit to the landfill facility is through a single-entry point, managed through signage and use of a radio call system to the waste contractors prior to entering and leaving the site.

Currently, approximately 500 t of waste material is disposed of to the landfill each year.

5.10.4.4 Resource recovery centre

The Resource Recovery Centre (RRC) is a purpose-built work area designed to house a bailing press (utilised for bailing cans, cardboard, paper and Polyethylene terephthalate (PET) plastics), sorting tables and bin handling equipment. It serves as a work area to meet general resource recovery activities and store recyclable material prior to transport. It is the base for the waste services contractor.

5.10.4.5 Recycling yard

The common user recycling yard is established as an additional designated resource recovery storage and processing area under the management and operation of the waste services contractor. The purpose of this yard is to provide a central location for contractors/site staff to segregate recyclable material; primarily steel, cardboard, timber, batteries, aerosols and lighting (fluorescent tubes and globes). A general waste skip is also located in this area. The facility is open 24 hrs a day, 7 days a week and is not locked.

5.10.4.6 Listed waste facility

A Listed Waste Facility (LWF) has been constructed on site near the Concentrate Plant. This is a contained area initially purpose built for the bioremediation of contaminated soil and storage of waste hydrocarbons and other hazardous/listed wastes requiring containment. These are stored in Intermediate Bulk Containers (IBCs) or 205 L drums.

The LWF (previously known as the BioPad) comprises a concrete pad 15 m wide and 15 m long, with permeability meeting EPA requirements. There is a blind sump with a manual bilge pump allowing transfer of water to a storage tank on the Listed Waste Facility. This sump has a 1-in-100 year rainfall capacity.

All liquid (e.g., oil) or friable products (e.g., contaminated soil) placed on the LWF are to be placed into sealed IBCs, drums or bins and packed correctly (i.e. drums strapped to pallets). Other products which will not spill such as used rubber boots etc. must be placed within an IBC with the top covered to facilitate safe loading and material blowout when transported.

All materials placed on the facility must have an information tag placed on them clearly labelling the contents of the container, to whom it belongs and the date on which it was deposited. All materials on the facility will be removed off site for processing and/or disposal by an EPA licenced operator/transporter at the cost of the owner of the waste. EPA Waste Tracking Certificates and Service Reports are given to

the waste generator to detail volume, type of waste removed. These are kept for auditing purposes. Currently no bioremediation of contaminated soil occurs on the LWF.

5.10.4.7 Soil remediation facility

Hydrocarbon impacted material is send-off site if it occurs in low volumes via a licenced EPA contractor. If an alternative onsite disposal method is proposed to occur, then the material will be laboratory tested to determine if it is classified as Low-Level Contaminated Waste (LLCW) or High-Level Contaminated Waste (HLCW).

6. Closure management

A Conceptual Mine Closure and Rehabilitation Plan was submitted to Primary Industries and Resources of South Australia (PIRSA) in 2006 as part of the MARP 2006 (Oxiana, 2006a). The plan outlined the anticipated closure strategies and potential closure liability for the Prominent Hill operation based on the information available at the time. Subsequent investigations conducted as part of the MARP have also addressed issues associated with closure and rehabilitation. The Conceptual Mine Closure and Rehabilitation Plan was updated in the MARP 2009 (OZ Minerals, 2009) to include the proposed underground project and to reflect the increase in knowledge associated with the project as it developed.

Closure management has now been incorporated throughout this PEPR reflecting the integrated approach during operations to closure management for the Prominent Hill project. The following sections describe the overall approach to closure management at Prominent Hill.

Uncertainties regarding certain aspects of the closure strategy that require further study prior to finalisation are detailed in Section 12.

6.1 Closure objectives

The primary objective for rehabilitation and closure at Prominent Hill is to comply with all relevant Lease conditions, achieve the operations closure related environmental outcomes and completion criteria and successfully relinquish all mining related tenements. In order to achieve this objective, BHP will operate and undertake rehabilitation and closure activities with the following considerations:

- minimise as far as practicable the risk to human health and safety
- leave a site that is physically and chemically stable
- leave a site which will not be a source of ongoing dust or water pollution
- ensure all stakeholders have their interests heard and considered as part of the mine closure planning process
- commit to providing adequate resources for closure planning and progressive rehabilitation and
- ensure BHP understands the cost of rehabilitation and closure and adequately account for this, so as not to leave the government or community with an ongoing liability.

6.2 General closure standards

In accordance with the Guidelines for Preparing Mine Closure Plans (DMP and EPA, 2011) the closure methodologies described throughout this PEPR for Prominent Hill are outcome-based and set out the long-term goals for closure. These are based on the proposed post-mining land use and are as specific as possible to provide a clear indication to government and the community on what BHP commits to achieve at closure.

In developing the closure strategy for the operation, the requirements of MG2b were considered. These outline the minimum general standards to be met before surrender of tenement.

Table 6.1 | General closure standards

Aspect	Standard
General economic standards	The community and future generations are left with no residual liability for site rehabilitation or maintenance.
	Any additional adverse economic effects are minimised.
	Provision is made for reasonable access for future mining (or reprocessing) of any remaining resource.
General social standards	Demonstration of effective ongoing community engagement.
	Closure is planned to minimise the disruption/impact on the community, for example, that caused by reduction in access to infrastructure.
	Development of programs that contribute to the sustainability of the community, driven by the needs of the community.
	Future public health and safety are not compromised.
General environmental and rehabilitation standards	The return of disturbed land to a stable, productive and self-sustaining condition, after taking into account the beneficial uses of the site and the surrounding land. This includes: • physical, geochemical and ecological stability • the protection of the quality of the surrounding waters • a condition where the risk of adverse effects to people, livestock, other fauna and the environment in general has been reduced as far as practicable to a level acceptable to all stakeholders. Where adverse effect is defined as a harmful effect to an entity as a result of mining operations.
	The establishment to the satisfaction of the community and government of: • clearly defined realistic, beneficial and sustainable post-mining land use (taking account of both the capability of the land and practicalities) • monitoring and reporting criteria for successful final and progressive rehabilitation; these criteria may include reference to: ○ appropriate mechanisms for formal 'sign-off' of rehabilitation as completed ○ Australian Standards as they apply at the time the rehabilitation is 'signed-off' ○ comparative measures, for example, reference photographs ○ agreed times for the proving of rehabilitation actions ○ requirements under other legislation, for example, the <i>Environment Protection Act 1993</i> • arrangement for post-surrender actions and funding.

6.3 Closure definitions

This PEPR document outlines the closure strategy for Prominent Hill across the six identified domains (as listed above). For the purposes of developing this strategy the following definitions have been adopted:

- **Decommissioning:** The process that begins near, or at, the cessation of mineral production. This term is used interchangeably with site closure but here refers to a transition period and activities between cessation of operations and final closure (e.g., demolition and removal of buildings, plant and equipment, removal of services and other infrastructure etc.).
- **Closure:** Closure is generally deemed to be complete at the end of decommissioning and rehabilitation and where all current appropriate regulatory obligations have been satisfied.

Three closure scenarios are considered as part of this PEPR. These are as follows:

- **Planned closure and completion:** Assumes that the mine operates as per the proposed LOM and transitions into closure activities at the end of the planned LOM.
- **Sudden unplanned closure:** Assumes that an unforeseen or unplanned event occurs that requires the mine to cease operation and potentially limited ability to undertake closure activities.
- **Care and maintenance:** Assume that an unforeseen or unplanned event requires the mine to cease the planned mining operations however, there is potential for the mining operation to recommence in the near future. Under this scenario the site would be maintained in a safe and stable state until either operations recommence, or the site is permanently closed. For more information on care and maintenance please refer to Section 6.8.

6.4 Closure planning

The current Prominent Hill closure management process is summarised in Figure 6.1, providing context to the description of closure provided in this PEPR. Prominent Hill is currently transitioning to the BHP closure management process which may influence future closure plans. With consideration to the Life of Mine Plan and final project design information presented in the PEPR, the Prominent Hill Supporting Works Plan is an internal document that is used to provide sufficient detail on the nature, extent and scope of proposed activities to define the expected financial liability associated with the operation.

Updated annually the Prominent Hill Supporting Works Plan considers information such as revised mine plans, existing closure strategies, actual areas of disturbance and activities approved under current budgets.

Information from the Prominent Hill Supporting Works Plan provides input to the Prominent Hill Closure Cost Model, an internal financial tool which is developed every six months in accordance with relevant accounting standards the Closure Cost Model includes:

A Life of Mine (LOM) estimate: represents an estimate of the expenditure required to successfully close the Prominent Hill Operations (PHO) and rehabilitate the LOM disturbance and in doing so, meet closure objectives and criteria as required by policy objectives, legal obligations and agreements with stakeholders. It includes the liability that currently exists as well as any anticipated liability.

Current estimate (IFRS): this estimate only includes the liability that exists at the end of the relevant reporting period (i.e., 31 December), and is prepared in accordance with Australian Accounting Standard AASB 137, AASB 116 and the requirements of the International Financial Reporting Standards (IFRS). The IFRS estimate excludes salvage and resale values of plant and equipment, inventory disposition costs and socio-economic costs which are included in the LOM estimate.

The Closure Cost Model is reviewed six monthly with a major review annually in line with the Supporting Works Plan review.

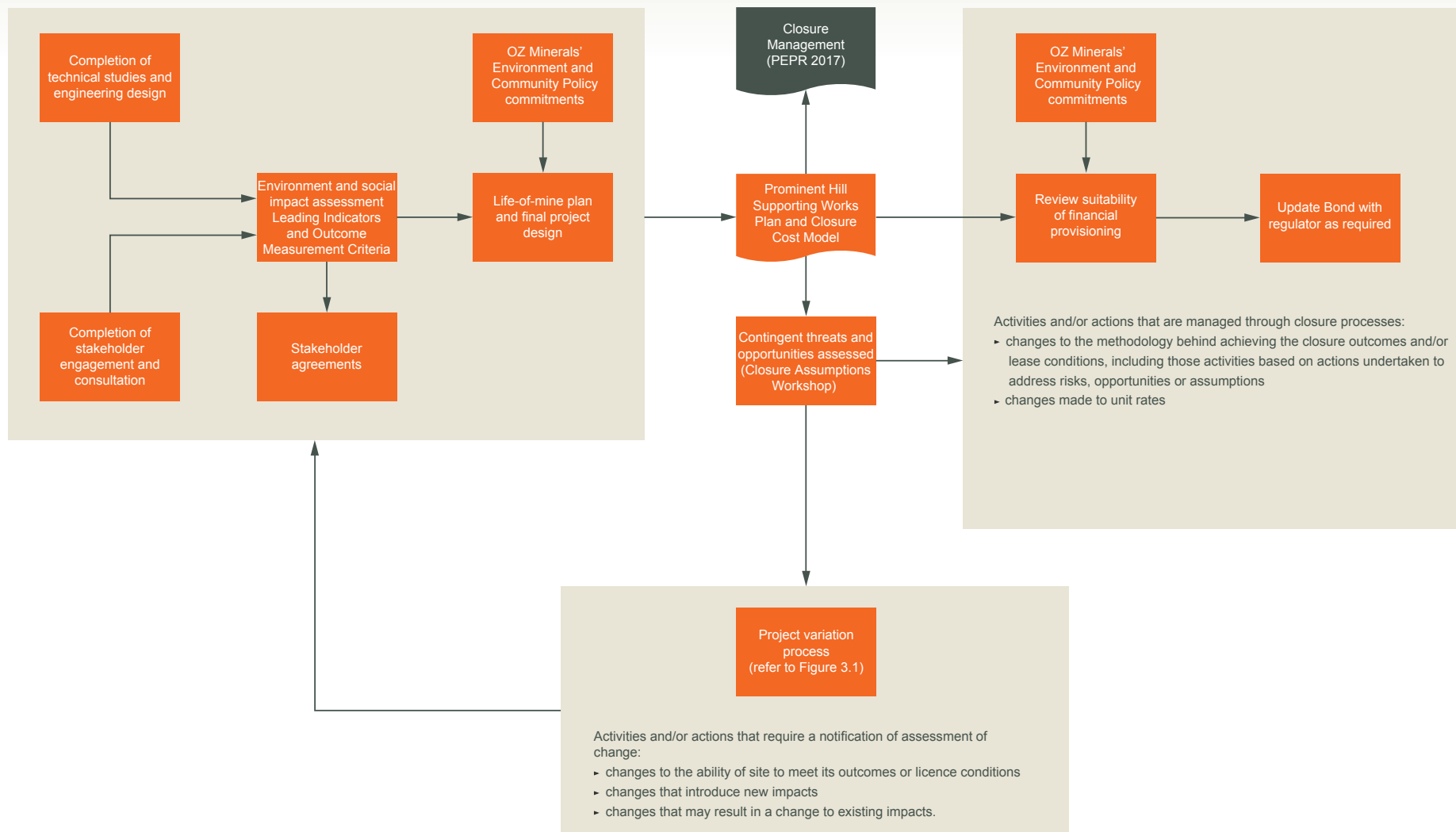


Figure 6.1 | Closure planning process

6.5 Closure activities

To assist in defining final land use and closure strategies, the Project has been divided into several closure domains from which an assessment of land capability following mining can be undertaken. These closure domains are generally reflective of the activities that occurred in those areas during mining. Closure domains, final land use, closure strategy and current status of closure works for each domain are described in detail in the following sections. The domains are as follows:

- **Domain 1:** Integrated Waste Landform
- **Domain 2:** Open pit (pit void)
- **Domain 3:** Underground Workings and Associated Infrastructure
- **Domain 4a:** Mining Lease Infrastructure – Mine Area
- **Domain 4b:** Mining Lease Infrastructure - Village
- **Domain 5:** Miscellaneous Purposes Licence Infrastructure and
- **Domain 6:** Extractive Minerals Leases.

6.5.1 Domain 1 – integrated waste landform (IWL)

6.5.1.1 Description and final land use

The IWL incorporates the northern and southern WRDs, the TSF and the ROM pad (Figure 6.2).

The IWL will remain a permanent feature of the landscape post-closure and due to its nature and the arid climate, it is not expected to achieve the pre-mining land use. The permanent nature of the disturbance of the WRD and TSF has been allowed for when calculating the Significant Environmental Benefit (SEB) requirements for this project (refer to Section 10.3 for more information regarding the SEB calculation).

6.5.1.2 Closure strategy

Waste rock dump structures

A geochemical classification study was undertaken as part of the initial mining approvals (Appendix 10A of MARP 2009) and found that a minor proportion of the Proterozoic host waste rock is considered to be PAF, this being the unweathered Bulldog Shale. As such, the WRD structures have been designed and constructed to encapsulate the PAF material with NAF material, in order to minimise the potential for the generation of AMD.

The WRDs were constructed using end dumping methodology. The construction of the WRDs and PAF cells has been controlled using waste tracking and survey. The following outlines more detailed information on the controls in place to ensure the WRDs are constructed to design:

- The WRDs were progressively built by tipping material in a designated dump cell at a given level. Dump cells were taken from the master dump design by the mining engineer and a jigsaw boundary made for the area. This jigsaw boundary was forwarded to the Fleet Management Centre (FMC) to load into the mine operation system, allowing operators to see the dump locations, and for FMC to monitor. As per the dump plan communicated by the mining engineer, material mined has been assigned to a cell by FMC who were able to turn dump cells on and off. When the truck operator is

loaded, and the material type assigned by the excavator operator, the mine operation system will confirm the location for tipping.

- The waste tracking system records material mined using the Jigsaw Tracking System. Load details are captured including date and time, equipment names, source, material and destination. Destination (or dump location) is supported by low precision GPS coordinates. This information may be used to track where blocks of material have been dumped.
- Survey set outs of dump cell toe lines are the primary control used to build the IWL. Where possible, windrows or paddock dumps are constructed along the surveyed line to reinforce the boundary and contain tip-head material. With the introduction of HPGPS in late 2013, survey set outs were supported by HPGPS projects. These projects may be uploaded by equipment in the field (dozer or LV) and used for construction or monitoring. Projects may be viewed on an onboard display and include dump RLs, and warning lights to assist with compliance to the design. Dump progression is captured by regular survey pickups and annual aerial flyovers. Combined, these tools are valuable when reviewing progressive rehabilitation and compliance.
- The WRDs have been progressively rock armoured with durable NAF material, initial erosion test work was undertaken (Appendix 10B of MARP 2009) identified the most suitable lithology for the armouring (dolomite, andesitic and volcanic waste rocks). The primary form of erosion resistance of the WRDs will be achieved through rock armouring of the slopes at the angle-of-repose, with 10 m (horizontally) of NAF. The armouring processes uses a dumping sequence from the formation of the outer face to placement of the rock armour which allows time after construction for initial settlement to occur.
- In order to limit infiltration into the PAF cells within the WRDs, a store-and-release cover system comprising a traffic compacted layer topped with paddock dumped NAF rock, similar to that placed on the WRDs of Mount Kidston mine in Queensland.
- The bulk of the on-site landfill cells have been rehabilitated in coordination with the progressive closure of the Northern WRD, as they fall within the WRD footprint. Waste cells one to five have been closed as of September 2015. These cells were closed as per the SA EPA requirements for a class SB landfill and have now subsequently been buried under approximately 20 m of NAF material. There is one landfill cell (cell six), which is outside of the Northern WRD footprint and will remain open for LOM. This cell would be covered with a layer of NAF rock or other suitable cover material in accordance with relevant guidelines and standards at closure.

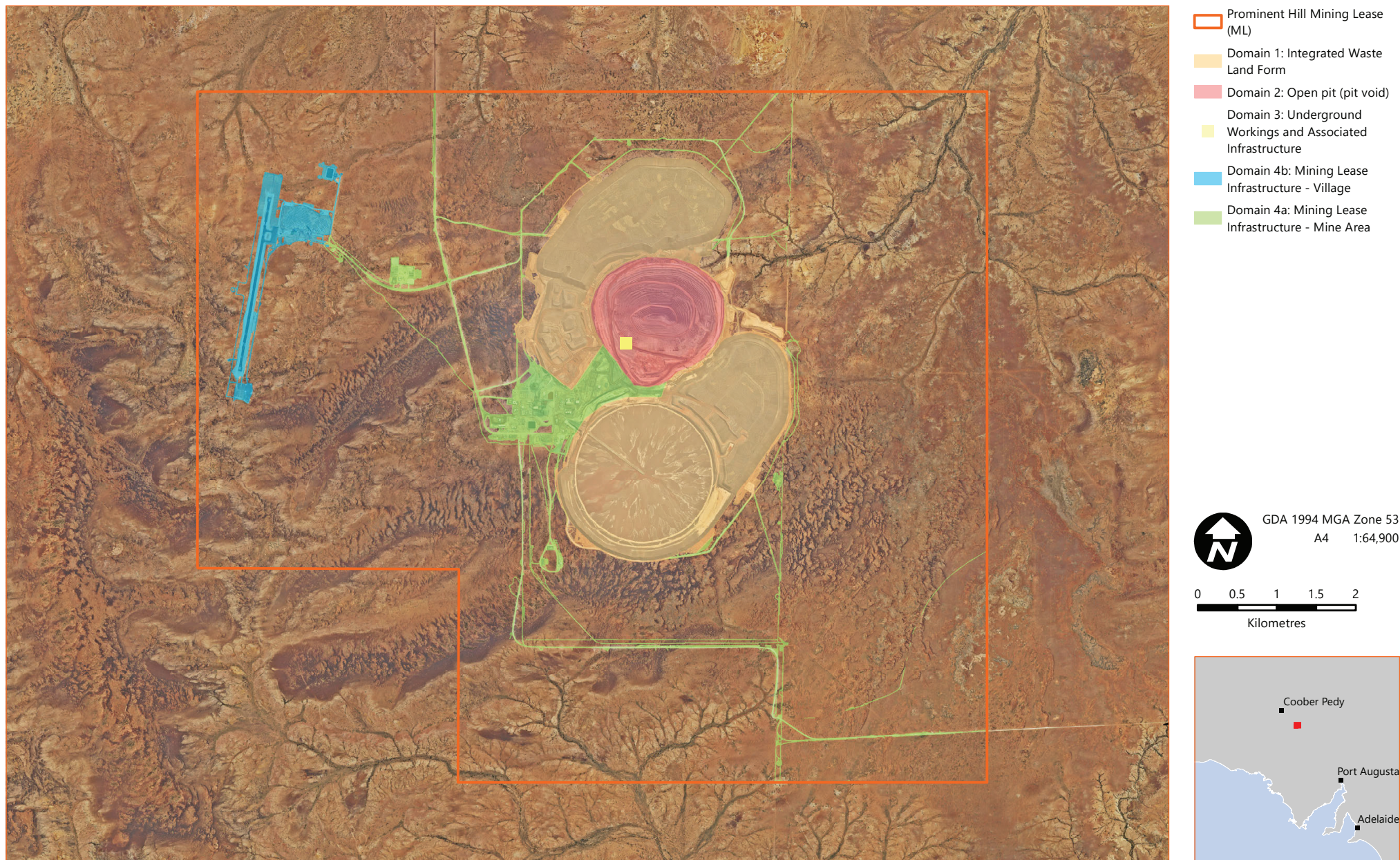


Figure 6.2 | Mine closure domains within ML 6228

Tailings storage facility

The following closure strategies have been employed for the TSF.

- The TSF is contained within a section of the southern WRD, the closure of which is discussed above. TSF embankments will be progressively rock armoured during operations, allowing final landform to be consistent with breakaway landforms common in South Australia. The current strategy for the closure of the TSF, from the MARP 2009, details that following a period of dewatering and consolidation, a layer (approximately 1-2 m) of NAF rock would be established over the TSF surface to provide erosion resistance and management of surface water flows. Dust generated from the upper surface of the TSF following rehabilitation will be consistent with background atmospheric dust levels (atmospheric dust monitoring). A cross section of the design can be seen in Figure 6.3.
- The TSF tailings material is classified as NAF, this is detailed in Section 5.6.3 and Appendix 10A of the MARP 2009. As noted in Section 5.7.3.2 a small volume of PAF material will be encapsulated within the TSF, however this is not expected to change the classification of the material within the TSF for closure given the volume of NAF.
- At closure, now expected post-2036, following a period of dewatering and consolidation, a layer of NAF rock of approximately 1-2 m in thickness would be established over the TSF surface to provide erosion resistance and break up surface water flows. At this stage it is proposed that there would be no placement of topsoil and active regeneration on top of the NAF material.
- The nature of the cover system for the TSF requires further investigation by BHP prior to TSF closure (see Section 12 for further details on future works required to reduce uncertainty).
- Numerical groundwater modelling of the IWL indicates that the open pit will act as a localised groundwater sink both during operations and post-closure. Particle tracking predicts that majority of any potential contaminants from IWL seepage during and post-mining will be captured by the pit.

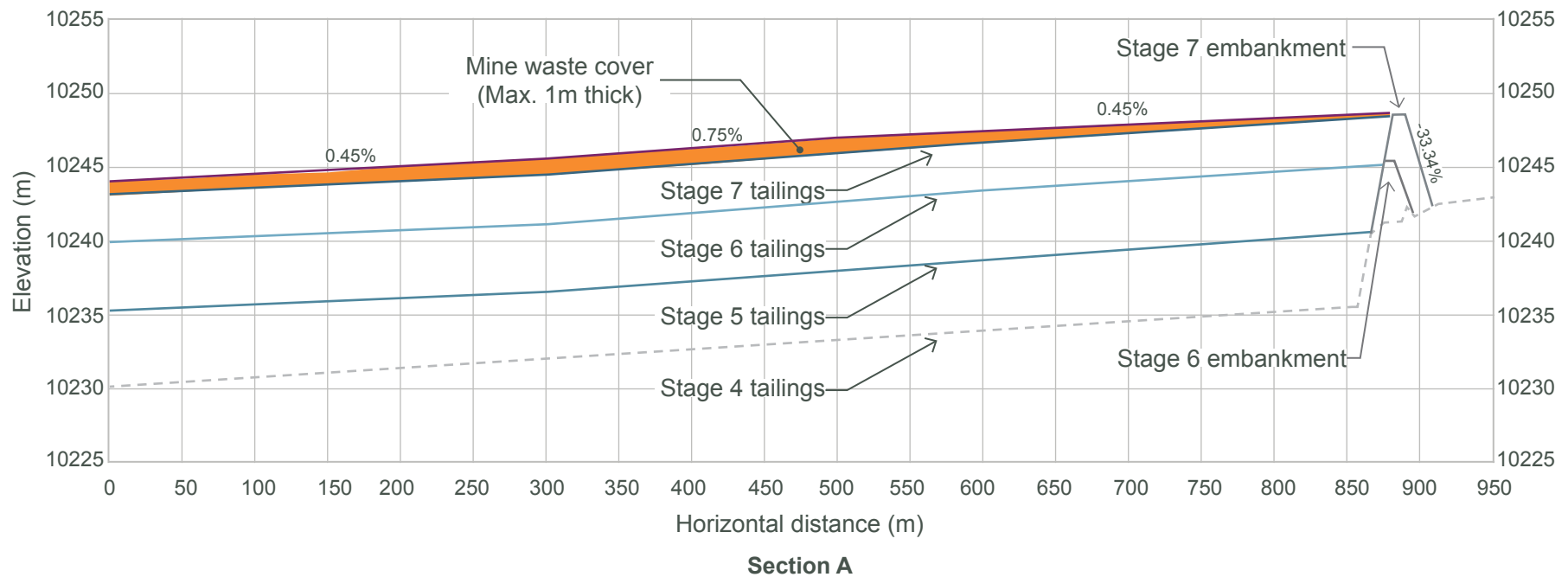


Figure 6.3 | TSF cross-section of tailings and cover system

Run-of-mine pad

The following closure strategies have been employed for the ROM pad:

- At closure, the surface infrastructure (including that relating to the Wira shaft) on the ROM pad will be removed.
- The surface of the ROM pad may be removed and fed to the concentrator to negate the need for an additional NAF rock cover layer. Any contaminated material will be removed and either processed or placed in the TSF. The ROM pad will be sheeted with a 1-2m NAF rock armour as part of the IWL final rehabilitation, to limit the potential for metals mobilisation. Final closure design for the ROM pad will be determined through progressive life-of-mine closure planning.
- Given the project area's low and unreliable rainfall, nutrient-poor and thin topsoil, limited volumes of available topsoil for revegetation activities, sparseness of existing vegetative cover and unsuitability of the rock armour NAF material used on the IWL for plant growth, OZ Minerals anticipates that establishing a full and functional vegetative cover on the surface of the IWL will not be possible.
- Recently published International Network for Acid Prevention (INAP) leading practise in the design of cover systems, states that in systems with low rainfall (i.e., less than 300 mm/a) and high intensity rainfall events, such as the conditions at Prominent Hill, a vegetation cover should not be relied upon to control erosion (INAP 2017). It is recommended that other cover designs are considered based on-site specific parameters, such as rainfall, material properties and cover objectives. As such vegetation trials have not been undertaken for the IWL at Prominent Hill. The approved design comprises a rock armour which removes the reliance of vegetative cover to minimise wind-based erosion of soils and minimises soils to be disturbed. Rock armouring (i.e., placement of a protective rock layer surface) is therefore considered the most appropriate mechanism to meet the IWL rehabilitation objectives.

6.5.2 Domain 2 – open pit (pit void)

6.5.2.1 Description and final land use

Closure Domain 2 encompasses the Malu open pit. Upon the cessation of open pit and underground mining, the open pit (pit void) will remain as a permanent feature in the landscape and will not be returned to a landscape function equivalent to the pre-mining landscape.

Domain 2 is further detailed in Figure 6.2.

6.5.2.2 Closure strategy

The following closure strategies have been employed for the open pit (pit void):

- To prevent inadvertent public access, an abandonment bund is to be constructed beyond the outer zone of the predicted final open pit subsidence/ instability zone. The abandonment bund will be constructed in accordance with the *Safety Bund Walls Around Abandoned Open Pit Mines Guideline* (DoIR, 1997). Using the methodology outlined in the guideline, the abandonment bund is to be no closer than approximately 125 m from the pit edge, or a distance as otherwise indicated via a relevant geotechnical stability assessment. In accordance with the guideline, the abandonment bund is at least 2 m high and 5 m wide (measured at the base), and constructed from unweathered, freely draining end-dumped NAF waste rock.

- The eastern portion of the abandonment bund has been constructed. This section of the bund is approximately 1500 m in length and joins the Northern WRD with the IWL, both of these landforms represent a structure that is equivalent to an abandonment bund. See Figure 5.3 to Figure 5.6 for details on the as built of the Eastern Abandonment Bund.
- The western portion of the abandonment bund will be completed at the conclusion of mining. It is estimated that approximately 26,000 t of NAF waste rock would be required for construction of the final section of the bund, which would be set aside for this purpose prior to the cessation of mining activities. The exact location of the Western Abandonment Bund will be determined in a future version of the PEPR after further investigation by OZ Minerals prior to closure (see Section 12 for further details on future works required to reduce uncertainty). Please refer to Figure 5.7 for a conceptual diagram of how it will be built.
- Upon the cessation of underground mining, mine dewatering activities would be stopped. Recent modelling (EMM, 2021) show that a pit lake is unlikely to form on cessation of these activities, as the incident rainfall volume plus inflow from groundwater is insufficient to overcome potential evaporation (simulated as 70% of pan evaporation).
- The modelled water levels recover quickly to the top of backfilled material (in-pit WRD) following the cessation of mining, as the modelled boundary condition assigns incident rainfall directly to the watertable in a unit of very low specific yield and hydraulic conductivity. However as mentioned above post-closure, modelling predicts that a pit lake will not form and the mining area will remain a groundwater sink. This outcome is consistent with anecdotal evidence from the site, with minimal pumping from sumps only required historically and only minor, localised inflows to the underground operations. It is also broadly consistent with previous modelling that predicted only minor post-mining groundwater inflows to the pit (SKM 2013).
- Groundwater wells (monitoring and production) will be decommissioned in accordance with the National and DEW standards (minimum construction requirements for water bores in Australia) unless otherwise agreed with the landholder and the regulator(s).
- Install warning signage as required.
- Remove all pumps, discharge lines and power supply.

Cross-sections detailing how the open pit will look at closure have been provided in earlier sections please refer to Figure 5.2 and Figure 5.14.

6.5.3 Domain 3 – underground workings and associated infrastructure

6.5.3.1 Description and final land use

The underground workings and associated infrastructure domain comprise the underground workings, box cut, decline, Wira hoisting shaft, underground crusher and ventilation shafts.

This domain will remain as a permanent feature in the landscape and will not be returned to the pre-mining land use.

Domain 3 is further detailed in Figure 6.2.

6.5.3.2 Closure strategy

The following closure strategies have been employed for the underground workings and associated infrastructure:

- Closure for the underground facilities consists of the progressive filling of both primary and secondary voids throughout mine operation with a paste mix of cement and tailings to ensure long term stability.
- Measures will be implemented to restrict access to the ventilation shafts, Wira shaft and access decline portals (which may include capping, plugging or drilling and blasting of entrances) to enable future access for mining operations should this be determined to be economically viable.
- The declines will be plugged with an 80/20 mix of rock and concrete.
- Signage will be installed, where required, to inform public of restricted access and warn of the potential risks associated with unauthorised entry.
- Removal of the surface infrastructure associated with the underground operation would be undertaken together with the processing plant demolition.

How the underground will look at closure is further detailed in Figure 6.4, specifically detailing that primary and secondary stopes will be backfilled (grey) though some areas, specifically underground development drives, will remain as a void post-closure (red).

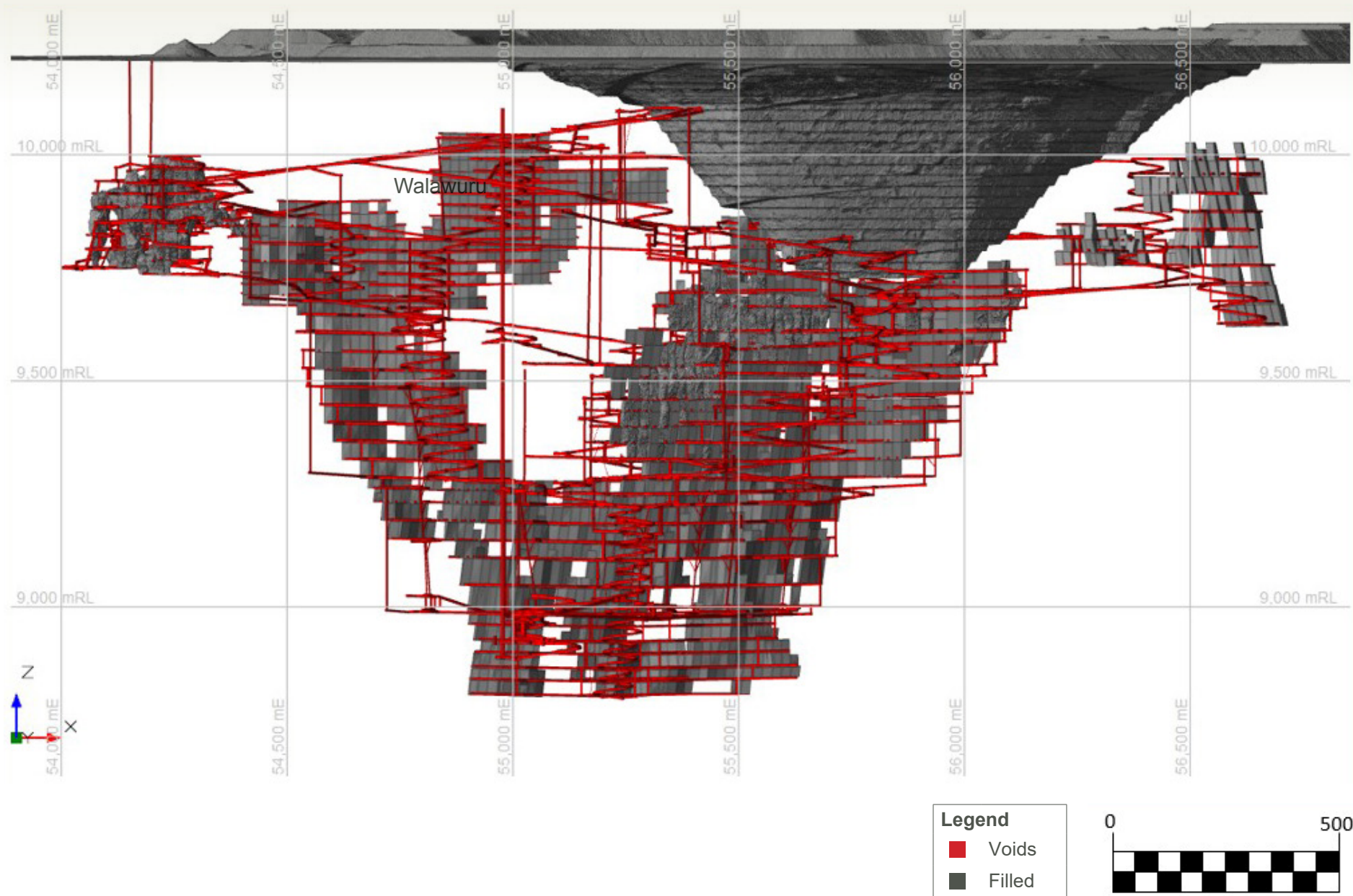


Figure 6.4 | Cross-section of underground at closure

6.5.4 Domain 4a – mining lease infrastructure (mine area)

6.5.4.1 Description and final land use

The following infrastructure is located within the ML (mine area):

- processing plant
- grinding mills
- reagents mixing and storage area
- tailings thickener
- concentrate thickener
- concentrate storage and loading facilities
- flotation area
- Malu and Ankata Paste Plants
- process and raw water dams
- administration buildings
- assay and Metallurgical Laboratories
- truck and vehicle wash bays
- wheel wash
- RO plant
- high voltage yard
- warehouse
- maintenance workshop
- hydrocarbon contaminated soil storage area (listed waste facility)
- core yard
- heavy vehicle workshop
- fuel farm
- crib rooms/ablutions
- contractor offices and laydown areas
- contractor maintenance areas
- explosives magazine
- landfill
- dewatering wells
- wick drains
- TSF monitoring wells

- resource recovery centre
- access roads and carparks
- surface water management infrastructure and
- SEB Area stock proof fence.

The infrastructure in the ML (mine area) will be removed and the area rehabilitated to a landscape similar to pre-mining however, it is currently considered that the land use will not return to pastoral use as the area is situated within the SEB offset area and will remain so in perpetuity.

Domain 4a is further detailed in Figure 6.2.

6.5.4.2 Closure strategy

The following closure strategies have been employed for the ML associated infrastructure (mine area):

- At the completion of mining, all items of infrastructure will be demolished and/ or removed.
- It is likely that many pieces of infrastructure and equipment will be sold for re-use or for scrap value. Items and materials that have no resale or scrap value will be disposed appropriately. In the months leading up to closure, store's inventory (parts, components and reagents) will be reduced, however some materials will be left at closure, requiring management and/or return to the vendor.
- Any salt-affected soils (i.e., soils with elevated salt concentrations) will be removed and placed in the TSF within the IWL.
- Concrete footings will be buried in situ or disposed of in an appropriate manner.
- Groundwater wells (monitoring and dewatering) will be decommissioned in accordance with the National and DEW standards (minimum construction requirements for water bores in Australia) unless otherwise agreed with the landholder and the regulator(s).
- Where required, boreholes would be capped below ground level, the upper casing removed, and a permanent concrete marker installed to allow re-establishment of bores in the future if required.
- Surface water management infrastructure would be maintained until closure of the greater mining and processing activities. This would allow for the management of 'first flush' sediments and run-off from these structures before the system is left to naturally revegetate and integrate back into the surrounding post-mining topography when the erosion of the WRDs has stabilised. No active rehabilitation of this system is proposed.
- The rehabilitation of the on-lease and any other remaining roads would be subject to discussions with relevant stakeholders regarding the potential for these to be transferred and maintained for future use. Subject to this, roads will, where relevant, have any paved surfaces remove.
- It is expected that deep ripping of these areas will be required during rehabilitation to break the compacted surface and enable infiltration of rainwater and root penetration.
- The site will be scarified and left to naturally revegetate. During land clearance activities for construction of the WRDs and TSF, topsoil along with overburden from the first few layers of land disturbance have been stockpiled, being approximately 370,000 m³. This will be utilised as necessary to provide a suitable growth medium for vegetation, as required.
- Areas within Domain 4a will be rehabilitated and revegetated to resemble the pre-mining landscape.

6.5.5 Domain 4b – mining lease infrastructure (village)

6.5.5.1 Description and final land use

The following infrastructure is located within the ML (village):

- accommodation units
- recreation facilities
- ancillary buildings (including administration, mess and check-in/out facility for airfield)
- access roads and carparks
- wastewater treatment plant
- airstrip and airport buildings
- airport fuel bay and
- parking apron.

The infrastructure in the village area will be removed and the area rehabilitated to a landscape similar to pre-mining however, it is currently considered the land use will not return to pastoral use as the area is situated within the SEB offset area and will remain so in perpetuity.

Domain 4b is further detailed in Figure 6.2.

6.5.5.2 Closure strategy

The following closure strategies have been employed for the ML associated infrastructure (village):

- At the completion of mining, all items of infrastructure will be demolished and/ or removed.
- Any salt-affected soils (i.e., soils with elevated salt concentrations) will be removed and placed in the TSF within the IWL.
- Concrete footings will be buried in situ or disposed of in an appropriate manner.
- It is likely that many pieces of infrastructure and equipment will be sold for re-use or for scrap value. Items and materials that have no resale or scrap value will be disposed of as appropriate.
- The rehabilitation of the on-lease roads and the airstrip would be subject to discussions with relevant stakeholders regarding the potential for these to be transferred and maintained for future use. Subject to this, roads and the airstrip would, where relevant, have any paved surfaces remove.
- It is expected that deep ripping of these areas will be required during rehabilitation to break the compacted surface and enable infiltration of rainwater and root penetration.
- The construction of roads and the airstrip originally included plans to strip vegetation and topsoil (where it exists) and stockpile it for respreading on completion of the project. In practice, very little topsoil was available for harvesting. Most stockpiled topsoil has been sourced from the site of the Southern WRD and TSF, however, given that the WRDs are to be rock armoured with no requirement for topsoil, the existing stockpiles are available for application onto other priority areas, including Domain 4b where this is deemed necessary for successful rehabilitation.
- Where required, the land profile will be reshaped to blend in with the surrounding environment and the site scarified and left to naturally revegetate.

- Areas within Domain 4b will be rehabilitated and revegetated to resemble the pre-mining landscape, but not the pre-mining land use (i.e., pastoral (low intensity livestock grazing)) as the domain is within the SEB offset area and will remain as such for the life of the mine.

6.5.6 Domain 5 – miscellaneous purposes licence infrastructure

6.5.6.1 Description and final land use

The MPL Infrastructure domain can be separated into three broad areas:

- Borefield, including:
 - borefield pipelines (Virgo and Aries Borefields)
 - associated water pumping infrastructure
 - transfer station crib room
 - groundwater production and monitoring wells (including those within the Aries and Virgo Borefields, previous borefields such as Gemini, Scorpio and Taurus, as well as the larger regional monitoring network)
 - associated roads
- Electricity Transmission Line, including:
 - electricity transmission line from Prominent Hill to southern end of MPL 122
 - associated tracks
- Concentrate Export Road, including:
 - haul road and
 - crib room and generator at Wirrida Siding.

The MPL infrastructure will be removed, unless previously agreed with the landholder and the regulators, the area will be rehabilitated and revegetated to resemble the pre-mining landscape. These areas will be returned to their pre-mining landscape use, productive pastoral use.

Groundwater level recovery is predicted to occur in the Aries Borefield once the borefield is decommissioned, with modelled elevations returning to within 5 m of pre-mining levels within 10 years. Recovery is predicted to continue at a more gradual pace over the following 100 or 200 years.

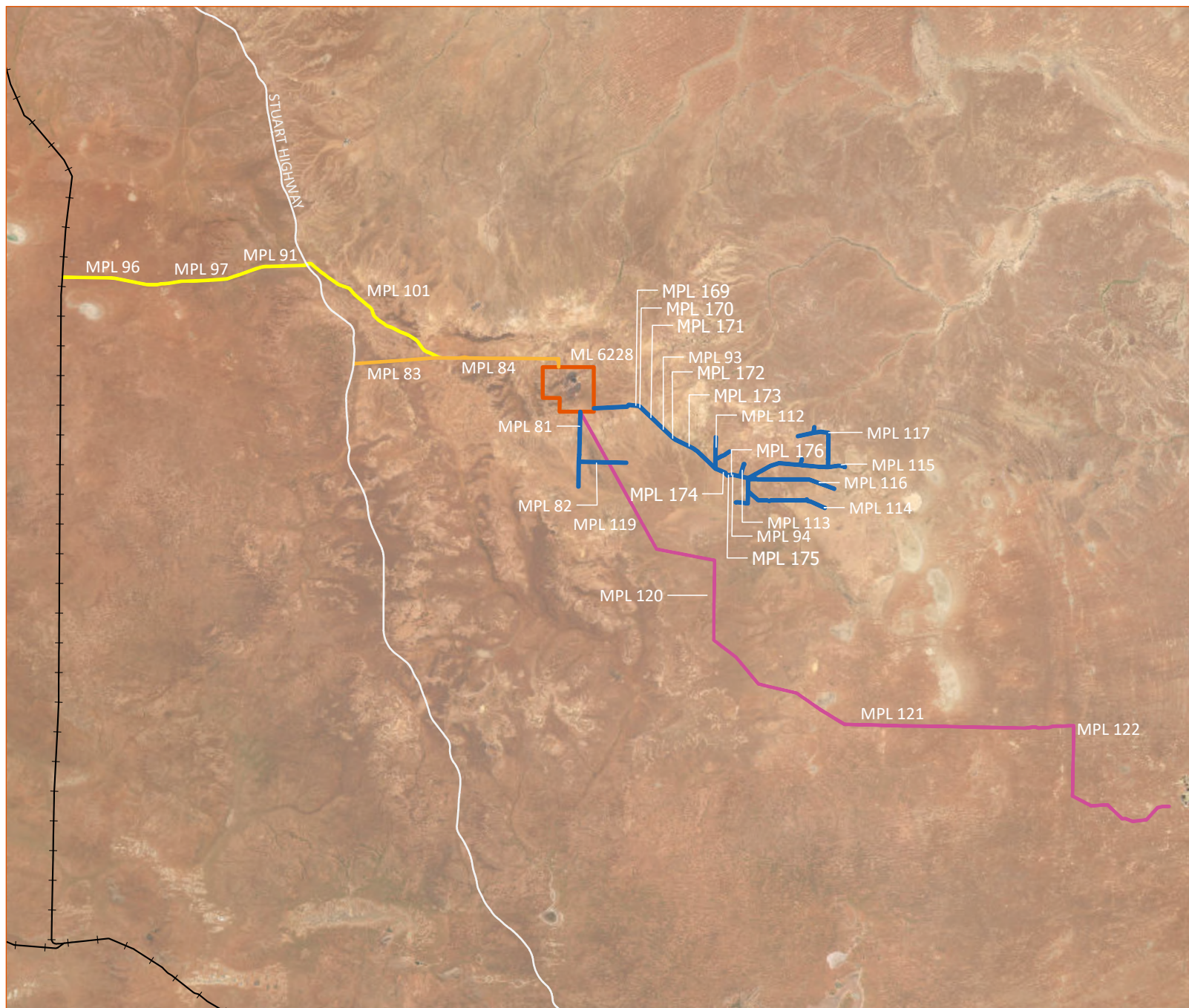
Domain 5 is further detailed in Figure 6.2.

6.5.6.2 Closure strategy

The following closure strategies have been employed for the MPL infrastructure:

- At closure, all items of water supply related infrastructure would be removed, unless otherwise agreed with the landholder and the regulator(s).
- The raw water supply pipelines would either be removed or left buried (subject to landholder agreement and appropriate transfer of any potential residual liability) with the exception of a 16 km above-ground section of the Virgo Borefield pipeline which would be removed for reuse or recycling.

- Scour pits would be backfilled and contoured as required to match surrounding topography or may be left as surface water storage dams for pastoral use (subject to landholder agreement).
- Groundwater wells (monitoring and production) will be decommissioned in accordance with the National and DEW standards (minimum construction requirements for water bores in Australia) unless otherwise agreed with the landholder and the regulator(s).
- Where required, boreholes would be capped below ground level, the upper casing removed, and a permanent concrete marker installed to allow re-establishment of bores in the future if required.
- Concrete footings will be buried in situ or disposed of in an appropriate manner.
- The rehabilitation of the off-lease roads including the site Access Road, Concentrate Export Road, Electricity Transmission Line road, Aries and Virgo Borefield roads and any other remaining roads would be subject to discussions with relevant stakeholders regarding the potential for these to be transferred and maintained for future use.
- The transmission lines will be de-strung, the conductors recovered, and the towers deconstructed and removed. Options for the re-use of towers will be investigated prior to closure.
- The operational compound at Wirrida Railway Siding would be removed, however hardstand areas and the railway siding would be left to enable future use.
- The Concentrate Export Road underpass would be backfilled under and around the culvert structure within the road reserve corridor, and creek crossing infrastructure (e.g., culverts) would be removed and the surface drainage patterns re-established to resemble the pre-mining surface water flows.
- The disturbed land would be rehabilitated as required to resemble the pre-mining landscape and function, pastoral (low intensity livestock grazing).
- It is expected that deep ripping of these areas will be required during rehabilitation to break the compacted surface and enable infiltration of rainwater and root penetration. Salinity resulting from the use of saline water for dust suppression of the road surface may inhibit the success of the rehabilitation processes. Hence further work may be necessary prior to closure to determine the significance of this risk and how it can best be managed.
- Drainage channels that are crossed by roads would be returned to their original contours where practicable and stabilised to reduce erosion.
- Where required, the land profile will be reshaped to blend in with the surrounding environment and the site scarified and left to naturally revegetate.



- ▬ ML 6228
- ▬ Domain 5a: Infrastructure- Electricity Transmission Line
- ▬ Domain 5b: MPL Infrastructure Wellfield
- ▬ Domain 5c: MPL Infrastructure - Concentrate Export Road
- ▬ Domain 5c: MPL Infrastructure - Site Access Road

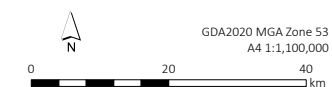


Figure 6.5 | Mine closure domain 5 – MPL infrastructure

6.5.7 Domain 6 – extractive mineral leases

6.5.7.1 Description and final land use

The EML domain comprises the borrow pits constructed as part of the supply and ongoing maintenance of road material for the site Access Road and the Concentrate Export Road.

The land disturbed by the construction of the borrow pits would be rehabilitated and revegetated to resemble the pre-mining landscape. These areas will be returned to their pre-mining landscape use, productive pastoral use.

Domain 6 is further detailed in Figure 6.2.

6.5.7.2 Closure strategy

The following closure strategies have been employed for the borrow pits:

- At closure all remaining pits will be rehabilitated in accordance with the conditions of each EML.
- All EMLs are to be progressively rehabilitated over the LOM, where appropriate.
- Terminal faces are to be formed to a gradient not steeper than 1 vertical to 3 horizontal (18.4°) to blend in with the local topography and drainage system.
- Area's disturbed by the EMLs would be rehabilitated and revegetated to resemble the pre-mining landscape and function, pastoral (low intensity livestock grazing).

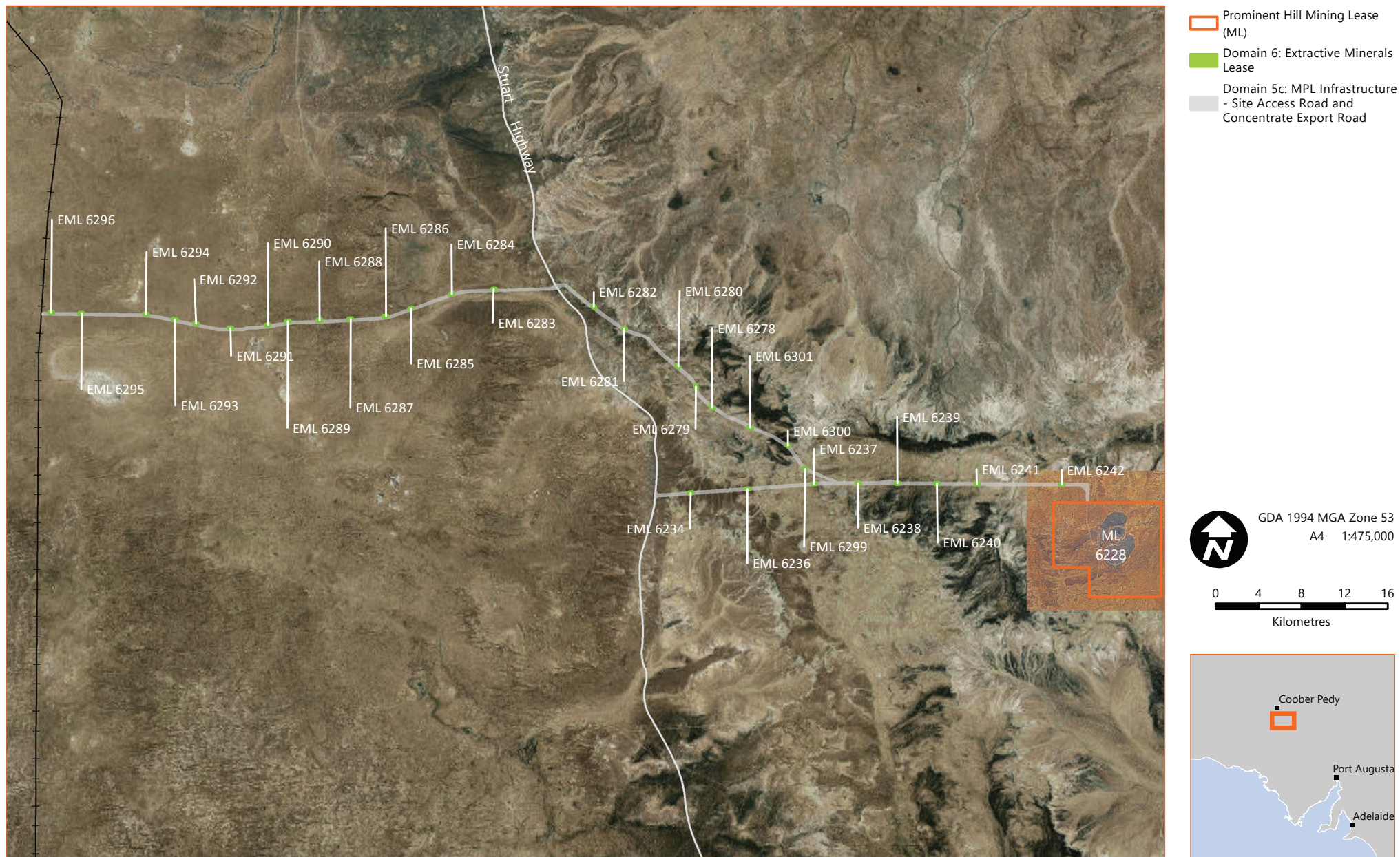


Figure 6.6 | Mine closure domain 6 – EMLs

6.6 Closure implementation (planned closure and completion)

6.6.1 Progressive rehabilitation

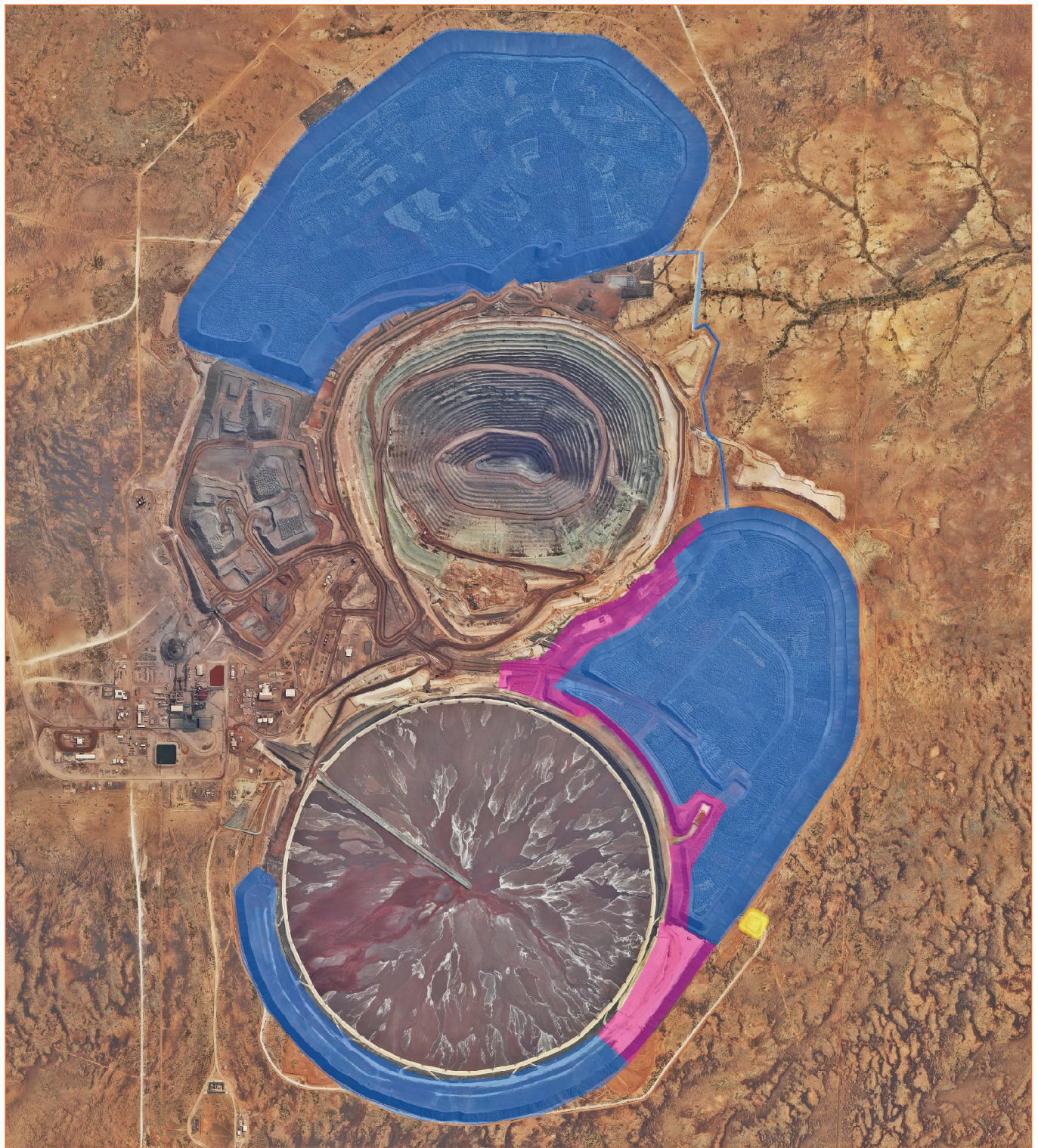
Progressive rehabilitation has been undertaken during operations, where possible, to minimise the amount of work required at closure. Due to the nature of the operation, the main area available for progressive rehabilitation is the IWL. The southern and northern WRDs have been progressively rehabilitated and currently the northern WRD is considered closed and the Southern WRD is approximately 98% complete. Figure 5.23 details the progressive construction and rehabilitation of the WRDs since 2009. Progressive rehabilitation of the TSF embankment has also been occurring. Figure 6.7 details the areas of the IWL which have been rehabilitated, and those left to complete.

Other areas able to be progressively rehabilitated are roads no longer required as part of future mining operations and infrastructure no longer in use e.g., holding dams and bores. An area of approximately 1 ha that consisted of a redundant holding dam was rehabilitated in early 2019, and further areas have been identified to be rehabilitated.

6.6.2 Decommissioning

It is anticipated that the decommissioning of mine infrastructure and equipment will commence upon completion of mining operations. The mine closure plan (as part of this PEPR) will be reviewed at least 12 months prior to the termination of mining operations and the following decommissioning activities described in detail:

- demolition, decommissioning (and/or relocation) of plant, and infrastructure including ancillary infrastructure located at the borefields and the powerline.
- consultation with stakeholders.
- handover process for infrastructure as agreed with other parties.
- final post closure monitoring and maintenance program.



- Landform completed
- Landform yet to be completed
- Rehabilitation complete



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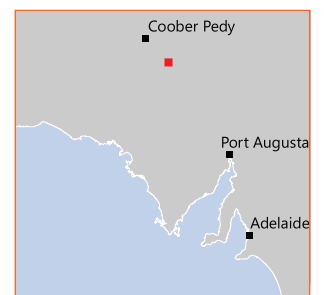


Figure 6.7 | Current IWL progressive rehabilitation

6.7 Closure implementation (sudden unplanned closure and completion)

In the event of a sudden unplanned closure it is anticipated that all closure activities described in will be carried out however the mine may enter a phase of care and maintenance (Section 6.4 to Section 6.5.7) while stakeholders are consulted and preparation and planning for decommissioning and closure is carried out.

6.8 Closure implementation (care and maintenance)

If Prominent Hill is placed into care and maintenance and production is suspended, BHP would develop a detailed Care and Maintenance Plan which covers, at a minimum, the following aspects:

- management of plant and equipment
- demonstration that relevant environmental outcomes nominated in the PEPR will be met (including environmental monitoring as required)
- statutory and documented commitments and
- resource scheduling.

The Care and Maintenance Plan would be based on the information presented within the PEPR, the internal site Supporting Works Plan and the associated Closure Cost Model which all provide specific detail associated with the planned closure methodology.

Relevant external and internal stakeholders would be consulted during the development and implementation of the Care and Maintenance Plan.

The BHP tenements associated with Prominent Hill would be maintained during the care and maintenance phase. Similarly, maintenance of the SEB offset area would continue.

No significant changes would be proposed to mining and surface infrastructure, processing infrastructure and WRDs. Vehicle fleets will be parked up, surplus chemicals and explosives will be removed from site, and the mining operations left in a stable state. Chemicals required for processing will be removed from site, and the processing facilities shutdown. Any exposed PAF cells within the waste rock dumps (if they are still open) will be covered to prevent the potential for acid generation. Any environmental outcomes, relevant to mining infrastructure, will still be met. Please refer to Section 8 for environmental outcomes and leading indicator criteria.

Within three months of entering care and maintenance, an audit of the then-current operation would be undertaken to establish the status of all landforms WRDs, TSF, open pit, ROM stockpiles and infrastructure to confirm, or otherwise, that the environmental outcomes nominated within this approved PEPR remain current and relevant. The outcomes of this audit would be used to ensure that relevant and significant potential environmental impacts have an appropriate environmental outcome as necessary.

Forward works detailed within the closure cost model with the potential to realise significant contingent opportunities would be progressed as a matter of priority. The outcomes of these works, in the form of updates to the closure methodology and costs, would be fed back into the closure cost model and the Supporting Works Plan in order to inform the closure methodology and reduce closure costs should the care and maintenance phase progress into unplanned closure.

The timeframes/durations associated with the care and maintenance phase will be established during the environmental audit in order to provide context to the audit. If unknown, the audit and associated Care and Maintenance Plan is to assume a two-year period in accordance with Western Australia Department of Mines and Petroleum guidance (WA DMP 2009).

Responsibility for ensuring the environmental outcomes associated with implementing the Care and Maintenance Plan are met will be nominated within the Care and Maintenance Plan. These responsibilities will include ensuring company-wide compliance with the Care and Maintenance Plan and the allocation of appropriate funding for care and maintenance activities.

Some of the key care and maintenance considerations that will need to be managed should BHP place the operation on care and maintenance are outlined in Table 6.2.

Table 6.2 | Care and maintenance considerations

Element	Care and maintenance considerations
Northern and Southern WRD	The WRDs have been progressively rehabilitated during the life of the open pit. The construction of the cover system for the Northern and Southern WRDs commenced in mid-to-late 2013 and is currently approximately 98% complete. For more information on the cover system design please refer to Section 5.7.1. In terms of waste rock movement, the northern and southern WRDs are complete and 98% complete respectively (i.e., $\text{dump volume} \div \text{IWL design volume} = \% \text{ complete}$). Given the completion status of the WRDs the risk of erosion and dispersion of material to the surrounding environment is minimal.
Open pit	Mining of the open pit finished in Q1 2018. However, as the pit and associated underground are likely to be inundated with seepage from groundwater, dewatering activities would continue to operate in the care and maintenance period to facilitate the return to mining. A surface drainage system has been constructed to prevent the ingress of significant surface water flows to the open pit.
Underground	As with the open pit, dewatering activities would also continue to operate for the underground operations. Other mine infrastructure, including the ventilation systems would be operated and maintained on a modified schedule.
TSF	The dewatering activities associated with the TSF would continue as would the monitoring program outlined in the Tailings Storage Facility Management Plan. Any adverse findings during inspections or monitoring would be dealt with in a timely manner.
Processing plant and associated infrastructure	At the time of shut down, treatment plants may contain significant volumes of process-related materials and chemicals. These materials will need to be stored appropriately or disposed of.
Off-lease infrastructure	Off-site infrastructure may require on-going maintenance, especially where disrepair may lead to adverse safety and environmental outcomes or impact the productivity of surrounding pastoral operations.
Chemical and hydrocarbon storages	Chemicals, fuels, oils and greases including used chemicals, oils and greases would be stored in appropriate containers or disposed of correctly to prevent unplanned release to the environment.
Waste management	The on-going disposal of wastes (including waste waters) will require consideration during the care and maintenance phase.
Emergency response and site security	The emergency response management plan would be maintained with clear lines of communication in place for the remaining personnel on site. The SEB Offset boundary fence will be maintained to prevent neighbouring stock entering the area.

6.9 Closure delivery

To facilitate the closure activities, a dedicated project management team would be required to coordinate the following activities:

- supervision and management of rehabilitation tasks
- establishment of temporary facilities and
- mobilisation and demobilisation.

External consultants would be required to complete or assist with a number of the investigations and activities associated with mine closure, including undertaking the following works:

- preparation of post-closure annual reports
- preparation of final relinquishment report and final negotiations
- geotechnical reviews of the TSF, open pit and ROM during the post-closure period
- legal advice post-closure
- hydrogeological investigation and modelling
- contaminated site assessment
- geochemical test work of tailings, waste rock, etc.
- general mine closure consultancy services post-closure
- vegetation modelling and
- preparation of an environmental assessment equivalent to a Mining Lease Proposal (MLP) for the post-mining land use prior to lease surrender.

Pre-closure consultancy works are covered under operating budgets. This also includes the provision of BHP resources to manage the closure works and maintain land tenure. The indicative closure team required is as follows:

- Closure Project Manager
- Site Coordinator
- Earthworks Supervisor/Engineer
- Surveyor
- Administrative Assistant
- Safety Officer
- Electrician and
- Fitter.

Prominent Hill expects to establish and maintain close relationships with the community, landholders and other stakeholders regarding mine closure planning and activities during the post-closure period. This shall be supported by community engagement plans that are progressively developed through the planning and post-closure stages.

Risk and uncertainty-based post-decommissioning monitoring is likely to be required to demonstrate that rehabilitation outcomes and completion criteria are being met or can be confidently predicted to be trending towards being met. Regulatory guidance (PIRSA, 2011; DSD, 2015b) suggests that the Closure Plan should not state fixed time periods for post-closure monitoring but commit to monitoring for as long as necessary to demonstrate that the completion criteria have been met.

6.10 Closure timeline

The indicative timelines for the operation, including infrastructure closure aspects, were presented in Section 5.2.

6.11 Rehabilitation liability estimate

BHP maintains a financial security in the form of a bond with the South Australian Government in accordance with Section 62 of the Mining Act for the operations at Prominent Hill. The bond represents an approach to the mitigation of the potential impacts of BHP not being able to meet its financial obligations (including closure and rehabilitation obligations) during the nominated bond period. It is thus dependent not only on the costs associated with site closure and rehabilitation, but also the likelihood and other consequences (i.e., the nature of site closure) of Prominent Hill not being an ongoing concern.

The current bond lodged with the South Australian Government is \$87,770,000.

Closure related rehabilitation liability estimates associated with this PEPR have been calculated using the rehabilitation liability calculator software made available for use by DEM. This software facilitates the calculation of closure costs including consideration of potential liability items discussed in MG2b.

The rehabilitation liability estimate is costed on the basis of a third party being contracted to undertake the work and includes a provision for contingencies and risk associated with the rehabilitation activities. The rehabilitation liability estimate will be reviewed again in the following circumstances:

- as part of subsequent PEPR review(s)
- as requested by DEM.

The updated rehabilitation and closure cost estimate for the described PEPR activities is detailed in Table 6.3, reflecting revised rates associated with the transition of the estimate to version 7.00 of the DEM Rehabilitation Liability Estimation Calculator and the additional costs associated with the removal of 20.7 km of buried pipeline and rehabilitation of the additional scour pits associated with the closure of Aries Borefield water supply pipeline as a worst case (noting that, subject to landholder agreement and the appropriate transfer of any potential residual liability, this pipeline and or the scour pits may remain in place at the completion of operations).

Table 6.3 | Current Prominent Hill rehabilitation liability estimate

Cost estimate description	Component total (\$)*
Summary of direct costs	
Underground workings	4,721,928
Open cut	2,180,402
Waste rock dump	1,390,925
Processing facilities	8,691,667

Cost estimate description	Component total (\$)*
Tailings storage facilities	10,957,770
Rail facilities	10,830
Haul road and access roads	909,120
Administration and accommodation	9,972,911
Borrow pits	21,851
Services infrastructure	27,669,183
Equipment mobilisation and demobilisation	2,832,986
Subtotal (direct costs)	69,359,572
Summary of in-direct costs	
Monitoring	1,198,260
Maintenance	1,387,191
Government management	3,467,979
Site supervision	4,092,215
Insurances	693,596
Contingencies	10,403,936
Subtotal in-direct costs	21,243,176
Total rehabilitation liability	90,602,749

Notes: * values may be subject to rounding errors. Total rehabilitation liability rounded down by DEM to nearest \$10,000 for bond.

7. Consultation and engagement

BHP believes that a partnership approach and transparent communication with key stakeholders helps us maintain our social licence to operate and gives stakeholders confidence that environmental and social risks have been identified, are understood and potential impacts are minimised or mitigated. Extensive stakeholder consultation regarding the Prominent Hill development was undertaken prior to submission of the MARP 2006 (Oxiana, 2006), during construction of the project and prior to the development of the underground operations, as detailed in the MARP 2009 (OZ Minerals, 2009). BHP seeks to maximise value for all stakeholders whilst actively managing direct, indirect and cumulative social risks and impacts associated with the project footprint and project lifecycle. A significant proportion of the consultation undertaken since the approval of the MARP 2009 has related to the sustainment of operations, the demobilisation of open pit mining operations and the progression to underground mining operations. Consultation undertaken to date is summarised in the following sections.

7.1 Records of engagement

7.1.1 Consultation prior to the MARP 2006

Extensive stakeholder consultation occurred prior to finalisation of the MARP in 2006. Consultation during the prefeasibility study (PFS) focused on liaison with key state and Commonwealth government agencies to facilitate the MARP process decisions, and with pastoral leaseholders to facilitate land access for exploration and resource definition activities. Project information was also posted on the BHP (then Oxiana) web site. Following the PFS, consultation was expanded to include a broader range of organisations and individuals. Consultation conducted prior to the MARP 2006 is summarised in Table 7.1. The extent and nature of consultation completed was considered adequate by the South Australian Government for the purposes of regulatory approvals.

Table 7.1 | Summary of stakeholder consultation prior to the 2006 MARP

Stakeholder	Date	Matters discussed
Local communities		
Mount Eba Station	Mar 2005	Review of project and discussion of access agreement
	Jan 2006	Project status and native vegetation issues (including Significant Environmental Benefit offsets)
	Mar 2006	Pastoral access and compensation agreements
	Ongoing	Informal meetings on a regular basis
The Twins Station (McDouall Peak pastoral lease)	Mar 2005	Review of project and discussion of access agreement
	Apr 2005	Rehabilitation of old camp site
	Jul 2005	Project update
	Mar 2006	Pastoral access and compensation agreements
	Ongoing	Informal meetings on a regular basis
Antakarinja Land Management Aboriginal Corporation (ALMAC)	May 2005	Native Title
	Jun 2005	Native Title
	Oct 2005	Native Title
	Nov 2005	Project update, pre-employment program
	Mar 2006	Introduction to the Proponent and Prominent Hill's new General Manager
Billa Kalina Station	Jul 2005	Introduction to the Proponent and the project
	Dec 2005	Project update, electricity transmission line route
Ingomar Station	Oct 2005	Introduction to the Proponent and the project
	Mar 2006	Pastoral access and compensation agreements
Peripheral communities		
Umoona Aboriginal Community	Sep 2005	Contact and project update
	Nov 2005	Project update, pre-employment program, liaison with ALMAC Council
Umoona Council	Mar 2006	Project update and discussion of training initiatives
District Council of Coober Pedy	Mar 2005	Introduction to the Proponent and the project
	Jul 2005	Possibility of project display in Information Centre
Coober Pedy Hospital	Mar 2005	Introduction to the Proponent and the project
	Mar 2006	Project update and discussion of medical service status
Coober Pedy TAFE	Mar 2005	Introduction to the Proponent and the project
Coober Pedy Police	Nov 2005	Project update
	Mar 2006	Project update and discussion of manning levels on site
Bungarla Aboriginal Community, CDEP (Community Development Employment Project) – Coober Pedy	Nov 2005	Project update, discussions on availability of training facilities and trainee candidates
Coober Pedy Mine Rescue Group	Mar 2006	Project update and discussion on potential cooperation

Stakeholder	Date	Matters discussed
Coober Pedy Area School	Nov 2005	Project update, discussions on access to training facilities
	Mar 2006	Project update and discussion on potential cooperation
Coober Pedy Retailers Association	Mar 2005	Introduction to the Proponent and the project
Coober Pedy Opal Miners Association	Mar 2005	Introduction to the Proponent and the project
Coober Pedy Regional Development Board	Mar 2005	Introduction to the Proponent and the project
Northern Regional Development Board, Coober Pedy	May 2005	Indigenous training (with Kepa Kurl (Indigenous Group) also present in this meeting)
	Jun 2005	Update on the project
Western Mining Corporation (WMC)	Feb 2005	Project update, discussion of joint cooperation agreement for the project and Olympic Dam
	Mar 2005 May 2005	Introduction to the Proponent and the project (various people)
	May 2005	Exploring Olympic Dam/project synergies
BHP Billiton Limited	Aug 2005	Introduction to the Proponent and the project
	Nov 2005	Update on the project
	Feb 2006	Olympic Dam Expansion Project. Update on project, power options and timing
Newmont Australia Limited	Jun 2005	Native Title compensations
Stuart Petroleum Limited	May 2005	Potential for water off-take from petroleum production
Coober Pedy business leaders	Jun 2005	Site visit
	Mar 2006	General discussions about project scale and business opportunities. (Coober Pedy Regional Development Board also present)
Coober Pedy Saints Football Club	Jul 2005	Presentation Night sponsorship
	Sep 2005	Presentation Night
Other communities		
Port Pirie Regional Council	Jul 2005	Introduction to the Proponent and the project. Raised possibility of Port Pirie being concentrate exporting port
	Nov 2005	Contact and update on the project. Discussion on port facilities
Whyalla City Council, Whyalla Economic Development Board	Nov 2005	Contact and update on the project
Whyalla City Council	Mar 2006	Project update and discussion relating to training, employment and business opportunities
Northern Regional Development Board (NRDB) Port Augusta	Nov 2005	Contact and update on the project
Port Augusta Regional Council	Nov 2005	Contact and update on the project
Port Augusta District Council	Mar 2006	Project update and discussions relating to training, employment and business opportunities
Flinders University	Jul 2005	Education and training issues related to the project
Flinders Ports	Nar 2005	Port Pirie and Port Adelaide options for concentrate shipping
	Feb 2006	Berth options at Port Pirie and Port Adelaide
	Feb 2006	Port options at Port Adelaide

Stakeholder	Date	Matters discussed
Government of South Australia		
Department of Primary Industries and Resources of South Australia (PIRSA)	Nov 2004	Meeting to initiate discussions about the environmental permitting process
	Jan 2005	Meeting to discuss the MARP and radiation issues. (EPA SA Radiation Branch also present in this meeting.
	Mar 2005 Apr 2005	Introduction to the Proponent and the project (various meetings with multiple PIRSA employees)
	Mar 2005	EPBC and groundwater study
	May 2005	Project update
	Jul 2005	Distribution of Conceptual Development Plan
	Aug 2005	Letter to the Proponent indicating that assessment under the Mining Act is required
	Sep 2005	Aboriginal Training
	Sep 2005	Project update, approvals process, native vegetation, Native Title/Aboriginal matters
	Oct 2005	Project update
	Oct 2005	On site familiarisation visit
	Oct 2005	PIRSA Petroleum division. Alternate energy sources
	PIRSA	Nov 2005
Nov 2005		Project update, aspects of uncertainty, native vegetation guidelines
Dec 2005		Phasing of the MARP, waste dump height, native vegetation plan
Jan 2006		Integrated waste landform, in particular the TSFs
Mar 2006		MARP process, timing, advertising and public meeting options
PIRSA, Department of Further Education, Employment, Science and Technology (DFEEST)	Nov 2005	Aboriginal training and business opportunities
Planning SA and PIRSA	Mar 2005	Meeting to discuss state assessment process
SA DEH and PIRSA	May 2005	Meeting to discuss state and Australian Government assessment process
SA DEH	Sep 2005	Coordination of SA DEH feedback, suggested contact points
	Nov 2005	Project update
	Dec 2005	Project update, water use
	Mar 2006	Project update, surface water, borefield, Significant Environmental Benefit offset area, weed management and visual impacts
	Mar 2006	Project update
Planning SA	Jun 2005	EPBC
Environment Protection Authority (EPA)	Jul 2005	Radiation Branch – Proposed Commonwealth radiation legislation
	Aug 2005	Project update
	Sep 2005	Project update and legislation
	Nov 2005	Discussed Port Pirie, dust, water quality, lead concentrations
	Dec 2005	Project update, uranium grades, licensing
	Jan 006	Project infrastructure overview and Port Pirie permitting

Stakeholder	Date	Matters discussed
	Mar 2006	Radiation Branch – MARP update, dust collection methods and regulatory context
	Mar 2006	Project update, odour and noise issues, waste management and tailing storage facility
Department of Aboriginal Affairs and Reconciliation (DAARE)	Nov 2005	Informal discussion about project and heritage issues
Prominent Hill Task Group (a multi-government agency group assembled for the MARP approvals process)	Nov 2005	Introduction of project and status, groundwater issues and port issues
	Dec 2005	Project update (timing of MARP, infrastructure, Native Title Negotiations, Access Agreements and Pre-Employment Program)
	Feb 2006	Project update (Inc. timing of MARP submissions)
PIRSA and Planning SA	Jun 2005	Government stakeholder consultation
DFEEST, Department of Education and Children’s Services (DECS)	Dec 2005	Project update, discussions on indigenous training and education
PIRSA and SA DEH	Jun 2005	Non-impact on GAB
SA Government	Sep 2005	Project update
DECS, Northern Regional Development Board (NRDB), South Australian Chamber of Mines and Energy (SACOME)	Sept 2005	Project update, employment opportunities in the mining industry, Pre-Employment Program
Department of Infrastructure	Aug 2005	Introduction to the Proponent and the project
	Sep 2005	Mechanism for keeping various government departments up to date with the project
Department of Employment and Workplace Relations (DEWR)	Oct 2005	Pre-Employment Program funding through Federal Government
DWLBC	Jul 2005	Groundwater-related issues
	Oct 2005	Upgrading water allocation application and confirming existing user status
	Nov 2005	Project update, native vegetation guidelines and offsets
	Dec 2005	Project update, permitting issues, native vegetation offset areas. (SA DEH also present in this meeting)
	Mar 2006	Project update and Significant Environmental Benefit offset area
PIRSA, Iluka, BHP Billiton, One Steel, DFEEST, Department of Trade and Economic Development (DTED)	Dec 2005	Workshop on proposed Mineral Skills Centre Initiative of State Government
PIRSA, SACOME, Minotaur Resources, BHP Billiton	Aug 2005	Proposed changes to SA State Mineral Royalties
Industry associations		
SACOME	May 2005	Royalties
	Jun 2005	Royalties (PIRSA present in this meeting)
Business SA	Sep 2005	Contact/proposed membership, industrial relations environment in SA
Australian Government		
DEWHA	Feb 2005	Meeting in Canberra to discuss project’s status with respect to the EPBC Act
	Apr 2005	Meeting in Canberra to discuss the EPBC referral
	Jul 2005	Distribution of Preliminary Information and Conceptual Development Plan (CDP)
	Aug 2005	Letter to the Proponent accrediting SA assessment under the Mining Act
	Jan 2006	MARP update and permitting issues. (PIRSA also present in this meeting)
	Jun 2005	Matters relating to the EPBC Act
DoD	Apr 2005	Woomera Rocket Range Access Agreement negotiations

Stakeholder	Date	Matters discussed
Special interest groups		
Arid Area Catchment Water Management Board (AACWMB)	Mar 2005	Introduction to the Proponent and the project
	Apr 2005	Water issues. (DWLBC also present in this meeting)
Arid Area Catchment Water Management Board (AACWMB)	Sep 2005	Groundwater conceptual model
	Sep 2005	Water Allocation Plan, Catchment Water Management Plan
Australian Water Environments	Jul 2005	Groundwater-related issues
Members of Parliament		
Mr Barry Wakelin MP (Electoral Division of Grey (SA))	Apr 2005	Introduction to the Proponent and the project
Mr Mitch Williams MP (Electoral District of MacKillop (SA))	Nov 2005	Introduction to the Proponent and the project
Hon. Paul Holloway, (Minister for Industry and Trade (SA)) and government officials	May 2005	Site visit
Hon. John Hill, Minister (Electoral District of Kurna (SA))	Jun 2005	Update on the project
Hon. Patrick Conlon, Minister (Electoral District of Elder (SA))	Jun 2005	Update on the project

The broad outcomes of these consultation activities included:

- Increased government and community awareness and understanding of the project.
- Involvement of regulatory authorities in determining the assessment and permitting route.
- Identification of areas of concern to local pastoralists and other stakeholders.
- Relationship building with local and peripheral communities.
- Progression of Native Title negotiations and access agreements.
- Identification of potential employment opportunities for local indigenous people.
- Opportunities for members of the local community to voice opinions and concerns.

Specific outcomes of note included:

- An understanding that no project-related impact to the GAB will occur as a result of utilising groundwater. Water will instead be sourced from the Arckaringa Basin aquifers, which are separate from, and not directly connected to, the artesian GAB aquifers.
- The development of a number of community-orientated commitments, such as sponsorship of the Coober Pedy Football Club and involvement in the establishment of the MTP.
- An understanding of issues of importance to the Antakarinja people, most of which relate to mine-derived benefits, particularly in terms of employment opportunities but also in ensuring protection of Aboriginal heritage issues.
- A broad understanding of issues of importance to Coober Pedy, which include employment, business opportunities and electricity supply.

A questionnaire was sent to local pastoralists to ascertain existing views concerning the project, issues of concern and satisfaction with the project, the Proponent and interactions to date. Key findings of the questionnaires include:

- Interactions between local pastoralists and the Proponent were positive and an appropriate amount of interaction has occurred.
- Socio-economic issues of importance to the pastoralists included impacts on employment, farming, road access, road traffic, visual amenity and property prices. Employment concerns relate to increased difficulty in finding suitable pastoral employees if the current skilled labour force is attracted to work at the mine site.
- Main concerns related to land use and land management were road access, increased public access to pastoral properties, public liability and impacts to water supplies.
- Negative environmental impacts were expected from the project with respect to noise, flora and fauna, dust and pollution.
- Positive aspects associated with the project included a boost to the state economy, employment increases and landowner compensation.
- Some pastoralists requested more information regarding the location of infrastructure associated with the mine (such as the transmission line).
- There was some concern about:
 - Tailing storage facilities, chemical usage and associated implications for organic producers.

- Downstream impacts from the mine site.
- Ongoing impacts after mine closure.

During the public exhibition period for the MARP, a public meeting was held in Coober Pedy on 12 April 2006 to provide an open forum for discussion of that document and the project in general. Twenty-five people attended the meeting, including interested members of the public and government representatives. No issues relating to environmental impacts of the project were raised, although some disappointment about the level of direct socio-economic benefits for Coober Pedy was expressed. Most of the discussion at the meeting was focussed on business opportunities associated with the proposal.

A site visit was also held on 12 April 2006 to provide various government referral agencies with an opportunity to gain a general appreciation of the project area. Areas visited included the site access road, Warriner Creek, northern pit boundary, airstrip and the general locations of the accommodation village and ore processing facilities. A further site visit was held on 12 July 2006 for additional government referral agencies to visit the site, including the construction wellfield area.

7.1.2 Consultation during project construction

Specific consultation in relation to matters of environmental and social interest conducted during project construction, following the 2006 MARP, is summarised in Table 7.2.

Table 7.2 | Stakeholder consultation during project construction (2006-2008)

Stakeholder group	Matter discussed	Response
Pastoralist	Effect on Great Artesian Basin, effect on stock water aquifers	Community meetings held in William Creek and Oodnadatta, as well as one-on-one meetings with individual pastoralists.
Pastoralist	Occurrences of trespassers on pastoralist properties	Each incident investigated. All staff reminded of property access rules.
Indigenous stakeholders	Disturbance of archaeological and heritage sites	Each incident investigated. Heritage clearance procedure developed and implemented. Approach to heritage sites included in staff induction.
Indigenous stakeholders	Preservation of Painted Hills	Commitment to work with SA Tourism and indigenous stakeholders to ensure access via mine site is not possible, and to assist in managing and preserving the area.
Indigenous stakeholders	Native Title – dispute over ownership	Consult with and take advice from Aboriginal Legal Rights Movement.
Indigenous staff and stakeholders	Aboriginal employees experiencing difficulty settling into site work rosters and living arrangements	Approach to mentoring established and provided to indigenous staff.

7.1.3 Consultation regarding underground operations

In October 2008 a series of meetings with local pastoralists, community groups and representative bodies were conducted to discuss the proposed underground operations and seek preliminary views from the community. This consultation is summarised in Table 7.3.

Table 7.3 | Stakeholder consultation for underground operations (October 2008)

Stakeholder group	Matter discussed
Umoona Community Council	Indigenous employment and training opportunities. Opportunities for forming partnerships with OZ Minerals.
District Council of Coober Pedy	Positive reaction to expectation of longer mine life and increased resource base.
Coober Pedy Retail and Tourism Association	Positive reaction to expectation of longer mine life and increased resource base. Positive reaction to increased employment opportunities.
Northern Regional Development Board	Positive reaction to expectation of longer mine life and increased resource base.
Coober Pedy Opal Miners Association	Some concern at inevitability of opal miners leaving the industry to take up employment opportunities with the project, and subsequent population movements in Coober Pedy.
William Creek Progress Association	Interest in the project's groundwater use and whether the expansion will increase water consumption beyond the existing water licence.
Anna Creek Station	Generally supportive of the mining operation and expansion. Questioned the location of the bore field and the project's groundwater use. Interested in the levels of local employment and the opportunities for partnership between the Proponent and Anna Creek.
Mt Eba Station	Questions around the project's groundwater use and the approach to bore field monitoring. Raised issues about road maintenance, property gates, communication, power off-take and power pole construction.
The Twins Station (McDouall Peak pastoral lease)	Generally supportive of the mining operation and expansion. Some concerns regarding construction of the haul road.

Specific outcomes of note included:

- An understanding that water requirements for the underground operations will be met within existing groundwater licence, achieved through efficiencies in water use during the project to date.
- An increased understanding of issues of importance to the local indigenous community, in particular potential improvements to the existing training program.
- Confirmation that the community of Coober Pedy remains generally supportive of the project and the opportunities it brings.

7.1.4 PEPR 2015-2017 consultation

During the preparation of the PEPR, consultation with key government agencies was a focus. The extent and nature of consultation completed was considered adequate for the purpose of the MARP to PEPR transition project and is summarised in Table 7.4.

Table 7.4 | Stakeholder consultation undertaken for the MARP to PEPR transition

Stakeholder group	Date	Matters discussed
Government of South Australia -DSD	12/12/2014	IAF – Development.
	12/06/2015	IAF – Groundwater.
	30/06/2015	MARP to PEPR Transition Project Presentation.
	30/06/2015	MARP to PEPR Transition Project Presentation.
	2/07/2015	MARP to PEPR Project update.
	8/07/2015	MARP to PEPR Project updates and timeframe.
	14/07/2015	MARP to PEPR Transition Project and EPBC Matters.
	1/06/2014	Critical Review of IAF.
	18/08/2015	Draft IAF Presentation.
	30/09/2015	Submission of PEPR 2015.
Pastoralist Stakeholders	Oct 2015	Provided full copies of PEPR 2015 and discussed the process with each of our pastoralist stakeholders.
Government of South Australia - DSD	12/12/2015	Feedback received from DSD on some of the IAF and outcomes.
	1/04/2016	Feedback received from DSD, DEWNR and EPA on the description of environment and operations chapter.
	5-6/04/2016	Site visit from DSD at Prominent Hill to discuss feedback received.
	10/08/2016	Request for extension for PEPR submission date to December 2016.
	19/08/2016	Discussion on IAF.
	2/09/2016	Discussion on IAF.
	17/09/2016	Discussion on IAF.
	10/10/2016	Decision made not to use IAF and developed new method for merging outcomes from all MARPs to one PEPR.
	2/11/2016	Informed DSD that the project had to be put on hold until 2017 due workforce availability.
	18/01/2017	Meeting to restart project.
	1/02/2017	Fortnightly update and discussion on new method for merging outcomes.
	2/02/2017	Request for extension of PEPR delivery to April 2017.
	13/02/2017	Fortnightly update

Stakeholder group	Date	Matters discussed
	1/03/2017	Fortnightly update
Government of South Australia -DEWNR	3/03/2017	Discussion on Groundwater Appendix and GAB Springs
Government of South Australia- DSD	15/03/2017	Fortnightly update and presentation of draft PEPR 2017 outcomes tables.
	20/03/2017	Feedback on outcomes tables received from DSD
Various government departments	27/03/2017	Presentation to DSD, EPA SA and DEWNR on water related environmental outcomes, prior to submission.
Government of South Australia – DPC (was DSD)	3/04/2017	Further refined outcomes tables in consultation with DSD.
Pastoralist Stakeholders	April/May 2017	Discussion on new proposed environmental outcomes with pastoral lease holders. Update on the MARP to PEPR process.
Government of South Australia – DPC (was DSD)	10/04/2017	Fortnightly update No feedback received so far from EPA SA or DEWNR.
	12/04/2017	Discussion on content of PEPR 2017 submission, process for bond review and forward plan for closure PEPR update. Feedback received from EPA SA.
	24/04/2017	Fortnightly update.
Various government departments	08/05/2017	Discussion with DPC and DEWNR on water related outcomes and the Conceptual Groundwater Model Appendix. Agreement was reached between all three parties on amendments to be made prior to official submission of PEPR to DPC. Fortnightly update with DPC.
Government of South Australia – DPC (was DSD)	22/05/2017	Fortnightly update. Confirmation on submission date.
	31/07/2017	PEPR 2017 submitted to DPC.
	07/11/2017	Update on PEPR approval process and expected date to receive comments.
	09/2017	Discussion on expected comments.
	15/11/2017	Comments received from DPC outlining the further information required to ensure the PEPR meets MD005.
	21/11/2017	Clarification on requirements for further information and resolution on outstanding issues.
	04/12/2017	Preparation for delivery of PEPR.

The broad outcomes of these consultation activities include:

- Increased government awareness and understanding of the MARP to PEPR Transition project.
- Involvement of regulatory authorities in the methods used to consolidate MARP outcomes and propose new PEPR outcomes in line with the Ministerial Determination 005.
- Increased understanding from critical local stakeholders (pastoralists) on new proposed environmental outcomes and that these outcomes do not change the monitoring that currently occurs on their leases.

7.1.5 PEPR 2022 consultation

Consultation with key stakeholders continued to be a key priority during the development of the draft 2019 PEPR (submitted but withdrawn from assessment) and the subsequent 2022 PEPR. Key engagement with all stakeholders is summarised in Table 7.5.

Table 7.5 | Stakeholder consultation undertaken for PEPR 2022

Stakeholder	Date	Discussions/issues	Outcome of discussions/ how issue was resolved	How has this been addressed in the PEPR (reference)
DEM	29/10/2018	Discuss revision of outcomes for PEPR	NA	NA
DEM	04/02/2019	PEPR and Mine Closure Plan	Revision of the PEPR and Mine Closure Plan	Closure outcomes specified in Section 6
DEM	12/04/2019	Meeting to discuss outcomes and measurement criteria for PEPR	NA	NA
DEM	31/07/2019	Prominent Hill PEPR Appendices A-J electronic copy	NA	NA
DEM	10/12/2020	PEPR 2019 further information regarding WRD and PAF cells	DEM provided assessment strategy from Golder surrounding the design, construction and long-term stability of the WRD and PAF cells. Request DEM review to ensure outcomes will meet their requirements and provide feedback if necessary. Continue on with the approval process for the 2019 PEPR.	NA
Pete Whittlesea (Mt Eba Station)	15/01/2021	Summary of PHOX scope and stakeholder team. Invitation to join stakeholder team from G.Iwanow.	Agreement to be part of stakeholder team	NA
Pete Whittlesea (Mt Eba Station)	28/01/2021	Detailed overview of PHOX scope and role of stakeholder team from K.Hobbs	Next steps for commercial engagement and meeting attendance	NA
Tjunguringanyi Steering Committee - AMY Traditional Owners, Legal Counsel and support staff	08/02/2021	PHOX Project detailed and an update of relevant items of this to the committee.	A range of plans were illustrated for the PHOX project to the committee; an emphasis on having the cultural heritage reviewed and taken care of throughout the proposed project lifecycle	NA
DEM	10/02/2021	Discussion on PHOX approvals inclusive of strategy, timeframes and engagement cadence. Discussed engagement of ELA to lead the writing of the PEPR documentation. Compliance issues were also discussed including the expiry in August 2021 of all mining related tenements at Prominent Hill and the water licence.	Agreement to set up regular meeting formats for ongoing engagement in the led up to the PEPR submission. ELA to arrange further discussion with DEM regarding the Matters Subsequent content. Agreed to discuss tenement expiry with Junesse Martin and water licence expiry with DEW.	Tenement expiry updated as per Section 2.2
DEM	18/02/2021	Request for withdrawal of 2019 PEPR	Formal request to withdraw the previously submitted Prominent Hill 2019 PEPR.	NA
DEM	23/02/2021	ELA and DEM discussed the Matters Subsequent letter and works that have been done to date on addressing the request. Feedback was requested on what DEM's key concerns are and actions to be taken to address outstanding gaps which will be included in PEPR 2021.	Agreed that Matters Subsequent information will be provided to DEM prior to the PEPR submission for early commentary.	NA
Pete Whittlesea (Mt Eba Station) + members of PHOX Stakeholder team	24/02/2021	PHOX Stakeholder team meeting to discuss update on PHOX activities, input into key elements and stakeholder and risk management.	Continued review and engagement in PHOX scope	NA
DEM	2/03/2021	General update on Prominent Hill and PHOX approvals. Key discussion points included the TSF closure strategy, the updates to the groundwater model work being undertaken by EMM Consulting, and potential Notifications which may be required for PHOX prior to the PEPR submission. An overview of DEM's recent visit to site was also discussed.	Continuing to work on the TSF strategy (as outlined in Matters Subsequent). When ready this will be sent to DEM for review prior to its inclusion in the PEPR.	NA
Mt Eba Station, Billa Kalina Station, Twins Station, Anna Creek Station, Ingomar Station, Coober Pedy Area School, Trevor Wright of Wrights Air William Creek	8/03/2021	The overall plan for PHOX and other notable updates at the Prominent Hill operation was delivered (inc. exploration updates) was delivered to the audience as a general introduction to the PHOX concept.	The presentation was made available for the Pastoralists and the community delegates who attended the event and plenty of dialogue was held throughout the evening on the topics raised in the presentation. As no material changes to pastoral/ local level agreements were presented in the PHOX proposal, the information was of general discussion	NA
DEM, DEW and EPA	19/03/2021	EMM Consulting presented the planned approach for updating the numerical groundwater models for Prominent Hill as part of PHOX.	Feedback was sought on the software being proposed to be used and the overall approach. Presentation notes were provided to all attendees with further questions to be directed to EMM Consulting for collation and inclusion into their scope of works.	NA

Stakeholder	Date	Discussions/issues	Outcome of discussions/ how issue was resolved	How has this been addressed in the PEPR (reference)
			Agreed that a further meeting will be arranged to discuss the results of the model when ready.	
DEM	22/03/2021	PHOX approval strategy review. RACI for approvals activities, and key items for addressing as part of the process.	Continue engagement and collaboration	NA
Pete Whittlesea (Mt Eba Station) + members of PHOX Stakeholder team	24/03/2021	Update on PHOX activities, input into key elements and stakeholder and risk management.	Continued review and engagement in PHOX scope	NA
DoD and DEM	30/03/2021	Discussed PHOX scope and timeline, WPA review and coexistence, greenzones and Innovation and Technology Centre.	Prominent Hill Operations to share further information on digital strategy and continue information sharing as PHOX study continues.	NA
AMYAC Traditional Owners	6-7/04/2021	A Cultural Heritage Review for PHOX interaction with Prominent Hill Heritage locations.	A number of conditions that will support the safe establishment of the PHOX project without impacting any AMYAC cultural heritage areas.	NA
AMYAC Health Check	14-15/04/2021	A meeting with AMY boards and prominent senior members and Site Management Team including CEO and ELT	PHOX was brought up in this meeting also and some future direction for AMYAC support in terms of the project and the mining agreement were workshopped for ongoing discussion.	NA
Pete Whittlesea (Mt Eba Station) + members of PHOX Stakeholder team	28/04/2021	Update on PHOX activities, input into key elements and stakeholder and risk management.	Continued review and engagement in PHOX scope	NA
DEM	29/04/2021	Golder Associates provided an overview to DEM on the options being considered as part of PHOX for the long-term storage of tailings material at Prominent Hill. One of these options is based on the current approved design heights and limits, however the other three would require modifications.	Golder Associates provided an overview to DEM on the options being considered as part of PHOX for the long-term storage of tailings material at Prominent Hill. One of these options is based on the current approved design heights and limits, however the other three would require modifications.	NA
AMYAC	30/04/2021	Monitoring the road construction area for PHOX.	A condition from the previous engagement was that the road that will deliver construction material to the PHOX project area, would need monitoring at a certain section – this was done to the Traditional Owner’s satisfaction- it was resolved that they would like to visit the site to inspect the progress of the PHOX area once underway	NA
Pete Whittlesea (Mt Eba Station) + members of PHOX Stakeholder team	25/05/2021	Update on PHOX activities, input into key elements and stakeholder and risk management.	Continued review and engagement in PHOX scope	NA
Defence and DEM	25/05/2021	WPA Approved Technology trial. Update on PHOX project scope and technology/ equipment. Update on Prominent Hill Tech & Innovation Centre.	Continued review and engagement in PHOX scope	NA
Safework SA	21/05/2021	Permanent hoisting system design and shaft sinking methodology discussion.	Continue engagement and collaboration	NA
DEM	25/05/2021	Feedback on level of detail required for WRD Matters Subsequent.	Feedback taken on board to satisfy requirements for Matters Subsequent.	NA
Safework SA	11/06/2021	Update on shaft sinking work package, study work and approval with Proponent Board. ROM pad material movement. Discussion on Regulatory pathway and approvals	Continue engagement and collaboration	
DEM	16/06/2021	Discussion with DEM on the intent to submit a Program Notification relating to PHOX Early Works.	Confirmation from DEM that ta Program Notification would be the most appropriate approval pathway.	NA
DoD	25/06/2021	Update on discussions between DoD (Kevin Rowlatt) and Prominent Hill representatives Next steps for discussion with Defence group and DEM One on one conversations with Prominent Hill personnel and DoD about technology onsite with focus on PHOX, ongoing digital transformation, and the Arkani Ngura Innovation and Technology Centre	Alignment on scope of initiatives DoD comfort about PHOX scope	NA
DEM	15/07/2021	Submission of a Program Notification for PHOX Early Works for assessment by DEM.	NA	Discussion in Section 11
DEM	26/07/2021	PEPR closure outcomes surrounding vegetation trials, erosion on external slopes of IWL and EFA discussed. Amending OMC to adequately meet lease conditions.	Feedback incorporated into resolving closure outcomes for inclusion in the PEPR.	Issue has been updated in Section 9.
DEM	13/08/2021	Approval for PHOX Early Works Program Notification.	NA	Discussed in Section 11
DEM, DEW and EPA	23/08/2021	Whole of government meeting to update on the recent PHOX ASX release, the scope of changes made within the PEPR and the results of recently completed groundwater modelling. Draft submission dates for the PEPR were also discussed along with approval dates required to meet the start of on ground works relating to PHOX.	Agreed to implement regular meetings to workshop any new information in the PEPR.	NA

Stakeholder	Date	Discussions/issues	Outcome of discussions/ how issue was resolved	How has this been addressed in the PEPR (reference)
DEM	13/09/2021	Presentation to DEM on major updates and content within the draft PEPR.	NA	NA
DEM	19/10/2021	Submission of draft PEPR for regulatory review	DEM to refer the draft PEPR to all agencies for feedback	NA
DEM	30/11/2021	Program Notification for PHOX Construction Works submitted to DEM.	NA	NA
DEM and EPA	1/12/2021	Provision of feedback on draft PEPR from EPA	Feedback reviewed and incorporated into the PEPR where appropriate. Responses to be provided on all comments received.	NA
DEM and DEW	6/12/2021	Provision of feedback on draft PEPR from DEW	Feedback reviewed and incorporated into the PEPR where appropriate. Responses to be provided on all comments received.	NA
DEM, DEW, NVB, EPA and SAAL Landscapes team	6/12/2021	Discussion with all regulators on preliminary feedback received.	Agreed on how to incorporate some of the feedback and that further discussions with regulators would occur where appropriate.	NA
DEM	15/12/2021	Confirmation from DEM that there will be no further commentary from them on the draft PEPR.	NA	NA
DEM	17/12/2021	Provision of updated bond calculation inclusive of PHOX	To be reviewed by DEM	NA
DEM and SAAL Landscapes team	20/12/2021	Provision of feedback on draft PEPR from SAAL Landscapes team.	Feedback reviewed and incorporated into the PEPR where appropriate. Responses to be provided on all comments received.	NA
DEM	22/12/2021	Approval for PHOX Construction Works Program Notification.	NA	Discussed in Section 11
DEM and NVB	11/01/2022	Discussions on how confirming the regulatory pathway for use of remaining SEB credits	To follow up	NA
DEM and DEW	12/01/2022	Discussions regarding some groundwater related regulatory feedback and agreement on how to address in the PEPR	Feedback reviewed and incorporated into the PEPR where appropriate. Responses to be provided on all comments received.	NA
DEM and NVB	12/01/2022	Confirmation from DEM on acceptance on regulatory pathway for the use of remaining SEB credits. This was confirmed as acceptable to NVB on 13/01/2022 with further discussion required on wording.	Update the PEPR	Discussion in Section 10.3
DEM and NVB	17/01/2022	Suggested wording on credit use provided to DEM and NVB for comment. This was confirmed as acceptable to NVB and DEM on 18/01/2022	Update the PEPR	Discussion in Section 10.3
DEM and DEW	18/01/2022	Discussions regarding some groundwater related regulatory feedback (GAB Springs) and agreement on how to address in the PEPR	Feedback reviewed and incorporated into the PEPR where appropriate. Responses to be provided on all comments received.	NA
EPA	18/01/2022	Potential for diesel generator described in PEPR to require licencing.	Confirmation that the “fuel burning” activity does not exceed 5 MW and as such does not trigger a licence requirement.	NA

7.1.6 PEPR 2026 consultation

Consultation regarding the Aries Borefield Pipeline Replacement Project and the associated tenement applications, together with the updates associated with this PEPR update are summarised in Table 7.6.

Table 7.6 | Stakeholder consultation undertaken for PEPR 2026

Stakeholder	Date	Consultation method	Potential areas of concern and opportunity	Where addressed in the PEPR
Mt Eba Landowners	2025 (multiple)	Phone calls, emails, Teams meetings and face-to-face meetings	• Compensation • Saline water still leaking into the ground • Grading opportunities • Fencing maintenance • Leaving infrastructure in the ground • Vegetation clearance • Future upgrades • Construction methodology • Staging of works and opportunities to avoid exempt land	Whole of PEPR
Millers Creek Landowners	2025 (multiple)	Phone calls, emails, Teams meetings and face-to-face meetings	• Compensation • Saline water still leaking into the ground • Grading opportunities • Fencing maintenance • Leaving infrastructure in the ground • Vegetation clearance • Future upgrades • Construction methodology	Whole of PEPR
AMY Aboriginal Corporation	2025	In-field heritage survey and consultation	Cultural Heritage clearance granted by AMYAC representatives. No additional Aboriginal heritage values identified within the proposed New MPL Project Area	Section 4.10
South Australian Arid Lands Landscape (SAAL) Board – Water Project Officer	2025 (multiple)	Phone calls, emails	Confirm if a Water Affecting Activity Permit is required for the activities involving traversing of creeks.	Section 5.9.1.4
Department for Energy and Mining (DEM)	2025 (multiple)	Phone calls, emails and face-to-face meetings	MPL tenement implementation strategy	Section 2.2
Department of Defence – Woomera Test Range	2025 (multiple)	Phone calls, emails	Pipeline is situated on Defence land within the Woomera Prohibited Area. Engaging with DoD to support amending BHP's Deed of Agreement to cover the New MPL Project Area, seeking the same conditions as the current Prominent Hill operations	Section 10.1
Department of Defence – Woomera Prohibited Area Coordination Office (WPACO) – Canberra	2025 (multiple)	Primarily emails, phone call	As above. WPACO are the DoD body responsible for orchestrating this change	
South Australian Arid Lands Landscape (SAAL) Board – Water Project Officer	November 2025	Phone calls, email	Discussion regarding requirement for a Water Affecting Activity Permit (follow up on if new policy is implemented prior to project implementation)	Section 5.9.1.4
Regulator meeting – DEM and DEW	March 2025	Meeting	Discussion regarding SEB offset strategy for the Aries Transfer Pipeline Replacement Project (Stage 1)	Section 10.3.3
Regulator meeting – DEM and EPA	27/02/2025	Meeting	Notification of Aries Transfer Pipeline Project (Stage 1).	Whole of PEPR
Regulator meeting – DEM and EPA	22/05/2025	Meeting	Discussion of Aries Transfer Pipeline Project (Stage 1) scope and schedule.	Whole of PEPR
Regulator meeting – DEM and DEW	27/06/2025	Meeting	Finalisation of Aries Transfer Pipeline Project (Stage 1) offset strategy with DEM, Native Vegetation Branch (DEW) and Nature Foundation	Section 10.3

7.2 Continuing and future project consultation

BHP continues to implement a structured approach to community and stakeholder engagement to support the developing operational profile of Prominent Hill through to mine closure. A consultative approach remains the benchmark of BHP's engagement activities and is resourced accordingly with dedicated consultation specialists.

As a maturing operation, current and future consultation with stakeholders critical to Prominent Hill aims to:

- continue to inform stakeholders of the current status of the Prominent Hill operation, predicted life of mine and estimated timing of closure
- maintain and enhance positive working relationships with all stakeholders
- provide opportunities for stakeholders to ask questions and raise feedback (both constructive and critical)
- provide environmental data to relevant station managers to ensure transparency of performance data
- develop and agree on the outcomes associated with mine transition to underground operations and the final closure commitments and completion criteria
- engage key stakeholders in the decommissioning, rehabilitation and closure program and processes
- develop and agree on the process for measuring, monitoring and ultimately relinquishing to the key stakeholders, including pastoral lease owners, Native Title groups and other relevant parties in-line with statutory laws, regulations and agreements
- facilitate the smooth and efficient transition, decommissioning, rehabilitation, closure and surrender of the Prominent Hill operation
- establish accountability and ongoing liability for all aspects of the Prominent Hill operation and
- obtain sign-off and surrender of BHP's conditional obligations.

Specific objectives are to:

- ensure that all stakeholders are:
 - informed of current mine plans
 - included in the decommissioning, rehabilitation and closure processes
 - have their interests considered and responded to
 - have the resources to participate meaningfully in the process
 - are aware of their roles and responsibilities
 - understand final outcomes
- ensure that all outcomes agreed to are achievable, and ensure the post-closure integrity of the site is maintained and
- ensure that all statutory and contractual obligations and requirements of the government and community are met.

7.2.1 Identification of stakeholders

Having operated within this region for many years, BHP has previously identified relevant stakeholders and formed strong working relationships with this and its other regional projects. BHP actively monitors its stakeholder base for new stakeholders and for changing or emerging issues. This is achieved through persistent community presence, utilising regional professional networks, advice from governmental and other stakeholders and through targeted research.

The stakeholders that continue to hold an integral role in the success of the Prominent Hill mine include:

- BHP staff (e.g., board, employees, shareholders)
- BHP contractors (including but not limited to local and aboriginal contract partners)
- Native Title Groups
- pastoralists on:
 - directly affected pastoral leases – The Twins, Mount Eba, Ingomar, Millers Creek, Billa Kalina
 - remote pastoral leases – Bon Bon, Anna Creek, Roxby Downs
- local partnerships and service providers – job services providers, Regional Development Australia Far North, Port Augusta Airport, District Council of Port Augusta, District Council of Coober Pedy, Outback Communities Authority, Global Maintenance Upper Spencer Gulf Business Alliance
- suppliers to BHP (e.g., transport, fuel, consumables etc.)
- financiers (e.g., brokers, bankers, investors) and their advisors
- mining industry (e.g., other mineral explorers or producers in the area that may be interested in workforce migration, purchasing plant, equipment, infrastructure, etc.)
- non-government agencies (e.g., South Australian Chamber of Mines and Energy)
- Government of South Australia, Australian Government and agencies (e.g., DEM, EPA, DPC, Planning SA, Department of Defence, relevant ministers and Members of Parliament)
- local communities including Coober Pedy, Port Augusta, Oodnadatta and Aboriginal communities
- community organisations, including those in education, health and emergency service provision sectors and
- members of the general public.

7.2.2 Consulting strategy

Building and maintaining strong supportive relationships and strategic partnerships with stakeholders in the areas where we operate drives value creation for both the business and stakeholders and is at the centre of our Strategy. We seek to deliver long-term benefits to stakeholders by engaging and collaborating, understanding the social (and other impacts of our activities, and minimising the negative effect of our activities.

7.2.2.1 Maintaining community and stakeholder support

Consultation strategies and processes have evolved based on feedback received from the community, government bodies and other stakeholders. BHP continues to consult with our project stakeholders using via a range of engagement tools including:

- communication through letters and emails
- meetings and/or site visits with landowners, station managers, traditional owners, local communities and businesses, government (Federal and State), non-government organisations
- external stakeholder representation on project stakeholder teams and/or steering committees
- presentations
- attending regional annual events relevant to our stakeholder base (such as sporting events, festivals, conference and other community gatherings) to disseminate information, develop a mutual understanding and have discussions with the issues that matter to stakeholders
- ensure members of the senior leadership team are present at as many community events as possible to provide heightened accountability within the community
- ensuring mine staff take part in regional groups such as the South Australian Arid Lands (SAAL) Landscape Board
- our website
- annual reporting and
- maintain a register for all stakeholder information including feedback received (positive, constructive and complaints).

Further consideration is being given to the application of additional engagement techniques, including social media platforms and digital document delivery (i.e., newsletters), and may be used in future engagement and consultation programs.

Additionally, BHP has, since the commencement of operations, continued to invest in the region through our social investment and community sponsorship funding and in-kind support. This funding has included support for schools and educational services, health initiatives, community infrastructure, events (including community race meetings, bronco brandings, gymkhanas and festivals), School of the Air, Royal Flying Doctors Service and social inclusion activities. Through sponsorship, BHP supports the community, builds community-based capacity, promotes positive relationships and engages directly on operations-related matters. BHP are currently reviewing their investment and sponsorship strategy to ensure the available funding is contributing to the sustainability of the community after the mine has closed.

BHP shall continue its structured engagement and community support initiatives for the life-of-mine, with internal planning of engagement requirements reviewed annually. Comments, feedback and concerns relating to BHP operations are welcomed and openly solicited from key stakeholders. Any relevant communication is recorded as described in Section 7.3 and used in engagement planning reviews as described in Section 7.4.

7.2.2.2 Mine closure planning

The closure consultation and surrender process will form the final major phases of the stakeholder consultation program initially established during exploration of the Prominent Hill project area. Each of the key stakeholder groups may be interested in all or a selection of the components that make up the closure of the Prominent Hill project. Closure considerations for each element of the operation have been built into the project description in acknowledgment that some post-closure aspects are progressively managed during the operational phase of the project. Informal and formal closure communication mechanisms may include:

- presentation and exhibition of the fundamental components of the PEPR
- presentation of the components of the PEPR to employees and contractors through employee training
- communications through the BHP website and press releases
- BHP's Annual Report
- presentations by project personnel to local communities
- continued meetings with pastoralists
- continued meetings with Native Title Groups
- continued meetings with DoD
- briefings to the Commonwealth and South Australian governments and
- stakeholder mine transition and closure information sessions.

It is anticipated that consultation to support mine closure planning and ultimate closure activities will increase through to LOM as broader engagement with community stakeholder is enacted. It is recognised that there is limited scope for general community and other stakeholder influence over many closure outcomes; however, BHP expects detailed consultation with selected stakeholders to minimise potential social impacts and maximise community and stakeholder benefits.

7.3 Documentation of consultation activities

BHP maintains a register that details all material commercial communications with our stakeholders; this register is kept by the Prominent Hill Environment and Community team. If complaints are raised by a stakeholder, they will be engaged with to resolve the issue as soon as practicable (details on committed timeframes for various complaint types are detailed in Section 8). Historical complaints regarding the project have been detailed in previous MARP documentation. As provided in recent compliance reports to the South Australian Government there have been no recent complaints raised for the project.

7.4 Monitoring and improvement

A continual review process is operated by BHP to assess the effectiveness and adequacy of its engagement program. Any learnings from this review process are used to improve and/or expand the engagement program. BHP may elect to seek external or third-party feedback in its review processes.

8. Operational outcomes, strategies, criteria and monitoring

This section sets out the operational Environmental Outcomes, OMC and LI for the Prominent Hill operations, in accordance with the requirements of TOR005.

The outcomes presented here were developed following a review and consolidation of the impact events, environmental outcomes and measurement criteria that were included in the original MARPs for ML 6228 and all associated leases and licences. The review process has been detailed in previous PEPR documents (i.e., PEPR 2017) along with the results of the review and the rationale for the consolidation.

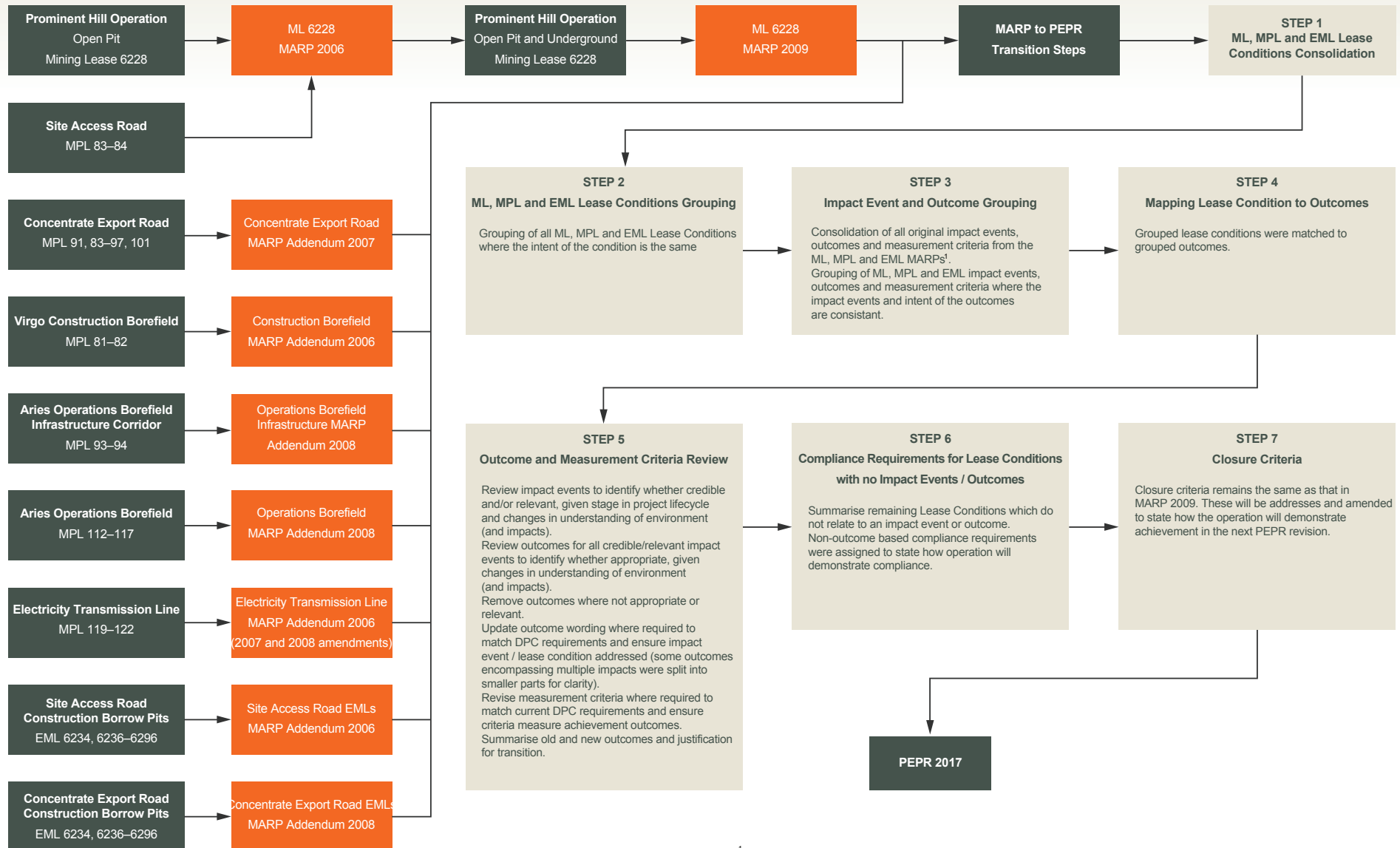
The review and consolidation process essentially involved reviewing and updating the existing impact events, Environmental Outcomes and measurement criteria where required to ensure that they were:

- appropriate, given the changes in understanding of the environment (and the impacts of the operations) gained as a result of the ongoing monitoring and modelling undertaken during operation of the mine
- aligned with the relevant lease condition (where one exists) and
- worded consistently with the requirements outlined in the Mining Act and Regulations and MD 005 (now referred to as TOR 005).

Environmental Outcome wording was updated where required to match the current requirements (as per MD005 (now TOR 005)) and ensure that the impact event and/or lease condition was addressed by the Environmental Outcome. Some outcomes encompassing multiple impacts were split into smaller parts for clarity. Significant modifications to outcomes were generally not required.

Measurement criteria were revised where required to match requirements (as per the then relevant MD 005) and ensure that they clearly and unambiguously measured the achievement of Environmental Outcomes. Where existing measurement criteria were not scientifically sound, sufficiently robust, or where experience at the site demonstrated that they were not effective, or practical, modified or alternative criteria were developed. Impact events and outcomes for different tenements were grouped during the review process where possible, to avoid unnecessary duplication. Further detail on the review of impact events and outcomes and a summary of changes made to the outcomes and measurement criteria are provided in PEPR 2017. The process for transitioning from the MARPs to a PEPR has been summarised in Figure 8.1.

The following sub-sections detail the impact events, Environmental Outcomes, strategies, criteria and monitoring for each environmental element. Impact events are derived from the original MARPs; further detail is provided in PEPR 2017. Each sub-section details the Environmental Outcomes, control strategies, uncertainties/ assumptions and any requirement for future works in an initial table, then goes on to provide detailed measurement criteria and leading indicator criteria (where relevant) in a subsequent table.



¹ The MARPs prepared before 2009 specified 'objectives' and 'assessment criteria', which are functionally equivalent to outcomes and measurement criteria

Figure 8.1 | MARP TO PEPR transition process

8.1 Surface water

Table 8.1 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to surface water at Prominent Hill. Table 8.2 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.1 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for surface water at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
7	GC07	All EMLs	Adverse effects on aquatic fauna and habitats due to the generation of fugitive sediment Adverse effects on aquatic fauna due to miscellaneous chemicals	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to spillage of miscellaneous chemicals or generation of fugitive sediment from activity within the EMLs	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Construction, and inspection, of surface water drainage/diversion system and sediment controls. - This includes the installation of perimeter drainage as necessary to prevent both surface water run-on eroding the stockpiles and the discharge of sediment-laden water from the stockpiles to the surrounding environment. - Contour ripping and seeding of topsoil stockpiles, if necessary, to minimise erosion. - Implementation of waste and hazardous material management plan.	Uncertainty is low. Operational experience has demonstrated effectiveness of control strategies and confirmed predicted low level of impact.	Low	X
15.1	GC15	ML6228	Adverse effects on aquatic fauna and habitats due to the generation of fugitive sediment from the site (principally from the IWL and ROM pad to Warriner and Wattiwarriganna creeks)	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to generation of fugitive sediment	Control and management strategies are detailed in the MARP (2009). Key strategies include: Construction, and inspection, of surface water drainage/diversion system and sediment controls, with minimisation of the diversion of flows from Warriner Creek catchment to Wattiwarrigana Creek catchment.	Uncertainty is low. Sediment monitoring, surface water data and absence of fugitive sediments in sediment traps in Warriner and Wattiwarriganna creeks have demonstrated effectiveness of control strategies and confirmed predicted low level of impact.	Low	X
15.2	GC15	ML6228	Adverse effects on aquatic fauna and habitats due to spillages of miscellaneous chemicals on site including fuels, lubricants, explosives and process reagents (principally to fauna in Warriner and Wattiwarriganna creeks)	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to spillages of miscellaneous chemicals	- Use of cleared vegetation and an initial spray of water to stabilise topsoil stockpile surface. - Installation of perimeter drainage to prevent both surface water run-on eroding the stockpiles and the discharge of sediment-laden water from the stockpiles to the surrounding environment. - Topsoil stockpiles to be inspected for erosion during high winds and following significant rainfall events.	Uncertainty is low. Operational experience and sediment/ surface water monitoring has demonstrated effectiveness of control strategies and confirmed predicted low level of impact.	Low	X
15.3	GC15	ML6228	Adverse effects on aquatic fauna and riparian vegetation due to altered flow regime by diversion (principally to Warriner and Wattiwarriganna creeks due diversion of some runoff from the headwaters of Warriner Creek)	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to altered flow regimes.	- Collection and disposal of contaminated sediments from the surface water drainage system to the TSF. - Construction of floodway crossings and culverts along the access road to ensure all-weather access and to minimise disruption to natural surface water flows. - Construct scour pits at appropriate locations along Aries pipeline to prevent uncontrolled release of water to natural surface during emergency, repair or maintenance activities (use of scour pits is infrequent and for draining pipeline only, and are not used during routine operations, scour pits are not pumped into). - Scour pits designed and constructed to contain entire drained volume of each section of pipeline with 500 mm freeboard.	Uncertainty is low. The site is located on the upper margin of the Warriner Creek catchment and the project design does not significantly alter surface water flows. Flow diversion affects less than 0.2% of the Warriner Creek catchment, which is not a significant alternation, particularly given the highly variable flows that occur in these streams. The consequence of flow diversion was rated as insignificant in the 2009 MARP and supporting specialist studies (Aquaterra, 2006). Note: the 2009 MARP did not contain any measurement criteria that relate to this outcome.	Low	X

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
15.4	GC15	ML6228	Adverse effects on aquatic fauna and riparian vegetation in Warriner and Wattiwarriganna creeks due to seepage from TSF	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to seepage from the TSF	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Construction and operation of the TSF (including collection and return of seepage to process water dam) to ensure seepage minimised. - Design and construction of the IWL to avoid formation of ARD from waste rock (by encapsulating PAF material and implementing an appropriate cover design). - Design and construction of the IWL to avoid erosion through use of rock armoured slopes at angle of repose. - Installation of a high-density polyethylene liner in the PWD. - No discharge of pit water to surface drainage unless the pit floods during a rainfall event to such an extent that there is insufficient capacity to retain water from the pit for use in the process plant. - Numerical modelling of long-term pit water and fate. - The Integrated Waste Landform (IWL) must be designed, constructed, operated and decommissioned in accordance with Tailings Management Guidelines as approved from time to time by the Chief Inspector of Mines in consultation with the Environment Protection Authority.	Uncertainty is low. TSF monitoring and modelling, and sediment/ surface water monitoring have demonstrated effectiveness of control strategies and confirmed predicted low level of impact.	Low	X
15.5	GC15	ML6228	Adverse effects on aquatic fauna in Warriner and Wattiwarriganna creeks due to ARD	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to ARD		Uncertainty is low. Monitoring of TSF bores, modelling and sediment/ surface water monitoring have demonstrated effectiveness of control strategies and confirmed predicted low level of impact.	Low	X
15.6	GC15	ML6228	Adverse effects on aquatic fauna due to pit water from emergency (controlled) discharge	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to water from open pit and underground operations.		Uncertainty is low. Operational experience has confirmed assumptions that emergency discharge to creeks downstream would be highly unlikely. Discharge from pit will be only occur during emergency situations and after consultation with DEM.	Low	X

Table 8.2 | Measurement criteria for surface water at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
7	GC07	All EMLs	Adverse effects on aquatic fauna and habitats due to the generation of fugitive sediment	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to spillage of miscellaneous chemicals or generation of fugitive sediment from activity within the EMLs	Annual inspection including photographs taken at four corners of EML and areas in the EML where high runoff is detected.	All EMLs As listed in Table 2.3 and shown in Figure 2.3	No visible sedimentation occurring outside the EML as a result of activities in the EML	Annually	NA	NA
			Adverse effects on aquatic fauna due to miscellaneous chemicals		Records maintained within the incident reporting system (SAP EMS) indicate that all spills of miscellaneous chemicals are managed in accordance with Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	All EMLs as applicable	Investigation and corrective actions triggered as a result of an accidental spill report demonstrate that all spillage to soil have been remediated in accordance with Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	On event	NA	NA
15.1	GC15	ML6228, MPL 93, MPL 94, MPL 112 to MPL 117, and MPL 169	Adverse effects on aquatic fauna and habitats due to the generation of fugitive sediment from the site (principally from the IWL and ROM pad to	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to generation of fugitive sediment	Concentrations of targeted heavy metals will be measured in sediment through laboratory analysis of total metals (and analysis of acid extractable metals if assessment of bioavailability	Sediment sampling locations WA-2, WA-3, WW-1, WW-2, WW-3, MI-1 (Figure 8.3).	Concentrations of targeted heavy metals are in the 'low risk (no action)' category identified in the decision tree process in Figure 8.2 and Section 3.5 of the ANZECC/ARMCANZ (2000) sediment quality guidelines (see Figure 8.2).	Annually	See Table 8.3 to Table 8.7. ELA (2017a) - Prominent Hill Surface Water and Soil Monitoring Assessment and	Visual surveys completed post construction of new pipelines and once per year for two subsequent years show no areas of sedimentation. If sedimentation is

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
		to MPL 176	Warriner and Wattiwarriganna creeks)		is required). The targeted metals comprise: Aluminium, Arsenic, Barium, Cadmium, Copper, Lead, and Uranium (total only). At each location, four sediment samples will be collected at approximate 1m spacing in a square grid pattern. The four samples will be combined into one sample and analysed as a composite of that location.	(WA-1 is also monitored as an internal lead indicator but is not a lead indicator or compliance site for the purpose of this PEPR). Additional locations where sedimentation is identified as part of leading indicator (Impact ID 15.1)	As per this ANZECC/ARMCANZ decision tree approach, the outcome is achieved if: - Concentrations of targeted heavy metals are below Interim Sediment Quality Guideline trigger values (ISQG-Low) identified in the ANZECC/ARMCANZ (2000) sediment quality guidelines, or where no guideline trigger value is specified, concentrations are below an adopted trigger value calculated in accordance with ANZECC/ARMCANZ (2000)) as stated in Table 8.3 to Table 8.7); or - If the ISQG-Low trigger values are exceeded, concentrations of targeted heavy metals are below background concentrations; or - If ISQG-Low trigger values or adopted trigger values (Table 8.3 to Table 8.7) (where relevant) and background concentrations are exceeded, bioavailable concentrations (analysed as acid extractable metals) are below ISQ-Low trigger values or adopted trigger values (where relevant); or - If bioavailable concentrations exceed ISQ-Low trigger values or adopted trigger values (Table 8.3 to Table 8.7), acute and chronic toxicity testing conducted in accordance with ANZECC/ARMCANZ (2000) demonstrates that concentrations are in the 'low risk (no action)' category.		ELA (2017b) – Prominent Hill Surface Water and Sediment Sampling Recommendations	observed, sample area affected by sedimentation as per GC15 (Impact ID 15.1) and include areas of concern to locations for GC14 (Impact ID 13)
15.2	GC15 GC18	ML6228, MPL 93, MPL 94, MPL 112 to MPL 117, and MPL 169 to MPL 176	Adverse effects on aquatic fauna and habitat due to spillages of miscellaneous chemicals including fuels, lubricants, explosives and process reagents (principally to Warriner and Wattiwarriganna creeks)	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to spillages of miscellaneous chemicals	Records maintained within the incident reporting system (SAP EMS) indicate that all spills of miscellaneous chemicals are managed in accordance with the Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	Various on ML and MPLs	Investigation and corrective actions triggered as a result of an accidental spill report demonstrate that all spillage to soil have been remediated as per Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	On event	NA	NA
15.3	GC15 GC18	ML6228, MPL 93, MPL 94, MPL 112 to MPL 117, and MPL 169 to MPL 176	Adverse effects on aquatic fauna and riparian vegetation due to altered flow regime by diversion (principally Warriner and Wattiwarriganna creeks due to diversion of some runoff from the headwaters of Warriner Creek)	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to altered flow regimes.	Refer to Impact No. 12 and 13 in Table 8.12 for details.	As per Impact No. 12 and 13 in Table 8.12	Refer to Impact No. 12 and 13 in Table 8.12 for details.	Annually	As per Impact No. 12 and 13 in Table 8.12	As per Impact No. 12 and 13 in Table 8.12
15.4	GC15	ML6228	Adverse effects on aquatic fauna and riparian vegetation in Warriner and	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian	Refer to measurement criteria (sediment quality) detailed for Impact 15.1.	Refer to measurement criteria (sediment	Compliance with measurement criteria (sediment quality) detailed for Impact 15.1. If leading indicator is triggered, further investigation (e.g., additional sampling,	Refer to measurement criteria (sediment	Refer to measurement criteria (sediment	Annual external third-party audit of operational TSF that includes but is not limited to:

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
			Wattiwarriganna creeks due to seepage from TSF or process water dam	vegetation) due to seepage from the TSF or process water dam		quality) detailed for Impact 15.1	modelling of seepage extent and targeted inspections for indications of seepage (e.g., surface salinity, vegetation changes) indicates that seepage has not or is not likely to adversely affect aquatic fauna and habitat biodiversity (incl. riparian vegetation)	quality) detailed for Impact 15.1	quality) detailed for Impact 15.1.	- visual inspection of structural integrity, ie. no seepage or cracks in perimeter - review of operational surveillance records and piezometer monitoring data
15.5	GC15	ML6228	Adverse effects on aquatic fauna and habitat in Warriner and Wattiwarriganna creeks due to ARD	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to ARD	Refer to measurement criteria (sediment quality) detailed for Impact 15.1.	Refer to measurement criteria (sediment quality) detailed for Impact 15.1	Compliance with measurement criteria (sediment quality) detailed for Impact 15.1. If leading indicator is triggered, further investigation (e.g., additional sampling, modelling of seepage extent and targeted inspections for indications of seepage (e.g., surface salinity, vegetation changes) indicates that seepage has not or is not likely to adversely affect aquatic fauna and habitat biodiversity (incl. riparian vegetation)	Refer to measurement criteria (sediment quality) detailed for Impact 15.1	Refer to measurement criteria (sediment quality) detailed for Impact 15.1.	Review of records undertaken annually while WRDs operational confirm that NAF thicknesses of 10 m minimum surrounding PAF material has been maintained during operation.
15.6	GC15	ML6228	Adverse effects on aquatic fauna and habitat due to pit water from emergency (controlled) discharge	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to water from open pit and underground operations.	Record review - pit water discharge records including water quality data.	Not applicable	Compliance with measurement criteria (sediment quality) detailed for Impact 15.1. If leading indicator is triggered, further investigation (e.g. additional sampling, modelling of seepage extent and targeted inspections for indications of seepage (e.g. surface salinity, vegetation changes) indicates that seepage has not or is not likely to adversely affect aquatic fauna and habitat biodiversity (incl. riparian vegetation)In the event that an emergency (controlled) discharge of pit water and/ or underground water needs to occur, records to demonstrate that approval was obtained from DEM, and that pit water quality data was collected.	Upon event	NA	NA

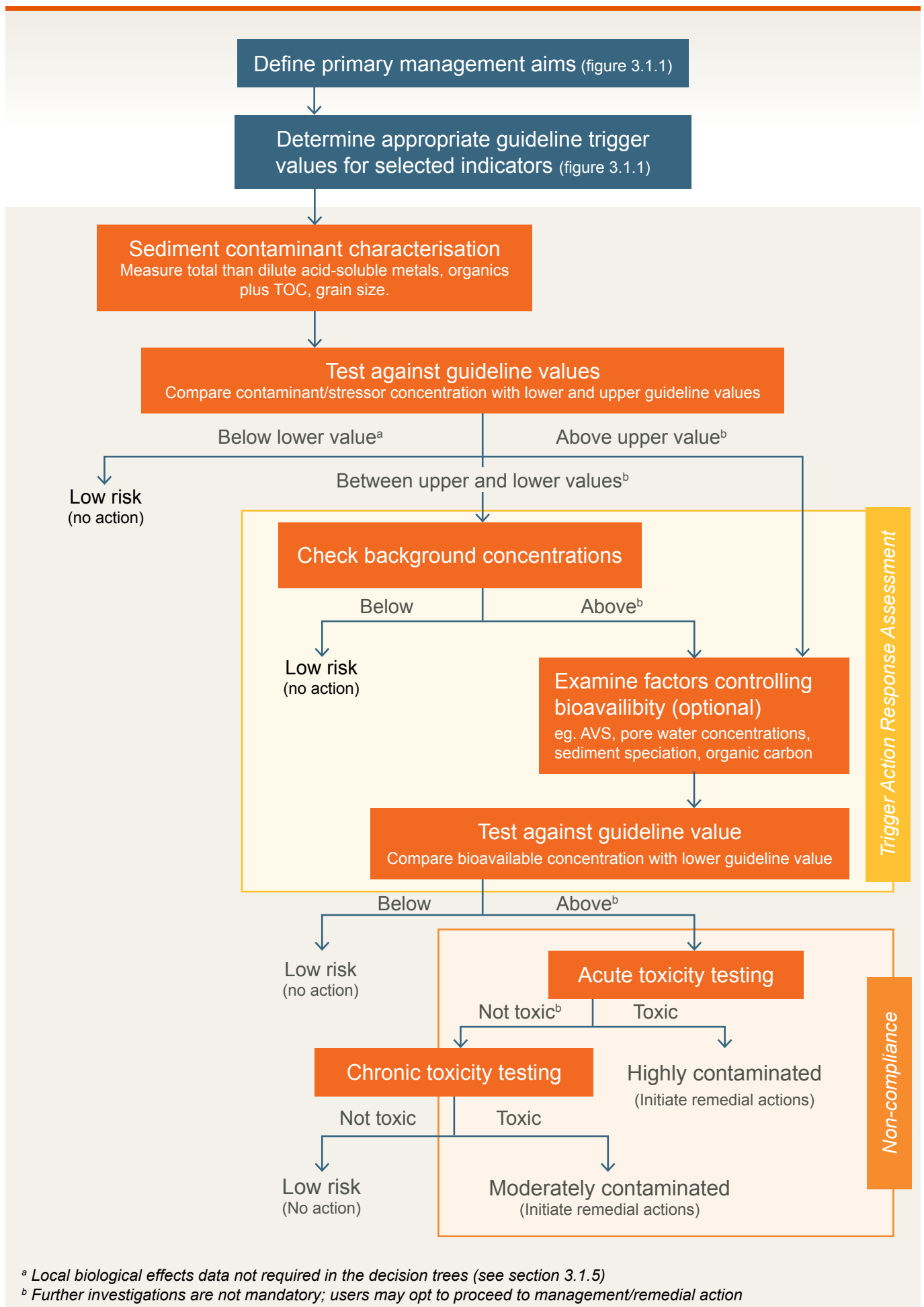


Figure 8.2 | Decision tree for the assessment of contaminated sediments (ANZECC, 2000)

Table 8.3 | Trigger levels for sediment sampling by constituent

Constituent	Unit	ANZECC (2000) Guideline value – lower trigger	ANZECC (2000) Guideline value – upper trigger
Aluminium	mg/kg	No guideline (refer to Table 8.4 and Table 8.5)	No guideline (refer to Table 8.4 and Table 8.5)
Arsenic	mg/kg	20	70
Cadmium	mg/kg	1.5	10
Copper	mg/kg	65	270
Lead	mg/kg	50	220
Total arsenic	mg/kg	20	70
Total barium	mg/kg	No guideline (refer to Table 8.6)	No guideline (refer to Table 8.6)
Total cadmium	mg/kg	1.5	10
Total copper	mg/kg	65	270
Total lead	mg/kg	50	220
Total uranium	mg/kg	No guideline (refer to Table 8.7)	No guideline (refer to Table 8.7)

Table 8.4 | Trigger values for dissolved aluminium

Sample site	Baseline data (mg/kg)	Date	Trigger level (mg/kg)*
WA-1	5,500	10/04/2007	11,000
WA-2	8,500	10/04/2007	17,000
WA-3	6,300	09/04/2007	12,600
WW-1	6,500	09/04/2007	13,000
WW-2	5,700	10/04/2007	11,400
WW-3	9,600	09/04/2007	19,200

Notes: * Trigger level at 2 x baseline data

Table 8.5 | Trigger values for total aluminium

Sample site	Baseline data (mg/kg)	Date	Trigger level (mg/kg)*
WA-1	14,300	27/06/2010	28,600
WA-2	18,600	27/06/2010	37,200
WA-3	19,300	27/06/2010	38,600
WW-1	10,700	27/06/2010	21,400
WW-2	7,020	27/06/2010	14,040
WW-3	16,400	27/06/2010	32,800

Notes: * Trigger level at 2 x baseline data

Table 8.6 | Trigger values for total barium

Sample site	Baseline data (mg/kg)	Date	Trigger level (mg/kg)*
WA-1	350	02/04/2015	700
WA-2	580	02/04/2015	1,160
WA-3	230	02/04/2015	460
WW-1	100	02/04/2015	200
WW-2	120	02/04/2015	240
WW-3	300	02/04/2015	600

Notes: * Trigger level at 2 x baseline data

Table 8.7 | Trigger values for total uranium

Sample site	Baseline data (mg/kg)	Date	Trigger level (mg/kg)*
WA-1	0.5	27/06/2010	1.0
WA-2	0.4	27/06/2010	0.8
WA-3	1.1	27/06/2010	2.2
WW-1	0.3	27/06/2010	0.6
WW-2	0.3	27/06/2010	0.6
WW-3	0.8	27/06/2010	1.6

Notes: * Trigger level at 2 x baseline data

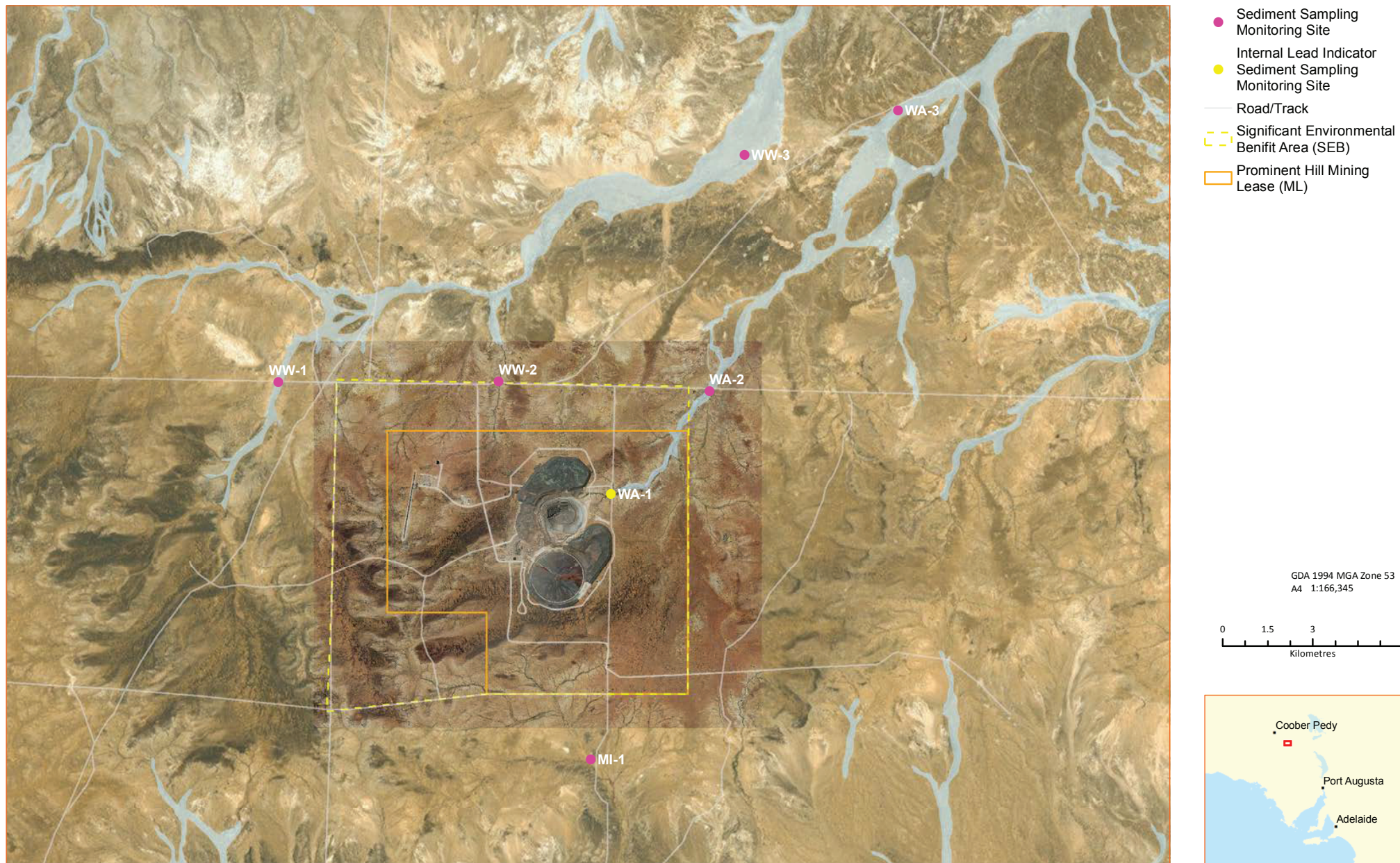


Figure 8.3 | Sediment sampling locations

8.2 Groundwater

Table 8.8 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to groundwater at Prominent Hill. Table 8.9 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.8 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for groundwater at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
16	GC16	ML6228 MPL 81, 82 MPL 91, 96, 97, 101, MPL 112 – 117	Reduced groundwater flows and/or quality to GAB springs due to project water extraction	No reduction in groundwater flows and/or quality to the Great Artesian Basin springs due to project water extraction	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Use of Arckaringa Basin aquifer for mine site water supply. - Use of the non-artesian aquifers (if possible) for concentrate export road water supply. - Further numerical modelling of project impacts on groundwater, based on field data. - Comply with water licence conditions. - Monitoring of regional groundwater to refine conceptual model. - Monitoring of groundwater (levels and quality) near the mine and wellfield (including water extraction rates) and at selected bores of existing users. - Review groundwater monitoring results annually.	Uncertainty is low. Ongoing modelling and monitoring have indicated that there is no credible risk to GAB springs from project water abstraction.	Low	X
17.1	GC17 GC18	ML6228 MPL 81, 82 MPL 112 - 117 MPL 91, 96, 97, 101	Reduced groundwater availability for other users due to project water extraction	No reduction in groundwater quantity and/or quality to existing third-party users of the Boorthanna Formation aquifer resulting in a loss of ability to operate pastoral station due to project water abstraction.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Use of Arckaringa Basin aquifer for project water supply. - Monitoring of regional groundwater to further refine model. - Monitoring of groundwater (levels and quality) near the mine and wellfield (including water extraction rates) and at selected wells of existing users. - Pit will act as a sink in perpetuity to capture any potential contaminants.	Uncertainty is relatively low. Ongoing monitoring of pastoral wells, additional studies and implementation of measures to ensure affected pastoral leases have adequate water supply have demonstrated that the outcome can be achieved. Prominent Hill water use has been declining with the close of the open pit mining operations, and will decline further from 2025 onwards, which provides further confidence.	Low	X
				No reduction in groundwater quantity and/or quality to existing third-party users of the non-artesian Eromanga aquifer due to project water abstraction.		Uncertainty is low. Ongoing monitoring of pastoral wells has indicated no impact (non-artesian Eromanga wells) and ongoing review of the conceptual hydrogeological model continues to support assumptions regarding lack of impact on the non-artesian Eromanga aquifer. Prominent Hill water use has been declining with the close of the open pit mining operations, and will decline further from 2025 onwards, which provides further confidence.	Low	X
17.2	GC17	ML6228	Deterioration in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL	No reduction in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Monitoring of regional groundwater to further refine model. - Monitoring of groundwater (levels and quality) near the mine and wellfield (including water extraction rates) and at selected wells of existing users. - Pit will act as a sink in perpetuity to capture any potential contaminants	Uncertainty is low. Ongoing TSF monitoring and modelling have confirmed the assumption that seepage would remain in close proximity to the TSF and IWL and would ultimately be captured by the pit. The pit will be a long-term sink.	Low	NA

Table 8.9 | Measurement criteria for groundwater at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
16	GC16	ML6228 MPL 81, 82 MPL 91, 96, 97, 101 MPL 112 – 117	Reduced groundwater flows and/or quality to GAB springs due to project water extraction	No reduction in groundwater flows and/or quality to the Great Artesian Basin springs due to project water extraction	Groundwater pressure	Margaret Creek bore (see Figure 8.4).	Groundwater pressure results to be within historical variation (i.e., 90-115 kpa) and show no decreasing trend that is attributable to Prominent Hill operations.	Half-yearly (groundwater pressure) or at a frequency agreed with DEW and DEM in annual review of water licence compliance	No baseline established prior to operation. Average pressure readings between 101-105 kPa, with historical pressure readings fluctuating between 90-115 kPa. ELA (2017d - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review All numerical model reports. Annual compliance reports (groundwater)	NA
					Groundwater quality (pH, temperature and salinity)	Margaret Creek bore (see Figure 8.4).	Water quality results (pH and salinity) are within baseline (+/- 10%).	Annually (water quality) or at a frequency agreed with DEW and DEM in annual review of water licence compliance	Baseline results 9.18 EC and 7.30 pH (based on two readings in 2007). Annual compliance reports (groundwater).	NA
17.1	GC17 GC18	ML6228 MPL 81, 82 MPL 112 – 117 MPL 91, 96, 97, 101	Reduced groundwater availability for other users due to project water extraction	No reduction in groundwater quantity and/or quality to existing third-party users of the Boorthanna Formation aquifer resulting in a loss of ability to operate pastoral station due to project water abstraction.	Standing water levels Record review - communications register within the stakeholder database.	Third party monitoring wells within the Boorthanna Formation aquifer (see Figure 8.4). Wells include: No. 2 Monwell, No. 6 Bore, Woolshed Monwell, CH1 (Walsh's Well), CH2, Homestead Monwell	This outcome is achieved by demonstrating that there has been no reduction in overall water supply access to the landholder to meet the demand of pastoral operations as a result of drawdown of the Boorthanna Formation This can be demonstrated by: - Hydrographs which show no declining trend in standing water level or a drawdown of less than 2 m. - In an instance where there is more than 2 m of drawdown within a third party well that is used for water supply purposes OZ Minerals must undertake a make good agreement to replace or renew lost water supply. This must be implemented before there is less than 2 m of available drawdown above the pump inlet. Evidence of any replacement/ renew water supply strategies and acceptance of these by the landholder must be provided to DEM.	Quarterly monitoring (as agreed in Land Access and Mining Compensation Agreements with landholders. Requirement in Water Licence No.396811, Water Resource Works Approval No. 396907Management Plans with DEW is half-yearly).	Baseline survey data of third party-party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements between OZ Minerals and existing users. Refer to Table 8.10 ELA 2017d - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review All numerical model reports.	Standing water levels measured against model outputs to confirm if levels are trending in accordance with model predictions, or to confirm when a well will soon become unusable and thus engagement with the landholder is required for replacement/ renew water supply strategies.

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
					Water quality (pH, temperature and salinity).	Third party monitoring wells within the Boorthanna Formation aquifer (see Figure 8.4). Wells include: No. 2 Monwell, No. 6 Bore, Woolshed Monwell, CH1 (Walsh's Well), CH2, Homestead Monwell	Water quality results (salinity) are within baseline (+/- 20% - as agreed with Landowners).	Quarterly monitoring (as agreed in Land Access and Mining Compensation Agreements with landholders. Requirement in Water Licence 396811 Management Plans with DEW is half-yearly).	Baseline survey data of third party-party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements between OZ Minerals and existing users. Refer to Table 8.10 ELA 2017d - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review All numerical model reports.	NA
					Standing water levels	Third party monitoring wells within the non-artesian Eromanga aquifer (see Figure 8.4). Wells include: Sugarloaf Well, North Well, New Mudla Monwell, No. 5 South Bore, No. 6 Monwell S, BK Homestead Bore, ASMW03, ASMW04, Baldhill Solar Bore, Baldhill W/M Bore, Bucklands Bore, Banjo's Bore, Twins Well, Pipeline Dam Bore, DW02.	This outcome is achieved by demonstrating that there has been no reduction in overall water supply access to the landholder to meet the demand of pastoral operations as a result of drawdown of the non-artesian Eromanga Aquifer This can be demonstrated by: - Hydrographs which show no declining trend in standing water level or a drawdown of less than 2 m. - In an instance where there is more than 2 m of drawdown within a third party well that is used for water supply purposes OZ Minerals must undertake a make good agreement to replace or renew lost water supply. This must be implemented before there is less than 2 m of available drawdown above the pump inlet. Evidence of any replacement/ renew water supply strategies and acceptance of these by the landholder must be provided to DEM.	Half-yearly (as agreed in Land Access and Mining Compensation Agreements with landholders and the Water Licence No.396811, Water Resource Works Approval No. 396907 Management Plans with DEW), with the exception of DW02, BK Homestead Bore and No. 6 Monwell S which are undertaken quarterly	Baseline survey of third-party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements with landholders between OZ Minerals and existing users, with the exception of wells on Mt Eba which had salinity agreed in 2016. Refer to Table 8.10. ELA (2017d - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review All numerical model reports.	Standing water levels measured against model outputs to confirm if levels are trending in accordance with model predictions, or to confirm when a well will soon become unusable and thus engagement with the landholder is required for replacement/ renew water supply strategies.
					Water quality (pH, temperature and salinity).	Third party monitoring wells within the non-artesian Eromanga aquifer (see Figure 8.4). Wells include: Sugarloaf Well, North Well, New Mudla Monwell, No.	Water quality results (salinity) are within baseline (+/- 20% - as agreed with Landowners).	Half-yearly (as agreed in Land Access and Mining Compensation Agreements with landholders and the Water Licence No.396811, Water Resource Works Approval No. 396907 with DEW),	Baseline survey of third-party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements with landholders between OZ Minerals and	NA

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
						5 South Bore, No. 6 Monwell S, BK Homestead Bore, ASMW03, ASMW04, Baldhill Solar Bore, Baldhill W/M Bore, Bucklands Bore, Banjo's Bore, Twins Well, Pipeline Dam Bore, DW02.		with the exception of DW02, BK Homestead Bore and No. 6 Monwell S which are undertaken quarterly	existing users, with the exception of wells on Mt Eba which had salinity agreed in 2016. Refer to Table 8.10. ELA (2017d - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review All numerical model reports.	
17.2	GC17	ML6228	Deterioration in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL	No reduction in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL	Deep TSF wells - half yearly monitoring for field parameters (EC, pH, water table). If field parameters monitored at deep TSF wells show statistical change then laboratory sampling (consistent with the shallow bores) would be conducted. Shallow wells and process water monitoring sites - quarterly monitoring with a broad analyte suite: (Metals dissolved and total - Ag, As, B, Cd, Co, Cr, Cu, Mn, Mo, Sb, Se, Sn, Sr, Vn, Zn, U, Major Ions – Ca, K, CL, HCO3-, SO4, pH, TDS, EC). QAQC duplicate sample to be collected once per year.	Deep TSF wells (TSF-D, TSF-E) Shallow wells (TSF-S1, TSF-S2, TSF-A, TSF-B, TSF-C) (Note: process water sites (Pit water S09 ramp, Raw water dam, Environmental Pond, TSF Finger) are also monitored quarterly to aid analysis but not as a compliance site for the purpose of this PEPR). See Figure 8.5.	Water sampling and laboratory analysis of bulldog shale wells (shallow wells) and non-Artesian Eromanga aquifer wells (deep wells) (Figure 8.5) and analysis of pH, EC and metals demonstrates water quality is within the rolling two-year statistical analysis over the preceding two years for all samples.	Deep wells - annually Shallow wells – half yearly	Rolling two-year statistical analysis using 95 percentile approach to generate a rolling window of assessment for all samples. This method is supported by the TSF Water Quality Assessment (ELA, 2017e). Historical information can be found in all TSF Water Quality Assessment reports.	Review of records undertaken annually while WRDs operational confirm that NAF thicknesses of 10 m minimum surrounding PAF material has been maintained during operation. Annual external third-party audit of operational TSF that includes but is not limited to: - visual inspection of structural integrity, i.e., no seepage or cracks in perimeter - review of operational surveillance records and piezometer monitoring data

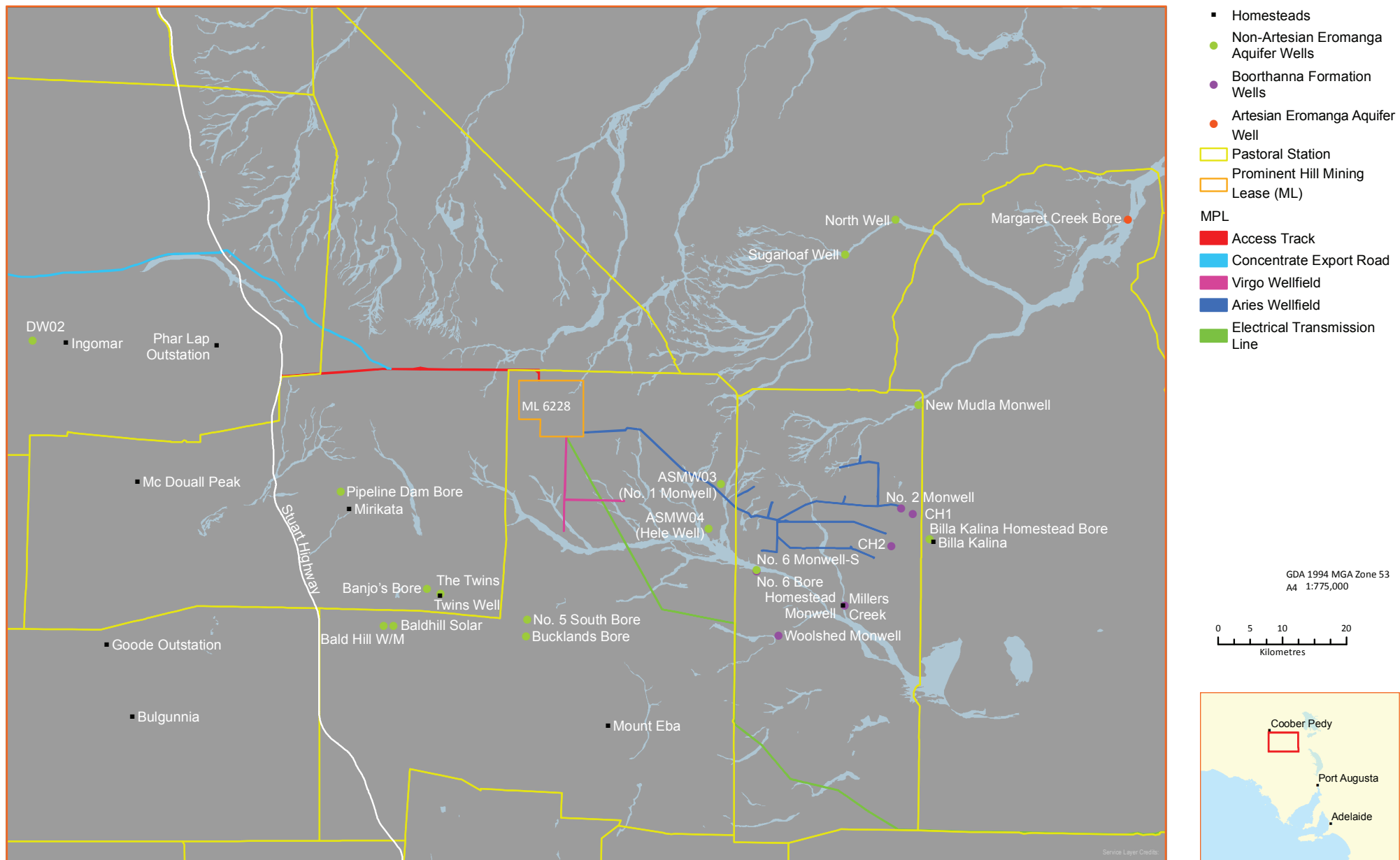


Figure 8.4 | Third party monitoring well locations



Figure 8.5 | TSF monitoring well locations

Table 8.10 | Baseline salinity and groundwater levels for third party users

Well no.	Pastoral lease	Aquifer installed within	Water level baseline (mBTCOC) ³	Salinity baseline (mS/cm)
Billa Kalina Homestead Bore	Billa Kalina	Non-artesian Eromanga	43.8	1.7
Homestead Monwell	Millers Creek	Boorthanna Formation	49.1	4.3
No. 2 Monwell	Millers Creek	Boorthanna Formation	49.8	3.2
No. 6 Bore	Millers Creek	Boorthanna Formation	50.6	10.3
No. 6 Monwell Shallow	Millers Creek	Boorthanna Formation	34.9	12.3
Woolshed Monwell	Millers Creek	Boorthanna Formation	49.5	11.6
CH1 "Walsh's Well"	Millers Creek	Boorthanna Formation	NA	NA
CH2	Millers Creek	Boorthanna Formation	NA	NA
New Mudla Monwell	Billa Kalina	Non-artesian Eromanga	26.55	7.07
Sugarloaf Well	Anna Creek	Non-artesian Eromanga	26.43	6.88
North Well	Anna Creek	Non-artesian Eromanga	25.45	6.89
ASMW03 (No. 1 Monitoring Bore)	Mt Eba	Non-artesian Eromanga	57.47	14.92
ASMW04 (Hele Well)	Mt Eba	Non-artesian Eromanga	39.11	19.12
Baldhill Solar	Mt Eba	Non-artesian Eromanga	63.68	13.16
No. 5 South	Mt Eba	Non-artesian Eromanga	NA	11.14
Baldhill W/M	Mt Eba	Non-artesian Eromanga	63.89	9.64
Bucklands Bore	Mt Eba	Non-artesian Eromanga	65.30	10.3
Banjo's Bore	The Twins	Non-artesian Eromanga	63.80	11.41
Pipeline Dam Bore	The Twins	Non-artesian Eromanga	69.33	11.28
Twins Well	The Twins	Non-artesian Eromanga	23.33	1.26
DW02	Ingomar	Non-artesian Eromanga	17.67	NA

³ Metres below top of casing

8.3 Flora and fauna

Table 8.11 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to flora and fauna at Prominent Hill. Table 8.12 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

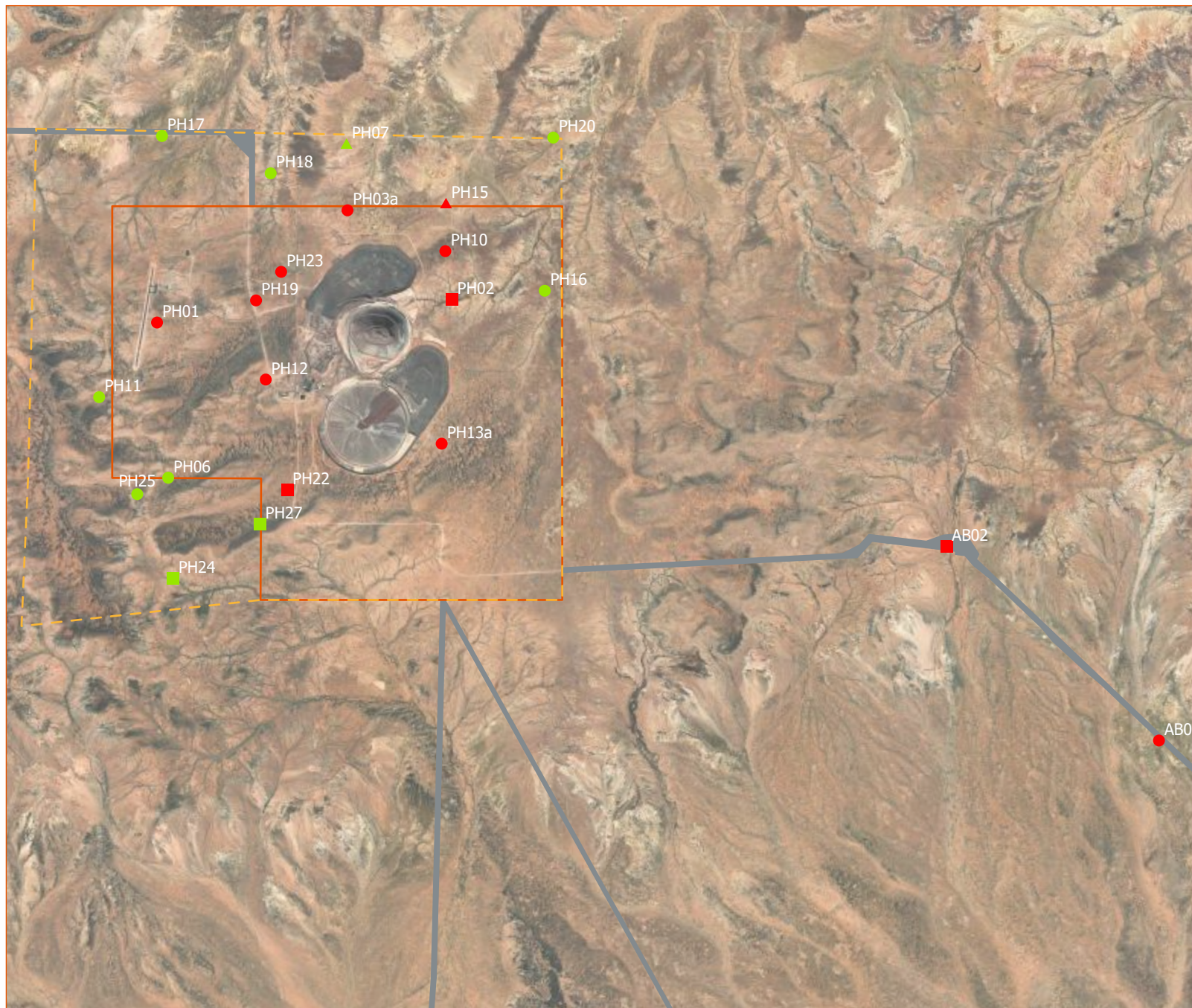
Table 8.11 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for flora and fauna at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
13	GC13 GC14	All tenements	Reduced conditions favourable for plant growth due to disturbance, dust, salinity, altered surface water flow or soil erosion Reduced species abundance due to vegetation clearing, increased grazing resulting from increased water Significant impacts to threatened species due to vegetation clearing Altered vegetation composition due to increase in fire ignition and/or changes in fire frequency and intensity	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, on or off the Mining and or miscellaneous purposes lease areas during construction and operation as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Implement dust control measures. - Ensuring areas to be disturbed are minimised and clearing complies with relevant requirements - Maintenance of roads during construction to minimise dust emission; enforcement of low vehicle speeds to minimise dust emissions; progressive revegetation of disturbed areas; and maintenance of vehicles and machinery). - Establishment and ongoing management of an SEB offset area. - Implementation of the Native Vegetation Management Plan (now called Stage Two SEB Management Plan and Threatened Species Management Plan) - Progressive rehabilitation.	Uncertainty is low. Flora monitoring data collected to date does not show any clear trend which indicates an adverse or significant impact as a result of mining activities.	Low	X
12	GC12	All tenements	Reduced species abundance due to vegetation clearing, increased grazing from increased surface water, traffic, noise and vibration and downstream effects Significant impacts to threatened species due to vegetation clearing and predation	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, on or off the Mining and or miscellaneous purposes lease areas during construction, operation as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Establishment and ongoing management of a SEB offset area. - Clearly identifying and documenting areas to be protected and areas to be cleared. - Minimising the area of direct land clearing and minimising off-road driving. - Progressively rehabilitating cleared land. - Identification of potential traps for ground-dwelling fauna, management to prevent entrapment - Minimising increased availability of surface water (including no new stock watering points). - Ensuring vegetation clearing complies with relevant regulations to reduce the risk of fire.	Uncertainty is low. Monitoring data collected do not show any clear trend which indicates an adverse or significant impact.	Low	X
64	GC64	All tenements	Increased weed density and distribution as a result of Prominent Hill operations Introduction of new weed species as a result of Prominent Hill operations	No introduction of new species of weeds, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the licence area compared to adjoining land as a result of mining operations.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Inspection and wash down of vehicles and project equipment. - Control of declared weed species. - Regular monitoring for weed outbreaks. - Minimisation of disturbance areas. - Implementation of weed control measures. - Regular baiting for foxes and wild dogs in collaboration with neighbouring properties and the local SAAL NRM group area plan.	Uncertainty is low. Operational monitoring has demonstrated effectiveness of control strategies	Low	X

Table 8.12 | Measurement criteria for flora and fauna at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
13	GC13 GC14	All tenements	Reduced conditions favourable for plant growth due to disturbance, dust, salinity, altered surface water flow or soil erosion Reduced species abundance due to vegetation clearing, increased grazing resulting from increased water.	Environmental offsets are approved and in place for all clearance of native vegetation	Habitat Quality Indicators including vegetation and soils (representing broader ecosystem function) 100 x 100m VEGETATION QUADRATS (Biol. Survey Method) - identification of all species present (species diversity/richness, inclusive of annuals) - cover (%) of individual species - species identified as recruiting.	See Figure 8.6. Assessment will be undertaken at a series of permanent impact sites (adjacent to mining operations) and control sites (replicate sites remote from mining operations but within SEB) to enable comparison between potential mine related activities and seasonal variations.	Approved Native Vegetation Management Plan and SEB Offset in place.	Annually	REP021 Prominent Hill Analysis of Flora and Fauna Monitoring Data 2007 to Spring 2012 Other Flora survey reports, conducted at the site biannually between 2007 and 2016. Comparable data up until methodology changes in 2015.	Reduction of perennial species abundance (counts) at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. Suppression of recruitment indicated by a reduction in recruitment index scores at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods.
			Significant impacts to threatened species due to vegetation clearing Altered vegetation composition due to increase in fire ignition and/or changes in fire frequency and intensity		10 x 2m SUB PLOT within VEGETATION QUADRAT. For each 1 x 1m unit of sub-plot: - estimate of % grass cover (ephemerals, annuals) - estimate of % bare ground - estimate of % litter cover within the plot - estimate of % surface crust - counts of recruits (all shrubs) to provide recruitment score - long lived perennials (over and under storey) via species abundance counts (density) for both juveniles and adults. Panoramic photographs collected to aid in assessment of vegetation cover for recruitment. Observational data to be collected at all sites including (but not limited to) vehicle tracks, erosion, vegetation clearing, distance to mine site, light, dust, inappropriate access, feral animals and weeds. GIS output of approved clearance boundary and actual clearance boundary.	Sites selected in representative habitats for key fauna species, including EPBC and NPW listed species, and to be representative of the broad vegetation community types present within the ML, MPL and SEB areas. Impact sites (PH01, PH02, PH03a, PH10, PH12, PH 13a, PH 15, PH19, PH22, PH23) and control sites (PH06, PH07, PH11, PH16, PH17, PH18, PH20, PH24, PH25, PH27)			Historical information can be found in Jacobs (2017) - 2017 Review of Prominent Hill Ecological Monitoring. All annual ecological monitoring reports.	An increase in bare ground and/or scald/erosion % cover at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. If leading indicator triggered, further assessment of detected impacts vs pre-mine condition by comparison with sites outside of SEB area required to determine non-compliance with lease condition. Annual review of vegetation clearance confirms all clearance has been approved
12	GC12	All tenements	Reduced species abundance due to	No loss of abundance or diversity of native	Refer to criteria for Impact 13	Refer to criteria for Impact 13	Refer to criteria for Impact 13	Refer to criteria for Impact 13	Refer to criteria for Impact 13	Indicators of habitat degradation, including:

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
			vegetation clearing, increased grazing from increased surface water, traffic, noise and vibration and downstream effects Significant impacts to threatened species due to vegetation clearing and predation	vegetation, or reduction in habitat quality, on or off the Mining and or miscellaneous purposes lease areas during construction, operation as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.						Reduction of perennial species abundance (counts) at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. Suppression of recruitment indicated by a reduction in recruitment index scores at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. An increase in bare ground and/or scald/erosion % cover at impact sites without a corresponding increase at control sites over three consecutive monitoring periods. If leading indicator triggered, implement targeted threatened bird surveys to confirm ongoing presence of Thick-billed Grasswren and Chestnut-breasted Whiteface within impacted sites.
64	GC64	All tenements	Increased weed density and distribution as a result of Prominent Hill operations Introduction of new weed species as a result of Prominent Hill operations	No introduction of new species of weeds, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the licence area compared to adjoining land as a result of mining operations.	Records of counts and identification of any declared weed infestations observed along transects at each location. Records of weed control actions implemented (where relevant). Records of feral animal observations, trapping and capture rates.	Five weed monitoring locations as identified in Figure 8.7 and at 5 km spacing along newly constructed pipelines	Weed infestations are recorded, treated and monitored for ongoing management requirements.	Annually for five weed monitoring locations as identified in Figure 8.7.	PH-ENV-REP-0500 Stage Two Significant Environmental Benefit Offset Area Management Plan REP021 Prominent Hill Analysis of Flora and Fauna Monitoring Data 2007 to Spring 2012. Other Flora and Fauna survey reports, conducted at the site biannually between 2007 and 2016. All annual ecological monitoring reports.	Annual review of the weed survey and management register (results of field monitoring and visual observations) considering trends that could indicate population increase or new weed species. Quarterly review of cat sightings and trapping register considering trends that could indicate population increase and requirement for increase in trapping program
						Various locations including landfill, camp and as per opportunistic sightings	Pest animal sightings are recorded and will result in the initiation of a trapping/baiting program and subsequent monitoring.	For each pipeline section, monitoring will occur once immediately after construction and once per year for the following two years. As required		



Vegetation and habitat monitoring site (by broad vegetation type)

- Control - Acacia woodland, (green square)
- Control - Chenopod shrubland (green circle)
- Control - Mallee Woodland (green triangle)
- Impact - Acacia woodland (red square)
- Impact - Chenopod shrubland (red circle)
- Impact - Mallee Woodland (red triangle)
- Significant Environmental Benefit Area (SEB) (dashed orange line)
- Other lease (grey line)
- ML 6228 (solid orange line)
- Wellfield (blue line)
- Electricity Transmission Line (purple line)
- Site Access Road (yellow line)
- Extractive Minerals Lease (green square)

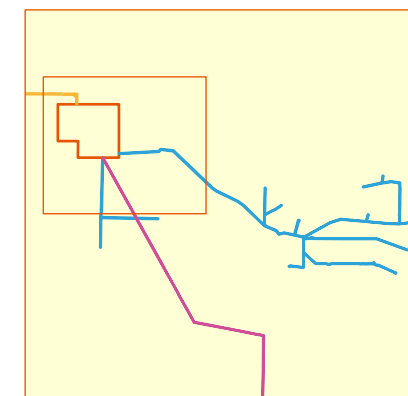
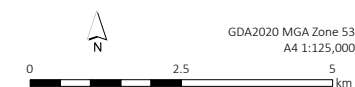


Figure 8.6 | Vegetation and habitat monitoring locations

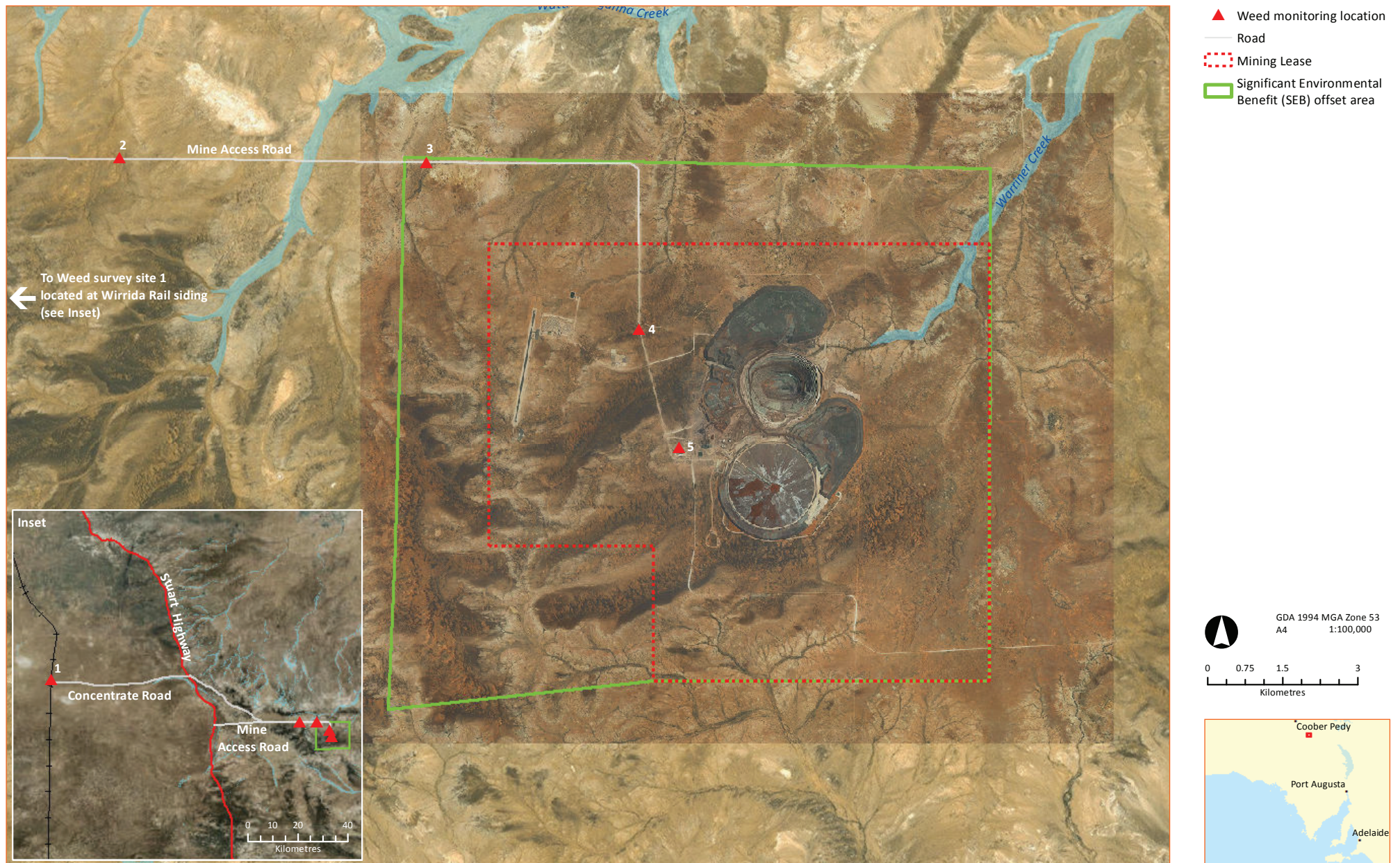


Figure 8.7 | Weed monitoring locations

8.4 Radiation and air quality

Table 8.13 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to radiation and air quality at Prominent Hill. Table 8.14 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.13 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for radiation and air quality at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
Radiation								
46	GC46	ML6228	Adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	No adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Implement the radiation controls and monitoring program contained in the approved radiation management plan (such controls could include minimising or avoiding long term occupancy of higher uranium grade areas, design and maintenance of adequate ventilation system for underground workings, dust control measures, provision of personnel hygiene facilities). - Design and construction of sediment traps, implementation of surface water management plan. - Compliance with conditions of Registration (RPC Act).	Uncertainty is low. Monitoring (vegetation, radon) has not indicated any adverse impact and ongoing compliance with the <i>Radiation and Protection Control Act 1982</i> and associated facilities licence has been achieved.	Low	X
Air quality								
11	GC11	MPL 81, 82 MPL 119 -122 MPL 93 - 94 MPL 112 - 117 MPL 91, 96, 97, 101 MPL 169 - 176 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 - 6242	Decrease in air quality due to dust emissions Decrease in air quality due to combustion emissions	No significant nuisance impacts due to dust as a result of project activities. (A significant nuisance impact is considered to be one that generates a complaint that is attributable to project activities and cannot be addressed within the timeframes specified in the measurement criteria.)	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Use of water or dust suppressants. - Maintenance of roads to minimise dust emissions. - Progressive revegetation of disturbed areas. - Maintenance of vehicle exhaust systems. - Reduction of vehicle speeds within the SEB offset area to minimise dust generation. - Establishment and maintenance of separation distances between operation and nearest residents (and workforce accommodation area).	Uncertainty is low. There have been no complaints regarding dust made to date. There are few receptors (pastoral stations) which are distant from the operations (over 35 km from the mine) and avoidance of impact at these sites is not reliant on-site dust control measures. Further it is anticipated that dust emissions will remain consistent with the current profile during both construction and operational phases of the PHOX Project.	Low	X

Table 8.14 | Measurement criteria for radiation and air quality at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
46	GC46	ML6228	Adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	No adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	Record review – compliance reporting under the <i>Radiation and Protection Control Act 1982</i> and associated facilities licence	NA	Reporting demonstrates compliance with facilities licence.	Annual	NA	NA
11	GC11	MPL 81, 82 MPL 119 – 122	Decrease in air quality due to dust emissions	No significant nuisance impacts due to dust as a result of project activities.	Record review - complaints register within stakeholder database (complaints relating to dust impacts from	NA	Audit of stakeholder engagement records undertaken quarterly demonstrates all complaints regarding significant nuisance dust have been responded to within 24 hours	Annual	NA	NA

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
		MPL 93 - 94 MPL 112 - 117 MPL 91, 96, 97, 101 MPL 169 - 176 –All EML tenements	Decrease in air quality due to combustion emissions	(A significant nuisance impact is considered to be one that generates a complaint that is attributable to project activities and cannot be addressed within the timeframes specified in the measurement criteria.)	project activities) have been responded to in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.		and corrective actions are closed out within 14 days or other time frame agreed by Director of Mines (or other authorised officer) in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.			

8.5 Land use

Table 8.15 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to land use at Prominent Hill. Table 8.16 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.15 | Environmental outcomes, control and management strategies and uncertainties and assumptions for land use at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
6	GC06	ML6228 MPL 81, 82 MPL 119 – 122 MPL 93 – 94 MPL 112 – 117 MPL 91, 96, 97, 101 MPL 169 - 176 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 - 6242	Soil contamination from chemical or fuel spills, acid rock drainage and tailing spills from either the TSF or tailing pipelines, concentrate dust and ore stockpiles	No long-term soil contamination that would compromise agreed future land uses.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Implement management measures for waste and hazardous materials (including spill response procedures). - Reuse and recycle waste materials where possible. - Dispose of putrescible/biodegradable litter in accordance with EPA guidelines. - Remediate contaminated soil or ensure it is sent offsite by a licenced contractor. - The Lessee must ensure that all fuel and liquid chemical storage areas on Mining Lease ML 6228 are bunded and lined in accordance with current EPA (South Australia) guidelines.	Uncertainty is low. Operational experience has demonstrated effectiveness of control strategies.	Low	X
65	GC65	ML6228 MPL 81, 82 MP 119 – 122 MPL 93 – 94 MPL 112 – 117 MPL 91, 96, 97, 101 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 - 624	Activity conflicts with Department of Defence within the Woomera Prohibited Area (WPA)	No adverse impacts to Department of Defence operations within the WPA.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Induct all staff regarding their responsibilities in relation to the access agreement for the WPA. - Establish, and honour the Woomera Access Agreement.	Uncertainty is low. Operational experience has demonstrated effectiveness of management strategies.	Low	X

Table 8.16 | Measurement criteria for land use at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
6	GC06	ML6228 MPL 81, 82 MPL 119 – 122 MPL 93 – 94 MPL 112 – 117 MPL 91, 96, 97, 101 MPL 169 - 176 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 - 6242	Soil contamination from chemical or fuel spills, acid rock drainage and tailing spills from either the TSF or tailing pipelines, concentrate dust and ore stockpiles	No long-term soil contamination that would compromise agreed future land uses.	Records maintained within the incident reporting system (SAP EMS) indicate that all spills of miscellaneous chemicals are managed in accordance with the Spill Response Procedure (PH-9999-SEC-PRO-0056)	Various	Investigation and corrective actions triggered as a result of an accidental spill report demonstrate that all spillage to soil have been remediated as per Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	On event	NA	NA
65	GC65	All tenements	Activity conflicts with Department of Defence within the Woomera Prohibited Area (WPA)	No adverse impacts to Department of Defence operations within the WPA	Review of communications register within the stakeholder database shows that any breaches have been responded to in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.	NA	Quarterly review of records demonstrates there has been no breaches of the deed with DoD or if a breach has occurred that it was notified within 24 hours and corrective actions are closed out within 14 days or other time frame agreed by Department of Defence (or other authorised officer) in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.	Quarterly	NA	NA

8.6 Roads, traffic and other infrastructure

Table 8.17 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to roads, traffic and other infrastructure at Prominent Hill.

Table 8.18 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.17 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for roads, traffic and other infrastructure at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
19	GC19 GC20	ML6228 EML 6234, 6236 – 6242 MPL 81, 82 MPL 119 – 122 MPL 93 – 94 MPL 112 – 117	Adverse impacts on public roads, traffic and public or private infrastructure	No significant adverse impacts on pastoral roads, public roads, traffic and other infrastructure.	Control and management strategies are detailed in the MARP (2009). Key strategies include: - Implement traffic management plan. - Implement consultation program to inform road users of any changed road conditions. - Record and investigate all accidents and near-misses and assess if the accident was substantially caused by project-related traffic.	Uncertainty is low. Due to the project road layout/ design, there is very little impact to public roads and traffic. This is supported by the lack of complaints or incidents that have been recorded during construction and operations.	Low	X

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
		MPL 91, 96, 97, 101 MPL 169 - 176			Improvements in pastoral roads to be utilised by the project			

Table 8.18 | Measurement criteria for roads, traffic and other infrastructure at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
19	GC19 GC20	ML6228 EML 6234, 6236 – 6242 MPL 81, 82 MPL 119 – 122 MPL 93 – 94 MPL 112 – 117 MPL 91, 96, 97, 101 MPL 169 - 176	Adverse impacts on public roads, traffic and public or private infrastructure	No significant adverse impacts on pastoral roads, public roads, traffic and other infrastructure.	Record review - communications register within stakeholder database (complaints relating to impacts to roads, traffic and other infrastructure from project activities) have been responded to in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.	NA	Complaint initially responded to within 24 hours. Issues underlying complaint are/ have been investigated, causes identified, complaint closed, and corrective actions implemented within 14 days. Reporting demonstrates all complaints regarding roads, traffic and other infrastructure related to mining activities have been responded to within 24 hours and corrective actions are closed out within 14 days or other time frame agreed by Director of Mines (or other authorised officer) in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.	Annually	NA	NA

8.7 Indigenous and non-indigenous cultural heritage

Table 8.19 outlines the Environmental Outcomes, control and management strategies, assumptions and uncertainties pertaining to roads, traffic and other infrastructure at Prominent Hill.

Table 8.20 outlines the measurement and leading indicator criteria, where relevant, associated with these Environmental Outcomes. Where forward works are required, these are detailed in Section 12.

Table 8.19 | Environmental Outcomes, control and management strategies and uncertainties and assumptions for Indigenous and non-indigenous cultural heritage at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty
8	GC08	ML6228 MPL 81, 82 MPL 119 – 122 MPL 93 - 94 MPL 112 – 117: MPL 91, 96, 97, 101 MPL 169 - 176 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 – 6242	Disturbance to indigenous and non-indigenous sites without authorisation	No disturbance to indigenous and non-indigenous artefacts or sites of significance unless it is authorised under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>).	Control and management strategies are detailed in the MARP. Key strategies include: - Monitoring of identified sites. - Implementation of the cultural heritage management plan (the cessation of activities at location if a significant site is discovered, employee and contractor training on importance of identifying and protecting these sites). - Design and construction to avoid significant sites. - The Lessee/ Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal Sites and Objects as defined by the <i>Aboriginal Heritage Act, 1988</i>.	Uncertainty is low. Control strategies have been demonstrated to be reasonably effective	Low	X

Table 8.20 | Measurement criteria for Indigenous and non-indigenous cultural heritage at Prominent Hill

Impact No.	Grouped condition	Tenement No.	Impact event	Environmental Outcome	OMC details					LI criteria
					What will be measured and form (method) of measurement	Location	Outcome achievement	Frequency	Control or baseline data	
8	GC08	ML6228 MPL 81, 82 MPL 119 – 122 MPL 93 - 94 MPL 112 – 117: MPL 91, 96, 97, 101 MPL 169 - 176 EML 6278 - 6296, 6299 – 6301 EML 6234, 6236 – 6242	Disturbance to indigenous and non-indigenous sites without authorisation	No disturbance to indigenous and non-indigenous artefacts or sites of significance unless it is authorised under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>).	Desktop and field audit of new land disturbance	New land disturbance sites	Land disturbance is within areas subject to cultural heritage clearance	On event	NA	NA
					Photo monitoring - condition of identified sites	Identified sites (site name and location has not been provided in the PEPR to maintain confidentiality with the native title groups.	No disturbance to identified sites attributable to project operations	Quarterly except electrical transmission line (annual)	Photographic record of identified sites	NA
					Review of records - incident reports of discovery of indigenous sites	Discovered sites	Records demonstrate that work ceased in the immediate area of discovery, appropriate authorities were advised, and work recommenced only after necessary authorisation under the <i>Aboriginal Heritage Act 1988</i> was obtained.	On event	NA	NA

8.8 Grouped lease conditions

All grouped lease conditions have been reviewed and consolidated as part of the MARP to PEPR process. This has resulted in three scenarios:

- lease conditions with a corresponding outcome
- lease conditions with no outcome (i.e., they are non-outcome based)
- lease conditions with no outcome (i.e., they are an administrative condition).

In order to provide transparency to DEM and BHP stakeholders, the following tables are provided to confirm how each lease condition is addressed within this document. Table 8.21 provides a list of the grouped lease conditions with a relevant operational outcome,

Table 8.22 summarises the lease conditions that have no corresponding environmental outcome (i.e., that are non-outcome based) and

Table 8.23 lists the lease conditions that are regulatory process or administrative conditions.

Table 8.21 | Summary of grouped lease conditions with a corresponding Environmental Outcome

Grouped condition no.	Grouped lease condition	Corresponding impact no.	Corresponding Environmental Outcome (see Table 8.1 to Table 8.20 for more detail)
GC05	The Lessee must ensure that all fuel and liquid chemical storage areas are bunded and lined in accordance with current EPA (South Australia) guidelines	6	No long-term soil contamination that would compromise agreed future land uses
GC06	The Lessee must, in constructing, operating and post mine closure of ensure there is no post-closure soil contamination.	6	As above.
GC07	The Lessee of active Extractive Mineral Leases (EMLs) must ensure that all water borne silt (or any other mining related contaminants) be contained on the mining lease EMLs.	7	Water borne silt (or any other mining related contaminants) is contained on the mining lease EMLs.
GC08	The Lessee/ Licensee must, in constructing, operating the lease/ licence, ensure there is no disturbance to indigenous and non-indigenous artefacts or sites of significance unless prior approval under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>) is obtained.	8	No disturbance to indigenous and non-indigenous artefacts or sites of significance unless it is authorised under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>).
GC09	The Lessee/Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal Sites and Objects as defined by the <i>Aboriginal Heritage Act 1988</i> .	8	As above
GC11	The Lessee/Licensee must ensure that dust from the operation be effectively controlled and managed.	11	No significant nuisance impacts due to dust as a result of project activities.
GC12	The Lessee/Licensee must, in constructing, operating the lease/ licence, and post mine closure, ensure there is no significant adverse impact to the abundance and diversity of threatened or non-threatened native fauna species.	12	No loss of abundance or diversity of native vegetation, or reduction in habitat quality, on or off the Mining and or miscellaneous purposes lease areas during construction, operation and post mine completion through: - land clearance - dust/ contaminant deposition - fire - reduction in, or introduction of, water supply or - other damage, unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.
GC13	The Lessee must, in constructing, operating and post mine closure ensure there is no avoidable disturbance to vegetation.	13	As above
GC14	The Lessee/Licensee must, in constructing, operating and lease/ licence, and post mine closure, ensure there is no significant adverse impact on the abundance and diversity of threatened or non-threatened native flora species or communities	13	As above
GC15	The Lessee must, in constructing, operating and post mine closure ensure no long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to: - generation of fugitive sediment - miscellaneous chemicals - altered flow regime - seepage from Tailings Storage Facility - seepage from the process water dam - acid rock drainage - pit water.	15.1 15.2 15.3 15.4 15.5 15.6	No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to generation of fugitive sediment No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to spillages of miscellaneous chemicals No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to altered flow regimes No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to seepage from the TSF or process water dam No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to ARD No long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to water from open pit and underground operations.
GC16	The Lessee must, in constructing, operating and post mine ensure there is no reduction in groundwater flows to Great Artesian Basin springs due to project water extraction.	16	No reduction in groundwater flows and/or quality to Great Artesian Basin springs due to project water extraction.
GC17	The Lessee must, in constructing, operating and post mine closure ensure that is no reduction in the quantity and quality of water for existing users.	17a 17b	No reduction in groundwater quantity and/or quality to existing third-party users of the Boorthanna Formation aquifer resulting in a loss of ability to operate pastoral station due to project water abstraction. No reduction in groundwater quantity and/or quality to existing third-party users of the non-artesian Eromanga aquifer due to project water abstraction. No reduction in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL
GC18	The Licensee must, in constructing and operating the Miscellaneous Purposes Licences, ensure that there is no adverse impact to the quality and quantity of groundwater and or surface water caused by mining operations to existing users and water dependent ecosystems. As per GC 15.1, 15.2 and 15.3.	17a	No reduction in groundwater quantity and/or quality to existing third-party users of the Boorthanna Formation aquifer resulting in a loss of ability to operate pastoral station due to project water abstraction. No reduction in groundwater quantity and/or quality to existing third-party users of the non-artesian Eromanga aquifer due to project water abstraction. As per GC15.1, GC15.2 and GC15.3

Grouped condition no.	Grouped lease condition	Corresponding impact no.	Corresponding Environmental Outcome (see Table 8.1 to Table 8.20 for more detail)
GC19	The Lessee must, in constructing, operating and post mine closure ensure no significant adverse impacts on public roads, traffic and power supplies.	19	No significant adverse impacts on pastoral roads, public roads, traffic and other infrastructure
GC20	The Licensee must, in constructing and operating the licence, ensure that there is no unauthorised damage to adjacent public or private infrastructure.	19	As above
GC22	The Lessee must control erosion on the external slopes of the Integrated Waste Landform	6	No long-term soil contamination that would compromise agreed future land uses.
GC27	Adjacent land use: The Licensee must in constructing and operating the Licence, ensure that there are no adverse impacts to adjacent land use.	19 65	No significant adverse impacts on pastoral roads, public roads, traffic and other infrastructure. No adverse impacts to Department of Defence operations within the Woomera Prohibited Area.
GC45	The Lessee must, in constructing, operating and post mine closure ensure there is no adverse impact on pastoralists' incomes.	17.2 17.1	No reduction in groundwater quantity and/or quality to existing third-party users of the Boorthanna Formation aquifer resulting in a loss of ability to operate pastoral station due to project water abstraction. Other relevant impacts are discussed, addressed and managed if the arise. No reduction in groundwater quantity and/or quality to existing third-party users of the non-artesian Eromanga aquifer due to project water abstraction.
GC46	The Lessee must, in constructing, operating and post mine closure ensure there is no adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	46	No adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.
GC61	The Lessee/Licensee must ensure that all affected topsoil is removed and stockpiled prior to carrying out any activity, and minimise the mixing and erosion of topsoil and overburden stockpiles	12 13	No loss of abundance or diversity of native vegetation, or reduction in habitat quality, on or off the Mining and or miscellaneous purposes lease areas during construction, operation and post mine completion through: - land clearance - dust/ contaminant deposition - fire - reduction in, or introduction of, water supply or - other damage, unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.
GC64	The Lessee/Licensee must in constructing, operating the lease/ licence and post mine closure ensure no introduction of new weeds, plant pathogens or pests (including feral animals), nor increase in abundance or distribution of existing weed or pest species in the lease/ licence area and adjacent areas caused by mining operations. The Lessee/Licensee must ensure that all employees and contractors on-site are fully aware of the requirement to operate in a manner that will minimise the spread of weeds and plant pathogens. Weeds are defined in this condition as any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in SA.	64	No introduction of new species of weeds, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the licence area compared to adjoining land as a result of mining operations.
GC65	The Lessee of Mining Lease 6228 must, in constructing, operating and post mine closure ensure there is no adverse impacts to Department of Defence operations within the Woomera Prohibited Area.	65	No adverse impacts to Department of Defence operations within the Woomera Prohibited Area (WPA).

Table 8.22 | Summary of grouped lease conditions with no corresponding Environmental Outcome

Grouped condition no.	Grouped lease condition	Comment
GC05	The Lessee must ensure that all fuel and liquid chemical storage areas on Mining Lease ML 6228 are bunded and lined in accordance with current EPA (South Australia) guidelines.	This is a control strategy, not an outcome, and has been incorporated into the control measures for Impact 6/ lease condition GC06.
GC09	The Lessee/Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal Sites and Objects as defined by the <i>Aboriginal Heritage Act, 1988</i> .	This is a control strategy, not an outcome, and has been incorporated into the control measures for Impact 8/ lease condition GC08.
GC10	The Licensee of Miscellaneous Purposes Licence (MPL) 91 must enter into a formal agreement with the Department of Transport, Energy and Infrastructure for construction, maintenance works and technical and operational issues regarding the Stuart Highway underpass. A copy of this formal agreement must be supplied to the Director of Mines and registered against the Miscellaneous Purposes Licence, prior to construction of the underpass	Deed of agreement with the Department of Transport, Energy and Infrastructure is in place. This deed is in place until 2023.
GC22	The Lessee must control erosion on the external slopes of the Integrated Waste Landform (IWL).	This is a control strategy, not an outcome, and has been incorporated into the control measures for Impact 15.1/ lease condition GC15.
GC26	The Integrated Waste Landform (IWL) must be designed, constructed, operated and decommissioned in accordance with Tailings Management Guidelines as approved from time to time by the Chief Inspector of Mines in consultation with the Environment Protection Authority.	This is a control strategy, not an outcome, and has been incorporated into the control measures for Impact 15.4/ lease condition GC15.

Grouped condition no.	Grouped lease condition	Comment
GC27	The Licensee must in constructing and operating the Licence, ensure that there are no adverse impacts to adjacent land use.	This lease condition applies only to the Electricity Transmission Line (MPL 119-122). There is no identified impact in and no corresponding outcome in the original MARP. Impacts to adjacent land use are not a credible impact for an operating transmission line in this environment, and consequently an impact event and outcome have not been specified in this PEPR. The outcome is considered to be achieved unless there are specific unresolved complaints relating to land use adjacent to the Electricity Transmission Line.
GC56	Significant Environmental Benefit (SEB) Vegetation Offset Area: The Lessee of Mining Lease 6228 must submit a detailed Significant Environmental Benefit Offset Area Management Plan to the satisfaction of the Chief Inspector of Mines within 12 months from the grant of the lease. This must include an inventory of the flora and fauna within the offset site and a plan for the long-term future management and monitoring activities.	SEB Offset Area Stage 2 Management Plan has been submitted and approved.

Table 8.23 | Summary of grouped lease conditions that are regulatory process / administrative conditions

Grouped condition no.	Grouped lease condition
GC01	The Lessee/Licensee must, before commencing operations under this lease/licence, lodge a Rehabilitation Bond (Bond) in accordance with section 62 of the Mining Act 1971 of such an amount of the surety as determined from time to time by the Minister, to cover the full cost of rehabilitation liability assessed by an independent third party at any time. In requesting a review of the bond, the Minister may request that written quotes from a third party are obtained by the lessee/licensee for the cost of rehabilitating the site to the requirements specified in the approved PEPR. The Licensee must meet all the charges and costs in obtaining and maintaining the Bond.
GC02	The Bond will not be refunded until the Minister is satisfied the completion criteria applicable to ML 6228, as stated in the approved PEPR, have been met. The Lessee must provide an audit of the achievement of the applicable completion criteria, to be carried out by an independent auditor approved by the Minister.
GC03	In requesting a review of the bond required under the <i>Mining Act 1971</i>, the Minister may request that written quotes from a third party are obtained by the Lessee/Licensee for the cost of rehabilitating the site to requirements specified in the approved PEPR. The Lessee/Licensee must meet all the charges and costs in obtaining and maintaining the Bond.
GC04	The Miscellaneous Purposes Licences (MPLs) are granted for the purposes of constructing and operating the following, for use in association with the mining operations known as the Prominent Hill Mine authorised under mining tenement ML 6228: • Site Access Road (MPL 83, 84) • Concentrate Export Road (MPL 91, 96, 97, 101) • Electricity Transmission Line (MPL 119 to 122) • Borefields and associated infrastructure (MPL 81, 82, Virgo West, 93, 94, 112 to 117).
GC21	The Lessee/Licensee must, prior to commencing operations under this lease/licence and for the duration of the lease/licence, maintain public liability insurance to cover operations under the lease/licence (including sudden and accidental pollution) in the name of the Lessee/Licensee for a sum not less than \$20 million for Miscellaneous Purposes Licences, and \$50 million for Mining Lease 6228, or such greater sum as specified by the Director of Mines, and make such amendments to the terms and conditions of the insurance as the Director of Mines may require. A copy of the cover note of certificate of currency for the insurance must be provided to the Director of Mines upon request. If requested by the Director of Mines, the Lessee/Licensee must engage an independent and reputable risk assessor to prepare a risk assessment report detailing the public liability risks arising out of the conduct of mining operations on the Lease/ Licence and recommending the level of amount of public liability cover (in respect of any one occurrence) that should be effected and maintained by the Lessee/ Licensee. In preparing the risk assessment report, the assessor must consult with the landowner and the Director of Mines. In specifying the level of insurance required, the Director of Mines accepts no liability for the completeness, adequacy of the sum insured, the limit of liability, the scoped coverage, the conditions or exclusions of the insurance in respect of how the Lessee/Licensee may or may not respond to any loss, damage or liability.
GC28	If in the opinion of the Minister any Miscellaneous Purposes Licence (MPLs) associated with the Prominent Hill Mine, or scope of operations associated with MPLs, have been significantly modified, the Minister may review the applicable MPL conditions, including any bond under this MPL, and impose new licence conditions as necessary.
GC29	The Lessee/ Licensee must provide to the Director of Mines a Mining and Rehabilitation Compliance Report (MARCR) on operations carried out on the Lease/Licence and compliance with the approved PEPR. The MARCR must be submitted every year, within 2 months after the anniversary of the date the Lease/ Licence was granted, or at some time agreed with the Director of Mines in accordance with guidelines approved by the Director of Mines. The Lessee/ Licensee agrees that the MARCR will be made available to the public in a manner and form as determined by the Director of Mines. The MARCR must include a geotechnical and operational audit of the Integrated Waste Landform undertaken by an independent certified geotechnical engineer.
GC30	The Lessee/ Licensee must demonstrate upon request and to the Director of Mines, the Lessee/ Licensee's capability and competence to comply with the requirements of the Mining Act, 1971, the conditions of this lease and the approved PEPR. This may be achieved by demonstrating aspects of the management system for the mine operations including: a. Work procedures and practices b. Risk management system c. Compliance monitoring system d. Emergency response plans e. Communication strategies to employees, contractors and visitors f. Resources allocated to compliance monitoring activities g. Previous experience of operator.

Grouped condition no.	Grouped lease condition
GC31	The Licensee accepts that the Director of Mines may withdraw a PEPR approval applicable to the Miscellaneous Purposes Licence (MPL) 112 to 117 if in the Director’s opinion, the Licensee is not complying with the approval, or has not demonstrated satisfactory capability to comply with the approval.
GC32	The Licensee must not commence or undertake any operations on the land delineated by Miscellaneous Purposes Licences (MPLs) 112–117 and 119–122 until a Mining and Rehabilitation Program (MARP) has been approved by the Minister and a bond has been paid in accordance with Section 62 of the <i>Mining Act 1971</i> .
GC33	The Lessee/Licensee must ensure that the activities approved for the lease/licence are carried out in an orderly and skilful manner in accordance with a PEPR of the land approved, from time to time, by the Minister.
GC35	The PEPR must include additional leading indicator criteria for the following outcome: No adverse impact to the quality and quantity of groundwater and/or surface water caused by water extraction operations associated with Miscellaneous Purposes Licence (MPL) 112 to 117, to existing users and water dependent ecosystems.
GC36	The Lessee must not breach any environmental outcomes to be achieved as detailed in clauses 15 to 39 (GC05, 06, 12 to 17, 19, 22 to 26, 45, 46, 56, 63, 65)
GC37	The Lessee/Licensee must prepare a PEPR that complies with the requirements of guidelines approved by the Director of Mines and include environmental and mine closure outcomes and criteria that are developed in consultation with relevant stakeholders. Include: • specify parameters to be measured and monitored by the Lessee/Licensee • specify locations that the parameters will be measured, or how these locations will be determined • clearly state the acceptable values for demonstrating achievement of the outcome, with consideration of any inherent errors of measurement • specify the frequency of monitoring by the Lessee/Licensee • Identify what background or control data are to be used and specify how it will be acquired (if necessary).
GC38	The PEPR will at all times be available to the public in a form as determined by the Director of Mines.
GC39	The Licensee must review the PEPR as applicable to Miscellaneous Purposes Licence (MPL) 119–122, on request of the Director of Mines within a time specified in the request and submit the revised PEPR for approval to the Director of Mines.
GC40	At least 3 months prior to relinquishment or expiry of Miscellaneous Purposes Licences (MPLs) 112–117 and 119–122, the Licensee must provide to the Minister a Mine Completion Report prepared in consultation with the landowner and in accordance with guidelines approved by the Director of Mines, which demonstrates achievement of the closure criteria as specified in the current PEPR.
GC41	Extractive Mineral Lease operations must be carried out for the recovery of gravel.
GC42	Mining operations may be carried out for the recovery of metallic mineral ores from the area of the lease.
GC43	The Lessee/Licensee must, if requested by the Director of Mines, undertake an independent audit of achievement of the following environmental outcomes in the PEPR, by an independent expert approved by the Director of Mines: all outcomes associated with Miscellaneous Purposes Licences (MPLs) 112–117 and 119–122 outcomes associated with Mining Lease (ML) 6228 in clauses 15 to 39 (GC05, 06, 12 to 17, 19, 22 to 26, 45, 46, 56, 63, 65) The audit will be made available to the public, in a manner and form as determined by the Director of Mines. Lessee/Licensee must meet all the charges and costs in obtaining the audit.
GC44	The Lessee/ Licensee must regularly keep the land occupier fully advised of their program of activities, particularly in regard to the impact on the land and rehabilitation.
GC45	The Lessee must, in constructing, operating and post mine closure ensure there is no adverse impact on pastoralists’ incomes.
GC47	The Lessee must keep accurate records of the quantity, value and manner of disposition of all minerals mined and, whenever required to do so, submit the records for inspection by any person authorised by the Minister
GC54	The Licensee must in constructing and operating the MPL 119–122 ensure that there are no public injuries and or deaths resulting from unauthorised entry to the site that could have been reasonably prevented.
GC55	The Lessee (EMLs and ML) must not cause any fatality or injury to an employee, contractor or member of the public by mining operations, including by truck movements.
GC57	The Licensee of MPL 119–122, MPL 169–176 must, in constructing and operating the Licence, ensure that there is no unauthorised damage (including that caused by fire) to adjacent public or private property and infrastructure.
GC58	The Lessee/Licensee must not cause any uncontrolled fires due to constructing and operating MPL 112–117 or EML or ML operations.
GC62	The Lessee must not allow any unauthorised entry onto ML or EMLs by member of the public, or breach of security measures
GC66	The Lessee/Licensee must notify the Director of Mines as soon as practical if any of the following significant incidents occur within the tenement area: (refer to SC2.14.1 to SC2.14.4): • any breach of environmental objectives to be achieved as detailed in clauses 15 to 39*. (SC2.14.1) • any unauthorised entry to site by member of the public, or breach of security measures. (SC2.14.2) • any fatality or injury to an employee, contractor or member of the public caused by mining operations (including by truck movements). (SC2.14.3) • any breach of environmental objectives to be achieved as detailed in clauses 15 to 39* (SC2.14.4). *Clauses 15 to 39 = GC05, 06, 12 to 17, 19, 22 to 26, 45, 46, 56, 63, 65

9. Closure outcomes, strategies, criteria and monitoring

9.1 Background

Prior to the development of the PEPR (2017) the Prominent Hill ML and associated tenements were regulated under eight separate MARPs and associated addendums that were developed between 2006 and 2009. As part of the development of the PEPR (2017), all environmental operational outcomes and measurement criteria were assessed and consolidated. This consolidation ensured there was consistent wording across all approvals. However, this consolidation did not address or refine the closure outcomes which remained that same as those approved in MARP 2009.

Approval for PEPR (2017) was conditional on addressing various Matters Subsequent, these Matters Subsequent included:

- providing an updated section on Mine Completion (including an updated closure plan with surveyed data of the location of the PAF material within the TSF/ WRD and a TSF cover system strategy)
- updated mine completion outcomes
- updated progressive rehabilitation and mine closure strategies and completion criteria
- updated schedule for future works
- updated plans showing the final open pit and underground workings and
- once mine completion strategies and criteria are finalised, provision of a specific assessment which demonstrates that the mine closure and rehabilitation strategies for the Northern WRD will be effective in the long-term.

This section of the PEPR addresses these Matters Subsequent, in particular the updating of mine closure outcomes and completion criteria.

9.2 Closure related grouped leased conditions

In developing this closure chapter, a review was undertaken of all grouped lease conditions relevant to the Project. Table 9.1 details the grouped lease conditions from the ML, EMLs and MPLs found during that review to be relevant to closure.

Table 9.1 | Grouped lease conditions relevant to closure

Grouped lease condition no.	Aspect	Grouped lease condition details
GC06	Land use	The Lessee must in constructing, operating and post mine closure ensure there is no post-closure soil contamination
GC09	Cultural heritage	The Lessee/Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal sites and objects as defined by the <i>Aboriginal Heritage Act 1988</i> .
GC12	Flora and fauna	The Lessee/Licensee must, in constructing, operating the lease/licence, and post mine closure, ensure there is no significant adverse impact to

Grouped lease condition no.	Aspect	Grouped lease condition details
		the abundance and diversity of threatened or non-threatened native fauna species.
GC13	Flora and fauna	The Lessee must, in constructing, operating the lease/licence, and post mine closure ensure there is no avoidable disturbance to vegetation.
GC14	Flora and fauna	The Lessee/Licensee must, in constructing, operating and lease/licence, and post mine closure, ensure there is not significant adverse impact on the abundance and diversity of threatened or non-threatened native flora species.
GC15	Flora and fauna	The Lessee must in constructing, operating and post mine closure ensure no long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to: • generation of fugitive sediment • miscellaneous chemicals • altered flow regime • seepage from Tailings Storage Facility • seepage from the process water dam • Acid Rock Drainage • pit water
GC16	Groundwater	The Lessee must in constructing, operating and post mine closure ensure there is not reduction in groundwater flows to Great Artesian Basin springs due to project water extraction.
GC17	Groundwater	The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.
GC19	Public health and safety	The Lessee must, in constructing, operating and post mine closure ensure no significant adverse impacts on public roads, traffic and power supplies.
GC22	Public health and safety	The Lessee must control erosion on the external slopes of the Integrated Waste Landform
GC23	Public health and safety	The Lessee must ensure that the slopes of the perimeter embankment on the Integrated Waste Landform (IWL) are stable post-closure even under seismic conditions.
GC24	Public health and safety	The Lessee must take responsibility for the IWL (including the tailings) until such time that it can be demonstrated that the waste is in a form that is safe, non-polluting and stable post-closure and will not cause any impacts to the surrounding environment or create potential legacy issues for future generations.
GC25	Flora and fauna	The Lessee must undertake revegetation trials and if successful, incorporate revegetation of the IWL into the Mine Closure Plan.
GC26	Public health and safety	The IWL must be designed, constructed, operated and decommissioned in accordance with Tailings Management Guidelines as approved from time to time by the Chief Inspector of Mines in consultation with the Environment Protection Authority.
GC34	Land use	The Lessee/Licensee must ensure that all land disturbed by operations conducted under this lease/licence is progressively rehabilitated in accordance with the approved PEPR, to an agreed post activity land use.
GC40	Administrative	At least 3 months prior to relinquishment or expiry of Miscellaneous Purposes Licences, the Licensee must provide to the Minister a Mine Completion Report prepared in consultation with the landowner and in accordance with guidelines approved by the Director of Mines, which

Grouped lease condition no.	Aspect	Grouped lease condition details
		demonstrates achievement of the closure criteria as specified in the current PEPR.
GC44	Administrative	The Lessee/Licensee must regularly keep the land occupier fully advised of their program of activities, particularly in regard to the impact on the land and rehabilitation.
GC45	Land use	The Lessee must in constructing, operating and post mine closure (of MPLs) ensure there is no adverse impact on pastoralists' incomes.
GC46	Flora and fauna	The Lessee must in constructing, operating and post mine closure ensure there is no adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.
GC48	Flora and fauna	The Lessee must incorporate the Ecosystem Function Analysis tool or equivalent as approved by the Director of Mines in the PEPR to monitor the performance of rehabilitation
GC49	Public health and safety	The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW
GC50	Land use	The Lessee/Licensee must ensure that as part of mine closure, the land disturbed by mining or associated activities on EMLs or MPLs is rehabilitated to a post mining land use as specified in the PEPR.
GC51	Public health and safety	The Lessee must ensure that there is no ongoing pollution or unsafe or unstable land left upon mine closure.
GC52	Public health and safety	The Lessee must ensure upon mine closure all plant and equipment (unless otherwise agreed with the Director of Mines) is removed from the site.
GC53	Flora and fauna	The Lessee must on completion of mining ensure that post closure an adequate exclusion zone (such as a fence or bund) is implemented to reduce access and ensure the safety of stock, other animals and unauthorised person to the satisfaction of the Director of Mines.
GC59	Land use	The Lessee must ensure that all terminal faces are formed (as part of mining on EMLs) to a gradient not steeper than 1 vertical to 3 horizontal (18.4°) to blend with the local topography and drainage system.
GC60	Land use	The Lessee/Licensee must ensure that all land disturbed by the construction and operation of the associated activity (EMLs and MPLs) under the lease/licence is progressively rehabilitated when practicable to do so and, in accordance with seasonal conditions, progressively re-spread with topsoil and re-vegetated to prevent soil erosion to the satisfaction of the Director of Mines.
GC63	Visual amenity	The Lessee must in construction, operating and post mine closure ensure the alteration of the visual landscape is ameliorated where practical.
GC64	Pest species	The Lessee/Licensee must in constructing, operating the lease/licence and post mine closure ensure no introduction of new weeds, plant

Grouped lease condition no.	Aspect	Grouped lease condition details
		pathogens or pests (including feral animals), nor increase in abundance or distribution of existing weed or pest species in the lease/licence area and adjacent areas caused by mining operations. The Lessee/Licensee must ensure that all employees and contractors on site are fully aware of the requirement to operate in a manner that will minimise the spread of weeds and plant pathogens. Weeds are defined in this condition as any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in SA.
GC65	Land use	The Lessee of Mining Lease 6228 must, in constructing, operating and post mine closure ensure there is no adverse impacts to Department of Defence operations within the Woomera Prohibited Area.

The above listed grouped lease conditions have been considered in the following sections of this chapter, with the exception of two, GC40 and GC44. Both are considered administrative in nature and as such have no associated closure outcome. Further details on the grouped lease conditions and how BHP will ensure compliance with them are detailed in Table 9.2.

Table 9.2 | Administrative closure grouped lease conditions

Grouped lease condition	Grouped lease condition no.	Aspect	Comment
At least 3 months prior to relinquishment or expiry of Miscellaneous Purposes Licences, the Licensee must provide to the Minister a Mine Completion Report prepared in consultation with the landowner and in accordance with guidelines approved by the Director of Mines, which demonstrates achievement of the closure criteria as specified in the current PEPR.	GC40	Administrative	Prior to tenement relinquishment BHP will prepare a completion report detailing how all relevant outcomes, OMC, LI and lease conditions have been met. This lease condition is deemed administrative and as such no related outcome is required.
The Lessee/ Licensee must regularly keep the land occupier fully advised of their program of activities, particularly in regard to the impact on the land and rehabilitation.	GC44	Administrative	BHP has a well-established engagement strategy with its key stakeholders in the region. Through the operations community engagement team lease holders will continue to be consulted on changes to the operation and their feedback received on developing closure strategies. This lease condition is deemed administrative and as such no related outcome is required.

9.3 Control, management strategies and uncertainty

All remaining (i.e., no administrative) grouped lease conditions have been grouped together, where their intent is similar, and closure outcomes developed. Table 9.3 outlines the impact events, closure outcomes, management plans/ strategies, uncertainty, sensitivity to change in assumptions and if a forward work plan if required relating to each of the grouped lease conditions.

Where forward works are required, these are detailed in Section 12.

Table 9.3 | Closure controls, management strategies and uncertainties

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
Cultural heritage							
GC09	The Lessee/Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal sites and objects as defined by the <i>Aboriginal Heritage Act 1988</i> .	Disturbance to indigenous and non-indigenous sites without authorisation	No disturbance, as a result of mining activities, to Indigenous and non-Indigenous artefacts or site of significance unless it is authorised under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>) or the Native Title Mining Agreement with the Traditional Owners (AMYAC).	Key control and management strategies include: - The location of all heritage sites is maintained in a GIS database and backed up onto the OZ Minerals server. - Key risk register with preventative and mitigating controls in place - Hard copy reports documenting site locations are available. - The majority of sites are marked in the field. - Implementation of the cultural heritage management plan and regular review with AMYAC is a requirement of this plan to remain relevant. - Monitoring program during operations ensures any disturbance is identified, notified and addressed with AMYAC.	Uncertainty is low. Control strategies have been demonstrated to be reasonably effective.	Low	X
Flora and fauna							
GC46	The Lessee must in constructing, operating and post mine closure ensure there is no adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	Adverse impacts on flora and fauna due to the release or accumulation of radionuclides into the environment.	No adverse impacts post mine closure on flora and fauna due to the release of or accumulation of radionuclides into the environment	Key control and management strategies include: - Implement the radiation controls and monitoring program contained in the approved radiation management plan (such controls could include minimising or avoiding long term occupancy of higher uranium grade areas, design and maintenance of adequate ventilation system for underground workings, dust control measures, provision of personnel hygiene facilities). - Compliance with conditions of Registration (<i>Radiation and Protection Control Act 1982</i>).	Uncertainty is low. Operational monitoring (vegetation, radon) has not indicated any adverse impact and ongoing compliance with the <i>Radiation and Protection Control Act 1982</i> and associated facilities licence has been achieved. Furthermore, recent ERICA assessment in 2019 found no referenced animals or plants received a dose above 10 µGy/h indicating that there are no impacts from a radiological perspective due to current operations.	Low	X
GC12	The Lessee/Licensee must, in constructing, operating the lease/licence, and post mine closure, ensure there is no significant adverse impact to the abundance and diversity of threatened or non-threatened native fauna species.	Reduced species abundance due to vegetation clearing, increased grazing from increased surface water, traffic, noise and vibration and downstream effects Significant impacts to threatened species due to vegetation clearing and predation	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and post mine closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place	Key control and management strategies include: - Establishment and ongoing management of a SEB offset area. - Implementation of SEB Offset Area Stage 2 Management Plan. - Clearly identifying and documenting areas to be protected and areas to be cleared. - Minimising the area of direct land clearing and minimising off-road driving. - Progressively rehabilitating cleared land. - Identification of potential traps for ground-dwelling fauna, management to prevent entrapment - Minimising increased availability of surface water (including no new stock watering points).	Uncertainty is low. Operational monitoring data collected do not show any clear trend which indicates an adverse or significant impacts to threatened native fauna species.	Low	X

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
				Ensuring vegetation clearing complies with relevant regulations to reduce the risk of fire.			
GC13	The Lessee must, in constructing, operating the lease/licence, and post mine closure ensure there is no avoidable disturbance to vegetation	Reduced conditions favourable for plant growth due to disturbance, dust, salinity, altered surface water flow or soil erosion Reduced species abundance due to vegetation clearing, increased grazing resulting from increased water Significant impacts to threatened species due to vegetation clearing Altered vegetation composition due to increase in fire ignition and/or changes in fire frequency and intensity	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and post mine closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place	Key control and management strategies include: - Implement dust control measures. - Ensuring areas to be disturbed are minimised and clearing complies with relevant requirements - Maintenance of roads during construction to minimise dust emission; enforcement of low vehicle speeds to minimise dust emissions; progressive revegetation of disturbed areas; and maintenance of vehicles and machinery). - Establishment and ongoing management of an SEB offset area. - Implementation of the Native Vegetation Management Plan (now called Stage Two SEB Management Plan and Threatened Species Management Plan) - Progressive rehabilitation.	Uncertainty is low. Operational flora monitoring data collected to date does not show any clear trend which indicates an adverse or significant impact as a result of mining activities.	Low	X
GC14	The Lessee/Licensee must, in constructing, operating and lease/licence, and post mine closure, ensure there is not significant adverse impact on the abundance and diversity of threatened or non-threatened native flora species.						
GC15	The Lessee must in constructing, operating and post mine closure ensure no long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to: - generation of fugitive sediment - miscellaneous chemicals - altered flow regime - seepage from Tailings Storage Facility - seepage from the process water dam - Acid Rock Drainage - pit water						
GC48	The Lessee must incorporate the Ecosystem Function Analysis tool or equivalent as approved by the Director of Mines in the PEPR to monitor the performance of rehabilitation	Potential for failure of rehabilitation methods	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Key control and management strategies include: - Minimising the area of direct land clearing and minimising off-road driving. - Progressively rehabilitating cleared land. - Implement spill response procedures.	Uncertainty is medium. Preliminary LFA locations have been developed within this PEPR, however these will need to be reviewed and refined as closure strategies change, particularly with attention to the Arkani Ngura Innovation and Technology Centre.	Medium	✓
GC49	The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW						

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
Groundwater							
GC16	The Lessee must in constructing, operating and post mine closure ensure there is not reduction in groundwater flows to Great Artesian Basin springs due to project water extraction.	Reduced groundwater flows to GAB springs due to project water extraction	Post mine closure there is no reduction in groundwater flows and/or quality to the Great Artesian Basin springs	Key control and management strategies include: - Use non-artesian Arckaringa Basin aquifers for mine site water supply. - Use of the non-artesian aquifers (if possible) for concentrate export road water supply. - Further numerical modelling of project impacts on groundwater, based on field data. - Comply with water licence conditions. - Monitoring of regional groundwater to refine conceptual model. - Monitoring of groundwater (levels and quality) near the mine and wellfield (including water extraction rates) and at selected bores of existing users. - Review groundwater monitoring results annually.	Uncertainty is low. Modelling and operational monitoring have indicated that there is no credible risk to GAB springs from project water abstraction.	Low	X
GC17	The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	Reduced groundwater availability for other users due to wellfield development and mine dewatering	Post-mine closure there is no adverse impact to the quantity of groundwater available to existing users as a result of mining activities.	Key control and management strategies include: - Use of the non-artesian Arckaringa Basin aquifers for project water supply. - Monitoring of regional groundwater to further refine model. - Monitoring of groundwater (levels and quality) near the mine and wellfield (including water extraction rates) and at selected wells of existing users. - Pit will act as a sink in perpetuity to capture any potential contaminants.	Uncertainty is relatively low. Operational monitoring of pastoral wells, additional studies and implementation of measures to ensure affected pastoral leases have adequate water supply have demonstrated that the operational outcome can be achieved. Prominent Hill water use is has declined as open pit mining operations ceased, which provides further confidence.	Low	X
GC17	The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	Reduced groundwater availability for other users due to wellfield development and mine dewatering	Post-mine closure there is no adverse impact to the quality of groundwater available to existing users.	See above	See above	Low	X
GC17	The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	Deterioration in groundwater quality affecting suitability for water uses (potable use and agricultural use) due to seepage from TSF or acid rock drainage from the IWL			Uncertainty is low. Operational TSF monitoring and modelling have confirmed the assumption that seepage would remain in close proximity to the TSF and IWL and would ultimately be captured by the pit.	Low	X
GC49	The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders	Failure to decommission groundwater wells effectively leads to reduced groundwater quality	Post-mine closure there is no adverse impact to the quality of groundwater available to existing users.	Key control and management strategies include: - OZ Minerals has and continues to decommission groundwater wells in accordance with Australian Standards (i.e., Minimum Construction Requirements for Water Bores in Australia – Chapter 18 Decommissioning). - Wells are only decommissioned by SA Licenced Class 2 or 3 drillers. - Wells are decommissioned as per DEW requirements.	Uncertainty is low. Wells to be decommissioned have been identified and are detailed in Figure 9.8 to Figure 9.10 and Figure 5.9.	Low	X

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
	- the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW			Permits are applied for prior to decommissioning and all permit conditions are followed.			
Land use							
GC06	The Lessee must in constructing, operating and post mine closure ensure there is no post-closure soil contamination.	Soil contamination from chemical or fuel spills, acid rock drainage and tailing spills from either the TSF or tailing pipelines, concentrate dust and ore stockpiles	No long-term soil contamination that would compromise the agreed land use post closure	Key control and management strategies include: - Implement management measures for waste and hazardous materials (including spill response procedures). - Reuse and recycle waste materials where possible. - Dispose of putrescible/biodegradable litter in accordance with EPA guidelines. - Remediate contaminated soil or ensure it is sent offsite by a licenced contractor. - The Lessee must ensure that all fuel and liquid chemical storage areas on Mining Lease ML 6228 are bunded and lined in accordance with current EPA (South Australia) guidelines.	Uncertainty is low. Operational experience has demonstrated effectiveness of control strategies.	Low	X
GC34	The Lessee/Licensee must ensure that all land disturbed by operations conducted under this lease/licence is progressively rehabilitated in accordance with the approved PEPR, to an agreed post activity land use.	Land is not rehabilitated to agreed land use (SEB)	Land disturbed through mining activities will be rehabilitated to agreed post mining land use as specified in the PEPR	Key control and management strategies include: - Where possible complete progressive rehabilitation during operations to allow sufficient time for recovery from disturbance - Rehabilitation trials completed during operations	Uncertainty is medium. Trails required to reduce uncertainty around rehabilitation methods ability to achieve post mining land use and function.	Medium	✓
GC45	The Lessee must in constructing, operating and post mine closure (of MPLs) ensure there is no adverse impact on pastoralists' incomes.	Land is not rehabilitated to agreed land use (pastoral)	Land disturbed through mining activities will be rehabilitated to allow for pastoral land use	Key control and management strategies include: - Where possible complete progressive rehabilitation during operations to allow sufficient time for recovery from disturbance - Rehabilitation trials completed during operations - Consultation with pastoralists on practical rehabilitation methods in actively grazed areas.	Uncertainty is medium. Trials required to reduce uncertainty around rehabilitation methods ability to achieve post mining land use and function.	Medium	✓
GC50	The Lessee/Licensee must ensure that as part of mine closure, the land disturbed by mining or associated activities on EMLs or MPLs is rehabilitated to a post mining land use as specified in the PEPR.						
GC59	The Lessee must ensure that all terminal faces are formed (as part of mining on EMLs) to a gradient not steeper than 1 vertical to 3 horizontal (18.4°) to blend with the local topography and drainage system.						
GC60	The Lessee/Licensee must ensure that all land disturbed by the construction and operation of the associated activity (EMLs and MPLs) under the lease/licence is progressively rehabilitated when						

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
	practicable to do so and, in accordance with seasonal conditions, progressively re-spread with topsoil and re-vegetated to prevent soil erosion to the satisfaction of the Director of Mines.						
GC65	The Lessee of Mining Lease 6228 must, in constructing, operating and post mine closure ensure there is no adverse impacts to Department of Defence operations within the Woomera Prohibited Area.	Activity conflicts with Department of Defence within the Woomera Prohibited Area (WPA)	Post mine closure no adverse impact to the Department of Defence operations	Key control and management strategies include: - Induct all staff regarding their responsibilities in relation to the access agreement for the WPA. - WPA requirements relevant to contractors are embedded in commercial contracts. - Establish, and honour the Woomera Access Agreement.	Uncertainty is low. Operational experience has demonstrated effectiveness of management strategies.	Low	X
Pest species							
GC64	The Lessee/Licensee must in constructing, operating the lease/licence and post mine closure ensure no introduction of new weeds, plant pathogens or pests (including feral animals), nor increase in abundance or distribution of existing weed or pest species in the lease/licence area and adjacent areas caused by mining operations. The Lessee/Licensee must ensure that all employees and contractors on site are fully aware of the requirement to operate in a manner that will minimise the spread of weeds and plant pathogens. Weeds are defined in this condition as any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in SA.	Increased weed density and distribution as a result of Prominent Hill operations Introduction of new weed and pest species as a result of Prominent Hill operations	No introduction of new species of weeds, plant pathogens or pest animals, nor sustained increase in abundance of weeds or pest species in the lease area caused by mining operations	Key control and management strategies include: - Inspection and wash down of vehicles and project equipment. - Control of declared weed species. - Regular monitoring for weed outbreaks. - Minimisation of disturbance areas. - Implementation of weed control measures. - Regular baiting for foxes and wild dogs in collaboration with neighbouring properties and the local SAAL NRM group area plan.	Uncertainty is low. Operational monitoring has demonstrated effectiveness of control strategies.	Low	X
Public health and safety							
GC23	The Lessee must ensure that the slopes of the perimeter embankment on the Integrated Waste Landform (IWL) are stable post-closure even under seismic conditions.	Potential for failure of rehabilitation methods results in instability of the IWL post closure	Post mine closure, the risks to the health and safety of the public are as low as reasonably practicable as far as it is affected by mining related activities.	Key control and management strategies include: - The IWL has been designed to be geotechnically stable with a FoS that exceeds the recommended minimum in ANCOLD (2012) - The IWL has been designed to prevent seepage of pollutants with PAF material encapsulated within the IWL. - The pit will act as a long-term sink for any potential contaminants from the IWL. - IWL built to design with North and South WRD PAF cells containing more than 99% of open pit's unweathered bulldog shale located 100 m from dump boundaries (M. Ormond, OZ Minerals, 2018).	Uncertainty is medium. The final closure strategy for the IWL (inclusive of the TSF capping strategy) is still to be refined and finalised. Whilst work is underway on providing as-builts of the WRDs as evidence of PAF encapsulation this work is not complete and further studies may be required for uncertainty to be low.	Medium	✓
GC24	The Lessee must take responsibility for the IWL (including the tailings) until such time that it can be demonstrated that the waste is in a form that is safe, non-polluting and stable post-closure and will not cause any impacts to the surrounding environment or create potential legacy issues for future generations.						
GC26	The IWL must be designed, constructed, operated and decommissioned in accordance with Tailings Management Guidelines as approved from time to time by the Chief Inspector of Mines in						

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
	consultation with the Environment Protection Authority.						
GC49	The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW	Injury or death to the public as a result of post-mining landscape		Key control and management strategies include: - The underground has been designed to be geotechnically stable. - Primary and secondary stopes are backfilled. - Other underground voids (e.g., the Wira shaft and declines) will remain open, though their access from surface will be blocked. - All waste will be removed from site as per operation methods. - All infrastructure to be removed from site unless otherwise agreed with stakeholders.	Uncertainty is low for the underground as the closure strategy is developed though further information will be required to be provided on the as-built prior to tenement surrender. Uncertainty is medium regarding infrastructure removal with regards to the impact that the ongoing use of the Arkani Ngura Innovation and Technology Centre will have on the sites closure strategy.	Medium	✓
GC51	The Lessee must ensure that there is no ongoing pollution or unsafe or unstable land left upon mine closure.						
GC53	The Lessee must on completion of mining ensure that post closure an adequate exclusion zone (such as a fence or bund) is implemented to reduce access and ensure the safety of stock, other animals and unauthorised person to the satisfaction of the Director of Mines.	Access to the site is not reduced to ensure the safety of stock, other animals and unauthorised persons		Key control and management strategies include: - Abandonment bund constructed around pit area to limit access to the open pit (Eastern Abandonment Bund has already been constructed). - Stock proof fence already installed around the SEB and site. - Installation of signage. - Ongoing monitoring of the stock proof fence during operations.	Uncertainty is medium. Location of Western Abandonment Bund still to be confirmed.	Low	✓
GC22	The Lessee must control erosion on the external slopes of the Integrated Waste Landform	Potential for failure of rehabilitation methods results in instability (chemical and structural) of the IWL post closure	Post mine closure the IWL will remain both physically and chemically stable.	Key control and management strategies include: - The IWL has been designed to be geotechnically stable with a factor of safety (FoS) that exceeds the recommended minimum in ANCOLD (2012). - Durable NAF material has been used for rock armouring.	Uncertainty is medium. Final IWL design is required to assess the potential for long-term erosion stability.	Medium	✓
GC25	The Lessee must undertake revegetation trials and if successful, incorporate revegetation of the Integrated Waste Landform (IWL) into the MARP closure plan			Uncertainty is medium. Whilst the current design assumes no vegetation is required to ensure the long-term stability of the IWL confirmation of this, once a final IWL landform has been determined, is required.	Low	✓	
Visual amenity							
GC25	The Lessee must undertake revegetation trials and if successful, incorporate revegetation of the Integrated Waste Landform (IWL) into the MARP closure plan	Potential for failure of rehabilitation methods results in instability of the IWL post closure	Post mine closure the alteration of the visual landscape is ameliorated where practical.	Key control and management strategies include: Demonstration that plants are not required on the IWL from a visual amenity perspective (i.e., that the current IWL design with blend in with the local Breakaway landform).	Uncertainty is low. The current design assumes no vegetation is required to ensure the long-term stability of the IWL.	Low	X

Grouped lease condition no.	Grouped lease condition	Impact event	Closure outcome	Control and management strategies	Uncertainties and assumptions	Sensitivity to change of assumptions	Forward work required to reduce uncertainty?
GC49	The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW	Reduced visual amenity in the region	Post mine closure the alteration of the visual landscape is ameliorated where practical.	Key control and management strategies include: - The IWL (WRD's & TSF) has been designed to blend in with the local Breakaway landforms. - Internal report to present evidence including but not limited to photographs, survey records and engineering designs.	Uncertainty is low.	Low	X
GC63	The Lessee must in construction, operating and post mine closure ensure the alteration of the visual landscape is ameliorated where practical.						

9.4 Closure outcomes and outcome measurement criteria

New OMC have been developed for each new closure outcome, with leading indicators as appropriate. This if further detailed in Table 9.4.

Table 9.4 | Closure outcomes and OMCs

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
Cultural heritage									
The Lessee/Licensee must ensure that all employees and contractors on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal sites and objects as defined by the <i>Aboriginal Heritage Act 1988</i> .	GC09	No disturbance, as a result of mining activities, to Indigenous and non-Indigenous artefacts or site of significance unless it is authorised under the relevant legislation (<i>Aboriginal Heritage Act 1988</i> or <i>Heritage Places Act 1993</i>) or the Native Title Mining Agreement with the Traditional Owners (AMYAC).	Cultural heritage	No new disturbance identified during quarterly and/ or annual (electrical transmission line) inspection of recorded cultural heritage sites during operations.	Final inspection of known cultural heritage sites and audit of historical inspection reports by OZ Minerals Personnel in collaboration with Traditional Owners (AMYAC).	All Domains Identified cultural heritage sites as shown in Figures 2 and 3 of the Prominent Hill Cultural Heritage Plan (PH-0000-SEC-PRO-0001). Figures not provided due to confidentiality.	Formal acknowledgement from AMYAC confirms their acceptance of the final inspection of heritage sites	Once prior to tenement relinquishment	Photographic and GIS records of identified sites Annual monitoring data.
Flora and fauna									
The Lessee must in constructing, operating and post mine closure ensure there is no adverse impacts on flora and fauna due to the release or accumulation of	GC46	No adverse impacts post mine closure on flora and fauna due to the release of or accumulation of radionuclides into the environment	Flora and fauna	Annual reporting during operations demonstrates compliance with facilities radiation licence.	Operational radiological records and environmental assessments	Locations as detailed in Figure 9.1	Independent external verification by suitably qualified person(s) confirms that s no unacceptable risk to flora or fauna as a result of	Once prior to tenement relinquishment	Papari Radiation Services, 2006, Prominent Hill Copper-Gold Project Radiation Assessment Report.

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
radionuclides into the environment.							the release or accumulation of radionuclides.		RCA 2019, OZ Minerals Prominent Hill Project, Environmental Radiation Impact Assessment. Annual monitoring data.
The Lessee/Licensee must, in constructing, operating the lease/licence, and post mine closure, ensure there is no significant adverse impact to the abundance and diversity of threatened or non-threatened native fauna species.	GC12	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and post mine closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Flora and fauna	Annual flora (habitat quality) surveys during operations demonstrates compliance with operational outcomes and the following leading indicators of habitat degradation have not been triggered: - Reduction of perennial species abundance (counts) at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. - Reduction in recruitment index scores at impact sites without a corresponding reduction at control sites over three consecutive monitoring periods. - An increase in bare ground and/or scald/erosion % cover at impact sites without a corresponding increase at control sites over three consecutive monitoring periods. - If leading indicator triggered, implement targeted threatened bird surveys to confirm ongoing presence of Thick-billed Grasswren and Chestnut-breasted Whiteface within impacted sites.	Operational habitat quality monitoring data	Habitat monitoring locations as detailed in Figure 8.6	Internal audit report of operational data demonstrates that there is no decrease in habitat quality (aside from that which has previously been approved) which can be attributed to mine related activities.	Once prior to tenement relinquishment	REP021 Prominent Hill Analysis of Flora and Fauna Monitoring Data 2007 to Spring 2012 Other flora survey reports, conducted at the site biannually between 2007 and 2016. Comparable data up until methodology changes in 2015. Historical information can be found in Jacobs (2017) - 2017 Review of Prominent Hill Ecological Monitoring. Annual monitoring data/ annual monitoring reports.
The Lessee must, in constructing, operating the lease/licence, and post mine closure ensure there is no avoidable disturbance to vegetation.	GC13	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and post mine closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Flora and fauna	Implementation of the SEB Offset Management Plan as approved by the Native Vegetation Council.	Operational habitat quality data within and outside of the SEB Offset Area	Habitat monitoring locations as detailed in Figure 8.6	Internal audit report demonstrates that habitat quality in impact sites is consistent with or is predicted to reach habitat quality of control sites (i.e., demonstration that an SEB has been met).	Once prior to tenement relinquishment	As above
The Lessee/Licensee must, in constructing, operating and lease/licence, and post mine closure, ensure there is not significant adverse impact on the abundance and diversity of threatened	GC14								

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
or non-threatened native flora species.	GC15								
The Lessee must in constructing, operating and post mine closure ensure no long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to: • generation of fugitive sediment • miscellaneous chemicals • altered flow regime • seepage from Tailings Storage Facility • seepage from the process water dam • Acid Rock Drainage • pit water									
The Lessee must incorporate the Ecosystem Function Analysis tool or equivalent as approved by the Director of Mines in the PEPR to monitor the performance of rehabilitation	GC48	No permanent loss of abundance or diversity of native vegetation, or reduction in habitat quality, during construction, operation and closure as a result of mining activities unless prior approval under relevant legislation is obtained and environmental offsets are approved and in place.	Flora and fauna	NA	Comparison of rehabilitation trials results and LFA (or equivalent) monitoring	Areas of disturbed land that has no further mining-related use At least one area per closure domain. (excluding Domain 1, 2 and 3) Preliminary locations are detailed in Figure 9.3 to Figure 9.6	Independent external verification by suitably qualified person(s) confirms that rehabilitation has achieved, or is likely to achieve, a landscape function equivalent to that of adjacent analogue LFA sites	Prior to the application of tenement surrender	NA
The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: • the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders • the risks to the health and safety of the public and fauna are as low as reasonably practical • the site is ecologically stable and sustainable • the site is physically stable • all waste materials left onsite are chemically and physically stable • wells are decommissioned to the satisfaction of DEW	GC49								

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
Groundwater									
The Lessee must in constructing, operating and post mine closure ensure there is not reduction in groundwater flows to Great Artesian Basin springs due to project water extraction.	GC16	Post mine closure there is no reduction in groundwater flows and/or quality to the Great Artesian Basin springs	Groundwater	Groundwater pressure and water quality (pH, temperature and salinity) collected at Margaret Creek Bore (Domain 5) during operations demonstrates: that groundwater pressure results have remained within historical variation (i.e., 90-115 kpa) and showed no decreasing trend attributable to Prominent Hill operations and that water quality results (pH and salinity) were within baseline (+/- 10%).	Historical groundwater quality and quantity data collected during operation	Artesian Eromanga aquifer well (Margaret Creek Bore) as detailed in Figure 8.4	Independent external verification by suitably qualified person(s) confirms a review of all historical operational data demonstrates acceptance of data collected demonstrates that there has been no reduction in groundwater flows and/ or quality to the Great Artesian Basin that is attributable to Prominent Hill operations.	Once prior to tenement relinquishment	No baseline established prior to operation. Average pressure readings between 101-105 kPa, with historical pressure readings fluctuating between 90-115 kPa. Baseline results 9.18 EC and 7.30 pH (based on two readings in 2007).
The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	GC17	Post-mine closure there is no adverse impact to the quantity of groundwater available to existing users as a result of mining activities.	Groundwater	Operational monitoring of groundwater levels within third party monitoring wells in both the non-artesian Eromanga aquifer and Boorthanna Formation aquifer demonstrates that: - Hydrographs which show no declining trend in standing water level or a drawdown of less than 2 m. - In an instance where there is more than 2 m of drawdown within a third party well that is used for water supply purposes OZ Minerals must undertake a make good agreement to replace or renew lost water supply. This must be implemented before there is less than 2 m of available drawdown above the pump inlet.	Historical groundwater level (quantity) data collected during operation	Third party monitoring wells in the Boorthanna formation and the non-artesian Eromanga aquifer as detailed in Figure 8.4	Independent external verification by suitably qualified person(s) confirms there has been no reduction in overall water supply access to the landholder due to mining operations	Once prior to tenement relinquishment	Baseline survey of third-party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements with landholders between OZ Minerals and existing users. Table 8.10 of the PEPR ELA (2017d) - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review Annual monitoring data/ annual water licence compliance reports.
The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	GC17	Post-mine closure there is no adverse impact to the quantity of groundwater available to existing users as a result of mining activities.	Groundwater	Periodic review and update (recalibration as required) of the Prominent Hill regional groundwater model during operations.	Historical groundwater level (quantity) data collected during operation	Locations of wells for data input into the model are detailed in Figure 9.7	Independent external verification by suitably qualified expert confirms that at closure the Prominent Hill regional groundwater model shows that drawdown levels associated with the Aries and Virgo borefield wells are trending towards baseline with a confidence-level classification of Class 3 (as defined in Australian groundwater modelling	Groundwater model to be recalibrated 12 months after mine closure. The need for future requirements to recalibrate/run the model to be determined by a suitably qualified expert.	Table 8.10 of the PEPR Groundwater model updates

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
							guidelines, Barnett et al 2012).		
The Lessee must in constructing, operating and post mine closure ensure there is not reduction in groundwater flows to Great Artesian Basin springs due to project water extraction.	GC16	Post mine closure there is no reduction in groundwater flows to the Great Artesian Basin springs	Groundwater	NA	Decommissioning reports	Locations of all wells relating to the Project which will require decommissioning are detailed in Figure 9.8, Figure 9.9 and Figure 9.10.	Internal audit report confirms that groundwater wells have been decommissioned in accordance with DEW requirements unless otherwise agreed with DEW, DEM and the landholder.	Once at completion of all groundwater monitoring requirements	InViron Database
The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	GC17								
The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW	GC49	Post-mine closure there is no adverse impact to the quantity of groundwater available to existing users as a result of mining activities.							
The Lessee must, in constructing, operating and post mine closure ensure that there is no reduction in the quantity and quality of water for existing users.	GC17	Post-mine closure there is no adverse impact to the quality of groundwater available to existing users.	Groundwater	Operational monitoring of groundwater quality of TSF monitoring wells identifies groundwater quality is within agreed limits.	Historical groundwater quality data collected during operations. Water quality includes: Deep TSF wells in the non-artesian Eromanga aquifer (salinity, pH, temperature)	Bulldog shale and non-artesian Eromanga aquifer wells as detailed in Figure 8.5	Independent external verification report confirms no ongoing economic loss to landholder as a result of reduction in groundwater quality associated with mining activities.	Once at completion of all groundwater monitoring requirements	Baseline survey of third party properties undertaken in 2007 as outlined in Land Access and Mining Compensation Agreements with landholders between OZ Minerals and existing users, with the exception of wells on Mt Eba which had salinity agreed in 2016. Table 8.10 of the PEPR

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
					Shallow TSF wells in the Bulldog shale (salinity, pH, temperature, and dissolved and total metals – Ag, As, B, Cd, Co, Cr, Cu, Mn, Mo, Sb, Se, Sn, Sr, Vn, Zn, U, Major Ions – Ca, K, Cl, HC03-, SO4				ELA (2017d) - Prominent Hill Copper-Gold Mine Conceptual hydrogeological model review Annual monitoring data/ annual water licence compliance reports
				Operational monitoring of groundwater quality within third party monitoring wells in both the non-artesian Eromanga aquifer and Boorthanna Formation aquifer demonstrates that groundwater quality is within agreed limits. (+/- 20% as agreed with the Landholder)	Historical groundwater quality data collected during operations. Water quality includes pH, temperature and salinity.	Third party monitoring wells in the Boorthanna formation and the non-artesian Eromanga aquifer as detailed in Figure 8.4	Independent external verification by suitably qualified person(s) confirms no ongoing reduction in groundwater quality due to mining operations	Once prior to tenement relinquishment	As above
Land use									
The Lessee must in constructing, operating and post mine closure ensure there is no post-closure soil contamination.	GC06	No long-term soil contamination that would compromise the agreed land use post closure	Land use	Records maintained within the incident reporting system (SAP EMS) indicate that all spills of miscellaneous chemicals are managed in accordance with the Chemical and hydrocarbon spill procedure (PH-9999-SEC-PRO-0056).	Internal audit of operational records of spills. Soil sampling of target sites (including but not limited to the fuel farm, chemical stores, access roads) measuring presence of impacted soils in accordance with the Guidelines for the assessment and remediation of site contamination (EPA, 2018) and the National Environment Protection Measure (NEPM) (HILs) 1999 Parameters to be measured include: salinity, pH, carbons (C6-C40).	Domain 4a Mine Area Domain 4b Village (Aerodrome)	Internal audit report confirms no long-term soil contamination is present that would compromise the agreed land use.	Once prior to tenement relinquishment	NA
The Lessee/Licensee must ensure that all land disturbed by operations conducted under this lease/licence is progressively rehabilitated in accordance with the approved PEPR, to an agreed post activity land use.	GC34	Land disturbed through mining activities will be rehabilitated to agreed post mining land use as specified in the PEPR	Land use	NA	Rehabilitated land	Domain 1 IWL Domain 2 Open pit Domain 4a Mine Area Domain 4b Village (Aerodrome)	Internal audit report confirms that disturbed land has been rehabilitated to agreed post-mining land use (SEB offset area).	Once prior to tenement relinquishment	PEPR
The Lessee must in constructing, operating and post mine closure (of MPLs) ensure there is no adverse impact on pastoralists' incomes.	GC45	Land disturbed through mining activities will be rehabilitated to allow for pastoral land use	Land use	Photo point monitoring	Evidence of rehabilitation to standards required as outlined in the PEPR and Lease/ Licence conditions e.g. terminal faces of EMLs to be a gradient not steeper than a ratio of 1 vertical: 3 horizontal, respreading of topsoil, where applicable.	Domain 5 MPLs Domain 6 EMLs	Internal audit report confirms that disturbed land has been rehabilitated to allow for pastoral use.	Once prior to tenement relinquishment	Control sites on neighbouring land undisturbed by mining activities.
The Lessee/Licensee must ensure that as part of mine closure, the land disturbed	GC50								

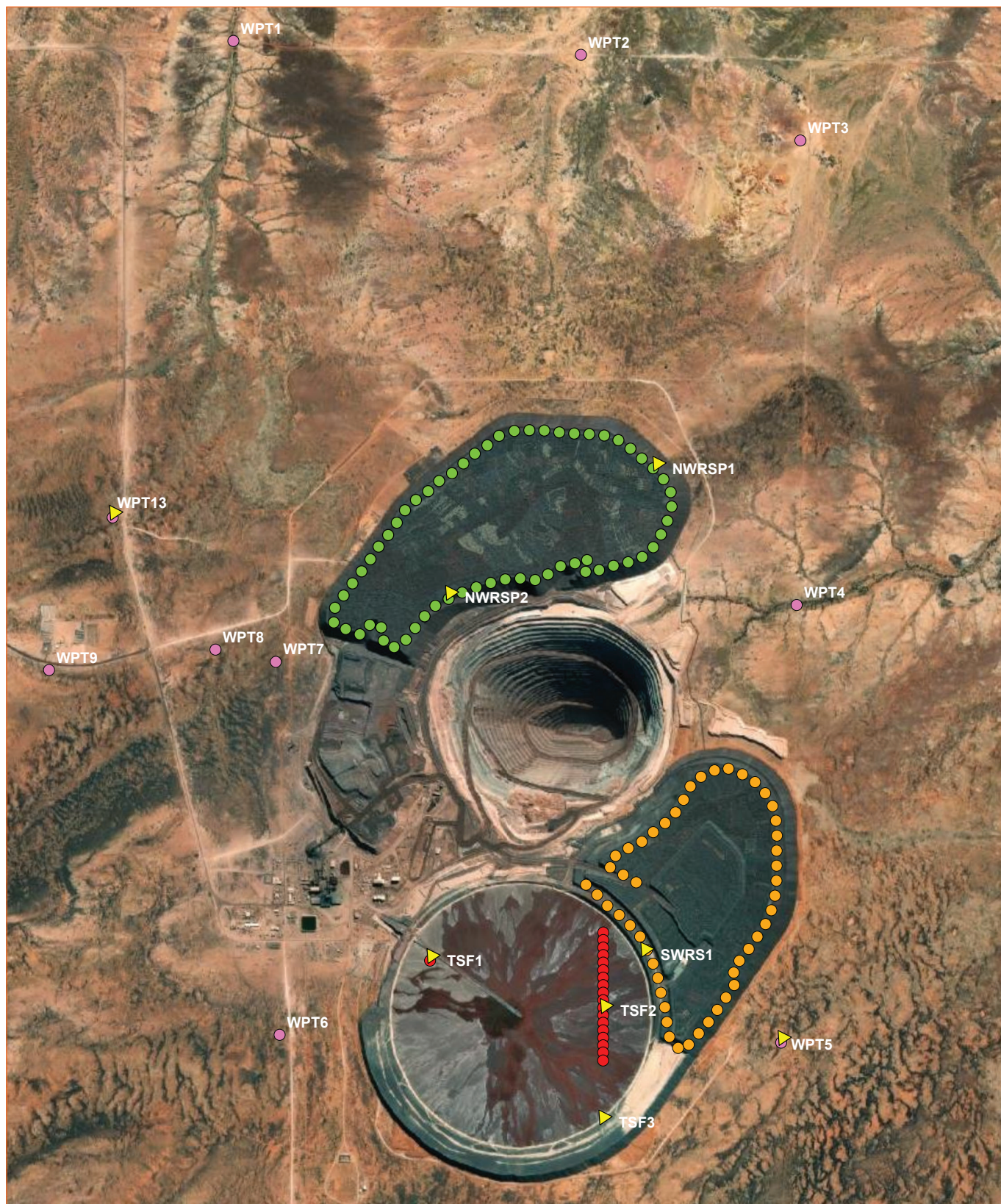
Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
by mining or associated activities on EMLs or MPLs is rehabilitated to a post mining land use as specified in the PEPR.	GC59				Photo point monitoring of designated locations demonstrates that disturbed land has returned to a level as agreed between the tenement holder and the relevant stakeholders.				
The Lessee must ensure that all terminal faces are formed (as part of mining on EMLs) to a gradient not steeper than 1 vertical to 3 horizontal (18.4°) to blend with the local topography and drainage system .									
The Lessee/Licensee must ensure that all land disturbed by the construction and operation of the associated activity (EMLs and MPLs) under the lease/licence is progressively rehabilitated when practicable to do so and, in accordance with seasonal conditions, progressively re-spread with topsoil and re-vegetated to prevent soil erosion to the satisfaction of the Director of Mines .	GC60								
The Lessee of Mining Lease 6228 must, in constructing, operating and post mine closure ensure there is no adverse impacts to Department of Defence operations within the Woomera Prohibited Area.	GC65	Post mine closure no adverse impact to the Department of Defence operations	Land use	Monthly review of records during operations demonstrates there has been no breaches of the deed with Department of Defence or if a breach has occurred that it was notified within 24 hours and corrective actions are closed out within 14 days or other time frame agreed by DOD (or other authorised officer) in accordance with PH-9999-SEC-PRO-0052 Enquiry, Complaint and Grievance Management Procedure.	Correspondence from/to Department of Defence.	All domains	Formal acknowledgement from Department of Defence confirms no likelihood of ongoing adverse impact to DoD operations.	Once prior to tenement relinquishment	NA
Pest species									
The Lessee/Licensee must in constructing, operating the lease/licence and post mine closure ensure no introduction of new weeds, plant pathogens or pests (including feral animals), nor increase in abundance or distribution of existing weed or pest species in the lease/licence area and adjacent areas caused by mining operations.	GC64	No introduction of new species of weeds, plant pathogens or pest animals, nor sustained increase in abundance of weeds or pest species in the lease area caused by mining operations.	Pest species	Review of the annual ecological survey demonstrates no increase in abundance or diversity of weeds or pest animals compared to control sites. Monthly inspection of sighting records to determine if increased activity of feral predators in observed.	Operational weed and pest animal species monitoring data	Weed monitoring locations as detailed in Figure 8.7	Internal audit report demonstrates that pest animal and weed species diversity and abundance in impact sites is consistent with control sites.	Once prior to tenement relinquishment	REP021 Prominent Hill Analysis of Flora and Fauna Monitoring Data 2007 to Spring 2012. Other flora survey reports conducted at the site biannually between 2007 and 2016. Comparable data up until methodology changes in 2015. Historical information can be found in the PEPR (2019) Appendix E of the

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
The Lessee/Licensee must ensure that all employees and contractors on site are fully aware of the requirement to operate in a manner that will minimise the spread of weeds and plant pathogens. Weeds are defined in this condition as any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in SA.									PEPR - Jacobs (2017) - 2017 Review of Prominent Hill Ecological Monitoring. Annual monitoring data/ annual monitoring reports.
Public health and safety									
The Lessee must ensure that the slopes of the perimeter embankment on the Integrated Waste Landform (IWL) are stable post-closure even under seismic conditions.	GC23	Post mine closure, the risks to the health and safety of the public are as low as reasonably practicable as far as it is affected by mining related activities.	Public Health and Safety	Annual TSF operational audit and management review report by a suitably qualified consultant demonstrates compliance with OMC as stated in Table 8.2.	Evidence including but not limited to survey records, engineer designs, photographs and operational monitoring data.	Domain 1 IWL Domain 2 Open pit	Independent external verification report by an independent and suitably qualified expert approved by the Director of Mines (or authorised officer) confirms that: - the landforms (including WRD, TSF and open pit) have been built to design - the TSF has been operated within design parameters - the TSF and WRDs landforms have been closed so that they will be non-polluting in the long-term - the landforms have been closed so that they will be stable in the long-term. So that the risks to the health and safety of the public are as low as reasonably practicable	Once prior to tenement relinquishment	IWL design as detailed in the PEPR Pit wall design as detailed in the PEPR Operational monitoring data.
The Lessee must take responsibility for the IWL (including the tailings) until such time that it can be demonstrated that the waste is in a form that is safe, non-polluting and stable post-closure and will not cause any impacts to the surrounding environment or create potential legacy issues for future generations.	GC24			Operational monitoring of TSF stability by means of 30 prisms positioned within the TSF embankment does not identify relative movement over time. Results from monthly inspection of three uniaxial and six biaxial inclinometers located between south pit crest and TSF embankment IWL landform do not identify any deformation of the overburden slopes Monthly visual inspection of the IWL does not identify any relative movement over time.					
The IWL must be designed, constructed, operated and decommissioned in accordance with Tailings Management Guidelines as approved from time to time by the Chief Inspector of Mines in consultation with the Environment Protection Authority.	GC26			Operational monitoring of geotechnical stability of north and south pit crest, using approximately 500 prisms, does not identify relative movement over time.					
The Licensee of Miscellaneous Purposes Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines:	GC49			Survey of IWL during construction to ensure is built to design Results of the following operational monitoring: - geotechnical annual aerial surveys and - geotechnical six-monthly visual inspections as outlined in the Surface Ground Control Principal Hazard Management Plan					

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
- the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW				(Document Control No. 3.17.2PLN002) demonstrate that the IWL is stable (i.e., no significant variance in the IWL cover system).					
The Lessee must ensure that there is no ongoing pollution or unsafe or unstable land left upon mine closure.	GC51			NA	Evidence including but not limited to survey records, engineer designs, photographs and operational monitoring data	Domain 3 Underground	Independent external verification report by suitably qualified person(s) confirms that: - the underground mine has been operated within design parameters - decline portals and shafts have been closed (unless otherwise agreed with stakeholders) - the underground has been backfilled as per design parameters (as outlined in this PEPR). So that the risks to the health and safety of the public are as low as reasonably practicable.	Once prior to tenement relinquishment	Section 5.5.3
The Lessee must on completion of mining ensure that post closure an adequate exclusion zone (such as a fence or bund) is implemented to reduce access and ensure the safety of stock, other animals and unauthorised person to the satisfaction of the Director of Mines.	GC53			NA	Methods and location of construction of the abandonment bunds	Figure 5.3 (Eastern Abandonment Bund) Noting location of Western Abandonment Bund still to be determined.	Independent external verification report by suitably qualified person(s) confirms that the abandonment bunds have been constructed in accordance with Western Australia Department of Industry and resources Guideline Safety Bund Walls Around Abandoned Open Pit Mines and the PEPR.	Once prior to tenement relinquishment	Section 5.5.2
				NA	Condition of the stock proof fence	Stock proof fencing around the boundary of the SEB offset area	Internal audit report (including but not limited to photographs)	Once prior to tenement relinquishment.	Operational fence line inspection reports.

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
						Location of stock proof fence and photo monitoring point locations is detailed in Figure 9.11.	demonstrates that an inspection of the stock proof fence around the SEB has occurred and that the fence is fit for purpose (exclusion of pastoral grazing animals) with access gates removed or blocked off.	To occur within <i>12 months of the application for tenement relinquishment.</i>	Photo point monitoring location photographs.
The Lessee must, in constructing, operating and post mine closure ensure no significant adverse impacts on public roads, traffic and power supplies.	GC19	Post mine closure, the risks to the health and safety of the public are as low as reasonably practicable as far as it is affected by mining related activities.	Public health and safety	NA	Evidence including but not limited to photographs, surveys and waste tracking documents.	All domains	Internal audit report verifies that all mining and processing infrastructure, associated infrastructure and supporting services have been removed, unless otherwise agreed with the landholder and the appropriate regulator(s).	Once prior to tenement relinquishment	Site plans and designs. Legal agreements between OZ Minerals and third party to retain infrastructure
The Lessee must ensure upon mine closure all plant and equipment (unless otherwise agreed with the Director of Mines) is removed from the site.	GC52								
The Lessee must control erosion on the external slopes of the Integrated Waste Landform.	GC22	Post mine closure the IWL will remain both physically and chemically stable.	Public health and safety	Results of the following operational monitoring: - geotechnical annual aerial surveys and - geotechnical six-monthly visual inspections as outlined in the <i>Surface Ground Control Principal Hazard Management Plan</i> (Document Control No. 3.17.2PLN002) demonstrate that the IWL is stable (i.e., no significant variance in the IWL cover system).	Results of the Landform Evolution Modelling (LEM) and Air Quality Modelling to assess the potential change in the final landform associated with surface waters and wind erosion over time.	Domain 1 - IWL	Independent external verification report by suitably qualified person(s) confirms that data has been collected for the calibration of the Air Quality and Landform Evolution Model(s) and the results demonstrate that the final IWL structure will remain physically and chemically stable post completion.	Once prior to tenement relinquishment	NA
The Lessee must undertake revegetation trials and if successful, incorporate revegetation of the Integrated Waste Landform (IWL) into the MARP closure plan.	GC25	Post mine closure the IWL will remain both physically and chemically stable.	Public health and safety	NA	Literature review and review of final closure strategies for the IWL.	Domain 1 - IWL	Independent external verification report by suitably qualified person(s) confirms that vegetation is not required on the IWL for it to be both chemically and physically stable in the long-term, and therefore that vegetation trials are not required.	Once prior to tenement relinquishment	NA
Visual amenity									
The Lessee must undertake revegetation trials and if successful, incorporate revegetation of the Integrated Waste Landform (IWL) into the MARP closure plan.	GC25	Post mine closure the alteration of the visual landscape is ameliorated where practical.	Visual amenity	NA	Literature review and review of final closure strategies for the IWL.	Domain 1 - IWL	Independent external verification report by suitably qualified person(s) confirms that IWL closure design is consistent with other breakaways landforms in the region.	Once prior to tenement relinquishment	NA
The Licensee of Miscellaneous Purposes	GC49	Post mine closure the alteration of the visual	Visual amenity		Evidence including but not limited to photographs,	Domain 1 IWL	Domain 1 IWL		

Grouped lease condition	Grouped lease condition	Closure outcome	Aspect	OMC					
				LI criteria	What will be measured and form of measurement	Location	Outcome achievement	Frequency	Control or baseline
Licence must demonstrate prior to licence expiry or surrender that the following outcomes will be achieved indefinitely post mine closure to the satisfaction of the Director of Mines: - the external visual amenity of the site is in accordance with the reasonable expectation of relevant stakeholders - the risks to the health and safety of the public and fauna are as low as reasonably practical - the site is ecologically stable and sustainable - the site is physically stable - all waste materials left onsite are chemically and physically stable - wells are decommissioned to the satisfaction of DEW	GC63	landscape is ameliorated where practical.		Survey of IWL to ensure it has been built to design.	survey records and engineering designs.			Once prior to tenement relinquishment.	IWL design as detailed in the PEPR
The Lessee must in construction, operating and post mine closure ensure the alteration of the visual landscape is ameliorated where practical.									



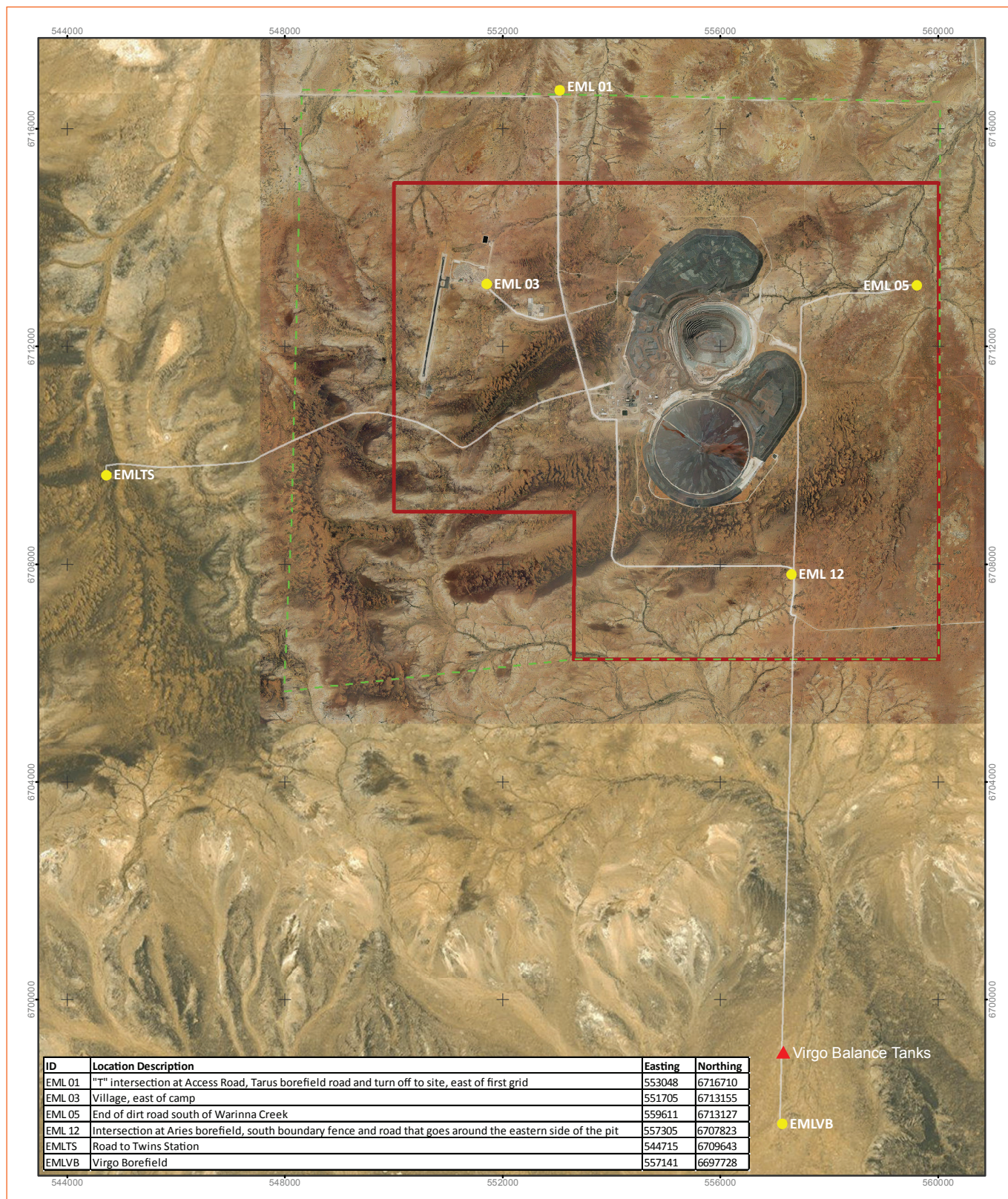
- ▶ Soil sample locations
- Gamma locations in the TSF
- Gamma locations in the Southern WRD
- Gamma locations in the Northern WRD
- Gamma locations away from the operational areas

Date prepared:
 18-06-2021
 A4
 0 0.25 0.5 1
 Kilometres

1:35,000



Figure 9.1 | Gamma monitoring and soil sampling locations



- Environmental Radiation Monitoring Location
- ▲ Site Infrastructure
- - - SEB
- ▭ Mining Lease

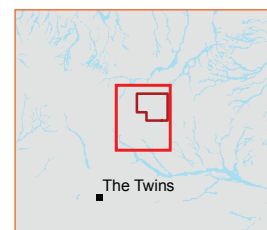
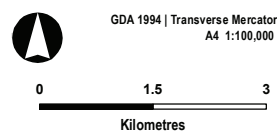
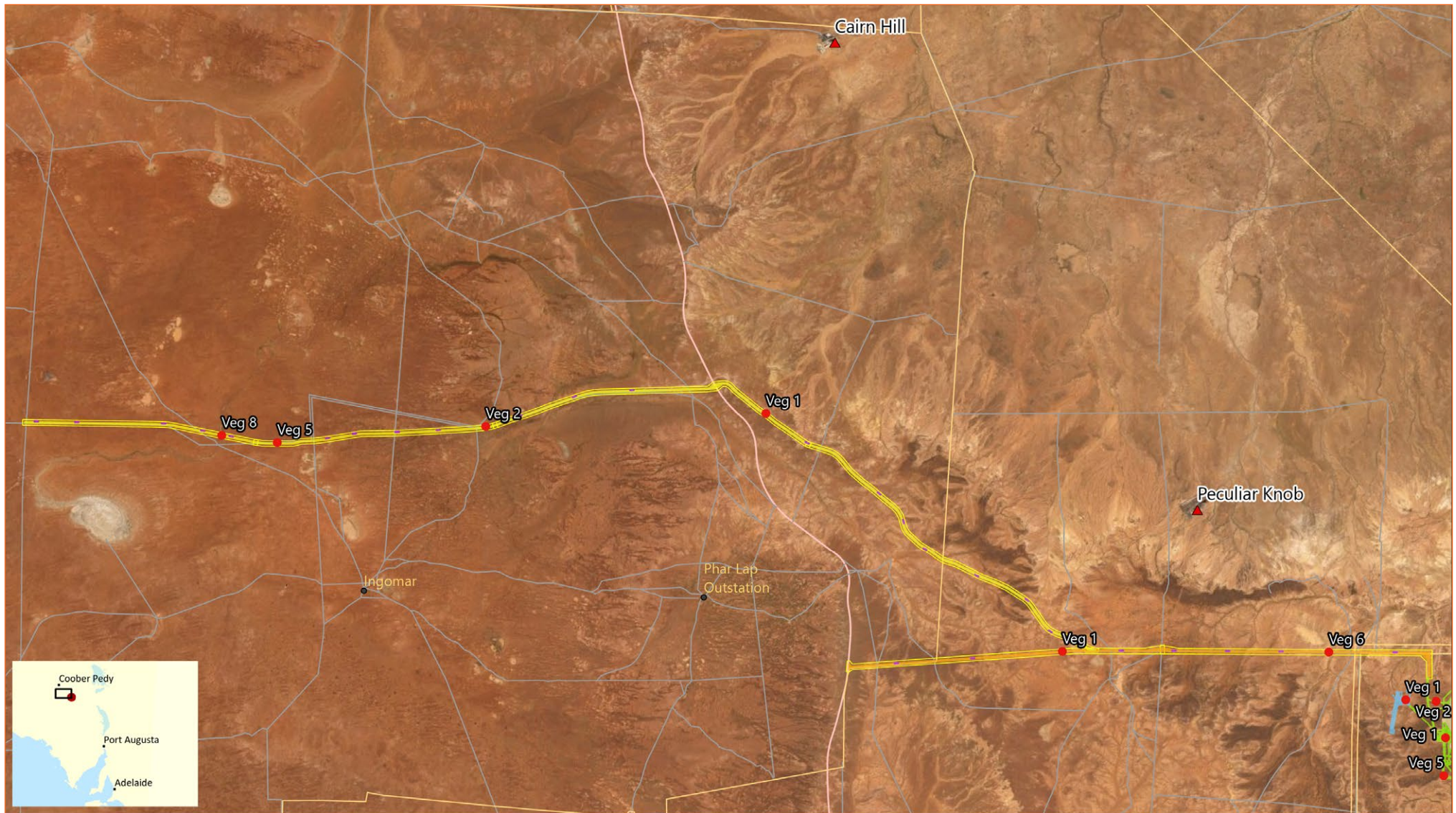


Figure 9.2 | Environmental radiation monitoring locations



- ▲ SARIG Major Mines
- Homesteads
- Highway
- Track
- Miscellaneous Purposes Leases (MPLs)
- Pastoral Station
- Proposed LFA Sites (Post Rehabilitation)

Closure Domain

- Domain 1: Integrated Waste Landform
- Domain 2: Open Pit (Pit Void)
- Domain 3: Underground Workings and Associated Infrastructure
- Domain 4a: Mining Lease Infrastructure - Mine Area
- Domain 4b: Mining Lease Infrastructure - Village

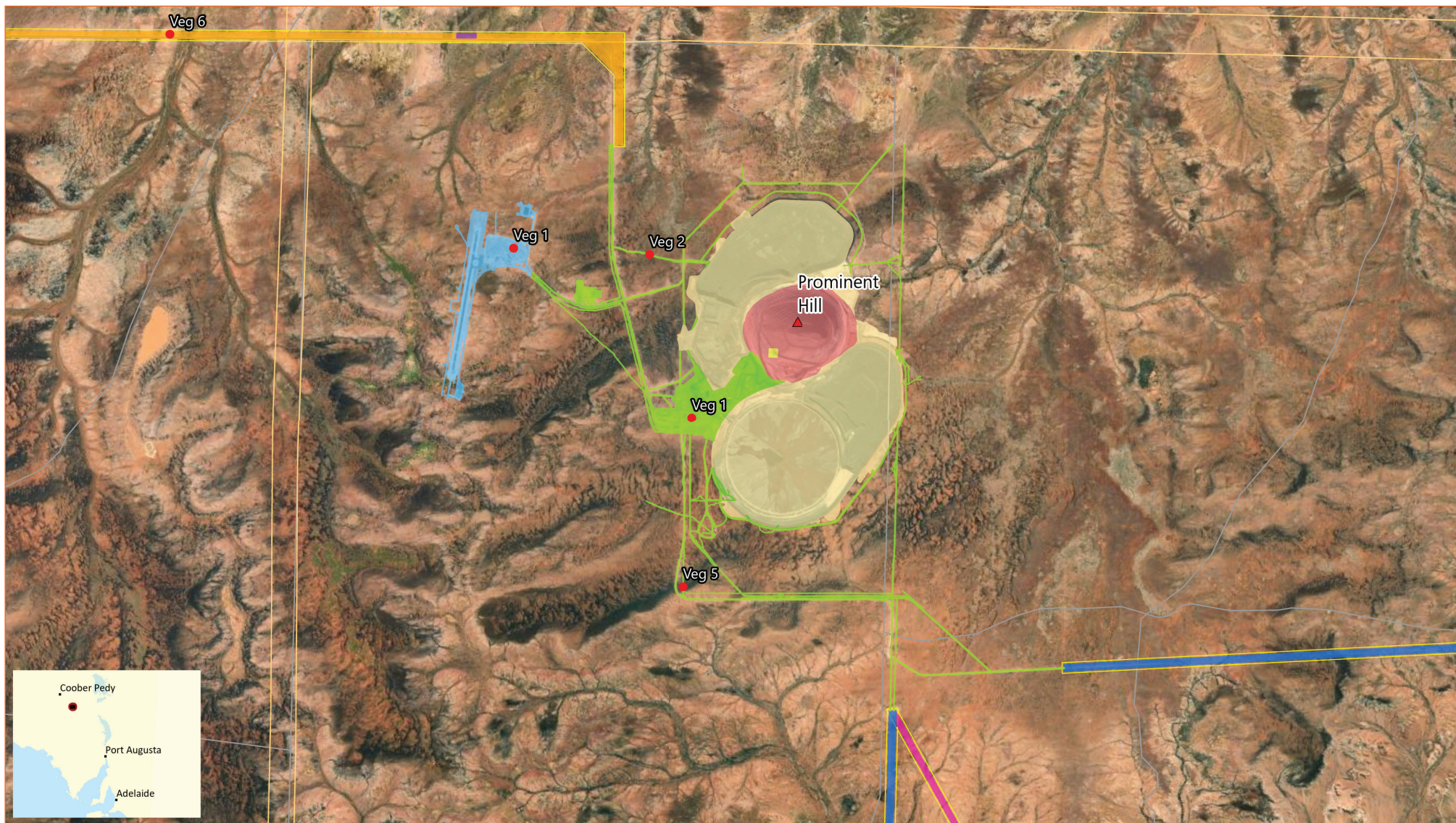
- Domain 5a: MPL Infrastructure - Electricity Transmission Line
- Domain 5b: MPL Infrastructure - Wellfield
- Domain 5c: MPL Infrastructure - Concentrate Export Road
- Domain 5d: MPL Infrastructure - Site Access Road
- Domain 6: Extractive Minerals Lease

0 3,000 6,000 12,000
Metres



Datum/Projection:
GDA 1994 MGA Zone 53
Project: 17842-SP Date: 7/10/2021

Figure 9.3 | Proposed LFA monitoring locations (part 1)



- ▲ SARIG Major Mines
- Homesteads
- Highway
- Track
- Miscellaneous Purposes Leases (MPLs)
- Pastoral Station
- Proposed LFA Sites (Post Rehabilitation)

- Closure Domain**
- Domain 1: Integrated Waste Landform
 - Domain 2: Open Pit (Pit Void)
 - Domain 3: Underground Workings and Associated Infrastructure
 - Domain 4a: Mining Lease Infrastructure - Mine Area
 - Domain 4b: Mining Lease Infrastructure - Village

- Domain 5a: MPL Infrastructure - Electricity Transmission Line
- Domain 5b: MPL Infrastructure - Wellfield
- Domain 5c: MPL Infrastructure - Concentrate Export Road
- Domain 5d: MPL Infrastructure - Site Access Road
- Domain 6: Extractive Minerals Lease

0 500 1,000 2,000
Metres



Datum/Projection:
GDA 1994 MGA Zone 53
Project: 17842-SP Date: 7/10/2021

Figure 9.4 | Proposed LFA monitoring locations (part 2)



- ▲ SARIG Major Mines
- Homesteads
- Highway
- Track
- Miscellaneous Purposes Leases (MPLs)
- Pastoral Station
- Proposed LFA Sites (Post Rehabilitation)

- Closure Domain**
- Domain 1: Integrated Waste Landform
 - Domain 2: Open Pit (Pit Void)
 - Domain 3: Underground Workings and Associated Infrastructure
 - Domain 4a: Mining Lease Infrastructure - Mine Area
 - Domain 4b: Mining Lease Infrastructure - Village

- Domain 5a: MPL Infrastructure - Electricity Transmission Line
- Domain 5b: MPL Infrastructure - Wellfield
- Domain 5c: MPL Infrastructure - Concentrate Export Road
- Domain 5d: MPL Infrastructure - Site Access Road
- Domain 6: Extractive Minerals Lease

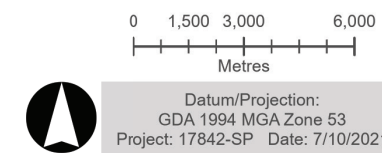
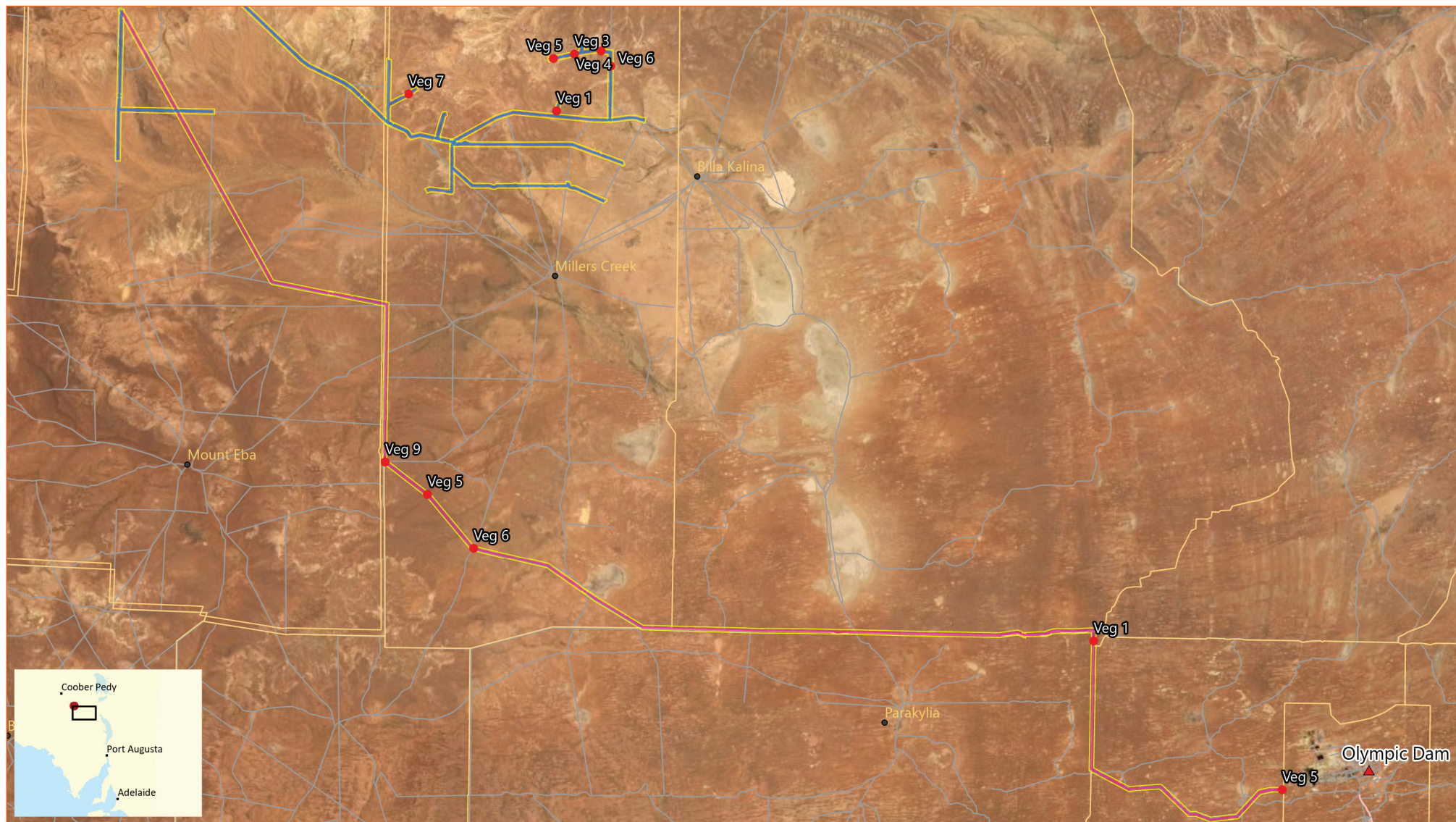


Figure 9.5 | Proposed LFA monitoring locations (part 3)



- ▲ SARIG Major Mines
- Homesteads
- Highway
- Track
- Miscellaneous Purposes Leases (MPLs)
- Pastoral Station
- Proposed LFA Sites (Post Rehabilitation)

Closure Domain

- Domain 1: Integrated Waste Landform
- Domain 2: Open Pit (Pit Void)
- Domain 3: Underground Workings and Associated Infrastructure
- Domain 4a: Mining Lease Infrastructure - Mine Area
- Domain 4b: Mining Lease Infrastructure - Village

- Domain 5a: MPL Infrastructure - Electricity Transmission Line
- Domain 5b: MPL Infrastructure - Wellfield
- Domain 5c: MPL Infrastructure - Concentrate Export Road
- Domain 5d: MPL Infrastructure - Site Access Road
- Domain 6: Extractive Minerals Lease

0 4,000 8,000 16,000
Metres



Datum/Projection:
GDA 1994 MGA Zone 53
Project: 17842-SP Date: 7/10/2021

Figure 9.6 | Proposed LFA monitoring locations (part 4)





Figure 9.8 | Locations of all groundwater wells to be decommissioned (part 1)

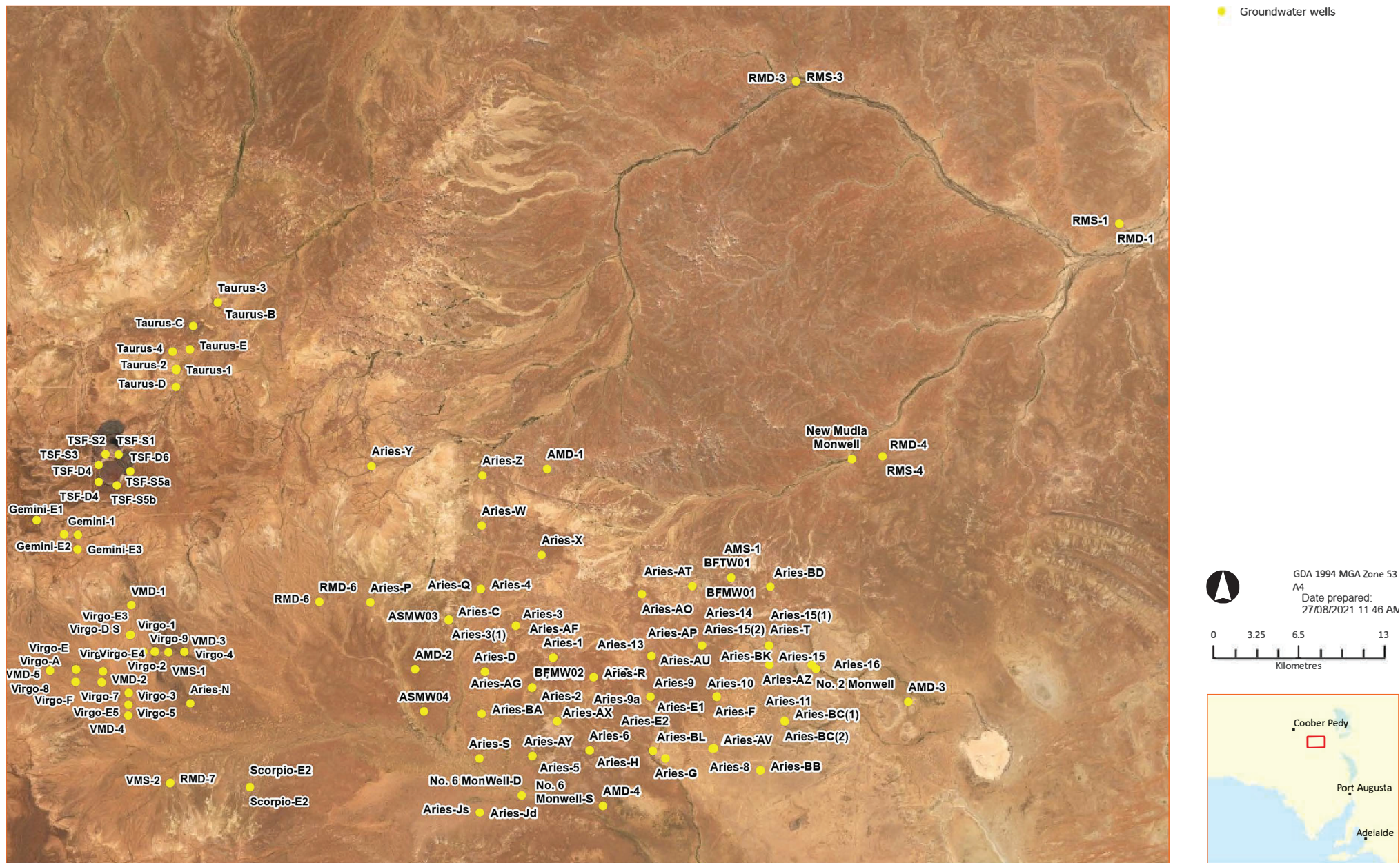


Figure 9.9 | Locations of all groundwater wells to be decommissioned (part 2)

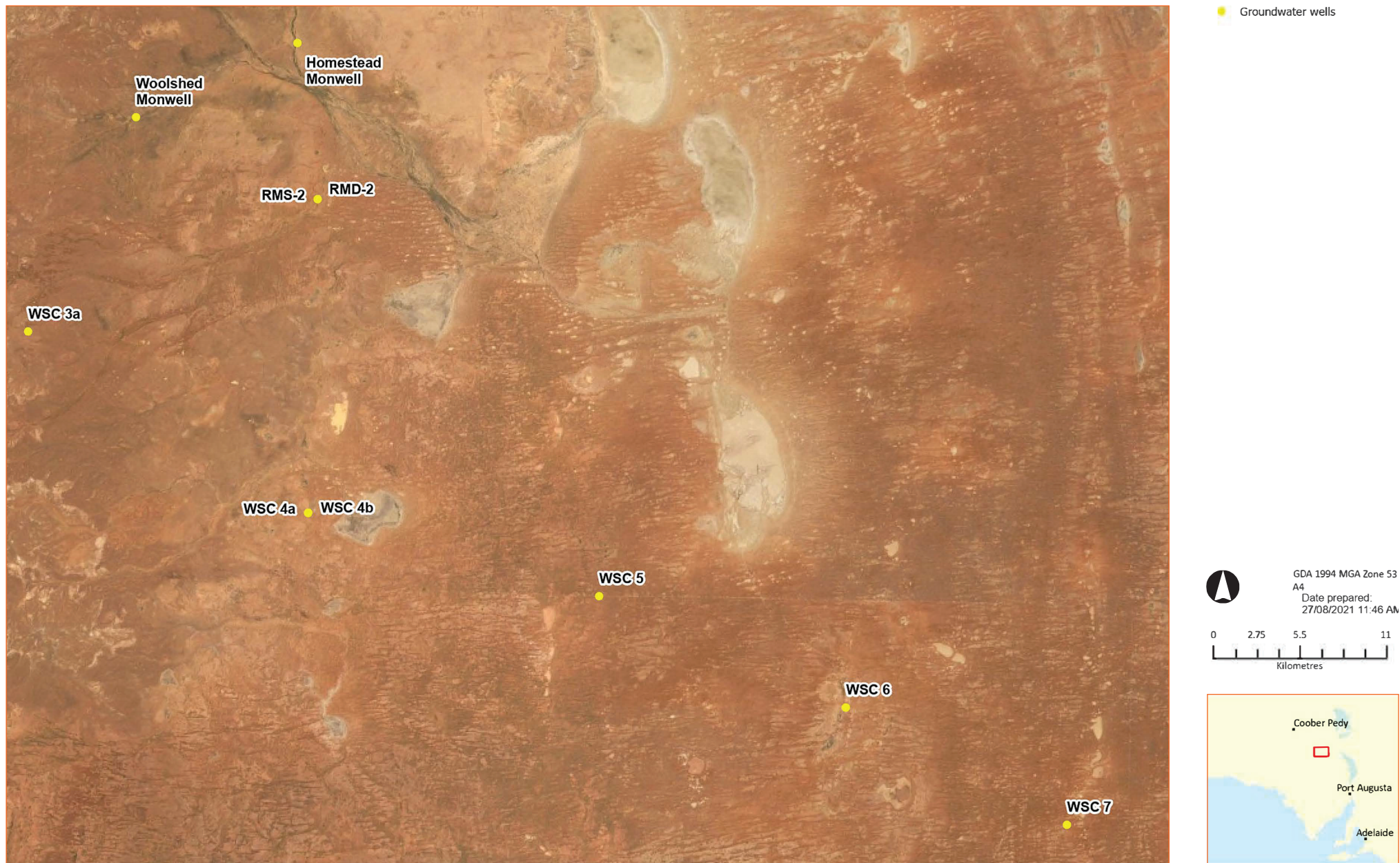


Figure 9.10 | Locations of all groundwater wells to be decommissioned (part 3)



Figure 9.11 | Location of stock proof fence and monitoring locations

10. Licences, permits and agreements

10.1 Register

BHP maintains a register of legal and other regulatory requirements that is maintained and updated regularly. The register captures the requirements of the Mining Act, other relevant legislation, ML, MPL and EML conditions and commitments/ environmental objectives contained within this PEPR. Compliance against individual lease conditions is undertaken in the annual compliance report.

Other legislative requirements associated with the ML, MPLs and EMLs are described in Table 10.1.

Table 10.1 | Miscellaneous legislative requirements for ML, MPLs and EMLs

Licence, permit and agreement	Regulatory authority	Supporting documentation
Licence to Undertake Prescribed Activities of Environmental Significance – Mineral Works, Sewage Treatment Works, Concrete Batching, Desalination plant, Waste or Recycling Depot (Licence No. 22764)	EPA	Waste Management Plan (PH-9999-SEC-PLN-0033) meets the requirements of the Landfill Environmental Management Plan
Haul Road Maintenance Water Licence No. 396809, Water Resource Works Approval No 396904	DEW	Water Licence 183346 Monitoring Plan (PH-9999-SEC-PLN-0035)
Stuart Highway – Underpass Access Deed of Agreement	DIT	Traffic Management Plan (PH-ENV-PLN-0001)
Borefields Water Licence No.396811, Water Resource Works Approval No. 396907	DEW	Water Licence 41028 Monitoring Plan (PH-9999-SEC-PLN-0034)
Water Effecting Activity – Water Permit to Drill	DEW	Separate permits for each drilled borehole
EPBC 2005/2040 (controlled action)	DAWE	Threatened Fauna Species Management Plan (PH-9999SEC-PLN-0052)
Woomera Prohibited Area Deed of Access	DoD	Agreement (5.3.1AGR001 – Confidential)
Native Title Mining Agreement	Antakirinja Land Management Aboriginal Corporation	Agreement (5.1.3AGR002 – Confidential) Cultural Heritage Management Plan – Confidential
Licence to Carry out Mining OR Mineral Processing (Licence No. 51429)	EPA	Radiation Management Plan (PH-999-SEC-PLN-0021) Radioactive Waste Management Plan (PH-9999-SEC-PLN-0022)
Registration of an Ionising Radiation Apparatus (Certificate No. 20021 and No. 25536)	EPA	None
Approval for the Cartage and Use of Recycled Water for Dust Suppression (WCS No. 2309)	Government of South Australia, Department for Health and Ageing	Waste Water Treatment Plant Management Plan (PH-0000-SEC-PLA-0050)

Licence, permit and agreement	Regulatory authority	Supporting documentation
Aerodrome Certificate (1-HOO80)	Australian Government Civil Aviation Safety Authority	Aerodrome Management Manual (PH-9999-PNP-PLN-0002)
Dangerous Substances Licence No. 366468	Government of South Australia SafeWork SA	NA
Apparatus licences (various licence numbers)	Australian Government Australian Communications and Media Authority	NA
Magazine Licence No. 331741, No. 530014 and No. 98484	Government of South Australia SafeWork SA	NA
Licence to Carry Explosives (467702 and 467703)	Government of South Australia SafeWork SA	NA
Registration under the <i>Safe Drinking Water Act 2011</i>	Government of South Australia, Department for Health and Ageing	Drinking Water Risk Management Plan (PH-9999-SEC-PLN-0051)
Electricity Transmission Licence (1.5.4LIC001)	Essential Services Commission of South Australia	None
Waste Water Treatment Plant (WCS No. 2259)	Government of South Australia, Department for Health and Ageing	Waste Water Treatment Plant Management Plan (PH-0000-SEC-PLA-0050)
Millers Creek Land Access and Mining Compensation Agreement	Millers Creek Pastoral Lease Holder (2315)	Agreement (5.2.2AGR001 – Confidential)
McDougall Peak Land Access and Mining Compensation Agreement	McDougall Peak Pastoral Lease Holder (2341)	Agreement (5.2.2AGR001 – Confidential)
Billa Kalina Land Access and Compensation Agreement	Billa Kalina Pastoral Lease Holder (2415)	Agreement (5.2.2AGR013 – Confidential)
Parakylia Land Access and Mining Compensation Agreement	Parakylia Pastoral Lease Holder (2197)	Agreement (OZM-000033-AA – Confidential)
Mount Eba Land Access and Compensation Agreement	Mount Eba Pastoral Lease Holder (2197)	Agreement (5.2.2AGR007 – Confidential)
Ingomar Land Access and Compensation Agreement	Ingomar Pastoral Lease Holder (2153, 2339, 2527)	Agreement (5.2.2AGR010 – Confidential)

10.2 EPBC Act controlled action status

The Prominent Hill operation has been determined as a Controlled Action under the EPBC Act. As such, Prominent Hill operates under conditions (EPBC reference 2005/2040) which are reported against annually to both DEM and DCCEEW. Table 10.2 below details the conditions for Prominent Hill that were revised in June 2018 to better align with the current environmental risks associated with the Project.

Table 10.2 | EPBC conditions for Prominent Hill operations

Condition number	Condition
1	To mitigate impacts to the Thick-billed Grass Wren (<i>Amytornis modestus indulkanna</i>) and the Plains Rat (<i>Pseudomys australis</i>), the person taking the action must prior to 1 July 2018, submit an Environmental Management Plan (EMP) for the approval of the Minister. The EMP must be prepared in accordance with the Department's Environmental Management Plan Guidelines and include, but not be limited to: a) management measures to maintain or improve habitat condition, including: i. measures to prevent and control human and stock access to species habitat; and

Condition number	Condition
	ii. the control of feral predator and weed species, and b) feral predator, weed and habitat condition monitoring, triggers for management intervention and corrective actions. The person taking the action must implement the approved EMP.
2	The person taking the action must, unless otherwise agreed by the Minister submit by 30 September of each year (beginning in 2019) written advice to the Minister demonstrating how the person taking the action has complied with the conditions of the approval.
3	The person taking the action may choose to revise the plan approved by the Minister under condition 1 without submitting it for approval under section 143A of the APEBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the person taking the action makes this choice they must notify the Department in writing that the approved plan has been revised and provide the Department, at least four weeks before implementing the revised plan, with: i. an electronic copy of the revised plan; ii. an explanation of the differences between the revised plan and the approved plan, and iii. the reasons the person taking the action considers that the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact.
4	The person taking the action may revoke its choice under condition 3 at any time by giving written notice to the Department. If the person taking the action revokes the choice to implement the revised plan, without approval under section 143A of the EPBC Act, the plan approved by the Minister must be implemented.
5	If the Minister gives a notice to the person taking the action that the Minister is satisfied that the taking of the action in accordance with the revised plan would be likely to have a new or increased impact, then: i. condition 3 does not apply, or ceases to apply, in relation to the revised plan; and ii. the person taking the action must implement the plan approved by the Minister To avoid any doubt, this condition does not affect any operation of conditions 3 and 4 in the period before the day the notice is given. At the time of giving the notice, the Minister may also notify that for a specified period of time condition 3 does not apply for the plan required under the approval. Conditions 3, 4 and 5 are not intended to limit the operation of section 143A of the EPBC Act which allows the person taking the action to submit a revised plan to the Minister for approval.

10.3 Native vegetation clearance and environmental offsets

Since 2006, Prominent Hill has utilised several pathways to achieve an SEB under the NV Act and the associated policies. These pathways are summarised as:

- providing a new SEB area by establishing the Mt Eba Blue Duck Dam On-ground SEB Offset Area from 2006 to 2018 (SEB On-ground Offset Area)
- payment into the Native Vegetation Fund from 2018 (financial SEB)
- engaging an Accredited Third-Party Provider via the purchase of SEB Credits from Nature Foundation (Witchelina Station) for the Aries Pipeline Replacement Project (2026).

Each of these pathways is discussed in detail in the following sections.

10.3.1 Provision of an SEB On-ground Offset Area (pre-July 2017 policy change)

During the development of Prominent Hill, a portion of the Mt Eba Pastoral Lease and the undisturbed areas within ML 6228 were used to establish and subsequently manage, an on-ground offset area (the Mt Eba Blue Duck Dam Paddock On-ground SEB Offset Area (SEB On-ground Offset Area), shown on Figure 10.1). The area of this offset was approximately 12,415 ha, minus Project-related disturbances. This area was incorporated into the Prominent Hill SEB Offset Area Stage One Management Plan.

The location and dimensions of the offset area was selected for the following reasons:

- It contains a significant proportion of the habitat, stony bluebush rises interspersed with low-lying cracking clay gilgais, which supports:
 - *Aphelocephala pectoralis* (Chestnut-breasted Whiteface), listed as Rare under the NPW Act
 - *Amytornis modestus indulkana* (previously *Amytornis textilis modestus*) (Thick-billed Grasswren), listed as Vulnerable under the EPBC Act and
 - possibly *Pseudomys australis* (Plains Mouse), listed as Vulnerable under the EPBC Act and NPW Act.
- The south-western corner of the offset area was extended to incorporate more of this habitat type.
- To encompass areas of Breakaway habitat to the north, identified as the preferred habitat for *Roepera crassissima*, listed as Rare under the NPW Act and *Frankenia plicata* (Sea-heath), listed as Endangered under the EPBC Act and Vulnerable under the NPW Act. It is considered unlikely that this habitat type will be affected by Project activities.
- It contains the same habitat/ vegetation types that will be disturbed by the Project.
- It allows BHP to manage the area initially as part of its operations (i.e., up until mine closure). The main advantage of this is that resources will be readily available, and the site/ fencing can be closely monitored.
- To ensure that the area removed from the pastoral paddocks is a discrete block that does not alienate fragments of pastoral land. Hence, the western and northern boundaries of the offset area are located along existing fence lines (with the fencing subsequently upgraded).

10.3.1.1 SEB On-ground Offset Area objectives

The key considerations in achieving an SEB include:

- management of the SEB On-ground Offset Area (i.e. the land surrounding Project infrastructure within the SEB boundary) to support habitat, by managing threatening processes during Prominent Hill operations
- restoration of selected on-site areas, cleared to enable mining activities
- provision of the mechanism by which offset restoration will be planned, implemented and monitored.

The SEB On-ground Offset Area, including management of additional clearances and offsets not able to be accommodated by the SEB offset area, are detailed in the Stage Two SEB Offset Area Management Plan (Appendix C).

10.3.1.2 Management of the SEB On-ground Offset Area

A key objective in demonstrating SEB achievement is to support habitat within the SEB On-ground Offset Area, by managing threatening processes during Project operations. Since the commencement of the Project, numerous measures to manage threatening processes have been undertaken. These are summarised within the Stage Two SEB Offset Area Management Plan.

Measures to manage the SEB On-ground Offset Area began in 2006, with the targeted selection of the SEB boundary, followed-by installation of stock-proof fencing and removal of livestock from the SEB area. Management of threatening processes during operations predominantly involves control of introduced species incursion and spread.

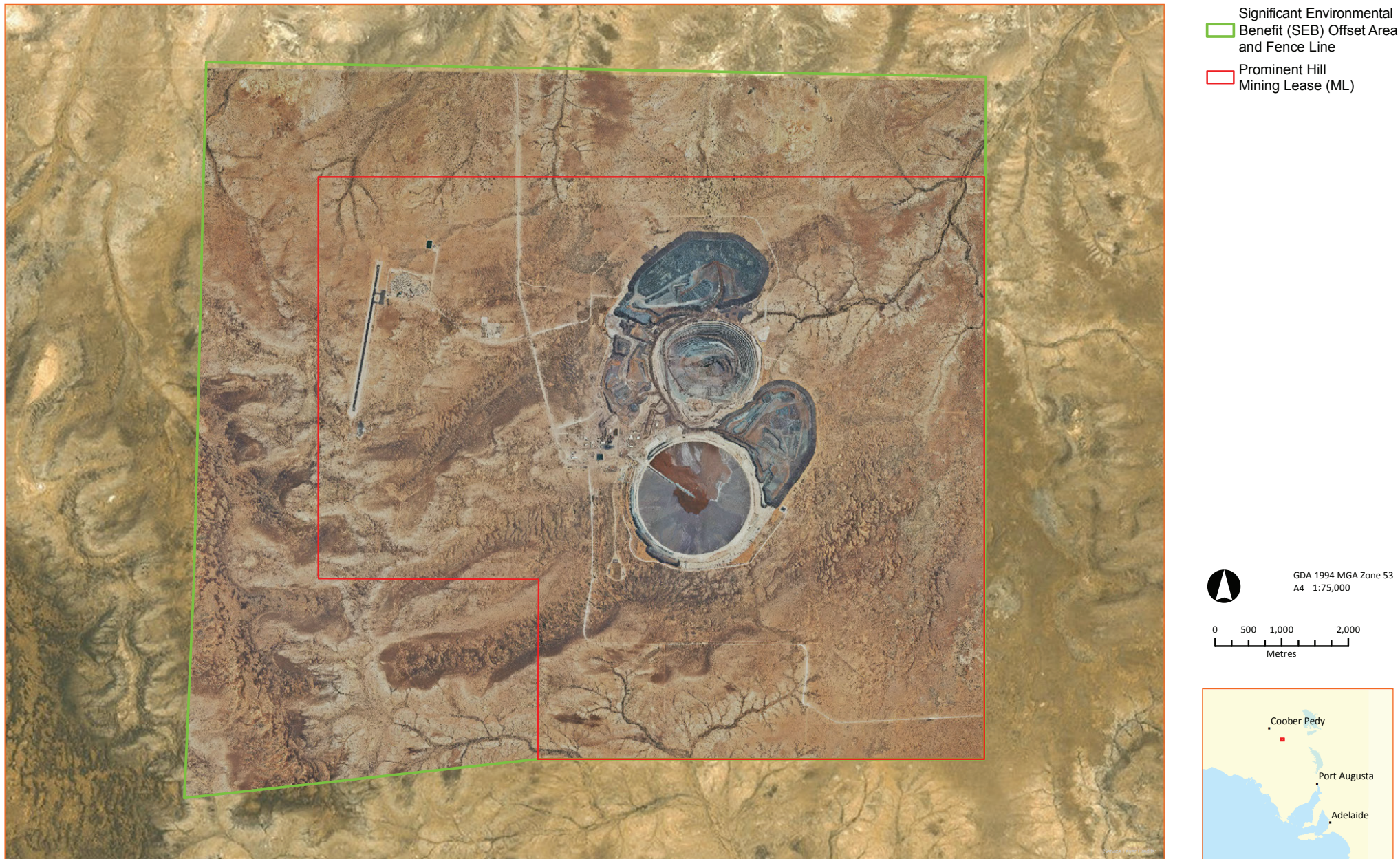


Figure 10.1 | SEB On-ground Offset Area location

10.3.1.3 SEB On-ground Offset Area requirements

The baseline land condition was surveyed prior to any project-related clearance, as provided in Badman (2005, 2006), Moseby (2005) and Oxiana (2006a) and summarised in the MARP 2009. The surveys were undertaken to characterise the existing environment and ultimately, determine vegetation condition and assign SEB ratios.

Actual clearance areas for the operation have been calculated using GIS analysis of aerial imagery, in parallel with engineering design drawings. It is noted that this assessment resulted in a larger area of clearance than originally calculated (MARP 2009) from assessment of design drawings alone.

Native vegetation within the ML and associated tenements has been cleared as part of the mine development, including the open pit area, WRDs, TSF, airfield, accommodation village, access roads, concentrate haul road, transmission line, operations borefield and transfer pipeline replacement project works (Aries) and construction borefield (Virgo). This area includes the EMLs, as well as area to account for existing road and track widening, footings and a maintenance track along the transmission line.

An initial assessment of the SEB requirements for the Project related area of impact based-on the SEB ratios assigned to the different clearance areas by Badman (2006), indicated an 'initial SEB requirement' of 15,274 ha.

The Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the Clearance of Native Vegetation Associated with the Minerals and Petroleum Industry (DWLBC 2005) (herein referred to as 2005 Guidelines), provided for a 50% reduction in the SEB size for areas of land to be restored at the completion of mining activities. This 50% reduction to SEB calculations relating to the Project, was accepted by the NVC, with the submission and acceptance in 2006 of the SEB Offset Area Stage One Management Plan. Originally, as detailed in the MARP 2009, the Project intended to also apply for a further 50% reduction in the SEB ratio for additional mitigation measures at this stage as allowed under the 2005 Guidelines, however as outlined in the Stage Two Significant Environmental Benefit Offset Area Management Plan, it was decided not to seek this further percentage reduction in SEB offset requirements.

Areas proposed to undergo restoration activities include the entire concentrate road, transmission line maintenance track, operations borefield, construction borefield, as well as a portion of the main Project Area (around 22% of the mine Project Area, including the airfield, accommodation village and site offices). The open pit, TSF and WRD, as well as the access road will remain in-place with no on-site restoration. The total area of on-site restoration equates to approximately 855 ha out of the total clearance. On-site rehabilitation is also a condition of the PEPR and will therefore require monitoring and be regulated by DEM and the NVC.

10.3.1.4 SEB offset calculations and review

The following outlines the SEB area calculations which formed part of the Stage Two SEB Offset Area Management Plan, and which relate to clearance approved prior to July 2017.

A summary of the SEB requirements (as relevant to the SEB On-ground Offset Area) is provided in Table 10.3, presenting the assessed offset ratio, clearance area (as quantified using assessment of aerial imagery, coupled with design drawings) and initial offset requirements.

Table 10.3 | Summary of the SEB On-ground Offset Area calculation for Prominent Hill

Tenement area	Initial SEB ratio (1 to 10)	2018 calculations of area cleared (ha)	Initial SEB offset area (ha)	Area to be restored onsite (ha)	SEB offset area with reductions of 50% for areas to be restored onsite (ha)
Mine lease (project area)	8	1,433	11,459	309	10,226
Access road	4	60	241	0	241
Concentrate road	6	209	1,253	209	627
Transmission line	6	151	904	151	452
Aries Borefield	8	141	1,130	141	565
Virgo Borefield	8	7	59	7	30
EMLs	6	38	226	38	113
Total		2,039	15,274	855	12,254

The fenced SEB On-ground Offset Area encompasses an area of 12,415 ha and includes the ML (and associated infrastructure). Of the total SEB On-ground Offset Area, 1,432 ha ('Project area') and 7 ha (from 'Access road') was designated as 'cleared' (Table 10.3). This left a legitimate offset area of 10,975 ha, which was fenced from the remainder of the pastoral station to exclude stock, and has been actively managed and monitored since 2005.

The Prominent Hill Project also claimed a 50% reduction for areas to be rehabilitated, bringing the total SEB area requirement to 12,254 ha. As the SEB On-ground Offset Area was 10,975 ha, an additional SEB offset area of 1,279 ha was also required. The shortfall in SEB credit was achieved via the payment into the NV Fund.

10.3.2 Financial SEB offset into the Native Vegetation Fund

Payment into the Native Vegetation Fund (NV Fund) occurred after all credits of the SEB On-ground Offset Area were consumed. As at February 2019, total payments to the NVC to offset native vegetation clearance associated with the Prominent Hill Project totalled \$171,459.16. This covered all additional SEB offset required up to February 2019, and to provide a small balance (SEB credit) for future project works.

10.3.2.1 SEB credit balance of pre-July 2017 SEB Payment

BHP incorporated into the NV Fund payment calculation a further 40 ha of clearance to serve as credit for possible future clearance. Clearance associated with the PEPR 2022 was up to 4.0 ha, and related to development near the Northern WRD (a refrigeration plant and pipes) for the PHOX project.

BHP currently has 19.31 ha worth of disturbance and associated credit remaining on the project.

Table 10.4 | SEB credit balance (pre-July 2017 policy)

Year	SEB Balance (ha) (as at 2025)
2017	40.0
2019	33.2
2021	32.3
2022	28.3
2024	24.96
2025	19.31

10.3.2.2 Approvals pathway for use of SEB credit

Future minor clearances of native vegetation will be required periodically to respond to operational changes; these clearances will use the remaining SEB credit balance shown in Table 10.4. As such, it has been agreed with DEM and the Native Vegetation Branch (NVB) that the most appropriate pathway to be able to use the remaining credit and provide regulatory oversight of its use would be through a self-assessment and notification to DEM.

BHP would provide a self-assessment to inform DEM prior to any land clearance >5 ha occurring. The notification detailing the land clearance should include the following information:

- description of the activity which will clear native vegetation
- size of land clearance to occur
- vegetation association to be cleared
- balance of remaining credits.

Once the remaining credits (under the pre 2017 guidelines) are exhausted, all future Project related disturbance would require a Rangelands Assessment undertaken by an NVC Accredited Consultant as per the *Native Vegetation Regulations* 2017, with SEB calculations completed in accordance with the policies and procedures provided by DEW as current at the time of this future consideration.

The remaining 19.31 ha of disturbance worth of credits prepaid into the NV Fund is noted as insufficient to cover the disturbance and credits required for the Stage 1 Aries Borefield Transfer Pipeline Replacement Project, nor is it appropriate for new works without consideration and approval prior to the July 2017 NV Act and policy revision.

10.3.3 Engage a third-party SEB Credit provider (Aries Transfer Pipeline Replacement Project)

10.3.3.1 SEB Credit requirement

The Aries Transfer Pipeline Replacement Project (Stage 1) was assessed in 2024, however SEB calculations have been updated to reflect the current available calculation datasheets (dated 9 September 2025, provided separately to the NVC for consideration) and policy (NVC 2025). This clearance is new (as described by BHP 2025) and has not been considered by previous versions of the Stage Two SEB Offset Area Management Plan.

The SEB requirements for the Stage 1 Aries Borefield Transfer Pipeline Replacement Project were determined under current NV Act policy (NVC 2024a, NVC 2024b) SEB Guidelines (NVC 2025) (see

Appendix C). The Aries Transfer Pipeline Replacement Project (Stage 1), occurring within the Aries borefield, will disturb an additional 35.77 ha that will require either an on-ground offset of 1,973.08 SEB points or a payment into the Native Vegetation Fund of \$140,458.82 (SEB Payment \$133,136.32 and Administration Fee of \$7,322.50 (see Table 10.5). BHP have not elected to apply an SEB reduction to this project at this stage as the disturbance is not proposed to be staged in any way and will be offset entirely prior to the commencement of the construction of the project.

Table 10.5 | SEB offset requirements for Aries Borefield transfer Pipeline Replacement Project

Project	Disturbance (ha)	SEB Points required ¹	SEB Payment	SEB Admin Fee ²	Total SEB Cost
Aries Borefield Pipeline Replacement (Stage 1)	35.77	1,973.08	\$133,136.32	\$7,322.50	\$140,458.82

1 SEB Points Required = SEB Points of Loss

2 SEB Administration Fee includes GST (SEB Payment does not)

3 SEB calculations have been completed in reference to NVC (2025) and using the latest available Rangeland Assessment Method (RAM) electronic scoresheet and Pastoral clearance summary scoresheet (dated 9 September 2025).

10.3.3.2 SEB Credit pathway

In accordance with current SEB policy guidance, it is not BHPs preference to pay directly into the NV Fund. BHP proposed to purchase SEB credits from Nature Foundation (Witchelina Station), to offset the Aries Borefield Replacement Project Stage 1.

The small size of the required offset combined with the nature of surrounding land rights (i.e. crown leases not held by BHP), and a lack of local third-party offset providers in proximity to the Prominent Hill Project, make it difficult for BHP to deliver an on-ground offset in this instance. It is further noted that the established Prominent Hill On-ground Offset Area is fully utilised and cannot be expanded (due to location of operations and the aforementioned land access constraints).

In consultation with the NVC and Nature Foundation, BHP will elect to offset the 1,973.08 SEB Points required through the purchase of suitable credits from Nature Foundation (a NVC Accredited Third-party Offset Provider) on Witchelina Station (Nature Reserve). This option has previously been discussed with and vetted by the NVC (March 2025 and June 2025, with DEM and DEW, refer Table 7.6). Following these discussions DEW advised Nature Foundation that credits issued to Prominent Hill should come from an offset within the Stony Tablelands IBRA region of the Witchelina property. Nature Foundation are establishing a Stony Tablelands offset and intend to transfer SEB credits to Prominent Hill from the Stony Tablelands offset; this is scheduled to occur at a NVC meeting after submission of this PEPR and prior to Prominent Hill's requirement for the credits. Witchelina Station has a range of similar native vegetation types in equivalent or better condition, to those that are common across the Prominent Hill Project region more broadly (for example, *Atriplex vesicaria* low open shrubland, *Maireana aphylla* shrubland and *Atriplex nummularia* +/- *Maireana aphylla* shrubland). Further, Witchelina Station also provides habitat for threatened species with direct relevance to Prominent Hill; Thick-billed Grasswren and Plains Mouse (refer Section 4.6.3). Being within a protected Nature Reserve, this area further has secure and ongoing protection from future potential disturbances with expected protection in-perpetuity.

Refer also the Stage Two Significant Environmental Benefit Offset Area Management Plan (Appendix C).

During engagement with DEW and members of the NVC it was agreed that provision of an SEB via an Accredited Third-party Offset Provider was preferable to payment into the NV Fund (refer Table 7.6).

11. Self-assessments

Self-assessments of proposed changes to approved operations have been undertaken in accordance with the variation process described in Section 3.5.

Where these self-assessments indicate that the proposed change(s) does not require a Change in Operations Proposal (CiOP) or a PEPR Review, these changes have been progressed as referenced in Table 11.1.

Table 11.1 | Summary of self-assessments captured in this PEPR

Assessment date	Variation description	PEPR section
June 2022	Aries Catchment Dam	Section 5.9.1.4
August 2025	New Logistics Yard	Section 10.3.1.4
September 2025	TSF Buttress	Section 5.7.2

12. Verification of uncertainty

As outlined in MG2b a forward works plan should form part of the content of the PEPR where there remains project uncertainty and key assumptions which require further investigation.

The information provided in Table 12.1 summarises the commitments made throughout this PEPR and identifies the estimated timing for completion of these works and submission to DEM.

Table 12.1 | Forward works plan summary

Aspect	Description	Relevant grouped lease conditions	Timing	Responsibility
Annual TSF review - recommendations	Annual TSF review recommendations As per the finding of the Annual TSF review conducted in 2024, all recommended actions were accepted and will be put into the Forward Work Plan (FWP) for the 2025-2026 reporting period	GC23 – The Lessee must ensure that the slopes of the perimeter embankment on the Integrated Waste Landform (IWL) are stable post-closure even under seismic conditions. GC24 – The Lessee must take responsibility for the IWL (including the tailings) until such time that it can be demonstrated that the waste is in a form that is safe, non-polluting and stable post-closure and will not cause any impacts to the surrounding environment or create potential legacy issues for future generations. GC26 – The Integrated Waste Landform (IWL) must be designed, constructed, operated and decommissioned in accordance with Tailings management Guidelines as approved from time to time by the Chief Inspector of mines in consultation with the Environmental Protection Authority.	2025/26	Processing
Closure workshop – establish closure vision, principles and objective and post closure land uses closure strategy review*	Develop and document a closure vision, principles, objectives and post closure land uses. - A closure vision will be established to articulate aspirations for what will be achieved with mine closure, compatible with the Mining Lease Outcomes. The vision will incorporate an overview of the post closure land use and will evolve as more information becomes available. - Closure principles will be established to outlines the common precepts that will guide the basis of the closure plan, such as promoting physical and chemical stability, meeting regulatory obligations, and facilitating social transition. - Closure objectives will be established to articulate what is to be achieved through implementation of the closure activities. - Post-closure land uses (or possible uses) and required land capabilities will be identified and documented to aid closure planning activities and stakeholder engagement. - This will inform all aspects of the closure plan, particularly the definition of both the closure vision and objectives. As per the FWP in the 2022 PEPR, the review and update of mine closure strategy for Prominent Hill will be undertaken, include stakeholder engagement.	GC23, GC24 and GC51 (see wording above)	Q2 2026	Senior leadership team and Department Leads
Closure risk assessment*	Undertake and document a closure risk assessment. A risk assessment will be performed to identify and assess threats and opportunities associated with closure, including physical, social, economic and ecological considerations. This risk assessment at a minimum will consider all potential failure models of the IWL (WRD and TSF) via a Failure Modes and Effects Analysis (FMEA). Formal identification and evaluation of threats and opportunities will help to set priorities and shape many aspects of the Closure Plan, including identification and selection of closure activities (controls) that will feed into the Closure Execution Plan, improving the knowledge base and inform final landform design.	GC23, GC24 and GC51 (see wording above)	2025/26	All departments
Closure execution plan*	Develop a Closure Execution Plan (CEP) and regularly update through the closure planning process. A Closure Execution Plan (CEP) will be developed to identify specific actions (controls) that will be implemented during the mine life in support of closure planning and implementation of closure activities. The actions included in the CEP will be informed by the closure risk assessment process. Controls that will be included into the CEP to increase the knowledge base include: - Determining net percolation rates within the IWL. - An integrated hydrological and seepage assessment. - An erosion assessment. This should include validation of the IWL cover design through modelling – such as landform evolution modelling, net percolation modelling and sensitivity analysis. - Audit of as built WRD (completed). - Investigating options for tailings re-treatment. Draft controls that will be included into the CEP to inform the Closure Plan include: - Detailed design of the final landform IWL (WRD and Tailings). - Abandonment bund detailed design. - Determination of if revegetation is required for the TSF cover design for a safe and stable landform. The CEP will be provided to DEM for review.	GC12, GC14, GC15, GC24, GC46 and GC51 (see wording above). GC22 – The Lessee must control erosion on the external slopes of the Integrated Waste Landform	2025/26	Mining Department and SHEC Department

Aspect	Description	Relevant grouped lease conditions	Timing	Responsibility
Government engagement of CEP	Undertaken consultation with the DEM on the development of the CEP. Engagement with DEM is critical to demonstrate and provide confidence that the actions (controls) identified in the CEP will reduce uncertainty relating to closure outcomes identified in the PEPR.	GC12, GC14, GC15, GC24 and GC51 (see wording above).	Ongoing	SHEC Department
Stakeholder engagement	Undertake and document stakeholder engagement with pastoralist, local communities and Antakirinja Matu-Yankunyjtjara Aboriginal community Engagement with stakeholders to take place throughout the closure planning process, with insight from that engagement used to shape key elements of the closure plan.		Ongoing	SHEC Department
Update Mine Closure Plan (PEPR)	Update the Closure Plan within the PEPR to incorporate the outcomes of the CEP. On completion of the above closure planning tasks, the PEPR/ Mine Closure Plan for Prominent Hill will be updated and submitted to DEM for assessment.	GC12, GC14, GC15, GC24 and GC51 (see wording above).	PEPR revision	SHEC Department
Update the rehabilitation liability	Update the rehabilitation liability to incorporate the outcomes of the CEP. The rehabilitation liability calculator will be updated to reflect the scope of the new PEPR/ Mine Closure Plan.	GC01 – The Lessee/Licensee must, before commencing operations under this lease/licence, lodge a Rehabilitation Bond (Bond) in accordance with section 62 of the <i>Mining Act 1971</i> of such an amount of the surety as determined from time to time by the Minister, to cover the full cost of rehabilitation liability assessed by an independent third party at any time. In requesting a review of the bond, the Minister may request that written quotes from a third party are obtained by the lessee/licensee for the cost of rehabilitating the site to the requirements specified in the approved PEPR. The Licensee must meet all the charges and costs in obtaining and maintaining the Bond.	Next PEPR revision, if required	SHEC Department
Monitoring locations	Contingency plan for inaccessible monitoring locations. Determine alternate means of measuring OMCs if off lease monitoring locations cannot be accessed during FY2026.	GC 15 The Lessee must, in constructing, operating and post mine closure ensure no long-term adverse effect on aquatic fauna and habitat biodiversity (including riparian vegetation) due to: • generation of fugitive sediment • miscellaneous chemicals • altered flow regime • seepage from Tailings Storage Facility • seepage from the process water dam • acid rock drainage • pit water.	Next PEPR revision, if required	SHEC Department

* Timing and content subject to change as Prominent Hill aligns to the BHP Closure and Legacy Management Global Standard

13. Supporting technical reports

All technical and expert reports from the MARP 2006 and 2009 referenced throughout this document and listed below can be provided upon request to DEM. Refer to Table 13.1.

Table 13.1 | Supporting technical reports

Technical report title	Source document, superseded
Project design	
Stormwater design	
Stormwater Management Conceptual Design	MARP 2009 (OZ Minerals, 2009), Appendix 15
Integrated waste landform	
Geochemical Assessment of the Prominent Hill Project	MARP 2009 (OZ Minerals, 2009), Appendix 10A
Preliminary Integrated Waste Landform Design	MARP 2009 (OZ Minerals, 2009), Appendix 11A
Waste Rock Durability, Soundness, Competency and Landform Design Considerations	MARP 2009 (OZ Minerals, 2009), Appendix 11B
Integrated Waste Landform Redesign	MARP 2009 (OZ Minerals, 2009), Appendix 11C
Revised Design for Integrate Waste Landform	MARP 2009 (OZ Minerals, 2009), Appendix 11D
Stability and Seepage Review	MARP 2009 (OZ Minerals, 2009), Appendix 11E
EML site access road	
Site Access Road EML 6234 to 6242 Photographs	Site Access Road EML MARP (Oxiana, 2006c), Appendix 3
EML concentrate export road	
Concentrate Export Road EML 6278 to 6296 and 6299 to 6301 Photographs	Concentrate Export Road EML MARP (Oxiana, 2008c), Appendix 1
Groundwater	
Groundwater baseline	
Third-party Groundwater User Baseline Survey	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 4C
Groundwater models	
Conceptual Groundwater Model	MARP 2009 (OZ Minerals, 2009), Appendix 14C
Numerical Groundwater Model	MARP 2009 (OZ Minerals, 2009), Appendix 14D
Groundwater assessments	
Water Supply Option Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 14A
Minesite Groundwater Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 14B

Technical report title	Source document, superseded
Terrestrial and aquatic ecology	
Flora surveys	
Mining Lease and Site Access Road Baseline Flora Survey	MARP 2009 (OZ Minerals, 2009), Appendix 4
Operations Borefield Infrastructure Corridor Flora Survey	Operations Wellfield Infrastructure Corridor MARP Addendum (Oxiana, 2007b), Appendix 1
Operations Borefield Flora Survey	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 1A
Operations Borefield Additional Collector Systems Area Flora and Fauna Survey	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 1B
Construction Borefield and Electricity Transmission Corridor Flora Survey	Construction Wellfield MARP Addendum (Oxiana, 2006b), Appendix 2
Concentrate Export Road Flora Survey	Concentrate Export Road MARP Addendum (Oxiana, 2007a), Appendix 1
Electricity Transmission Line Corridor Flora Survey	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 1B
Electricity Transmission Line Corridor Revised Alignment Flora Survey 2006	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 1B
Electricity Transmission Line Corridor Revised Alignment Flora Survey 2007	Electricity Transmission Line MARP Addendum – Revised Southern Section (Oxiana, 2008b), Appendix 1
Fauna surveys	
Mining Lease and Site Access Road Fauna Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 5
Operations Borefield Infrastructure Corridor Fauna Survey	Operations Wellfield Infrastructure Corridor MARP Addendum (Oxiana, 2007b), Appendix 2
Operations Borefield Fauna Survey	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 2
Construction Borefield Fauna Assessment	Construction Wellfield MARP Addendum (Oxiana, 2006b), Appendix 3
Concentrate Export Road Fauna Survey	Concentrate Export Road MARP Addendum (Oxiana, 2007a), Appendix 2
Electricity Transmission Line Corridor Fauna Survey	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 2A
Electricity Transmission Line Corridor Revised Alignment Fauna Survey 2006	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 2B
Socio-economic environment	
Socio-economic Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 7
Air quality	
Air Quality and Greenhouse Gas Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 12
Radiation	
Radiation Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 9A
Radiation Assessment of Underground Mining	MARP 2009 (OZ Minerals, 2009), Appendix 9B

Technical report title	Source document, superseded
Noise and vibration	
Noise and Vibration Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 13
Heritage	
Mining Lease and Site Access Road Cultural Heritage Assessment	MARP 2009 (OZ Minerals, 2009), Appendix 6
Operations Borefield Infrastructure Corridor Archaeological Assessment	Operations Wellfield Infrastructure Corridor MARP Addendum (Oxiana, 2007b), Appendix 3
Operations Borefield Archaeological Assessment	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 3A
Operations Borefield Additional Operations Archaeological Assessment	Operations Wellfield MARP Addendum (Oxiana, 2008a), Appendix 3B
Construction Borefield Cultural Heritage Assessment	Construction Wellfield MARP Addendum (Oxiana, 2006b), Appendix 4
Concentrate Export Road Archaeological Assessment	Concentrate Export Road MARP Addendum (Oxiana, 2007a), Appendix 3
Electricity Transmission Line Corridor Archaeological Assessment	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 3A
Electricity Transmission Line Corridor Variation Archaeological Assessment	Electricity Transmission Line MARP Addendum (Oxiana, 2008d), Appendix 3B

14. List of superseded documents

This PEPR supersedes the following documents:

- Mining Lease 6228 Mining and Rehabilitation Program (Oxiana, 2006a)
- Miscellaneous Purposes Licence 81 and Miscellaneous Purposes Licence 82 Construction Wellfield MARP Addendum (Oxiana, 2006b)
- Extractive Mining Leases 6234, 6236, 6237, 6238, 6239, 6240, 6241 and 6242 Access Road EML MARP Addendum (Oxiana, 2006c)
- Miscellaneous Purposes Licences 91, 96, 97 and 101 Concentrate Export Road MARP Addendum (Oxiana, 2007a)
- Miscellaneous Purposes Licences 93 and 94 Operations Wellfield Infrastructure Corridor MARP Addendum (Oxiana, 2007b)
- Operations Wellfield MARP Addendum (Oxiana, 2008a)
- Miscellaneous Purposes Licence 108 Electricity Transmission Line MARP Addendum – Revised Southern Section (Oxiana, 2008b)
- Extractive Minerals Leases 6278 to 6296 and 6299 to 6301 CER Extractive Minerals Leases MARP Addendum (Oxiana, 2008c)
- Miscellaneous Purposes Licences 86, 87, 88, 89, 90, 98, 102 and 103 Electricity Transmission Line MARP Addendum (Oxiana, 2008d)
- Mining Lease 6228 Mining and Rehabilitation Program 2009 (OZ Minerals, 2009).
- Prominent Hill Program for Environment Protection and Rehabilitation Mining Lease 6228 and Associated Tenements (OZ Minerals, 2015a)
- Prominent Hill Program for Environment Protection and Rehabilitation Mining Lease 6228 and Associated Tenements (OZ Minerals, 2017)
- Prominent Hill Transition to Program for Environment Protection and Rehabilitation Mining Lease 6228 and Associated Tenements (OZ Minerals, 2015b)
- Prominent Hill Program for Environment Protection and Rehabilitation Mining Lease 6288 and Associated Tenements (OZ Minerals, 2019). Document withdrawn from submission, not approved version of the PEPR.
- Prominent Hill Transition to Program for Environment Protection and Rehabilitation Mining Lease 6228 and Associated Tenements (OZ Minerals, 2022)

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DSD — see Department of State Development, Government of South Australia

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16. Definitions and abbreviations

Table 16.1 | Definition of acronyms

Abbreviation	Description
ALARA / SFAIRP	as low as reasonably achievable / so far as is reasonably practicable
AMD	acid mine drainage
ANC	acid neutralising capacity
ANCOLD	Australian National Committee on Large Dams Incorporated
ANFO	ammonium nitrate / fuel oil
ARI	average rainfall intensity
ASX	Australian Securities Exchange
CHF	cemented hydraulic fill
COS	coarse ore stockpile
DAWE	Australian Government, Department of Agriculture, Water and Environment
DEM	Government of South Australia, Department for Energy and Mining
DEW	Government of South Australia, Department for Environment, and Water
DoD	Australian Government Department of Defence
DIT	Government of South Australia, Department for Infrastructure and Transport
EL	Exploration Lease
EPA	Government of South Australia, Environment Protection Authority
EML	Extractive Mineral Lease
ERICA	Environmental Risk from Ionising Contaminants Assessment and Management
FoS	factor-of-safety
GAB	Great Artesian Basin
HDPE	high density polyethylene
IAF	Impact Assessment Framework
IWL	integrated waste landform, includes TSF and WRDs
JORC	Australasian Joint Ore Reserves Committee
LOM	life-of-mine
MARP	Mining and Rehabilitation Program
ML	Mining Lease
MLP	Mining Lease Proposal
MPL	Miscellaneous Purposes Licence
NAF	non-acid forming
No.	number
NSR	Net Smelter Return
NV Fund	Native Vegetation Fund, into which funds to achieve an SEB can be paid to offset native vegetation clearance
OZL	OZC and OZM together as subsidiaries of OZ Minerals Limited
PA	potential acid
PAF	potentially acid forming
PIRSA	Primary Industries and Resources of South Australia

Abbreviation	Description
PEPR	Program for Environment Protection and Rehabilitation
PF	paste fill
Q	Quarter of year where Q1 represents January to March, Q2 represents April June, Q3 represents July to September and Q4 represents October to December.
RCP	reverse circulation percussion
RO	reverse osmosis
ROM	run-of-mine
RRC	Resource Recovery Centre
SAG	semi-autogenous grinding
SEB	Significant Environmental Benefit
SHEC	Safety, Health, Environment and Community
SLOS	sub-level open stoping
SoC	Statement of Commitments
TDS	total dissolved solids
TSF	tailings storage facility
UPAF	undifferentiated potentially acid forming
VWP	vibrating wire piezometers
WRD	waste rock dump
WWTP	waste water treatment plant

Table 16.2 | Definition of terms

Term	Definition
Approval	The act of formally confirming, sanctioning, ratifying or agreeing to something. Approval must be obtained from an appropriate person with accountability or delegated authority.
Aspect	An element of an organisation's activities or products or services that can interact with the environment. Note that a significant environmental aspect has, or can have, a significant environmental impact.
Closure	Closure is generally deemed to be completed at the end of decommissioning and rehabilitation and where all current appropriate regulatory obligations have been satisfied. There are three closure scenarios which are as follows: - Planned closure and completion: assume that the mine operates as per the proposed mine life and transitions into closure activities at the end of the planned mine life. - Sudden unplanned closure: assumes that an unforeseen or unplanned event occurs that requires the mine to cease operation and potentially limited ability to undertake closure activities. - Care and maintenance: assumes that an unforeseen or unplanned event requires the mine to cease the planned mining operation however, there is potential for the mining operation to recommence in the near future. Under this scenario, the site would be maintained in a safe and stable state until either operations recommence, or the site is permanently closed.
Decommissioning	The process that begins near, or at the cessation of mineral production. This term is used interchangeably with site closure.
Effect	An effect can occur on a pathway as a result of an aspect/source. A deviation from the expected; positive and/or negative.

Term	Definition
Environment and community outcomes	Environment and community outcomes indicate the expected impact on the environment or community caused by the proposed activity subsequent to control and management strategies being implemented. They demonstrate a commitment on the extent to which an activity will limit impact on the environment and community. Environment and community outcomes have been documented in this PEPR where the risk is such that specific control measures are required to minimise the risk, or there are strong public perceptions, or there is uncertainty in the risk level.
External audit	Audit undertaken externally by an independent consultant or expert who can demonstrate transparency.
Impact	Any certain and defined change to a receptor, whether adverse or beneficial, wholly or partially resulting from an aspects/source. Note, an impact is not a risk as it is deemed to be certain.
Internal audit	Systematic reviewing of process undertaken internally by experts in specific disciplines
Leading indicator criteria	Measurable standard that, when monitored, provides early warning that a control measure is failing and that an outcome is potentially at risk of not being achieved. Leading indicator criteria have been established in this document for each risk where there is a high consequence event that relies significantly on a control measure to reduce the risk.
Linkage	Source-pathway-receptor linkage. A linkage is confirmed where a source affects a pathway and ultimately leads to an impact on an identified receptor. The linkage can be broken by the application of a control strategy or inherent nature of location, e.g., distance to sensitive receptors.
Monitoring	Collection and analysis of environmental data.
Monitoring locations	Monitoring locations are used to demonstrate compliance with the mining lease conditions, outcomes and operational performance.
Pathway	The means by which material originating from the source reaches a receptor.
Sensitive receptor	A discrete, identifiable attribute or associated entity that is measurably impacted by an effect to a pathway. Examples of a sensitive receptor are a third-party, workers, or a particular species or assemblage of a species.
Source	A natural entity, a specific location or infrastructure component of a project.
Wellfield / Borefield	Wellfield and borefield are interchangeable throughout this document depending on the specific reference. This is mainly due to the different use of terminology in different licences.

Table 16.3 | Units of measurement

Abbreviation	Expansion of unit	Abbreviation	Expansion of unit
bcm	bulk cubic metres	mm	millimetre(s)
d	Day	m ²	square metre(s)
dmt	dry metric tonnes	m ³	cubic metre(s)
g	gram(s)	mg	milligram(s)
GWh	gigawatt hour	ML	megalitre(s)
ha	hectare	Mm ³	million cubic metre(s)
hr / h	hour	mRL	metres Reduced Level
kg	kilogram(s)	Mt	million tonne(s)
kL	kilolitre(s)	pa	per year / per annum
km	kilometre(s)	s	second
kN	kilonewton(s)	t	tonne(s)
kPa	kilopascal(s)	V	volt(s)
kV	kilovolt(s)	wmt	wet metric tonne
kW	kilowatt(s)	w/w	weight per weight
L	Litre	µm	micrometre(s)
m	metre(s)		

17. Terms of Reference checklist

This Section provides a checklist of the minimum information required to be provided for the preparation of a PEPR under Terms of Reference (TOR) 005 Metallic and industrial mineral PEPRs. The Minerals Regulatory Guideline MG2b Preparation of a PEPR for metallic and industrial minerals, provides the checklist below (Table 17.1) for comparison of PEPR documents against the requirements of TOR 005.

Table 17.1 | TOR 005 PEPR 2025 checklist

Framework	Requirement	Included in PEPR?
Guideline	Basic information on the mine	
	ML/MPL number(s) Name of the mining operation	Section 2.1, Section 2.2
	Table of contents	Table of Contents
	Name/s of the tenement holder, mine operator and on-site contact person (phone and email)	Section 2.1
	Version control sheet Date PEPR prepared and version control number	Document Control History
	Summary of PEPR content changes (PEPR reviews only)	Executive Summary
TOR005	From the PEPR	
	An electronic version of the PEPR must be submitted online through the relevant government website, or if approved by the Director of Mines or an authorised officer, submitted via email, post or courier and should be marked 'Attention: Mining Assessments'; Each page, plan or other separate sheet must include the tenement number(s), date of the PEPR preparation and sequential page numbering; and The electronic version must be submitted in one single Acrobat PDF file or if requested by the Director of Mines or an authorised officer, Microsoft Word compatible files must be submitted; A reviewed PEPR submitted to the Minister for approval under section 70C of the Mining Act 1971, must in accordance with regulation 63(1)(e) include	Acknowledged
84	Requirement for declaration of accuracy	
	Signed statement by the tenement holder, that the person has taken reasonable steps to review the information and to ensure its accuracy.	Declaration of Accuracy
TOR005-1	Description of the environment	
	A PEPR must include any new baseline environmental data relevant to the control strategies or criteria set out in clause 4 of TOR005, since the previous description of the environment or criteria was provided (in a proposal, approved PEPR or change to operations proposal). Where changes to the environment are identified, a PEPR must provide an updated description of the environment to describe the changes.	Section 4.2
70B(2)(a)	Description of the mining operations	
	Each of the elements of the Mining Operations must be described only to the extent that they apply to the mining operation.	Section 5.1, Section 5.2, Section 5.3, Section 5.4, Section 5.5, Section 5.6, Section 5.7, Section 5.8, Section 5.9, Section 5.10, Section 6
TOR005 – 2.1	General description and maps/plans of operations	
	Provide a summary description of all elements of the operation, including mining, processing and waste management (include maps/plans and sections as per clause 7).	Section 5.1, Section 5.5.2, Section 5.5.3, Section 5.5.8, Section 5.7, Section 5.8.1, Section 5.10, Section 6.5, Section 6.6
TOR005 – 2.2	Reserves, product and market	
TOR005 – 2.2.1	Ore reserves and mineral resources	
	Provide: - a statement of the current Australasian Joint Ore Reserves Committee (JORC) compliant ore reserve or mineral resource estimates (or both) in the tenement area; and - a statement of what reserve and/or resource forms the basis for the mining operation; - or (if a JORC compliant reserve or resource (or both) has not been reported) - an estimate of the resource to be mined and the basis of this estimate. Provide steps that have been taken to ensure mining operations will not sterilise/prevent future extraction of mineral resources.	Section 5.3.1
TOR005 – 2.2.2	Production rate and products	
	Provide: - a statement of the relevant commodities that are to be extracted, processed and sold, and the expected market or end use; - a statement of any other commodities present in the tenement area that are not to be recovered for sale, and the reasons for this decision; - a quantitative estimate of production of mine gate product(s) for the life of mine, and a schedule of the annual production of mine gate product(s); and - a statement if any extractive minerals (as defined by Section 6 of the Mining Act 1971) will leave the lease.	Section 5.3.1, Section 5.3.2, Section 5.3.3
TOR005 – 2.3	Exploration activities	
	Provide information that details all exploration activities to be undertaken within the tenement area as a part of the mining operation, including: - purpose of the activities (i.e. resource drill-out or resource extension); - types of drilling; - geophysical techniques likely to be used;	Section 5.4

Framework	Requirement	Included in PEPR?
	- earthworks required to conduct exploration activities; - equipment required to conduct exploration activities; and - rehabilitation methods for exploration works (including that not yet rehabilitated from previous tenure). Any clearance of native vegetation due to exploration activities that had not been rehabilitated at the grant of the mining lease or licence must be included within the significant environmental benefit calculations detailed within the native vegetation management plan.	
TOR005 – 2.4	Description of mining	
TOR005 – 2.4.1	Type or types of mining operation to be carried out	
	Mining method to be adopted	Section 5.5.1, Section 5.5.2, Section 5.5.3
TOR005 – 2.4.2	Open pit	
	Describe, for the life of mine from inception to cessation, all open pit workings, including (but not limited to): - overall pit wall angles, bench height, berm width; - dimensions and depth of pit; - access ramps; and - maps, plans and cross-sections (as per 7.1.1, 7.1.2, 7.1.7, 7.2.1 and 7.2.2).	Section 5.5.2, Section 5.5.2.1, Section 5.5.2.2, Section 6.5.2
TOR005 – 2.4.3	Underground workings	
	Describe underground workings, including (but not limited to): - stoping methods; - potential surface disturbance resulting from underground mining; - declines, shafts, tunnels, bore holes, ventilation intakes and exhausts; and - maps, plans and cross-sections (as per 7.1.1, 7.1.2, and 7.2.1). Where underground fill is used, describe: - type of fill to be used; - the volume percentage of underground void to be filled; - sequence of filling; - source and proportion of fill; and - maps, plans and cross-sections showing the fill (as per 7.1.7 and 7.2.2).	Section 5.5.3, Section 5.5.3.1, Section 5.5.3.2, Section 5.5.3.3Section 5.5.3.4, Section 5.5.3.5 Section 5.5.3.6, Section 6.5.3
TOR005 – 2.4.4	Material movements	
	Provide: - expected life of mine (including scope for extension); - annual mine production rates and mine production schedule of ore and waste rock over the life of mine; and - life of mine and annual strip ratios.	Section 5.2, Section 5.3, Section 5.5.3.2
TOR005 – 2.4.5	Stockpiles	
	Describe for all ore, product, subsoil and topsoil stockpiles the: - location, size, shape and height of ore, product, subsoil and topsoil stockpiles; method of placement; - method of stabilisation and erosion control of all stockpiles; and - water movement through stockpiles. The location, maximum height and extent of all stockpiles must be shown on a map (as per 7.1.1).	Section 5.8, Section 5.8.1, Section 5.8.2, Section 5.8.3, Section 5.8.4, Section 5.8.5, Section 6.5.1
TOR005 – 2.4.6	Use of explosives	
	If explosives are used, describe: - type of explosives used on the site; - timing and frequency of blasting; - size of blasts; and - storage of explosives (amount, type, detailed location and method of storage).	Section 5.5.5
TOR005 – 2.4.7	Type of mining equipment	
	Provide a description of the equipment (fixed and mobile) to be used in the mining operation in terms of: - type, size and capacity of machines; - approximate number of units; - noise outputs; - exhaust outputs; and - fire ignition sources.	Section 5.5.7

Framework	Requirement	Included in PEPR?
TOR005 – 2.4.8	Mine dewatering	
	Provide: - estimated inflows of groundwater, stormwater and water from any other mining activities into mine workings; - details of mine dewatering infrastructure, and mine water management and disposal; - contingency measures for greater than planned water inflows into mine workings; and - a mine water balance of water inflows and water outflows during operations and at mine completion (if not included in the water balance in clause 2.5.4).	Section 5.5.8, Section 5.7.4.7, Section 5.9.1
TOR005 – 2.4.9	Sequence of mining and rehabilitation operations	
	Provide the following information on the sequence of operations in both text, map and cross section form (as per 7.1.2 and 7.2.1): - description of the sequence of mining stages; - sequencing of progressive and final rehabilitation, including demonstration that progressive rehabilitation has been integrated with the mining plan; - an estimation of the quantities of sulfide minerals that have the potential to generate acid or mobilise metals, or other hazardous minerals to be mined at each mining stage; and - any mineral resource that may be sterilised from future mining by the planned mining operations.	Section 5.2, Section 5.3.2, Section 5.3.3, Section 5.5.4, Section 5.8.1.1, Section 5.8.1.2, Section 6.4, Section 6.6.1
TOR005 – 2.4.9.1	Rehabilitation strategies and timing	
	Describe all activities, strategies and designs relating to mine closure for rehabilitation of: - open pit and/or underground workings, - stockpiles, - explosives storage, - mining equipment and mine dewatering infrastructure. Include timing of these activities and all opportunities for progressive rehabilitation. Include (but not limited to): - the maximum area of land disturbed by mining operations at any time, - battering of mining faces and other earthworks, - mine void backfilling, - abandonment bunds, - sealing of portals and ventilation shafts, - soil management, - revegetation; and - expected water infill rates.	Section 6, Section 6.1, Section 6.2, Section 6.4, Section 6.5.1, Section 6.5.2, Section 6.5.3, Section 6.5.4, Section 6.5.5, Section 6.5.6, Section 6.5.7, Section 6.6, Section 6.7, Section 6.9, Section 6.10
TOR005 – 2.4.10	Modes and hours of operation	
	State if the operation will be worked on a continuous (24 hour, 7 days a week), regular periodical or campaign basis. If the operation is to be worked on a regular periodical basis, specify: - period(s) (daily, weekly and public holidays) to be worked; and - start and finish hours the site is to be worked per period. If the operation is to be worked on a campaign basis, specify: - minimum hours the site is to be worked per year; - the minimum time of each campaign; - the maximum and minimum time between campaigns; - define the beginning and end of each campaign; - hours of mining operations during campaign; - days of mining operations during campaign; - determining factors for initiating and ceasing a campaign; - maximum and minimum tonnage of each campaign; and - maximum and minimum tonnage of production per year.	Section 5.10.1.1
TOR005 – 2.4.11	Care and maintenance	
	Detail all activities and strategies required for care and maintenance of the mine, should the mine suspend production, but not progress immediately to closure.	Section 6.8
TOR005 – 2.5	Crushing, grinding, processing and product transport	
TOR005 – 2.5.1	Crushing and grinding plant	
	Provide a description of the crushing / grinding plant including: - area, size, type of construction and location; - throughput rate;	Section 5.6.1, Section 5.6.4

Framework	Requirement	Included in PEPR?
	- a description of ore preparation for processing; - grind size of the ore; - noise sources; - dust sources and composition; - fire ignition sources; and - maps and plans (as per 7.1.3).	
TOR005 – 2.5.2	Processing plant	
	Provide a description of the processing plant including: - the methods and details of processing and value adding; - number, location, area, size, type of construction (including lining and drainage systems, as appropriate) of processing plant; - any ancillary plant and infrastructure to be used for processing the minerals on site; examples of associated structures are concrete batching plants, wheel wash facilities, silos, fuel tanks, water tanks, chemical storage/use, reverse osmosis plants and bore fields; - if chemicals are to be used in the beneficiation or processing of ore, describe the nature and quantities of the chemicals to be used, their reactions with ore and their ultimate fate; - noise sources; - dust sources and composition; - fire ignition sources; - other potential air emissions (including odour) and their composition; and - maps and plans (as per 7.1.1 and 7.1.3).	Section 5.6.2, Section 5.6.2.2, Section 5.6.2.3, Section 5.6.2.4, Section 5.6.2.5, Section 5.6.4
TOR005 – 2.5.3	Heap leach	
	Provide a description of the Heap Leach Pad and process including: - type, size and location of the Heap Leach Pad; - construction and operating specifications for the Heap Leach Pad and process, including solution containment measures; - geochemical and geotechnical assessment of the material placed on the Heap Leach Pad before and after leaching; - method and rate of ore deposition and removal; - chemical characteristics of the leach solution, pregnant liquor and raffinate solutions; - solution application rates, and method of application; - removal (where proposed) of the Heap Leach Pad at cessation of production and the method/location of disposal of leached material; - method of stabilisation and erosion control of Heap Leach Pad; - an assessment of the long-term chemical and physical stability of the Heap Leach Pad post mine completion; - the source, pathway and ultimate fate of any potential mobile contaminants; and - maps and plans (as per 7.1.1 and 7.1.4).	Not applicable
TOR005 – 2.5.4	Process water management	
	Provide a water balance including: - approximate water volumes required; - a summary of the inputs and outputs (with consideration of any purge requirements); - determination of net surplus or deficit; and - process flowsheet showing all streams including stormwater management and mine dewatering where these are connected to the processing circuit. Provide a description of all water ponds, including: - size, capacity, layout and location of ponds; - design and construction methods; - chemical composition of the solution to be stored in each pond; - minimum freeboard to be maintained; and - plans (as per 7.1.2.1).	Section 5.6, Section 5.7.4.3, Section 5.7.4.7, Section 5.9.1
TOR005 – 2.5.5	Type of mobile equipment	
	For mobile equipment to be used in crushing / grinding, processing ore and in transporting the mine product to the point of sale, describe: - type, size and capacity of machines; - approximate number of units; - noise outputs; - exhaust outputs; and - fire ignition sources.	Section 5.5.7, Section 5.6.4
TOR005 – 2.5.6	Conveyors and pipelines	

Framework	Requirement	Included in PEPR?
	Provide a description of any conveyors or pipelines to be used for transporting material to or from the mine, processing facilities and the point of sale including: - length, size (volumes to be transported), design and type of construction and location; - the material being transported; - leak detection strategies for pipelines; - noise sources; - dust sources and composition; - fire ignition sources; and - maps, plans and cross-sections (as per 7.1.1).	Section 5.6.1, Section 5.6.4, Section 5.9.1.2, Section 5.9.1.4
TOR005 – 2.5.7	Hours of operation	
	Describe the hours of operation of crushing / grinding, processing and transport activities.	Section 5.1, Section 5.10.1.1
TOR005 – 2.5.8	Care and maintenance	
	Detail all activities and strategies required for care and maintenance of processing facilities, and material transport systems, should the mine suspend production, but not progress immediately to closure.	Section 6.8
TOR005 – 2.5.9	Rehabilitation strategies and timing	
	Detail all activities, strategies and designs relating to mine closure for removal, disposal, and rehabilitation of processing facilities, and material transport systems, including timing of these activities. For rehabilitation strategies and timing related to Heap Leach, provide: - a Heap Leach detoxification strategy; - identification of the volumes of process solution and flush water to be disposed of at closure; and - a methodology for the disposal of residual process solution and flush water at closure.	Section 6.5.4, heap leach not applicable
TOR005 – 2.6	Wastes	
TOR005 – 2.6.1	Waste rock and tailings storage facilities	
	For waste rock and tailings storage facilities (TSF) provide: - the estimated tonnes and volumes of all waste rock and tailings to be stored; - the reserve and any resource or potential resource that the estimated tonnes and volumes of waste rock and tailings is based on; - the type, location, size, shape, height and method of construction of permanent and temporary waste storage facilities; - a geochemical and geotechnical assessment of the waste rock and tailings based on the geochemical and geotechnical properties determined from the analysis of representative sampling of all waste rock types and tailings to be disposed; - an assessment on the weathering and erosive potential of waste rock to be disposed; - specifications, drawings and plans for the design, construction, operation and completion of all facilities (as per 7.1.5); - the method and rate of waste rock/tailings disposal; - where relevant, a description of the placement and encapsulation of waste material deemed to be hazardous, including potentially acid forming material (PAF); - the method of stabilisation and erosion control of waste storage facilities, both during operations and post completion; - surface water runoff control on disturbed and rehabilitated areas; - a geotechnical stability assessment and a factor of safety analysis; - an assessment of seepage of liquids through the waste rock and tailings storage facilities; - strategies for the containment of any seepage that has the potential to impact the environment; - an assessment of the post completion chemical and physical stability of the structure following rehabilitation, including the expected extent of erosion; - an assessment of the source, pathway and ultimate fate of any potential mobile contaminants; and - a description of the governance arrangements for the design, construction, operation and closure including when it is proposed to use third party verification. Include a water balance for the TSF (if not included in the water balance in clause 2.5.4).	Section 5.8.1.1, Section 5.8.1.2, Section 5.8.1.3, Section 5.8.1.4, Section 5.8.1.5, Section 5.8.1.6, Section 5.8.1.7, Section 5.9.1, Section 5.7.3.1, Section 5.7.3.2, Section 5.7.4.2, Section 5.7.4.3, Section 5.7.4.4, Section 5.7.4.5, Section 5.7.4.6, Section 5.7.4.7, Section 5.7.4.8, Section 5.7.4.9
TOR005 – 2.6.2	Other processing wastes	
	Provide: - the volumes and composition of all solid and liquid wastes produced; - estimated volumes of waste processing water, reverse osmosis reject water, water content of solid wastes, and method of disposal or recycling; - waste water composition; - disposal and management of any hazardous material or contaminants within waste including radioactive, toxic, corrosive or flammable materials; and - the source, pathway and ultimate fate of any potential mobile contaminants.	Section 5.6.1, Section 5.7.4, Section 5.8.1, Section 5.9.1
TOR005 – 2.6.3	Industrial and commercial wastes	
	List any industrial and commercial wastes generated including, but not limited to: putrescible waste, including sewage;	Section 5.10.4

Framework	Requirement	Included in PEPR?
	- oils and other hydrocarbons; and - tyres. For each waste type, describe the method of disposal including: - offsite disposal; - on site waste disposal (including size, location and construction details); - recycling (either on or offsite); - the type, area and layout of sewage systems to be installed at the site; and - describe what, if any approvals are required for the disposal of waste.	
TOR005 – 2.6.4	Care and maintenance	
	Detail all activities and strategies required for care and maintenance of waste rock and tailings and any other waste left on site, should the mine suspend production, but not progress immediately to closure.	Section 6.8
TOR005 – 2.6.5	Rehabilitation strategies and timing	
	Detail all activities, strategies and designs relating to mine closure, including timing of these activities and all opportunities for progressive rehabilitation of waste rock and tailings and any other waste to be left on site.	Section 6.5.1, Section 6.5.4, Section 6.5.5
TOR005 – 2.7	Supporting surface infrastructure	
TOR005 – 2.7.1	Access	
	Describe: - access route to the mining operations and show on a map (as per 7.1.6); - indicate if any new roads are to be constructed, or if existing roads or intersections (public and private) are to be upgraded; - transport system(s) used to and from the mining operations and the estimated number of vehicle movements per day; and - airport/airstrips to be constructed.	Section 5.10.1.2, Section 5.10.1.3, Section 5.10.1.5, Section 5.10.3
TOR005 – 2.7.2	Accommodation and offices	
	Describe onsite personnel accommodation and offices, including (but not limited to): - number, area, size, type of construction and location of accommodation, office, meals or laboratory buildings, caravans or camp, and associated structures to be used on site; and - state if temporary or permanent.	Section 5.10.2
TOR005 – 2.7.3	Public and private services and utilities used by the operation	
	Describe: - sources of services that are supplied to the operations, including (but not limited to) power, water, telecommunications; - routes for connection if any new connections to public infrastructure are required; and - any existing surface infrastructure that has been and/or the extent it may be affected by the mining operations.	Section 5.9.2.1 ,Section 5.10.2
TOR005 – 2.7.4	Visual screening	
	Describe the type of screening, including existing or planned vegetation (i.e. species and density of plantings) and show on a map (as per 7.1.1).	Section 5.10.2.3
TOR005 – 2.7.5	Fuel and chemical storage	
	For all fuels and chemicals stored on site show the proposed location of storage on a map (as per 7.1.1) and provide detail on: - types of bulk chemicals and the volumes of each; and - details on storage, bunding and containment for all chemical and fuel storage vessels.	Section 5.9.2.2, Section 5.10.2.1, Section 5.10.3, Section 5.10.4, Section 5.6
TOR005 – 2.7.6	Site security	
	Describe and show on a map (as per 7.1.2.1) infrastructure and measures that will be adopted to prevent unauthorised access by the public, including fencing, signage etc.	Section 5.10.1.5
TOR005 – 2.7.7	Stormwater, silt control and drainage	
	Describe: - location and design of silt management structures; - runoff control on disturbed and rehabilitated areas; - storage, diversion and release of clean water (discharge water must comply with the applicable Environment Protection Authority South Australia water quality policy); and - a whole of site stormwater balance, if not included in the water balance in clause 2.5.4. Provide a plan showing the surface water movement for the whole mine site (as per 7.1.1).	Section 5.5.8, Section 5.9.1, Stormwater balance not included
TOR005 – 2.7.8	Care and maintenance	
	Detail all activities and strategies required for care and maintenance of supporting surface infrastructure, should the mine suspend production, but not progress immediately to closure.	Section 6.8
TOR005 – 2.7.9	Rehabilitation strategies and timing	

Framework	Requirement	Included in PEPR?
	Detail all activities, strategies and designs relating to mine closure for rehabilitation of supporting surface infrastructure. Provide details for timing of closure activities, including all opportunities for progressive rehabilitation	Section 6.5.5, Section 6.6.1
TOR005 – 2.8	Vegetation clearance	
	If clearance of native vegetation is to occur, a Native Vegetation Management Plan (NVMP) prepared by an accredited consultant must be included with the PEPR. The NVMP must: - describe the vegetation type to be cleared and include a map (as per 7.1.2) showing the proposed clearance area; and - state the quantum of significant environmental benefit (SEB) to be gained in exchange for the clearance and describe how the SEB will be provided.	Acknowledged, Section 10.3
TOR005 – 2.9	Mine completion	
TOR005 – 2.9.1	Description of mine site at completion	
	Provide a description, plans and cross sections of the mine site (as per 7.1.7 and 7.2.2) as it will be at completion after all rehabilitation and closure activities have been completed, including: - final post completion land use; - landforms; - vegetation covers (including native vegetation that will not be disturbed due to mining operations); - natural contours of land not to be disturbed by mining operations; - any mining infrastructure that will remain on site and will become the responsibility of the landowner; - location, description and management of waste disposal areas; - location of reshaped and rehabilitated areas showing surface contours and revegetation; - mine voids (open pit and/or underground); - location of stored and/or exposed PAF material and/or other hazardous materials; - expected final water level and time to reach this level, and water quality of mine voids; - location of surface water infrastructure including ponds and diversions; and - representative plans and cross-sections that show: - pre-mining natural surface - emplacement areas, waste disposal areas and disturbed areas - final rehabilitated surface - where relevant, backfilled and remaining underground workings - predicted final groundwater levels - interpreted geology including all rock types. Provide a description of the mechanism for transferring responsibility for any potential residual liability (i.e. ongoing maintenance or monitoring) subsequent to surrender of the tenement.	Section 6, Section 6.4, Section 6.5, Section 6.6.2
TOR005 – 2.9.2	Rehabilitation liability estimate	
	Provide the maximum third party cost of rehabilitation at any time over the life of mine covered by the PEPR. The estimate must be based on reasonable third party costs of undertaking the rehabilitation strategies as outlined in clause 2 and include costs for project management, inflation, normal project variation, and contingency provision for risk associated with the strategies and uncertainty in the cost estimates.	Section 6.11
TOR005 – 2.10	Resource inputs	
TOR005 – 2.10.1	Workforce	
	For the workforce for all operations (mining, processing, waste management and supporting surface infrastructure), describe: - how operations on the site will be managed; - number and workforce breakdown by job type; - number of full-time employee positions that would be directly created by the proposal (not to include existing positions); - the proportion of the workforce that would reside in the local community and the estimated impact on local employment; - any programs to target and assist Indigenous or local employment at the mine; - training to be provided to employees and potential employees; - approximate timelines for creation of the positions; and - potential for local business participation, and procurement of local goods and services.	Section 5.9.3
TOR005 – 2.10.2	Energy sources	
	For the energy sources and usage provide: - estimates of total annual energy usage (from all sources, including personnel transport and ore transport to point of sale); - expected sources of energy; - potential for efficiency gains; - amount and percentage of zero emission energy to be utilised; - equivalent annual CO2 generated; and	Section 5.9.2

Framework	Requirement	Included in PEPR?
	any carbon offsets proposed.	
TOR005 – 2.10.3	Water sources	
	Provide details on the source(s) of water to be used, expected usage and any discharge, including: - expected annual water usage by source; - indicate if any water usage by source will be more than 5% of the total annual water withdrawal for that source; - percentage of water that will be recycled; and - water discharge by quality and destination.	Section 5.9.1, Section 5.9.1.1, Section 5.9.1.2
r. 64 (1) & (2) &	Consultation	
TOR005 - 3	A description of: - the process undertaken for identifying stakeholders with an interest in, or stakeholders likely to be directly affected by the mining operation; - the process undertaken for the delivery of information to, gathering of feedback from, and responding to those identified stakeholders; - if any individual or group of similar affected persons were not able to be consulted, the steps taken to consult with them.	Section 7.1, Section 7.2.1, Section 7.2.2, Section 7.4
r. 64 (1) & (2)	The results of the consultation undertaken with those identified stakeholders, including: - the persons consulted; - any concerns / issues raised; and - the response and steps (if any) taken or proposed to address those concerns.	Section 7.1
TOR005 – 4	Environmental outcomes, strategies, criteria and monitoring	
s. 70B(2)(b) & r. 63(1) & r.	Environmental outcomes	
s. 70B(2)(b)(i)	Set out environmental outcomes (including mine completion outcomes) in accordance with section 70B(2)(b)(i) of the Act, or as required by the lease/licence. For each environmental outcome include:	Section 8, Section 9
r. 63(1)(b)	Control and management strategies	
r. 63(1)(b)	set out control and management strategies proposed to be adopted to achieve the environmental outcomes	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3
TOR005 – 4.2	demonstrate that the control and management strategies are commensurate with the impacts, achieve compliance with other applicable statutory requirements and promote progressive rehabilitation;	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3
r. 63(3)(c)	describe any significant degree of uncertainty in accordance with regulation 63(3)(c) pertaining to the likely effectiveness of control and management strategies, including (but not limited to) lack of site specific information, limitations on modelling and quality of data. Describe any assumptions connected with the identified uncertainty;	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3
r. 63(3)(d)	so far as is relevant, identify the sensitivity to change of any assumption that has been made in accordance with regulation 63(3)(d) and assess the likelihood of an outcome not being achieved if an assumption is later found to be incorrect;	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3
TOR005 – 4.2	provide a description and list of current and future works (for example (but not limited to) trials, test work, studies, modelling, validations) that are to be undertaken to address the identified uncertainty or assumption;	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3, Section 12
TOR005 – 4.2	provide a schedule of the timing that the future works will be undertaken and completed; and	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3, Section 12
TOR005 – 4.2	based on the schedule of future works, state the timing for review of the PEPR in accordance with Section 70C (1) of the Mining Act 1971.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.3, Section 12
s. 70B(2)(b)(ii)	Measurement criteria	
s. 70B(2)(b)(ii)	Set out a statement of criteria to be adopted to measure each environmental outcome (including completion outcomes).	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
r. 63(1)(c)	Measurement criteria must include all details listed in regulation 63(1)(c); - what is to be measured and the form of the measurements that are to be used; and - the locations where relevant measurements are to be taken, or how such locations are to be determined; and - what is proposed to be taken to constitute the achievement of the relevant outcomes (with consideration being given to any inherent errors of measurement); and	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4

Framework	Requirement	Included in PEPR?
	- the frequency of any measurement or monitoring; and - any background or control data that is to be used, or how any such data is to be acquired.	
TOR005 – 4.3	The criteria must include details about: - responsibility (who will measure); - record keeping; and - frequency of reporting to management and any external parties.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
TOR005 – 4.3	The statement of criteria must be developed separately for construction, operation and mine completion, as appropriate.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
TOR005 – 4.3	Where appropriate, recognised industry standards, codes of practice or legislative provisions from other Acts can be used as criteria.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
TOR005 – 4.3	All point-related measurement criteria, such as water bores, sampling points and photo points (including direction) must be included on a map.	Section 8.1, Section 8.2, Section 8.3
TOR005 – 4.3	When control or baseline data is used, this must be included in the PEPR.	Section 8.1, Section 8.2, Section 8.3, Section 8.7. Any reports referenced can be provided upon request.
TOR005 – 4.3	Where groundwater modelling is to be relied upon to demonstrate achievement of groundwater completion outcomes, the statement of criteria must include a process must be provided for validation of predictive modelling, including a description of the model and assumptions used.	Section 9.4
TOR005 – 4.3	Where native vegetation clearance is planned and in the case where an on ground offset by the operator is to be used to demonstrate the Significant Environmental Benefit (SEB), the statement of criteria must demonstrate the successful implementation of the on ground offset through the native vegetation management plan.	Acknowledged. Section 9.4, Section 10.3
r. 63(4)	The measurement criteria must, insofar as is reasonably practicable and appropriate, be expressed in quantitative terms (rather than qualitative terms).	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
r. 63(1)(d)	Leading Indicator Criteria	
r. 63(1)(d)	Set out leading indicator statement of criteria where required by the lease/licence or where there is a high level of reliance on control strategies to achieve an environmental outcome (including mine completion outcomes).	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
TOR005 – 4.4	Leading Indicator criteria must include all details listed in regulation 63(1)(c); - what is to be measured and the form of the measurements that are to be used; and - the locations where relevant measurements are to be taken, or how such locations are to be determined; and - what is proposed to be taken to constitute the achievement of the relevant outcomes (with consideration being given to any inherent errors of measurement); and - the frequency of any measurement or monitoring; and - any background or control data that is to be used, or how any such data is to be acquired.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
TOR005 – 4.4	The leading indicator criteria must include details about: - responsibility (who will measure); - record keeping; and - frequency of reporting to management and any external parties.	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
r. 63(4)	The leading indicator criteria must, insofar as is reasonably practicable and appropriate, be expressed in quantitative terms (rather than qualitative terms).	Section 8.1, Section 8.2, Section 8.3, Section 8.4, Section 8.5, Section 8.6, Section 8.7, Section 9.4
s. 70B(2)(c)	Operator capability	
s. 70B(2)(c)	Provide information about the ability of the tenement holder (and any other person who may be acting on behalf of the tenement holder) to achieve the environmental outcomes set out in the PEPR.	Section 3.1, Section 3.5.1.2
TOR005 – 5	Provide relevant evidence demonstrating that the tenement holder (and any other person who may be acting on behalf of the tenement holder as an operator) has appropriate experience, processes and procedures in place to be able to achieve the environmental outcomes.	Section 3.2
s. 70B(2)(d)	Lease and licence conditions	
TOR005 - 6	Where the lease or licence includes specific conditions or requirements that are not environmental outcomes, in accordance with regulation 63(1)(e) a PEPR must include a section that demonstrates where the respective conditions or requirements have been addressed in the PEPR (if relevant) or demonstrates how otherwise they have or will be complied with.	Section 8.8, Section 10.1, Section 10.2
TOR005 - 7	Maps and plans	
	All maps and plans must conform to the following standards: state and show the relevant datum (Australian Height Datum (AHD) is preferred);	Acknowledged

Framework	Requirement	Included in PEPR?
	- metric units; - title, north arrow, scale bar, text and legend; - date prepared and author; - be of appropriate resolution and scale for represented information; and - be legible in both the hardcopy and electronic versions of the submission. All cross-sections must conform to the following standards: - state and show the relevant datum (Australian Height Datum (AHD) is preferred); - metric units; - title, scale bar, text and legend; - date prepared and author; - be of appropriate resolution and scale for represented information; - be legible in both the hardcopy and electronic versions of the submission; and - be accompanied by a map showing the orientation of the cross-sections.	
TOR005 – 7.1	Maps and Plans required for Description of Operations	
TOR005 – 7.1.1	Site Layout Map showing all components of the operation including (but not limited to): - tenement area boundaries; - location of surface water and sediment management infrastructure; - location of process water dams; - location of fuel and chemical storage areas; - location of haul/access roads; - location of fixed plant; - location of mobile plant for stage 1 of mining; - location of visual screening measures; - location of fencing; - location and extent of topsoil/subsoil and product stockpiles. - location and extent of all areas proposed to be disturbed from mining including waste rock, silt/slime dams, mine infrastructure, processing plant, process water ponds, waste disposal facilities; and - location and extent of open pit(s) and/or underground workings. Location of key environmental features that are within or in close proximity to the Tenement and that are relevant to the design of the Site Layout Plan, including but not limited to housing and infrastructure, existing heritage sites, existing ephemeral and permanent rivers, watercourses, creeks or dams and/or existing native vegetation.	Section 2.2, Section 5.5.2, Section 5.5.3, Section 5.5.8, Section 5.6, Section 5.8, Section 5.9.1, Section 5.10
TOR005 – 7.1.2	Sequence of Mining and Progressive Rehabilitation Map showing: - tenement area boundaries; - staging of each progressive mining stage; - native vegetation clearance; - location and applicable buffer zones for protection of native vegetation that will not be cleared; and - conceptual staging of each progressive rehabilitation stage.	Section 2.2,Section 5.5.2, Section 5.5.3.2, Section 10.3.1.2
TOR005 – 7.1.3	Crushing, Grinding and Processing Plant Plan showing: - tenement area boundaries - layout of crushing, grinding and processing plant(s) and ancillary plant and infrastructure; and - if required; including lining and drainage systems.	Section 2.2, Section 5.6
TOR005 – 7.1.4	Heap Leach Pad Plan showing: - tenement area boundaries - construction and design drawings of heap leach pad (including size and batters); and	Not applicable
TOR005 – 7.1.5	Tailings Storage Facility (TSF) Plan showing: - tenement area boundaries - conceptual drawings and plans for design, construction, operation and completion of all facilities; - size, shape, height and method of construction; and - location of any waste material deemed to be hazardous including potentially acid forming material.	Section 2.2, Section 5.7.4
TOR005 – 7.1.6	Access Route Map showing: - tenement area boundaries - access route for heavy vehicles; - exit route for heavy vehicles; and	Section 2.2, Section 5.8.6.1, Section 5.10.1

Framework	Requirement	Included in PEPR?
	any road upgrades or new roads to be constructed.	
TOR005 – 7.1.7	Completion Map showing: - tenement area boundaries - conceptual final landforms (including rehabilitated and non-disturbed areas); - topographical contours of the entire site (including rehabilitated and non-disturbed areas); - backfilled and remaining underground workings; - location of waste disposal areas (including waste rock dumps, tailings storage facilities and PAF encapsulation); and - interpreted geology including all rock types.	Section 2.2, Section 6.5.1, Section 6.5.3, Section 6.5.6, Section 6.5.7
TOR005 – 7.2	Cross-sections required for Description of Operations	
TOR005 – 7.2.1	Mining Operation Cross-Section(s) showing: - pre-mining natural surface; - pit depth; - pit dimensions (length and width) - pit batters and benches; - location of underground shafts and stopes; and - stages of operation.	Section 2.2, Section 5.5.2
TOR005 – 7.2.2	Completion Cross Section(s) showing: - pre mining natural surface; - rehabilitated final batters and benches; - location of underground backfill in shafts and stopes; - predicted final groundwater elevations; and - final rehabilitated surface.	Section 2.2, Section 6.5.1, Section 6.5.3

BHP