

Environmental Assessment  
Report  
Grange Resources  
(Tasmania) Pty Ltd  
**North Pit Underground  
Operations**  
*Savage River Mine*

*August 2024*



ENVIRONMENT PROTECTION AUTHORITY

## Environmental Assessment Report

Proponent	Grange Resources (Tasmania) Pty Ltd
Proposal	North Pit Underground Operations
Location	Savage River Mine
Class of Assessment	2B
PCE no.	I2021
Permit Application No.	DA54/2024 (Waratah-Wynyard Council)
myDAS Folder No.	EN-EM-EV-DE-261290-001
myDAS Document No.	D24-180128

## Assessment Process Milestones

Date	Milestone
2 March 2020	Notice of Intent lodged
24 April 2020	Guidelines Issued
29 February 2024	Permit Application submitted to Council
15 March 2024	Application received by the Board
23 March 2024	Start of public consultation period
23 April 2024	End of public consultation period
30 July 2024	Date draft conditions issued to proponent
8 August 2024	Statutory period for assessment ends

## Glossary/Acronyms

Term	Detail
BC	Block cave mining
Board	Board of the Environment Protection Authority
EIA	Environmental impact assessment
EIS	Environmental Impact Statement
EMPCA	<i>Environmental Management and Pollution Control Act 1994</i>
EMPCS	Environmental management and pollution control system
EPBCA	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
LUPAA	<i>Land Use Planning and Approvals Act 1993</i>
NAF	Non-Acid Forming
NCA	<i>Nature Conservation Act 2002</i>
NOI	Notice of Intent
NRE	Department of Natural Resources and Environment Tasmania
PAF	Potentially Acid Forming
RMPS	Resource Management and Planning System of Tasmania
SD	Sustainable development
TSPA	<i>Threatened Species Protection Act 1995</i>

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## Report Summary

This report provides an environmental assessment of the North Pit Underground Operations by Grange Resources (Tasmania) Pty Ltd.

The proposal involves development of underground mining operations below the existing North Pit open cut at Savage River Mine using initially sub-level caving methods, followed by a main underground stage involving block cave mining. The mine will be developed to a level approximately 200 m below the floor of the existing pit and will eventually break the surface of the pit.

An exploration decline currently extends approximately 4,500 m underground from an existing portal located at the southern end of North Pit, with current approval to extend to 6000 m (EPN 10006/1, EPN 10006/2). The proposed North Pit Underground Mine operations will commence at the end point of the approved exploration decline.

The proposed mining operations would operate 24 hours per day, 365 days per year, with no change to current production rate. Approximately 44 Mt of tailings and 4.3 Mt of waste rock will be produced. The majority of waste rock is anticipated to be NAF, with only small amounts of PAF expected to be generated. It is proposed to dump the majority of the waste rock, including the PAF, into the existing North Pit. Tailings will be directed to the South Deposit Tailings Storage Facility, which has sufficient capacity to accept the tailings.

Surface disturbance will be limited. Outflows from the underground mine will be managed through the existing South Lens treatment facility, which discharges to Savage River.

This report has been prepared based on information provided in the permit application and Environmental Impact Statement (EIS). Relevant government agencies and the public were consulted, and their submissions considered as part of the assessment.

**Appendix 1** contains a table of the proponent's proposed management measures.

**Appendix 2** contains the environmental permit conditions for the proposal.

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## I. Approval Process

The Board of the Environment Protection Authority (the Board) received a Notice of Intent in relation to this proposal on 5 March 2020.

An application for a permit under the Land Use Planning and Approvals Act 1993 (LUPAA) in relation to the proposal was submitted to Waratah-Wynyard Council on 29 February 2024

This proposal is defined as a 'level 2 activity' under clauses 5 (c) and 3 (b) of Schedule 2 of the Environmental Management and Pollution Control Act 1994 (EMPCA), being a mine and waste depot.

Section 25(1) of the EMPCA required Council to refer the application to the Board for assessment under the Act. The application was received by the Board on 15 March 2024.

The Board required that information to support the proposal be provided in the form of an Environmental Impact Statement (EIS), prepared in accordance with the Guidelines issued by the Board on 24 April 2024. Several drafts of the EIS were submitted to EPA for review against the Guidelines before it was finalised and accepted on behalf of the Board on 20 March 2024.

The EIS was released for public inspection for 28 days on 23 March 2024. Advertisements were placed in The Advocate Newspaper and on the EPA website. The EIS was also referred to relevant government agencies for comment. No representations were received.

Note, the Board's assessment of NPUG, as addressed in this report, does not include the currently approved exploration decline (EPN 10006/1, EPN 10006/2), which incorporates all current and approved development to 6000 m underground from the entrance portal at the southern end of North Pit.

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## 2. SD Objectives and EIA Principles

The proposal must be considered by the Board in the context of the objectives of the Resource Management and Planning System of Tasmania (RMPS), and the Environmental Management and Pollution Control System (EMPCS). Both sets of objectives are specified in Schedule 1 of the EMPCA.

The functions of the Board are to administer and enforce the provisions of the EMPCA, and to use its best endeavours to further the RMPS and EMPCS objectives. The Board must assess the proposal in accordance with the Environmental Impact Assessment Principles defined in Section 74 of the EMPCA.

### 3. The Proposal

The main characteristics of the proposal are summarised below. A detailed description is provided in Section 2 of the EIS.

#### Summary of the main characteristics of the proposal

##### Activity

The proposal, referred to as North Pit Underground Operations (NPUG), involves development of underground mining operations below the existing North Pit open cut at Savage River Mine. A transition mine will initially be developed involving sub-level caving methods, followed by the main underground block cave development (herein referred to as the BC mine) (Figures 1 and 2).

The mine will be developed to a level approximately 200 m below the floor of the existing pit and will break the surface of the pit approximately 12 months after the first drawbell firing<sup>1</sup>.

The total production of the transition mine is estimated at 5.3 million tonnes (Mt) of ore over six years, and 59.1 Mt from the BC mine over 15 years (see Tables 2 and 3 of the EIS), with a total production of 64.4 Mt over the life of mine (LOM).

Construction will occur over 5 years, requiring an extension to the existing decline (approved to 6000 m, EPN 10006/1, EPN 10006/2) and development of underground infrastructure. The transition mine is scheduled to commence in year 3 of construction, mid to late 2027, once open cut mining in North Pit has ceased. It is proposed to continue transmission mine production during the ramp up of the BC mine, with current scheduling showing a range of 38 to 41 months of simultaneous production.

Approximately 44 Mt of tailings and 4.3 Mt of waste rock will be produced. The majority of waste rock is anticipated to be non-acid forming (NAF), with only small amounts of potentially acid forming (PAF) waste rock expected to be generated. Waste rock from the transition mine will be transported and stored within existing waste rock dumps on site. Waste rock generated from the BC mine will be backfilled into North Pit.

Development of surface infrastructure will be limited, with the only disturbance to existing vegetation required for a new access track.

Mining operations will continue to operate 24 hours per day, 365 days per year, with no change to the current production rate<sup>2</sup>.

Groundwater inflows to the underground mine will be managed through the existing South Lens treatment facility (South Lens Pit, herein referred to as South Lens), which discharges to the Savage River.

There will be an initial increase in both light and heavy vehicle movements both on and off-site during the construction period and ramp up phase of underground production, with a decrease in the long term.

##### Location and planning context

<b>Location</b>	Savage River Mine is located in north-west Tasmania (latitude 41°29'25"S, longitude 145°12'03"E), 45 km west of the Murchison Highway. The nearest localities are Corinna 24 km to the south-west and Waratah 38 km to the north-east. The proposed underground operations are located within the bounds of the existing North Pit open cut, to the north of the mine site (Figure 3).
<b>Land zoning</b>	Under the Tasmanian Planning Scheme (Waratah-Wynyard), Savage River Mine is located on land zoned 'Rural', 'Environmental Management' and 'Utilities'. North Pit sits within the Rural zone.

<sup>1</sup> The exact timing of the cave breakthrough is uncertain. The earliest breakthrough would occur in August 2028 with the latest scenario, September 2029.

<sup>2</sup> 6,666,000 tonnes of raw material (ore) per annum is permitted to be processed on site (EPN 248/2), producing up to 3,000,000 million tonnes of mineral (magnetite concentrate) per annum.



<b>Land tenure</b>	Crown Land, including Permanent Timber Production Zone Land, Future Potential Production Forest and Regional Reserve.
<b>Mining lease</b>	ML 2M/2001, ML 14M/2007, ML 11M/2008, and ML 4M/2019
<b>Lease area</b>	ML 2M/2001 - 4987 hectares ML 14M/2007 - 91 hectares ML 11M/2008 - 108 hectares ML 4M/2019 - 235 hectares
<b>Bond</b>	MRT is currently reviewing the security deposits held for each of the Savage River/Port Latta mining leases.

### Activity site

<b>Land Use</b>	Existing mine site.
<b>Topography</b>	Savage River mine is located at an elevation of between 100 m and 350 m in a valley incising the easternmost extension of the Western Ranges. The area is characterised by erosional and depositional glacial landforms.
<b>Geology</b>	The mine is located within the Arthur Metamorphic Complex and exploits a series of magnetite-rich lenses which extend from north of Savage River to north of the Pieman River.
<b>Soils</b>	Soils at the mine site are classified as ‘Soils on Precambrian Dolomite’ and depending on the parent rock are either ‘sandy’ or ‘clayey’. Sandy soils are developed to depths of about 0.1 m on quartzite, while clay soils are well developed to depths of up to tens of metres.
<b>Hydrology</b>	The mine site is dissected by Savage River, which flows between Centre Pit North and South Lens (Figures 3 and 4). South Lens currently acts as a water storage and treatment facility, and discharges directly into the Savage River.  Savage River flows into the Pieman River approximately 16 km upstream from the coast.  Two main tributaries of Savage River flow through the mine site; Broderick Creek which forms part of the Broderick Creek Flow Through (BCFT) and enters Savage River just downstream of South Lens, and Main Creek, of which the Main Creek Tailings Dam and Old Tailings Dam are located at its headwaters, with South Deposit Tailings Storage Facility (SDTF) located approximately 2 kms further downstream.
<b>Natural Values</b>	The proposed works are solely located on cleared, disturbed ground, except an area (480 m <sup>2</sup> ) of clearance required for the access track, which is located within the vegetation community (RMS) <i>Nothofagus - Phyllocladus</i> (short rainforest), as shown on TASVEG 4.0 mapping.

### Location region

<b>Climate</b>	Mean annual rainfall is approximately 1,947 mm. Monthly minimum and maximum daily temperatures range from 9.4 and 20.1 degrees centigrade respectively.
<b>Surrounding land zoning, tenure and uses</b>	The northern and north-eastern boundaries of the lease border the Savage River Regional Reserve.  The Savage River Pipeline Regional Reserve and Donaldson River Nature Recreation Area border the mine to the west.  The Meredith Range Regional Reserve borders the mine to the east and south. West of this reserve, and to the south of the mine is an area of Future Potential Production Forest managed by the Parks and Wildlife Service.  The proposed NPUG mine is located approximately 4 km from the privately-owned Savage River accommodation area.
<b>Species of conservation significance</b>	The following fauna species listed under the <i>Threatened Species Protection Act 1995</i> (TSPA) and or the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBCA) are known to occur in the local area: <ul style="list-style-type: none"> <li>Spotted-tailed Quoll;</li> </ul>

	<ul style="list-style-type: none"> <li>• Tasmanian Devil;</li> <li>• Wedge-tailed eagle;</li> <li>• Grey Goshawk;</li> <li>• Australian grayling;</li> <li>• Azure kingfisher; and</li> <li>• Tateid snail (formerly known as Hydrobiid) (<i>Beddomeia bowryensis</i> and <i>B. trochiformis</i>).</li> </ul>
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### Proposed infrastructure

<b>Major equipment</b>	<p>Existing plant/machinery to be utilised includes (see Table 4 of EIS for a complete list):</p> <ul style="list-style-type: none"> <li>• Trucks, loaders and excavators;</li> <li>• Surface crushers, ball mills and magnetic separators;</li> <li>• Concentrator; and</li> <li>• Slurry pipeline.</li> </ul> <p>Additional plant/machinery required for the underground mine includes:</p> <ul style="list-style-type: none"> <li>• Run-of-mine (ROM) ore bin,</li> <li>• Primary crusher,</li> <li>• Crushed ore bin;</li> <li>• Conveyor system; and</li> <li>• Ventilation system, including regulators and fans.</li> </ul>
<b>Other infrastructure</b>	<p>The following underground mine infrastructure will be developed:</p> <ul style="list-style-type: none"> <li>• Mine dewatering infrastructure;</li> <li>• Mine services infrastructure – compressed air, electrical distribution HV and LV;</li> <li>• Control and communications systems; and</li> <li>• Underground facilities – workshop, crib room, ablution facilities, explosive storage, emergency egress and refuge chambers.</li> </ul> <p>The following surface infrastructure will be developed:</p> <ul style="list-style-type: none"> <li>• Exhaust ventilation stations;</li> <li>• New access track and associated drainage; and</li> <li>• New rock waste dump created by backfilling the North Pit void</li> </ul> <p>The following existing infrastructure will be used:</p> <ul style="list-style-type: none"> <li>• Exploration decline (approved under EPN Nos 10006/1 and 10006/2);</li> <li>• ROM and stockpile areas;</li> <li>• South Deposit Tailings Storage Facility (SDTSF);</li> <li>• South Lens water treatment system; and</li> <li>• Waste rock dumps, including Broderick Creek Dump Complex, Centre Pit Dump, South Deposit Pit Backfill Dump.</li> </ul> <p>The following surface infrastructure will be upgraded/altered:</p> <ul style="list-style-type: none"> <li>• Upgrades to compressed air and power, and maintenance workshop; and</li> <li>• Potential relocation of the existing concrete batch plant closer to the NPUG portal.</li> </ul>

### Inputs

<b>Water</b>	No additional water input is required.
<b>Energy</b>	An increase of 50% in electricity will be required as part of the proposed expansion, with a subsequent 90% decrease in diesel use once the BC is in operation.
<b>Other raw materials</b>	No additional raw materials are required.

### Wastes and emissions

<b>Liquid</b>	Effluent emissions will result from dewatering of the underground operation.
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	Other ongoing mine emissions include waste rock dump run-off and seepage, tailings dam seepage, and stormwater runoff from the ROM pad, roads, stockpile areas and other infrastructure areas.
<b>Atmospheric</b>	Venting to atmosphere from underground operations, including machinery exhaust emissions.
<b>Solid</b>	Waste rock and other general mining waste (e.g. general refuse, metal waste, waste tyres, machinery servicing waste etc, including controlled waste).
<b>Controlled wastes</b>	Waste engine oil, contaminated soil.
<b>Noise</b>	From excavators, heavy mine vehicles, front end loaders, gyratory crusher, overland conveyor, processing plant and blasting.
<b>Greenhouse gases</b>	Greenhouse gases are anticipated to decrease significantly over the life of the underground operations with the replacement of diesel machinery with electrical equipment.

### Construction, and operations

<b>Proposal timetable</b>	Construction is anticipated to commence immediately following project approval by the EPA Board and Grange Board and is expected to occur over a 5 year period.  The underground operations are proposed to be mined over a period of 15 years.
<b>Operating hours (ongoing)</b>	24 hours per day, seven days per week.

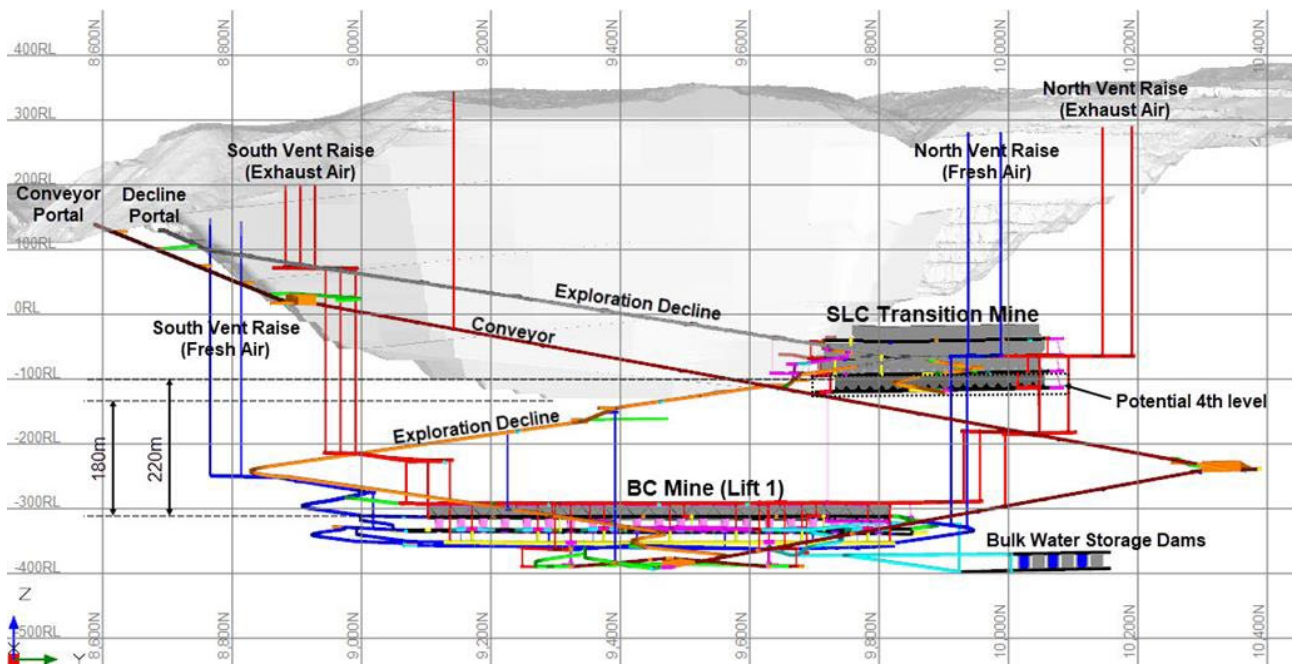


Figure 1: North Pit, BC and Transition mine, vertical section looking west. Existing exploration decline shown in grey (Figure 8 of the EIS).

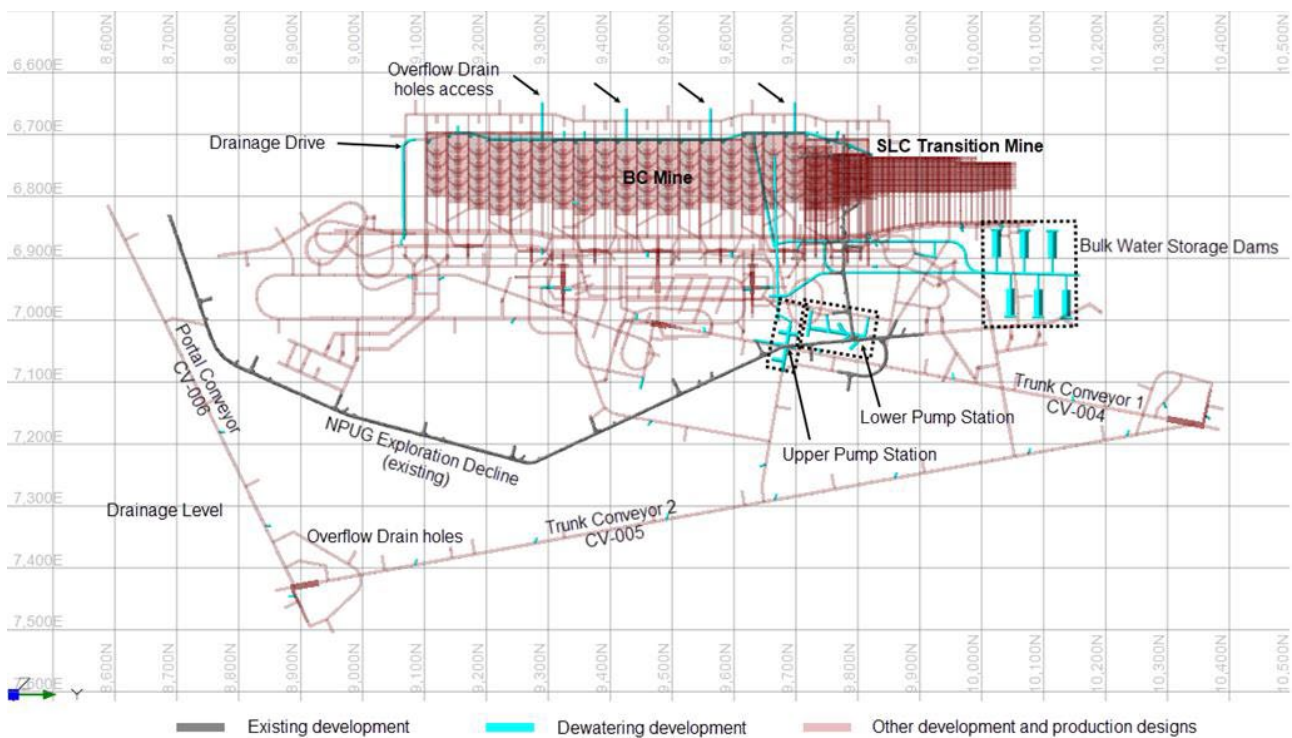


Figure 2: North Pit, BC and Transition mine, plan view. Existing exploration decline shown in grey, as labelled (Figure 5 of the EIS).



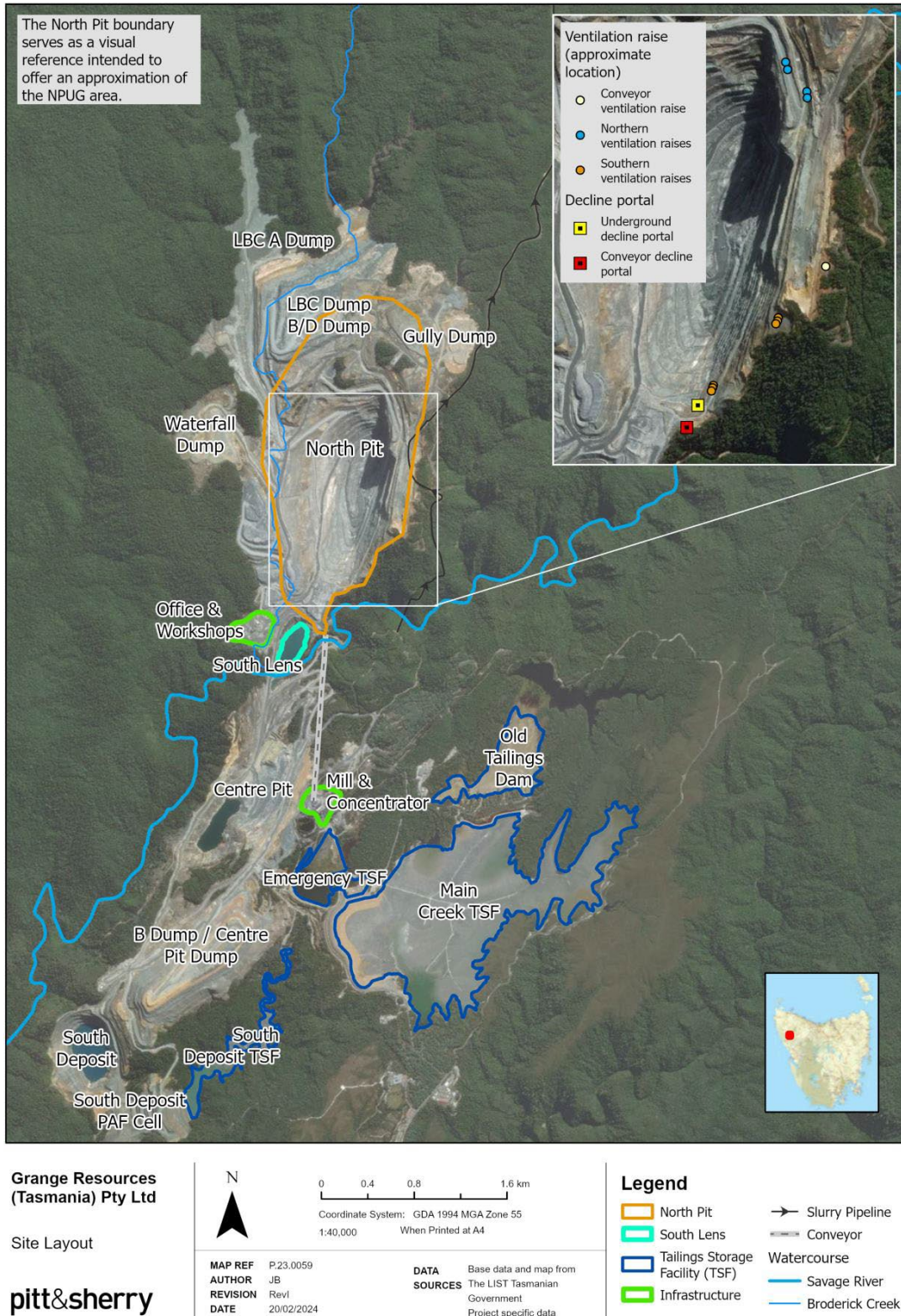


Figure 3: Savage River Mine location and key mine infrastructure (Figure 11 of the EIS)

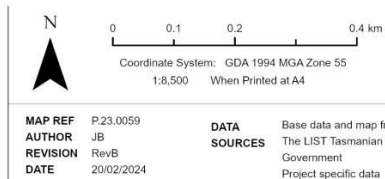




Grange Resources  
(Tasmania) Pty Ltd

Site Infrastructure

**pitt&sherry**



**Legend**

- ★ Monitoring Location
- Waste Rock Stockpile
- ▲ Substation & Civil Laydown Yard
- New Access Track
- Concrete Batch Plant
- Current location
- Potential future location (~2026)
- Slurry Pipeline
- Conveyor
- Infrastructure
- South Lens
- Watercourse
- Savage River
- Broderick Creek

**Figure 4: Proposed surface infrastructure (Figure 12 of the EIS).**

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## 4. Project Rationale and Alternatives

According to the EIS, the proposed underground mining method is the most effective means of extraction of the mineral resource while minimizing impacts to natural values. The proposal also makes the best use of existing systems and infrastructure on site.

Ongoing extraction at the mine also ensures continued support for the Savage River Rehabilitation Program (SRRP). This has direct benefits for environmental management at the site and facilitates continued remediation of legacy impacts.

The transition from open cut to underground mining will also ensure continual extraction from the existing mine site, rather than expand into previously undisturbed areas.

The proposed change to underground operations is also likely to result in significantly lower volumes of waste rock generated compared with the open cut. This is likely to expediate closure of the existing waste rock dumps and bring forward rehabilitation of these areas.

## 5. Public and Agency Consultation

No public submissions were received during the public consultation period.

The EIS was also referred to several government agencies with an interest in the proposal. Submissions were received from the following:

- Chief Inspector of Mines, Office of the Chief Inspector of Mines, WorkSafe Tasmania, Department of Justice; and
- Policy, Projects and Regulatory Services Branch, Environment Unit - Environment Heritage and Land Division, Department of Natural Resources and Environment Tasmania.

The Environment Unit expects that the proposed mine development is likely to be low risk in terms of potential impacts to threatened flora and threatened native vegetation communities. Further comment on potential impacts to threatened fauna is provided in the relevant evaluation section of this report.

The following individuals also provided specialist advice on the EIS:

- Savage River Rehabilitation Program Officer, Environment Protection Authority;
- Regulatory Officer, Environment Protection Authority; and
- Scientific Officer (Water), Environment Protection Authority.

## 6. Evaluation of Key Environmental Issues

Two key environmental issues were identified for detailed evaluation in this report:

- Underground dewatering – groundwater and surface water impacts; and
- Waste rock and tailings management.

These issues are discussed in the following subsections.

### 6.1 Underground dewatering – groundwater and surface water impacts

#### 6.1.1 Description

##### Current North Pit water management, treatment and discharge

Management of North Pit surface water is currently undertaken through a combination of diversion channels, water collection and transfer infrastructure with all water directed to South Lens (Figure 15 of the EIS), detailed as follows:

- The West Wall Dewatering System (WWDS) captures seepage into North Pit from the Broderick Creek Flow Through (BCFT) when high flow in Broderick Creek causes water to backup. Seepage rates are highly seasonal, with up to 500 L/s recorded during the wetter months (see figure 16 of EIS). The water captured by the WWDS is transferred out of the pit to South Lens Pit by pipeline (Figure 15 of the EIS).
- Surface run-off to North Pit is currently managed by an in-pit sump and pump. The catchment has an estimated area of 1.7 km<sup>2</sup>, the majority of which (85%) is the pit footprint. Estimated annual flows from the existing North Pit Stage 6c cut back (from 2022-2023) include:
  - May to November: 200 L/s, 20 hours per day, 7 days per week; and
  - December to April: 200 L/s, 20 hours per day, 4 days per week.
  - There is the availability to increase pumping rates to 320 L/s, if required.
- Groundwater inflows to the pit are managed via the in-pit sump (no estimate of inflow rate was provided).
- Since development of the exploration decline, dewatering has taken place with all water pumped to South Lens at an estimated rate of 10 l/s. Note, since publication of the EIS, Grange has installed a telemetered flow meter, with recent data showing dewatering rates varying from approximately 12 m<sup>3</sup>/hr (3 l/s) to 65 m<sup>3</sup>/hr (18 l/s).

Monitoring of North Pit water quality to South Lens from the sources outlined above has not been undertaken, except for the exploration decline seeps and outflow.

According to the EIS nevertheless, water derived from North Pit would be expected to be similar to Broderick Creek, characterised by neutral pH, low metal concentrations, elevated concentrations of alkalinity, and moderate sulphate (~300 - 400 mg/L) (see Table 9 of the EIS).

The exploration decline seeps water quality is summarized as follows (see Appendix B of the EIS for further detail):

- The water quality of the seven (7) identified seeps varies, but is generally characterised by high pH (> 7), sulphate mostly between 200 mg/l and 800 mg/l (except one seep with concentrations 1400-1600 mg/L), alkalinity generally between 100 mg/l and 300 mg/l, and dissolved zinc up to 40 ug/l.
- When normalised to the TSS concentrations, the same patterns of metal concentrations are observed, but are lower, indicating that the sediment contains low concentrations of easily liberated metals. TSS increases as the flow progresses through the underground towards the exit portal, with the variable input likely related to traffic movements and drilling activity; and
- The water discharged from the exploration decline (monitoring point NPUG out) to South Lens has a pH>7.5, elevated alkalinity (generally between 100 mg/l and 300 mg/l, with peaks higher than 500 mg/l), low acidity, moderate sulphate (200 mg/l to 800 mg/l) and high TSS (20 mg/l – 8,000 mg/l, median = ~700 mg/l). Dissolved metal concentrations are low with the exception of zinc (maximum - 866 ug/l, median - 41 ug/l). The dissolved zinc concentrations were elevated in 2019-2020, but concentrations have decreased over time. This is likely related to the loss of available zinc from



galvanised pipes and hardware used in construction underground. Total metals are elevated, with aluminium and iron present in the highest concentrations (10,000 – 100,000 ug/l) and manganese and zinc in concentrations (total) between 100 and 1,000 ug/l. All other metals are present in concentrations <100 ug/l.

South Lens is currently used as the central water treatment facility for the site before discharge to the Savage River via a constructed outflow channel.

According to the EIS, South Lens receives the following inputs:

- North Dump Drain and Brett's Drain seepage;
- North Pit (BCFT seepage, run-off, groundwater, exploration decline, as described above);
- Centre Pit North Pond (Note, input this is now directly from Centre Pit South); and
- Machinery washdown and site runoff.

According to the EIS, North Dump Drain is the major source of metals, sulphate and acidity to South Lens, with water from North Pit and Broderick Creek via Bretts Drain providing the majority of neutralisation capacity.

The metal removal mechanism(s) in South Lens are not particularly well understood. The existing model is that alkalinity promotes precipitation of metals, with elevated input of TSS increasing surface area for metal precipitation and enhancing removal through settlement of the solids.

According to the EIS, water quality results since 2017 suggest that the metal removal in South Lens has been maintained, and likely increased since an increased inflow from North Pit, despite a reduction in retention time.

According to the EIS, total alkalinity is added to Savage River via South Lens, and it is important that the concentration of alkalinity from South Lens to Savage River is generally in-line, or higher than the natural Savage River baseline. The South Lens outflow total alkalinity concentration is generally stable, ranging from 8 mg/L to 158 mg/L, averaging 114 mg/L (over a 26 year period). Baseline total alkalinity in Savage River has ranged from 2 mg/L to 59 mg/L, averaging 8 mg/L.

According to the EIS, ongoing monitoring of South Lens, by both the SRRP and Grange is a critical part of the Savage River mine AMD treatment strategy.

### **Proposed water management**

#### Inflow to the underground mine

Three potential inflow pathways to the underground mine have been identified:

- Surface water run-off;
- Groundwater inflows; and
- Broderick Creek Flow Through (BCFT) seepage.

Surface water run-off which currently reports to North Pit will report to the proposed underground workings via subsidence cracking, and directly once the BC mine breaks through the surface of the pit<sup>3</sup>. Once break through occurs there will be no lag time in water infiltrating to the mine workings.

Runoff rates to the underground mine were simulated using GoldSim modelling based on a synthetic rainfall data set. The results are summarized as follows (see Appendix A of the EIS for full report):

- Mean runoff inflow rates range from 0L/s to 150L/s; and
- Probability of runoff inflow rates (over LOM, 15 years):
  - 50% probability of a flow exceeding 1,300L/s.
  - 25% probability of a flow exceeding 1,400L/s.

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<sup>3</sup> According to the EIS, breakthrough is estimated to occur between August 2028 and September 2029, 12 months after the first drawbell firing.

- Maximum predicted inflow rate of 2,500L/s.

An analytical groundwater flow model was developed to predict groundwater inflow rates at ‘the end’ of BC mining. The following key assumptions were applied (see sections 4.2, 4.3 and 4.4 and Appendix A of the EIS):

- The base of the BC mine is -330 mRL;
- The margins of the cave zone and 0.4% plastic strain envelope will be roughly parallel but extend laterally further than the final pit walls; and
- The base of the aquifer remains at -100 mRL. The model simulates groundwater inflows to the upper half of the cave only. This is considered realistic as permeability in fractured rock aquifers typically decreases with depth and is minimal at depths of 400 m below natural surface.

The model predicted a groundwater inflow of 40 L/s to the cave zone and 15 L/s to the access declines, with a total inflow of 55 L/s. According to Appendix A of the EIS, the exploration decline and future main access and extraction declines will largely be contained within the East Wall Block aquifer zone (in the footwall of the Eastern Contact Fault – ECF), which has an interpreted very low bulk permeability. Long-term inflows are therefore expected to be minimal, although some measurable inflows could be encountered where the declines and other access workings intersect faults and jointed ground.

According to Appendix A of the EIS, the transition mine will intercept some, if not all, groundwater inflow that currently occurs from the north, and will therefore not result in any net increase in total mine inflows.

According to the EIS, there are two potential inflow pathways from the BCFT system to North Pit underground:

- Overflow to the pit during high rainfall and associated high BCFT levels which result in the WWDS being overwhelmed. Note, there is the risk (albeit low according to the EIS) that deformation along the west wall of the pit as a result of BC mining, could result in failure (or partial failure) of the WWDS and up to 600 L/s of additional inflow to the pit and BC mine following high rainfall events.
- Leakage from the base of the BCFT into a zone of enhanced permeability that might be connected laterally to the pit crest. Such flows are not likely to result in increased daily total inflows to the WWDS but may result in flows occurring over longer periods.

According to the EIS, these risks have been identified as having a very low likelihood of occurrence, and will be managed by:

- Upgrading the current WWDS with modifications to make it more robust under minor deformation (see section 6.3 of Appendix A of the EIS for details); and
- Implementing the Upper Broderick Creek Diversion Scheme (see section 6.3 of Appendix A of the EIS for details). According to the EIS, if required there would be sufficient lead time to install the scheme, as the identified risks are unlikely to develop early in the life of the BC mine. Relevant approvals would be sought in the event that the scheme was required.

### Proposed water management

The underground dewatering system is designed to capture water on the extraction level, but allow it to overflow to lower levels for storage as required.

According to the EIS, bulk water storage dams (95,000 m<sup>3</sup>) will be developed at RL -395 m, below the active BC mine workings (Figure 5). There will also be a second dam (85,000 m<sup>3</sup>) located above the bulk storage dams which can act as secondary containment, giving a total storage capacity of approximately 180,000 m<sup>3</sup>. Water will be pumped from the storage dams to lower and upper pump stations (Figure 5).

The extraction levels and ventilation horizons will be graded so that all water is diverted away from critical infrastructure and reports to the water storage areas.

According to the EIS, the probability of mine inflows exceeding the storage capacity and flooding the extraction level is less than 10% with 95,000 m<sup>3</sup> of storage, or 1%, with 180,000 m<sup>3</sup> of storage, assuming a pumping rate of 750 L/s.

Dewatering infrastructure will be developed in stages, summarized as follows:

- Stage 1 will employ the current dewatering method used for the exploration decline, with sumps developed at 200 m intervals, and pumping from sump to sump.
- Stage 2 will include development of the upper pump station and associated dewatering infrastructure, commissioned prior to production commencing at the transition mine.
- Stage 3 will include commissioning of the lower pump station and rising mains and development of the bulk water storage dams. The lower pump station and water storage dams will be commissioned prior to production commencing at the BC mine.
  - To mitigate the risk of water inundation into the mine prior to establishment of the storage water dams, the lowest levels of the transition mine (those below the open pit floor) will be isolated from critical mine infrastructure, to allow for temporary flooding.

The lower and upper pump stations will each have a maximum pumping rate of 750 L/s. Note, the pumping system will be a 'dirty' water system, negating the requirement for settlement of solids. According to the EIS, this will also ensure that suspended solids are continually discharged to South Lens.

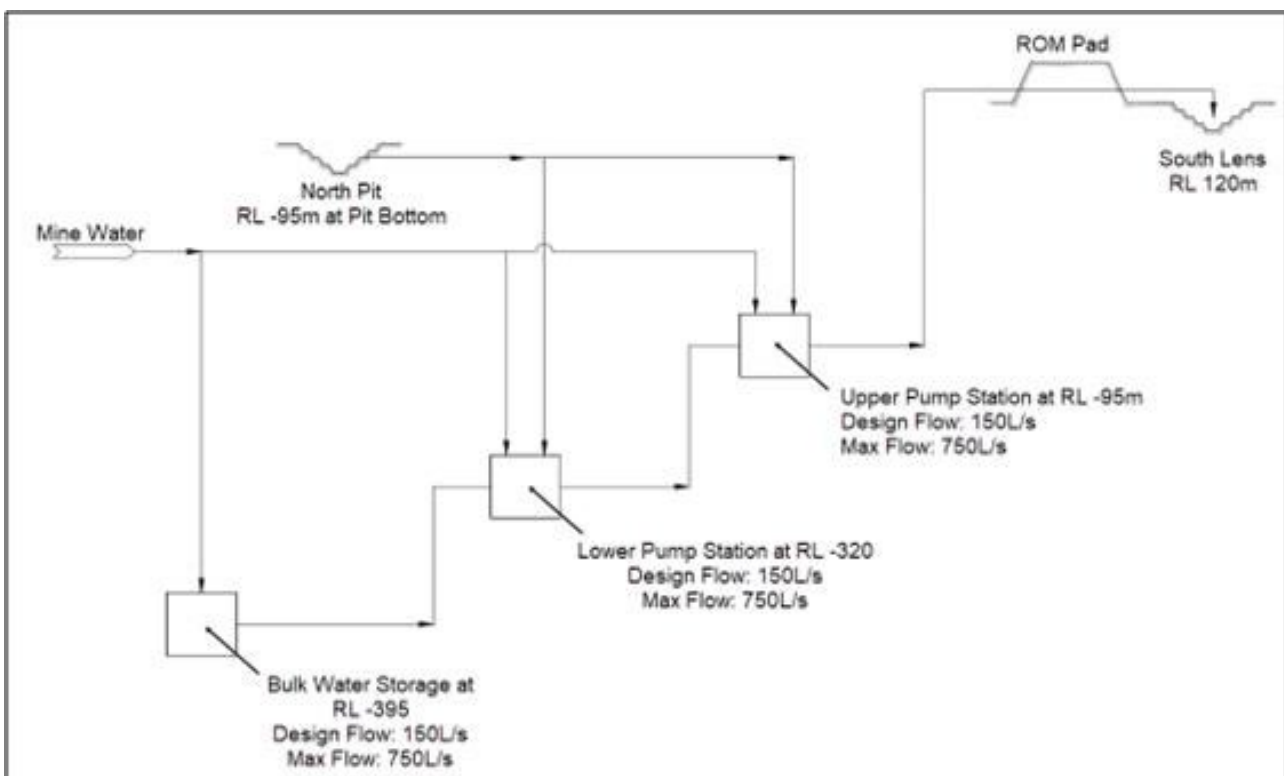


Figure 5: Schematic of proposed dewatering system (Figure 3 of the EIS).

### Potential impacts to South Lens and Savage River

According to the EIS, any change in water flow rates from North Pit to South Lens as a result of the proposed underground operations is considered to be negligible, with all flows captured and directed as currently occurs on site. No change to South Lens chemistry is also anticipated, especially in the short term. Alkalinity and TSS from dewatering the underground mine will continue to contribute to the neutralisation and precipitation of metal oxy-hydroxides in South Lens.

It is also noted in the EIS that during development of the exploration decline, approximately 18,000 L to 30,000 L of shotcrete washout water is added to the system per day, providing approximately 270 kg<sup>4</sup> of total alkalinity to South Lens per day, a 12% w/w relative addition (daily flux of total alkalinity is 2,255 kg based on average flow rate).

<sup>4</sup> Based on shotcrete washout water alkalinity averaging approximately 15,000 mg/L.

According to the EIS, the addition of shotcrete washout water will continue until approximately February 2032.

The EIS acknowledges however that the proposal will also result in potential loss of alkalinity to the system, as spreading and crushing of A type carbonaceous material on the roads to North Pit will cease with cessation of open cut mining. Currently, the grinding of the A type rocks through traffic movement in combination with surface run-off provides alkalinity to South Lens. The exact amount, however, is unknown.

The EIS nevertheless considers that there will be no increase in toxicants of concern, such as copper and other heavy metals, discharged from South Lens to Savage River as a result of the proposal.

### 6.1.2 Management measures

The following management measures are proposed:

- Existing dewatering of North Pit, including the interception of Broderick Creek water and monitoring of flow rates; and
- Dewatering of NPUG to intercept all seeps and flows, and monitoring of flow rates.
- Monitoring of water levels in the BCFT monitoring bores and overflows from the BCFT waterfalls (duration and flow rates) to develop empirical relationships between rainfall and BCFT water levels and overflows; and
- Deformation monitoring in and around the BCFT waterfalls and the WWDS, and development of trigger levels for implementation of the Upper Broderick Creek Diversion Scheme.
- Water quality monitoring as proposed in Table 11 of the EIS, including:
  - Exploration decline seeps (current locations as shown on Figure 18 of the EIS) monitored monthly for first 6 months, with additional monitoring undertaken should underground outflow (NPUG\_out) and or South Lens outflow show elevated concentrations;
  - Underground outflow (NPUG\_out) monitored fortnightly for first 6 months then monthly; and
  - South Lens outflow monitored fortnightly as per EPN248/2 and PCE 10995. If changes in South Lens alkalinity are detected, Grange will implement corrective actions, such as supplementary alkalinity addition, in partnership with SRRP, in accordance with its responsibilities under the *Goldamere Pty Ltd (Agreement) Act 1996*.

Reporting will include:

- Summary report of monitoring results and any management actions on a quarterly basis to the EPA for the first year following the commencement of approval, and then six monthly; and
- Provision of annual report with an analysis of results to the EPA, including a detail summary of the monitoring results, any exceedances and management actions implemented as a result of exceedances.

Note, according to the EIS, the installation of a drainage line along the North Pit east wall to intercept and divert surface waters is currently being constructed, with completion due winter 2024. This does not form a part of the Board's assessment but is provided here for reference.

### 6.1.3 Public and agency comment and responses

No representations were received.

The following comment was provided by the SRRP:

- SRRP concerns relate to South Lens' capacity to provide for the long-term passive treatment of legacy pollution.
- If alkalinity provided by the current operations in North Pit reduce or cease, and this is not matched by any subsequent change in water quality from the underground operations, it may be

necessary for the SRRP to contribute to the dosing of South Lens at a rate proportional to legacy inputs (acid and metals).

- The South Lens Investigation Project (SLIP) is a joint project between Grange and the SRRP to investigate the key drivers of metal sequestering and acid neutralisation in South Lens, including neutralisation capacity over the short and long term. Of particular interest is the potential impact of changes to the mining operation that alter the hydrology and or alkalinity input to South Lens that may lead to a reduction in metal retention in the pit, and/or a deterioration in the quality of discharge to Savage River.
- The SLIP is currently in the planning and early commencement stage with data collection over the next 12-18 months. A critical step is to ensure all inflows to South Lens are identified, and that water quality and flow can be monitored over a 12-month period. Installation of monitoring infrastructure to monitor inflows from North Pit has been problematic but has now recently been completed.
- Another issue of relevance to the SRRP is the potential impact on the Broderick Creek Flow Through (BCFT), and failed capture of overflow by the WWDS.

#### 6.1.4 Evaluation

The key element of concern for the proposal is the quality and quantity of outflow from the proposed underground mine, and subsequent impact to South Lens and its ability to treat existing AMD (legacy or otherwise).

While the proponent contends that there is unlikely to be significant change to the chemistry of South Lens in the short term, there is insufficient information to be able to arrive at a similar conclusion in the medium to long term. Indeed, there are several mechanisms by which the quality of inflow to South Lens from North Pit may deteriorate as the BC mine develops.

The current water quality of the exploration decline outflow, low dissolved metals and elevated alkalinity and pH, suggests that it is unlikely there will be a significant change to the current quality of inflow to South Lens from North Pit in terms of AMD potential during the initial development of the mine, i.e. extension of the existing exploration decline and development of underground infrastructure.

During this initial development all waste rock generated will be managed in accordance with the most recent Waste Rock Management Plan (WRMP)(version 3, dated 9 Nov 2021, Appendix C) and placed on existing waste rock dumps (see Section 6.2 for further details). North Pit open cut operations will also continue, adding alkalinity to the system via road traffic.

Once mining ceases in North Pit however, projected to occur mid to late 2027, and dumping of waste rock directly into North Pit commences, there is potential for the quality of water pumped from the underground mine to change. PAF waste rock will be encountered as the mine develops through the Main Host Assemblage (MHA) and is predicted to be dumped into North Pit early in the development (2027 and 2028, Table 20 of the EIS). While it is acknowledged that significantly greater amounts of acid neutralising waste will also be dumped into the pit (see Section 6.2), there is the potential for changes to the chemistry of the run-off to into North Pit, that may include products from the neutralisation of the PAF material and potential formation of neutral metalliferous drainage (see Section 6.2 for further discussion on PAF waste disposal).

An additional unknown is the potential for the water quality to be further altered as it percolates through the ore / alteration zone from the base of North Pit to the underground workings. Note, it is unclear exactly what stage pumping from North Pit will cease. With the breakthrough of the pit floor, predicted to occur between August 2028 and September 2029, run-off will report directly to the underground. It is unknown whether this would further enhance the contact between water and PAF materials associated with the ore body and host assemblage.

Note, the proponent has indicated that their timelines have slipped since publication of the EIS. Condition **G7** requires the Director be notified before commencement of backfilling into North Pit, and also within 14 days of the commencement of breakthrough of the North Pit floor.

The potential for AMD, including neutral metalliferous drainage, to impact the quality of the underground outflow is further complicated by lag times that may be associated with any AMD generation.

As noted previously, the alkaline dynamics of the North Pit system may also be significantly altered, although it is unclear how and to what extent. While there will be a loss of alkalinity to the system with the cessation of open cut mining and the crushing of A type material on the road surface, alkalinity will be added via shotcrete washout water, and backfilling of a high proportion of A type material into North Pit. It is unclear however, what the relative contribution of the road run-off is to the total alkalinity of the system, and whether this loss would be offset by additions.

Note, the use of shotcreting and generation of washout water would likely be sporadic, with the volume proportionately increasing or decreasing in relation to periods of mine development, and of course it will not occur throughout the LOM. Indeed, according to the proponent, the current exploration decline water quality results are generally not representative of times of shotcrete washout water input, as very few samples were taken during active shotcreting. The proponent has nevertheless indicated that the rate of shotcrete use will likely increase, at least in the short term.

Given the relative importance of North Pit water quality to South Lens, in particular alkalinity, and the lack of understanding of how the development of the mine will impact outflow quality, monitoring of the outflow is considered critical, and is required by Condition **MI**. As detailed in earlier sections, the underground outflow will ultimately capture all inputs to North Pit, except for flow diverted by the WWDS. It will therefore represent a combination of run-off via the waste rock dump and breakthrough area, groundwater inflow to the open pit, underground seeps, and water from construction activities<sup>5</sup>.

The proposal to sample the outfall fortnightly is considered necessary, at least initially (Condition **MI**). While the EIS suggests monthly sampling from 6 months onwards, it is considered prudent at this stage to maintain the fortnightly sampling frequency.

Condition **MI** does allow a case to be put to the Director to alter the monitoring frequency at a later date. Given the lack of understanding of the current system however, and the potential for change, 12 samples per year, at least initially, were not considered adequate. Any proposed change in the frequency of monitoring would be expected to be based on an analysis of the results as the mine progresses.

Condition **MI** also requires monitoring of water pumped from the pit floor to South Lens, until it is no longer possible to do so<sup>6</sup>. Monitoring of the water pumped from the pit floor to South Lens is also required to be undertaken fortnightly, in keeping with the underground outflow monitoring and that currently undertaken at South Lens outfall (as required under PCE 10995 and EPN 248/2). It is understood that a monitoring site for North Pit pumped surface water has already been established.

South Lens outfall monitoring is also required by condition **MI**. Monitoring of Savage River at the pump station and below the southwest waste rock dump, as currently undertaken in accordance with PCE 10995, is also required (condition **MI**). This is to ensure that monitoring of Savage River continues when mining of Centre Pit ceases<sup>7</sup>.

It is considered important to understand the driving forces behind any changes to the NPUG outflow that may occur to allow for any remedial actions to be taken, and to further the understanding of any potential impacts to South Lens. Condition **EMI** therefore imposes investigation trigger levels for the underground outflow.

It is considered appropriate to apply the 80<sup>th</sup> percentile concentrations for key parameters of concern as derived from the current exploration decline outflow, and as proposed in the EIS (total metals). Note, this is representative of the quality of current underground seeps, but also inputs from some decline construction activities. According to Grange, galvanised piping during construction is likely to have

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<sup>5</sup> According to the EIS, shotcrete washout water will be added to the system up to 2032.

<sup>6</sup> It is unclear exactly at which point the pumping of water from the surface floor of North Pit will cease, although it is likely to occur on the cessation of open cut mining, and commencement of backfilling.

<sup>7</sup> Mining of Centre Pit, approved under PCE10995, is proposed to occur over a period of 13 years, and so is likely to cease operation prior to NPUG.



contributed to the elevated zinc totals. Indeed, totals up to 28,600 ug/l (28.6 mg/L) have been observed, with an 80<sup>th</sup> percentile value of 2152 ug/l, proposed as the investigation trigger value (Table 10 of the EIS).

The value of 2152 ug/l is considered too high. The aim of condition of **EMI** is to establish investigation trigger levels for the LOM, not for the construction period. An investigation of the data set shows a suite of values in the low hundreds, down to 37 ug/l. The EIS does not explain the specific drivers behind the elevated zinc totals however, it is assumed that it may relate to the mechanical handling of the piping, and possibly cutting, welding or other similar activities. The values in the low hundreds are in general alignment with what maybe expected without the confounding input from construction activities. Indeed, the 80<sup>th</sup> percentile total zinc value for Centre Pit North Pond is 74 ug/l. As the bulk of the underground development is through the east wall assemblage, a mafic carbonate chlorite schist of A-type classification, zinc levels would not be expected to be substantially different from elsewhere across the site. Indeed, the geochemical summary of the waste rock type for North Pit (Table 15) shows that the results are within the range reported for all rock types studied at Savage River. Further, NPUG waste rock column leach trials from material described as from mainly within the mineralised envelope, show zinc leachate concentrations ranging from < 5 ug/l to a maximum of 69 ug/l (Tables 5, 6, 7 and 8 of Appendix E of the EIS). Note, these trials are ongoing. On this basis, and review of the data set, it was determined that an appropriate investigation trigger level for total zinc would be 300 ug/l.<sup>8</sup>

Recognising a level of uncertainty in the trigger values, condition **EMI** allows a case to be submitted to the Director for a change in trigger levels. An application of higher levels, other than zinc, would likely only be appropriate once there is a sufficient understanding of the dynamics of South Lens, its neutralising capacity, and therefore the likely impact of North Pit outflow, and any subsequent changes to this flow, on South Lens. With regard to zinc, the Director may consider allowing a temporary increase in the trigger level during certain phases of construction, should several consecutive samples be likely to exceed the level.

Condition **EM2** ensures that the NPUG outflow is directed to South Lens before discharge to the environment.

The importance of South Lens for the long-term passive treatment of legacy AMD is well known. As noted above however, the key drivers of metal sequestering and acid neutralisation in South Lens are not well understood, and subsequently it is not known how specific changes in North Pit inflow would impact South Lens.

The South Lens Investigation Project (SLIP) is an important project which will help inform how the North Pit underground mine may impact South Lens into the future. As noted by the SRRP, of particular interest are the potential changes in alkalinity input and or flow rates to South Lens, that may lead to a reduction in acid neutralising capacity and metal removal, and subsequent deterioration in the quality of discharge to Savage River.

Based on information provided by the SRRP, results of the SLIP would likely be available prior to backfilling and pit floor breakthrough (mid 2027). It would therefore be expected that any changes to condition **EMI** (investigation trigger values) be informed by the SLIP. The SLIP may also highlight additional monitoring requirements, and therefore subsequent changes to condition **MI**.

Note, flow from Broderick Creek overflow, via the WWDS, will form a part of the monitoring suite for the SLIP. This will provide information on the water quality, including alkalinity input to South Lens. While this is unlikely, should deformation of the North Pit west wall result in additional inflow to NPUG, a general understanding of the chemistry of the water will be available.

The proponent considers that any change in flow rate as a result of the proposal will be negligible. The modelled groundwater inflow, which would be additional to that currently pumped from the North Pit open cut, is estimated at 55 L/s. It is difficult to ascertain how reliable this estimate is. Needless to say, there is potential for groundwater inflows to be underestimated, as has been experienced at other mines on the West Coast. It is also noted that the proposed maximum underground pumping rate, of 750 L/s, which would presumably be employed should large rain events flood the proposed lower level storage

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<sup>8</sup> The 300mg/L investigation trigger value was based on the data set after 15/6/2021, with outliers removed. Prior to this date, zinc levels were generally elevated with very high individual sample concentrations.

dams, is greater than the pumping rates currently employed for the open cut (200 L/s during winter, with up to 320 L/s able to be employed).

It is considered that there is insufficient information to conclude that there will only be a negligible change in flow rate. Should significantly greater inflows to South Lens result, it would likely reduce the retention time and potentially impact the efficiency of metal removal from the system. Note, the relative importance of retention time in driving metal removal dynamics in South Lens has recently been questioned. The SLIP will nevertheless provide some clarity on the geochemical mechanics of South Lens and allow for an understanding of the impact any changes in flow rates to South Lens may have on metal removal.

Flow rates from North Pit, including the underground mine, will form part of the monitoring suite (condition **MI**).

It is considered appropriate to apply the current investigation trigger levels for South Lens Outfall<sup>9</sup> (condition **EM3**). It is also considered appropriate to apply a TSS investigation trigger level. The proposal to apply a dirty water pumping system could result in significant TSS loads being discharged into South Lens. Indeed, up to 8000 mg/l has been recorded from the exploration decline, and a substantial sediment load could be discharged to South Lens over the LOM. The impact on South Lens, and potential for short circuiting and release to Savage River, is unknown. An investigation level of 30 mg/l is therefore applied to the outfall (condition **EM3**). Ongoing monitoring has indicated that TSS levels are typically less than 8 mg/l, with a maximum of 27 mg/l recorded since reporting began (as required by PCE 10995, April 2022).

Note, bathymetric surveys of South Lens completed by Grange in 2017 indicated sediment accumulation of 20 to 25 m. The SLIP will undertake further analysis of the extent of sediment accumulation within the pit and provide an understanding of the composition and stability of this material.

According to the EIS, Grange will undertake modifications to the WWDS to counter any minor deformations that may occur as the result of the BC mine development. The following modifications are identified in Appendix A of the EIS as being required: stabilising the pit wall beneath the “waterfalls”; and the cushioning of the tank and pipework system against differential settlement. It is agreed that the risks associated with significant deformation and or leakage from the base of the BCFT zone due to enhanced permeability are low. It is also agreed that during the initial stages of development, prior to BC mine production and breakthrough, the risks are even lower.

According to the EIS, a Trigger Action Response Plan (TARP) has been developed, which includes monitoring rainfall and water levels in the BCFT<sup>10</sup> and readiness checks of the inflow interception scheme. The overflow from the BCFT waterfalls is currently monitored via an inline flowmeter.

The proposal to undertaken deformation monitoring in and around the BCFT waterfalls and develop deformation trigger levels for the implementation of the Upper Broderick Creek Diversion Scheme is supported. Condition **M3** requires reporting of all monitoring results, including the reporting of deformation trigger levels for the implementation of the Upper Broderick Creek Diversion Scheme.

Finally, if alkalinity provided by the current operations in North Pit reduce or cease, and it is not matched by any subsequent change in water quality from the NPUG operations, it may be necessary for the SRRP to contribute to the dosing of South Lens at a rate proportional to legacy inputs (acid and metals). Given this, the SRRP may need to pay a significant proportion of the cost of dosing, which could result in an ongoing cost for the life of the underground mine, should other passive measures not be available.

### 6.1.5 Conditions

The proponent will be required to comply with the following conditions:

EM1 NPUG outflow investigation trigger levels

EM2 Management of NPUG outflow water

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<sup>9</sup> The investigation trigger levels currently imposed by PCE 10995 for Centre Pit expansion.

<sup>10</sup> According to the EIS, 6 monitoring bore have been installed.



- EM3 South Lens Outflow investigation trigger levels
- M1 Water quality monitoring requirements
- M2 Samples and measurements for monitoring purposes
- M3 Monitoring reporting and record keeping
- G7 Notifications

## 6.2 Waste rock and tailings management

### 6.2.1 Description

#### Waste Rock

According to the EIS, approximately 4.3 million tonnes of waste rock will be produced, 0.5 million tonnes from the transition mine and 3.8 million tonnes from the BC mining operation.

Approximately 3.6 million tonnes (82%) of Type A waste rock (NAF), 0.5 million tonnes (12%) of Type B (neutral), and 0.3 million Tonnes (6%) of Type D (PAF) is predicted to be extracted<sup>11</sup>.

A geochemical summary of the North Pit underground waste rock compared to Centre Pit North and Centre Pit South is provided in Table 15 of the EIS. North Pit waste rock has greater ANC and lower NAPP, but slightly higher total percent S and lower NAG pH than Centre Pit North.

The University of Queensland undertook kinetic column leach testing (2022) of waste rock samples from the mineralised envelope of the proposed BC mine (Appendix E of the EIS). A summary of the results is provided as follows:

- The pH values over the 46-week period were circumneutral, ranging from pH 6 to 7;
- Pyrite is present in greater abundance than carbonates, however it is well encapsulated. According to Appendix E of the EIS, the locked nature of pyrite will retard AMD formation, although based on the bulk mineralogy, it could be expected in the longer term (4 out of the 5 column materials would be expected to be acid forming); and
- Copper is the main element of concern with values (max 0.016 mg/l) mostly above ANZECC (2000) 80<sup>th</sup>% water quality protection values from week 17 onwards. Occasional ANZECC exceedances also were also observed for lead (max 0.011 mg/L), nickel (max 0.003 mg/L only column 4) and zinc (max 0.069 mg/L).

Information on the specific origin or classification of the samples was not provided.

According to the EIS, waste rock generated from the NPUG operation will be from the development phase only. B and D-type waste rock will be encountered as development approaches the Main Host Assemblage (MHA), however mining waste generated through the MHA, above the recoverable rate, will be sent to the crusher and report as tailings, and is therefore not regarded as waste rock.

During North Pit open cut operations, all waste rock from the extension of the exploration decline and development of the underground infrastructure will continue to be managed in accordance with the Waste Rock Management Plan (WRMP) and will be placed in existing waste rock dumps in accordance with Grange's waste rock classification (A, B C or D). All dumps containing D-type waste (PAF) are encapsulated by clay-type material to minimise oxygen diffusion and maintain a reduction in the Acid Sulphate Generation Rate of greater than 95%.

Once North Pit open cut operations cease and it is no longer feasible for open cut mine equipment to handle the waste rock, it will then be managed through backfilling into the southern end of North Pit, near the underground portal (Figure 22 of the EIS). According to the EIS, backfilling is likely to commence mid-2027. Waste rock will continue to be backfilled into North Pit until 2033 (Table 20), after which time all waste rock generated will report as tailings. Note, according to the EIS, from January 2029, no D-Type

<sup>11</sup> Waste rock classification at Savage River Mine is well established and is summarised in Table 13 of the EIS.

waste rock will be backfilled into North Pit (Table 20 of the EIS). While some D type waste will still be generated (Table 19 of the EIS), Grange has indicated that this will report to the mill, and as tailings via processing.

According to the EIS, the estimated quantity to be backfilled into North Pit is 2.14 Mt, with the majority (74%) estimated to be A Type, and only 4.7% D Type (Figure 20)<sup>12</sup>. The total capacity of North Pit to accept waste rock is 5.4 Mt. Figures 22 and 23 of the EIS shows the proposed location of the dump in relation to North Pit and the underground mine, and the final breakthrough cave shape. Cave modelling estimates there will be dilution (waste entry to underground workings) from around the mid-point of the mine life, including fall-off from the North Pit walls and potentially from the waste dump within North Pit.

According to the EIS, AMD is not a concern given the alkaline nature of the majority of the waste (A type).

### Tailings

A leach column testing program of NPUG ore was undertaken by Geo-Environmental Management Pty Ltd.

Appendix D provides an interim report with the results of the first six months of testing presented, summarised as follows:

- Sulfide content is moderate (4.48% S) in comparison to Centre Pit North and Centre Pit South, with high ANC (118 kg H<sub>2</sub>SO<sub>4</sub>/t) (Table 22 of the EIS).
- NAPP value of 19 H<sub>2</sub>SO<sub>4</sub>/t and a NAG<sub>pH</sub> of 8.2 provides an “uncertain” classification. Given the presence of lower reactivity, crystalline sulfides, it is expected the NPUG tailings material will be found to be NAF. Further leach column testing is being undertaken to confirm this. Note, previous testing<sup>13</sup> has shown the tailings to be PAF, but with a long lag phase to acid production.
- The results of multi-element scans indicate that boron, cobalt and selenium are elevated (see Table 23 of the EIS), although at concentrations generally lower than currently produced from Centre Pit North and Centre Pit South.

Tailings produced from the processing of North Pit ore will be deposited into South Deposit Tailings Storage Facility (SDTSF). According to the EIS, there is adequate capacity in the tailings storage facilities to accommodate the tailings.

According to the EIS, the SDTSF operates at between pH 7.00 and 7.50, indicating that metal mobilisation is unlikely. Tailings placement is sub-aerial, with the tailings maintained in a saturated state with fresh tailings covering at regular intervals. Under these conditions current tailings management practices are considered appropriate for tailings generated from the NPUG operations.

On closure, water covers will be used to prevent long term oxidation.

## 6.2.2 Management measures

### Waste Rock

Management Measure 6 - Waste rock management will continue to be managed in accordance with the most recent Waste Rock Management Plan, which will be updated prior to underground mining commencement.

Management Measure 7- Monitoring of waste rock dumps will be conducted in accordance with the most recent Waste Rock Management Plan.

### Tailings

Management Measure 8 - All tailings will be managed in accordance with current site practices.

Management Measure 9 - The SDTSF will be operated in accordance with the Savage River SDTSF Operations, Maintenance and Surveillance Manual, July 2023 and in accordance with PCE 8808.

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<sup>12</sup> According to Table 20 of the EIS, a total of 1.58 Mt of A Type, 0.46 Mt of B Type, and 0.1 Mt of D Type waste rock will be backfilled into North Pit.

<sup>13</sup> Tailings generated from the mining of other sources, e.g. Centre Pit South and Centre Pit North (Appendix D of the EIS).

Management Measure 10 - Reporting of tailings dam monitoring to the EPA will be undertaken as required by PCE 8808.

### 6.2.3 Public and agency comment and responses

No representations were received.

No agency comment was received in relation to waste rock or tailings.

### 6.2.4 Evaluation

Grange has a well established waste rock management system, including encapsulation of PAF material, as currently detailed in the WRMP (version 3, dated 9 Nov 2021, Appendix C of the EIS). Waste rock will continue to be managed as per the current WRMP until North Pit open cut operations cease, including monitoring of existing waste rock dumps (management measures 6 and 7).

The WRMP however, does not provide any detail on the management of waste rock from the underground mining operations, and will therefore need to be updated (management measure 6) (condition **WMI**), incorporating detail on processes for the classification of waste rock, tracking of PAF volumes, and backfilling of North Pit. It is to also include detail on any remedial actions for North Pit required to be undertaken for backfilling to occur, and a revised estimate of waste rock volumes for backfilling, noting the current estimates are based on only one bulk sample drive.

According to Tables 18 and 19 of the EIS, a total of 4.3 Mt of waste rock will be generated from the underground operations through the LOM, of which 2.28 Mt will be generated during development of the BC mine, after cessation of open cut mining. According to the EIS (Table 20), not all of this material is proposed to be backfilled into North Pit. To reduce the volume of PAF material dumped into the pit, and importantly to mitigate the potential for PAF material to end up on the outer batters of the dump, Grange has proposed to send all PAF waste rock (D-type) to the mill from 2029 onwards (Table 20). Backfilling is proposed to cease 2033, with the remaining waste from 2029 onwards being A and B type (Table 20). Only 0.1 Mt of the PAF waste is therefore proposed to be dumped into North Pit, with 0.141 Mt proposed for the mill, that could otherwise be dumped into the pit.

As noted in Section 6.1, there is potential for the North Pit dump to impact the water quality of the NPUG outflow. The proposal to ensure no PAF material remains on the outer batters of the backfill, while also minimising the amount of PAF dumped into North Pit, is considered important. While it is acknowledged that there will be significantly more A type material generated and dumped into the pit, the encapsulation of PAF material, as per what is currently undertaken across the mine site, is not possible. The North Pit dump will be exposed to the elements over the LOM, and without encapsulation, the ingress of oxygen and water<sup>14</sup> would be expected, even with a coarse rock outer layer of A or B type material.

Note, due to the slippage in timelines, as previously noted, Grange has informed the EPA that they would not be able to meet the 1 January 2029 timeline for the cessation of backfilling of D-type waste rock.

Grange has subsequently proposed three options:

- Date of cessation of backfilling of D-type waste to be moved to 1 January 2030;
- Limit the maximum volume/mass of D-type waste that can be backfilled, proposed as 200,000 t; or
- Set a specific ratio of D-type waste to A-type waste i.e. D-type less than 50% of the total volume of A-type in the same calendar year.

At this stage it would not be appropriate to accept Grange's options, as outlined above, which would likely result in an increase in the amount of PAF material deposited into North Pit with no further refinement of waste rock block modelling and waste schedules. Given the importance of limiting AMD potential, including neutral metalliferous drainage, it is considered appropriate to limit the amount of PAF material that will be backfilled into North Pit to that proposed in the EIS, 0.1 Mt (condition **WM2**). Based on the relative

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<sup>14</sup> Both oxygen and water are required for the generation of AMD from sulfides such as pyrite.

scheduling provided in the EIS (Table 20), this would result in 0.79 Mt of A and B type material backfilled into the pit after the cessation of A type backfilling, presumably acting as a substantial batter. Note however, no detail on dumping practices, for example number of tipping points or whether all A type is going to be restricted to a particular zone, is provided. As noted above, backfilling practices will be detailed in the revised WRMP (condition **WMI**).

Condition **WM2** does allow a case to be submitted to the Director to alter the amount of PAF permitted to be dumped into the pit. This would only be considered however after an initial 12 to 18 months of North Pit backfilling<sup>15</sup>. Any case presented to the Director would be expected to consider an updated schedule of the volumes of waste types generated, demonstrating sufficient coverage of D type material on the outer batter slopes of the dump with A and B type material on completion on North Pit backfilling. It would also be expected to consider the water quality outflow from NPUG during this time and the results of the SLIP.

Condition **G7** requires the Director to be notified of the commencement of backfilling, and condition **WMI** requires a program be developed to keep track of the volume of PAF material backfilled, including reporting of volumes to the Director.

Note, the EIS does not address the potential for PAF material to be exposed within the North Pit backfill dump should temporary or early mine closure occur. This issue is addressed in Section 7.7.

The proposal to cease the dumping of D-type material into North Pit earlier, as detailed above, will result in this material ultimately reporting as tailings to the SDTSF. Based on the preliminary findings from NPUG column testings, it is agreed that the current management practices of the SDTSF are appropriate, and sufficient to manage tailings generated from the NPUG operations (management measures 8, 9 and 10). Further, incorporation of the additional PAF material into the tailings stream is considered a lesser risk to the environment than backfilling it into North Pit.

Finally, according to Appendix E of the EIS, asbestiform minerals have been identified as present in NPUG. Health risks associated with the proposal will be managed by the Office of the Chief Inspector of Mines.

### 6.2.5 Conditions

The proponent will be required to comply with the following conditions:

WMI Waste Rock Management plan

WM2 PAF waste rock management.

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<sup>15</sup> Note, according to Table 20 of the EIS, 0.1 Mt of PAF is estimated to be dumped in the first 18 months. Condition **WM2** therefore allows for the first 18 months of the proposed PAF waste rock backfilling into North Pit.

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## 7. Evaluation of Other Environmental Issues

In addition to the key issues, the following environmental issues are considered relevant to the proposal and have been evaluated in this section:

1. Natural values
2. Air emissions
3. Noise emissions
4. Waste management (excluding waste rock and tailings)
5. Dangerous goods and environmentally hazardous materials
6. Decommissioning and Rehabilitation

### 7.1 General conditions

The following general conditions will be imposed on the activity:

- G1 Access to and awareness of conditions and associated documents
- G2 Incident response
- G3 Proposed change to activity
- G4 Change of responsibility
- G5 Change of ownership
- G6 Annual Environmental Review
- G7 Notifications
- G8 Amendment of required plans and reports

#### Legal obligations

The following legal obligations are detailed in the permit:

- L01 EMPCA
- L02 Storage and handling of dangerous goods, explosives and dangerous substances
- L03 Aboriginal relics requirements
- L04 MRDA

#### Other information

Other information included in the permit:

- O11 Waste Management hierarchy
- O12 Notification of incidents under section 32 of EMPCA
- O13 Release of Relevant Information

## 7.2 Issue I: Natural Values

### 7.2.1 Potential impacts

An area of approximately 480 m<sup>2</sup> will require clearing for a new access track (see Figure 12 of the EIS).

According to the EIS, in considering the small area of habitat to be cleared, in the context of extensive contiguous habitat in the surrounding area, the potential impact to any threatened fauna species is considered minimal. The area is immediately adjacent (i.e. within 20 m) to the main access road, the rock crusher and the active ROM which operates 24 hours a day. With such a high level of existing disturbance in close proximity, it is considered unlikely that fauna would nest or den within this patch of vegetation.

There will be an increase in vehicle numbers, both on-site and off-site as a result of the construction phase of the development. There will be an additional 66 light vehicles per shift change, currently once a week for off-site roads, undertaken around midday every Wednesday. This relates to an increase in traffic of 25% for one day a week.

Current traffic movements during shift change from the Savage River township to the mine occur at 6 am and 6 pm. The proposed construction phase will result in an additional crew mini bus and 5 private vehicles each way (total of 12 additional traffic movements per shift change). This will result in an increase of 20% in traffic movements during the dusk to dawn period for approximately 6 months of the year (over winter), during construction of the underground development period.

There is a potential for an increased risk of roadkill from construction traffic movements.

According to the EIS, current EPNs require procedures to be established to reduce the risk of introduction and spread of plant pathogens such as *Phytophthora cinnamomi* and declared and environmental weeds. Appropriate weed and hygiene management measures will be implemented in line with current site practices.

### 7.2.2 Management measures proposed in the EIS

The following management measures were provided in the EIS:

- Appropriate weed and hygiene management measures will be implemented in line with current site practices.
- Monitoring and removal of roadkill to reduce the roadkill risk will continue on all site roads as well as between the Savage River township and the site.
- Implementation of vehicle speed limits, 40 km/hour on site and 70 km/hour from Savage River accommodation to site.
- A pre-clearance survey will be undertaken for natural values prior to the clearance of vegetation for the access track.

### 7.2.3 Public and agency comment

The following comments were provided by Conservation Assessments, Policy, Projects and Regulatory Services Branch, NRE:

- It is expected that the proposed mine development is likely to be low risk in terms of potential impacts to threatened flora and threatened native vegetation communities. CAS supports the pre-clearance surveys and has no further recommendations regarding threatened flora and threatened native vegetation communities.
- CAS supports the continued monitoring and removal of roadkill on all roads currently monitored in accordance with the South Deposit Tailings Storage Facility (SDTSF) approval. The continued application of speed limits of 70 km/hr on the road between the township and the mine and 40 km/hr on site is also supported. CAS recommends keeping the number of vehicle movements between dusk and dawn to the minimum required for construction purposes.

## 7.2.4 Evaluation

Given the large extent of contiguous habitat available within the wider area and the minimal area required for clearing, it is considered that the loss of potential foraging and denning habitat for the Spotted-tailed Quoll and Tasmanian Devil is negligible.

It is understood that no survey of the area to be cleared has recently been undertaken. The proponent's commitment to conduct a pre-clearance survey is considered necessary and is required by condition **FFI**.

In the event that any threatened fauna dens or nests, and or threatened flora, is identified, condition **FFI** requires that the Director be notified upon completion of the survey. The Conservation Assessments, Policy, Projects and Regulatory Services Branch, NRE, must also be contacted for advice.

While there is potential for an increased risk of roadkill from increased construction traffic movements, the current practices employed at the site are considered sufficient to mitigate the roadkill risk. No further measures are required.

According to the EIS, the current EPNs for the site (EPN 248/2, 7984/1, 8748/4, 8994/1, 10006/2) require procedures be established to reduce the risk of introduction and spread of plant pathogens such as *Phytophthora cinnamomi* and declared weeds.

The current EPNs for the mine site do not impose any requirements for management of *Phytophthora cinnamomi* and or declared weeds. There is however, a requirement under PCE 10995 (Condition FF3) for all machinery to be washed in accordance with Weed and Disease Planning Hygiene Guidelines-Preventing the spread of weeds and disease in Tasmania, 2015 prior to entering The Land.

## 7.2.5 Conditions

The proponent will be required to comply with the following conditions:

**FFI Natural values preclearance survey**

## 7.3 Issue 2: Air emissions

### 7.3.1 Potential impacts

The site is an active mine site in a remote location with no sensitive receptors located within 2 km of the mine. There are limited existing emissions from the site and no perceivable odours are generated.

Access to the mine is via a sealed road. The only truck movements associated with extraction and processing are internal to the site.

No new point sources of emissions will be generated from the proposed activity.

According to the EIS, dust generation from the proposed expansion will occur, consistent with the nature and level of dust generation currently occurring onsite. It is, however, likely that emissions will decline overall following completion of open pit mining.

Residents at Savage River are over 2 km from the mine and are unlikely to be impacted by dust generated by the proposed works.

According to the EIS, plant life around the mine is sufficiently clear of active areas to avoid direct impacts, and the high levels of rainfall experienced will ensure excessive dust does not accumulate on leaves, impacting plant health.

### 7.3.2 Management measures proposed in the EIS

As the proposed activity is unlikely to increase the nature or level of dust generation that currently occurs on site, no specific additional management measures are proposed.



Water carts and dust suppression sprays are operated on site when dry and windy conditions create a dust and/or visibility risk on site. This generally only occurs during the drier months, i.e., November to April.

### 7.3.3 Public and agency comment

No public or agency comment was received.

### 7.3.4 Evaluation

The mine is situated 45 km off the Murchison Highway. The nearest localities are Corinna, 17.5 km to the south, and Waratah, 38 km to the north-east. Worker accommodation is located in the Savage River township, approximately 2.3 km from the mine.

During dry windy weather there is potential for generation of dust plumes.

A requirement to ensure that dust emissions are controlled to the extent necessary to prevent environmental nuisance, is imposed by PCE 10995 (condition AI) (expansion of Centre Pit open cut).

The assessment of the expansion of centre pit open cut (PCE 10995) however, did not contemplate development of the proposed waste rock dump within North Pit. It is therefore considered prudent to apply condition **AI** for the proposed activity.

Given the relatively isolated nature of the mine, and the fact that dust emissions will likely decline over the course of the mine life as the mine transitions to underground mining, no additional requirements are considered necessary.

### 7.3.5 Conditions

The proponent will be required to comply with the following conditions:

#### **AI Control of dust emissions**

## 7.4 Issue 3: Noise emissions

### 7.4.1 Potential impacts

Noise levels on site are not expected to increase above existing levels as a result of proposal.

### 7.4.2 Management measures proposed in EIS

No specific management measures in relation to noise were proposed.

### 7.4.3 Public and agency comment

No public or agency comment was received.

### 7.4.4 Evaluation

The proposed activity is unlikely to increase the nature or level of noise emissions generated at the site.

Given the relatively isolated nature of the mine, issues arising from noise on the mine site are unlikely to occur, and regulatory controls are therefore not required.



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### 7.4.5 Conditions

Regulatory controls in relation to noise are not required.

## 7.5 Issue 4: Waste management (excluding waste rock and tailings)

### 7.5.1 Potential impacts

Waste disposal programs are well established and maintained at the Savage River site. According to the EIS, reasonable and practicable efforts are made to segregate waste into different waste streams and disposed of accordingly, minimizing the volume of waste going to landfill and maximizing the amount of waste that can be reused or recycled.

Management practices currently undertaken onsite include:

- All waste material is disposed of in designated bins and transported and disposed of by appropriately qualified and licensed transporters;
- Material removed from the site is covered to prevent spillage; and
- No solid waste is washed into, or placed in or about the storm water or process drains.

Existing waste management practices will continue to be implemented during underground operations.

According to the EIS, there will be a reduction in the amount of hydrocarbon waste, including waste tyres, once the operation is underground.

### 7.5.2 Management measures proposed in the EIS

No additional management measures, to those outlined above, were proposed.

### 7.5.3 Public and agency comment

No public or agency comment was received.

### 7.5.4 Evaluation

All management measures for solid and liquid waste at the site will be maintained in accordance with the Environmental Management Plan 2022, as submitted to the Director, EPA.

The proponent will be made aware of the waste management hierarchy (**OII** Waste Management hierarchy). No specific restrictions are considered necessary.

### 7.5.5 Conditions

The proponent will be made aware of the waste management hierarchy:

#### **OII Waste Management hierarchy**

## 7.6 Issue 5: Dangerous goods and environmentally hazardous materials

### 7.6.1 Potential impacts

According to the EIS, all dangerous or hazardous goods at the site are stored in accordance with Australian standards and approved operational systems. This will not change as a result of the proposed underground operations.

All hydrocarbon and chemical management on site is undertaken in accordance with the Environmental Management Plan 2022, as submitted to the Director, EPA.

### 7.6.2 Management measures proposed in EIS

No specific management measures were proposed.

### 7.6.3 Public and agency comment

No public or agency comment was received.

### 7.6.4 Evaluation

Condition 43 of EPN 248/2 requires that all potentially hazardous goods are stored in accordance with the relevant Australian standards. Condition 44 requires that Hazardous materials storage comply with the *Dangerous Goods Act 1976 and Regulations 1993*.

To ensure environmentally hazardous materials, such as fuel and oil, are stored and handled in accordance with up to date best practice, condition **H1** is required. **H2** requires spill kits appropriate for the types and volumes of material handled at the mine site be kept on site at appropriate locations.

Note, while similar conditions are also imposed by PCE 10995, the underground mine was not contemplated in the Board's assessment for centre pit expansion (PCE 10995). While not explicitly stated in the EIS, Table 4 of the EIS indicates that fuel trucks will form part of the underground operation.

Conditions **H1** and **H2** will ensure any storage and handling of fuel underground is undertaken appropriately, and sufficient safeguards are in place.

### 7.6.5 Conditions

The proponent will be required to comply with the following conditions:

**H1 Storage and handling of hazardous materials**

**H3 Spill kits**

## 7.7 Issue 6: Decommissioning and rehabilitation

### 7.7.1 Potential impacts

Closure scenarios for NPUG are currently limited to the works associated with the exploration decline.

According to the EIS, sudden and unanticipated closure of the NPUG exploration decline will require:

- Submission of a decommissioning and closure plan for approval by the Director, EPA
- Engineered portal and conveyor plugs;
- Removal of underground plant and infrastructure; and
- Capping of all vent rises.

Where there is uncertainty whether the mine would re-open, dewatering of the underground operations would continue.

Where there is certainty that the mine would not re-open, then dewatering would cease.

The following is expected to occur on LOM closure:

- Removal and disposal of hazardous chemical and other wastes;
- Removal of non-structural plant and equipment;

- Barricade placed in the bulk sample drive as a safety measure to prevent access, with an additional barricade likely at the main portal to prevent access prior to flooding;
- Capping of all vent rises;
- Flooding of the workings that will submerge any exposed PAF waste and subgrade ore within the underground mine;
- Signage to inform people of the potential hazard in the area; and
- Any other requirements to make the area safe.

According to the EIS, it is conservatively estimated that flooding of the proposed NPUG workings to the main access decline would occur within 12 months of cessation of dewatering activities.

Equipment that is anticipated to stay behind in the underground mine following closure is listed in the EIS, in Section 7.

According to the AQ2 supplementary report (Appendix A of the EIS) it will take approximately 30 years for both the NPUG operations and North Pit open cut to fill to invert level. Key points from the report are summarised as follows:

- North Pit water will overflow south into South Lens, then Savage River.
- The actual water level that the pit reaches is likely to be higher than that predicted in the model (RL 125 m), as the overflow channel linking North Pit and South Lens has been backfilled and is likely to have a restricted capacity compared to inflow rates during the peak winter periods. The restricted capacity of the pathway may mean that it may take slightly longer for the pit to reach invert level and consequently may contain a slightly greater volume.
- There is uncertainty related to a number of the inputs within the model. However, these will mostly impact the length of time taken for the pit to recover to the overspill level rather than the result that it will reach the overspill level.
- The porosity of the subsidence zone, volume of void in the underground to be filled, and the impact of the BCFT overflow into North Pit are unlikely to impact the final water level in North Pit.

### 7.7.2 Management measures proposed in EIS

No specific management measures were proposed.

### 7.7.3 Public and agency comment

No public or agency comment was received.

### 7.7.4 Evaluation

Conditions 19 and 20 of EPN 248/2 require review and revision of the operating Environmental Rehabilitation Plan (ERP), and implementation of the approved ERP following permanent cessation of operations. Condition 7 requires notification of any permanent cessation.

The ERP for the site is reviewed every three years, with the latest review occurring in 2023. The ERP covers final rehabilitation and closure of the entire Savage River mine site, including decommissioning of plant and equipment after cessation of operations.

The rehabilitation and closure of the NPUG operations and associated North Pit waste rock dump will form part of the final rehabilitation and closure of the mine site and will be captured by current conditions 19 and 20 of EPN 248/2.

As the next review is not due until 2026, it would be appropriate to require a revised ERP 6 months from the date of issue of PCE I2021 (condition **DC2**).

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It is noted that the EIS does not address the potential for PAF material to be exposed within the North Pit backfill dump, should early mine closure occur before a sufficient batter of A and B type material has formed. Condition **DC2** requires management measures to be detailed to ensure PAF material is not exposed should early or unanticipated closure occur.

Should Grange temporarily suspend operations, condition **DC1** will ensure that the land is managed appropriately, and a Care and Maintenance Plan is submitted, relevant to the NPUG operations.

### **7.7.5 Conditions**

The proponent will be required to comply with the following conditions:

- DC1 Temporary suspension of activity**
- DC2 Environmental Rehabilitation Plan**

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## 8. Issues not assessed by the Board

The following issues have been raised during the assessment process but are not the responsibility of the Board under the EMPCA. These may be issues which are more appropriately addressed by another regulatory agency.

1. Health and safety
2. Fire risk

### 8.1 Health and safety

#### 8.1.1 Potential impacts

The change from open cut to underground mining at Savage River presents a variety of health and safety risks to personnel.

#### 8.1.2 Management measures proposed in EIS

No management measures were proposed in the EIS.

#### 8.1.3 Public and agency comment

The Office of the Chief Inspector of Mines (OCIM) have no specific objections to the proposal, however it is noted that the transition from open pit to underground mining represents a very significant change in mining method and subsequent risk profile for the site.

#### 8.1.4 Conclusion

The OCIM will engage with Grange Resources to ensure the change to underground mining is adequately risk assessed and managed in accordance with relevant legislation.

## 8.2 Fire risk

### 8.2.1 Potential impacts

According to the EIS, Grange has a range of existing fire and emergency management procedures which will continue to be implemented throughout the change in operations. These plans and procedures have all been updated to include the proposed NPUG, and include:

- *Fire Prevention Procedure (MHS-02), 2022*
- *Savage River Emergency Management Plan, 2019*; and
- *NPUG Fire or Explosion Management Plan, 2019.*

The NPUG Fire or Explosion Management Plan describes how the risk of fire or explosion at NPUG operations will be safely and efficiently managed.

According to the EIS, these procedures and plans will ensure that any potential fire risk associated with the proposal is appropriately managed to reduce environmental impacts that could occur as a result of a fire.

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### **8.2.2 Management measures proposed in EIS**

No specific management measures were proposed in the EIS.

### **8.2.3 Public and agency comment**

No public or agency comment was received.

### **8.2.4 Conclusion**

Grange is required to operate the mine in accordance with relevant legislation.

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## 9. Report Conclusions

This assessment has been based on the information provided by the proponent, Grange Resources (Tasmania) Pty Ltd, in the permit application and the case for assessment (EIS).

This report incorporates specialist advice provided by EPA scientific and regulatory staff, the Department of Natural Resources and Environment Tasmania, and other government agencies.

It is concluded that:

1. the RMPS and EMPCS objectives have been duly and properly pursued in the assessment of the proposal; and
2. the assessment of the proposal has been undertaken in accordance with the Environmental Impact Assessment Principles; and
3. the proposal is capable of being managed in an environmentally acceptable manner such that it is unlikely that the RMPS and EMPCS objectives would be compromised, provided that the Permit Conditions - Environmental No. 12021 appended to this report are imposed and duly complied with.

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## 10. Report Approval

**Environmental Assessment Report and conclusions, including environmental conditions, adopted:**



Andrew Paul

**CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY**

Meeting date: 6 August 2024



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## II. References

Pitt&sherry (2024) Savage Rive Mine: North Pit Underground Operations, Environmental Impact Statement (Rev04 dated 15 March 2024), prepared for Grange Resources.

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## 12. Appendices

Appendix 1 Table of proponent management measures

Appendix 2 Permit conditions No: 12021

## Appendix I: Table of proponent management measures

Table I: Proponent management measures (Table 25 of the EIS)

Number	Action	Timing
1	Continuation of current surface water diversion around North Pit	Ongoing
2	Continuation of existing dewatering of North Pit, including the interception of Broderick Creek water	Ongoing
3	Dewatering of North Pit underground, refer 2.3.1 for details	Ongoing
4	Water quality monitoring of NPUG	Ongoing
5	Reporting of water quality monitoring to the EPA. Quarterly for summary report, and annually for analysis of results (as part of Annual Environmental Report)	As required
6	Waste rock management will continue to be managed in accordance with the most recent Waste Rock Management Plan, approved by the EPA	Ongoing
7	Monitoring of waste rock dumps will be conducted in accordance with the most recent Waste Rock Management Plan, approved by the EPA	Ongoing
8	All tailings will be managed in accordance with current site practice	Ongoing
9	The SDTSF will be operated in accordance with the Savage River SDTSF Operations, Maintenance and Surveillance Manual, July 2023 and in accordance with PCE 8808.	Ongoing
10	Reporting tailings dam monitoring to the EPA as required by PCE 8808.	Ongoing
11	A pre-clearance survey will be undertaken for natural values, prior to clearance of 480 m <sup>2</sup> of native vegetation to allow construction of a new access track	Prior to clearance

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## **Appendix 2: Permit conditions – No: I2021**

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**PERMIT PART B**  
**PERMIT CONDITIONS - ENVIRONMENTAL No. 12021**

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Issued under the *Environmental Management and Pollution Control Act 1994*

Activity: **The operation of a mine (ACTIVITY TYPE: Mines)**  
**SAVAGE RIVER MINE,**  
**SAVAGE RIVER TAS 7321**

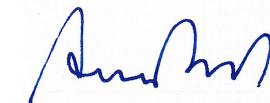
The above activity has been assessed as a level 2 activity under the *Environmental Management and Pollution Control Act 1994*.

Acting under Section 25(5)(a)(i) of the EMPCA, the Board of the Environment Protection Authority has required that this Permit Part B be included in any Permit granted under the *Land Use Planning and Approvals Act 1993* with respect to the above activity.

Municipality: **WARATAH/WYNYARD**  
Permit Application Reference: **DA 54/2024**  
EPA file reference: **261290-001**

Date conditions approved: 6 August 2024

Signed:



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CHAIRPERSON, BOARD OF THE ENVIRONMENT  
PROTECTION AUTHORITY

## DEFINITIONS

Unless the contrary appears, words and expressions used in this Permit Part B have the meaning given to them in **Schedule 1** of this Permit and in the EMPCA. If there is any inconsistency between a definition in the EMPCA and a definition in this Permit Part B, the EMPCA prevails to the extent of the inconsistency.

## ENVIRONMENTAL CONDITIONS

The person responsible for the activity must comply with the conditions contained in **Schedule 2** of this Permit Part B.

## INFORMATION

Attention is drawn to **Schedule 3**, which contains important additional information.



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## Attachments

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Attachment 2: Attachment 2 The Land (modified: 23/03/2021 14:38)..... 1 page  
Attachment 3: Attachment 3 Surface water monitoring (modified: 08/08/2024 10:24)..... 2 pages

## Schedule 1: Definitions

In this Permit Part B:-

**Aboriginal Relic** has the meaning described in section 2(3) of the *Aboriginal Heritage Act 1975*.

**Activity** means any environmentally relevant activity (as defined in Section 3 of EMPCA) to which this document relates, and includes more than one such activity.

**AMD** means acid and metalliferous drainage arising from the oxidation of sulphide minerals.

**Authorized Officer** means an authorized officer under section 20 of EMPCA.

**Director** means the Director, Environment Protection Authority holding office under Section 18 of EMPCA and includes a delegate or person authorised in writing by the Director to exercise a power or function on the Director's behalf.

**EIS** means the document entitled, *Savage River Mine: North Pit Underground Operations, Environmental Impact Statement, prepared for Grange Resources by Pitt&Sherry, Rev04, dated 15 March 2024*.

**EMPCA** means the *Environmental Management and Pollution Control Act 1994*.

**Environmental Harm** and **Material Environmental Harm** and **Serious Environmental Harm** each have the meanings ascribed to them in Section 5 of EMPCA.

**Environmental Nuisance** has the meanings ascribed to it in Section 3 of EMPCA.

**Environmentally Hazardous Material** means any substance or mixture of substances of a nature or held in quantities which present a reasonably foreseeable risk of causing serious or material environmental harm if released to the environment and includes fuels, oils, waste and chemicals but excludes sewage.

**EPA Board** means the Board of the Environment Protection Authority established under section 13 of EMPCA and includes a delegate or person authorised in writing by the EPA Board to exercise a power or function on the EPA Board's behalf.

**NPUG mine** means that North Pit Underground Mine, incorporating the Transition mine and the Block Cave mine as described in the EIS.

**NPUG Outfall** means the North Pit underground mine outflow monitoring point as detailed in the Table of Surface Water Monitoring at Attachment 3.

**PAF** means potentially acid forming, defined as material with a NAG pH of less than 4.5 and a Net Acid Producing Potential (NAPP) of greater than or equal to 0kg of H<sub>2</sub>SO<sub>4</sub>/tonne and also includes UC material.

**Person Responsible** is any person who is or was responsible for the environmentally relevant activity to which this document relates and includes the officers, employees, contractors, joint venture partners and agents of that person, and includes a body corporate.

**Planning Authority** means the Council(s) for the municipal area(s) in which The Land is situated.

**Pollutant** has the meaning ascribed to it in Section 3 of EMPCA.

**Reporting Period** 'means the financial year'.

**South Lens Outflow** means the South Lens outflow discharge to Savage River as shown at Attachment 1.

**The Land** means the land on which the activity to which this document relates may be carried out, and includes: buildings and other structures permanently fixed to the land, any part of the land covered with water, and any water covering the land. The Land falls within the area defined by:

- 1 Mining Lease: 2M/2001, 14M/2007, 11M/2008, 4M/2019; and
- 2 as further delineated at Attachment 2.

**WWDS** means the Western Wall Dewatering System.

## Schedule 2: Conditions

### Maximum Quantities

#### **Q1 Regulatory limits**

- 1 The activity must not exceed the following limits:
  - 1.1 No limit has been set for the purposes of the Environmental Management and Pollution Control (General) Regulations 2017.

### General

#### **G1 Access to and awareness of conditions and associated documents**

A copy of these conditions and any associated documents referred to in these conditions must be held in a location that is known to and accessible to the person responsible for the activity. The person responsible for the activity must ensure that all persons who are responsible for undertaking work on The Land, including contractors and sub-contractors, are familiar with these conditions to the extent relevant to their work.

#### **G2 Incident response**

If an incident causing or threatening environmental nuisance, serious environmental harm or material environmental harm from pollution occurs in the course of the activity, then the person responsible for the activity must immediately take all reasonable and practicable action to minimise any adverse environmental effects from the incident.

#### **G3 Proposed change to activity**

- 1 The person responsible must notify the Director in writing prior to implementing any change to the activity authorised by this document that may cause or increase the emission of a pollutant or which may result in environmental harm or environmental nuisance (even temporarily). A change includes, but is not limited to, any of the following:
  - 1.1 an increase in the discharge of a pollutant, or the location of its discharge.
  - 1.2 the construction, installation, alteration or removal of any structure or equipment used in the course of carrying out the activity.
  - 1.3 any clearance of native vegetation or earthworks.
  - 1.4 a change in the quantity or characteristics of materials used in carrying out the activity.
- 2 The notification must be in an approved form and include the following:
  - 2.1 details of the proposed change;
  - 2.2 an assessment of the environmental impacts that may result from the change;
  - 2.3 any relevant approvals held by the person responsible; and
  - 2.4 any advice from the relevant planning authority to the effect that approval is not required.
- 3 The person responsible must provide additional information as requested by an Authorized Officer.
- 4 The proposed change must not be implemented until the Director has confirmed in writing that they are satisfied that no other approval or variation of this document is required.

- 5 For the avoidance of doubt, a notification of a proposed change under this provision is not required if the proposed change is part of a referral to the EPA Board for assessment under sections 24, 25 or 27 of EMPCA.

#### **G4 Change of responsibility**

If the person responsible for the activity intends to cease to be responsible for the activity, that person must notify the Director in writing of the full particulars of any person who will become the person responsible for the activity, before such cessation.

#### **G5 Change of ownership**

If the owner of The Land upon which the activity is carried out changes or is to change, then, as soon as reasonably practicable but no later than 30 days after becoming aware of the change or intended change in the ownership of The Land, the person responsible must notify the Director in writing of the change or intended change of ownership.

#### **G6 Annual Environmental Review**

- 1 Unless otherwise specified in writing by the Director, a publicly available Annual Environmental Review for the activity must be submitted to the Director each year within three months of the end of the reporting period. Without limitation, each Annual Environmental Review must include the following information:
  - 1.1 a statement by the General Manager, Chief Executive Officer or equivalent for the activity acknowledging the contents of the Annual Environmental Review;
  - 1.2 subject to the *Personal Information Protection Act 2004*, a list of all complaints received from the public during the reporting period concerning actual or potential environmental harm or environmental nuisance caused by the activity and a description of any actions taken as a result of those complaints;
  - 1.3 details of environment-related procedural or process changes that have been implemented during the reporting period;
  - 1.4 a summary of the amounts (tonnes or litres) of both solid and liquid wastes produced and treatment methods implemented during the reporting period. Initiatives or programs planned to avoid, minimise, re-use, or recycle such wastes over the next reporting period should be detailed;
  - 1.5 details of all non-trivial environmental incidents and/or incidents of non compliance with these conditions that occurred during the reporting period, and any mitigative or preventative actions that have resulted from such incidents;
  - 1.6 a summary of the monitoring data and record keeping required by these conditions. This information should be presented in graphical form where possible, including comparison with the results of at least the preceding reporting period. Special causes and system changes that have impacted on the parameters monitored must be noted. Explanation of significant deviations between actual results and any predictions made in previous reports must be provided;
  - 1.7 identification of breaches of limits specified in these conditions and significant variations from predicted results contained in any relevant EIS or EMP, an explanation of why each identified breach of specified limits or variation from predictions occurred and details of the actions taken in response to each identified breach of limits or variance from predictions;
  - 1.8 a list of any issues, not discussed elsewhere in the report, that must be addressed to improve compliance with these conditions, and the actions that are proposed to address any such issues;
  - 1.9 a summary of fulfilment of environmental commitments made for the reporting period. This summary must include indication of results of the actions implemented and explanation of any failures to achieve such commitments; and



- 1.10 a summary of any community consultation and communication undertaken during the reporting period.

## **G7 Notifications**

- 1 The Director must be notified in writing at least 14 days before the commencement of waste rock backfilling into North Pit.
- 2 The Director must be notified in writing at least 14 days before the commencement of blasting the first drawbell.
- 3 The Director must be notified in writing within 14 days of the commencement of breakthrough of the North Pit floor.

## **G8 Amendment of required plans and reports**

- 1 The plans and reports required by these conditions must be amended to address any matter required by the Director, as advised by notice in writing.
- 2 Amended plans and reports must be resubmitted within the timeframe that the Director specifies.

## **Atmospheric**

### **A1 Control of dust emissions**

Dust emissions from The Land must be controlled to the extent necessary to prevent environmental nuisance beyond the boundary of The Land.

## **Decommissioning And Rehabilitation**

### **DC1 Temporary suspension of activity**

- 1 Within 30 days of becoming aware of any event or decision which is likely to give rise to the temporary suspension of the activity, the person responsible for the activity must notify the Director in writing of that event or decision. The notice must specify the date upon which the activity is expected to suspend or has suspended.
- 2 During temporary suspension of the activity The Land must be managed and monitored by the person responsible for the activity to ensure that emissions from The Land do not cause serious environmental harm, material environmental harm or environmental nuisance.
- 3 If required by the Director, a Care and Maintenance Plan for the activity must be submitted to the Director for approval, by a date specified in writing by the Director. This requirement will be deemed to be satisfied only when the Director indicates in writing that the submitted document adequately addresses the requirements of this condition.
  - 3.1 The plan must be prepared in accordance with any reasonable guidelines provided by the Director.
  - 3.2 Once approved the person responsible must act in accordance with the approved Care and Maintenance Plan.
  - 3.3 The person responsible may apply to the Director to vary or substitute the Care and Maintenance Plan. Any variation or substitution of the plan approved by the Director, by notice in writing, replaces the earlier approval with effect from the date specified in the notice.
- 4 Unless otherwise approved in writing by the Director, if the activity on The Land has substantially ceased for 2 years or more, rehabilitation of The Land must be carried out in accordance with the requirements of these conditions as if the activity has permanently ceased.

**DC2 Environmental Rehabilitation Plan**

- 1 Unless otherwise approved by the Director in writing, within 6 months of the date of issue of this permit, a revised Environmental Rehabilitation Plan must be submitted to the Director for approval. This requirement will be deemed to be satisfied only when the Director indicates in writing that the submitted document adequately addresses the requirements of this condition.
- 2 The plan must be prepared in accordance with any guidelines provided by the Director.
- 3 Without limitation, the revised plan must include details of the following:
  - 3.1 closure and rehabilitation of the Savage River mine site, incorporating all aspects of NPUG;
  - 3.2 early and unanticipated mine closure scenarios, detailing management measures that will be undertaken to ensure that PAF waste rock is not exposed should early or unanticipated mine closure occur;
  - 3.3 a table containing all of the major commitments made in the plan;
  - 3.4 an implementation timetable for key aspects of the plan; and
  - 3.5 a reporting program to regularly advise the Director of the results of the plan.
- 4 Once approved the person responsible must act in accordance with the approved plan.
- 5 The person responsible may apply to the Director to vary or substitute the Environmental Rehabilitation Plan. Any variation or substitution of the plan approved by the Director, by notice in writing, replaces the earlier approval with affect from the date specified in the notice.

**Effluent Management****EM1 NPUG outflow investigation trigger levels**

- 1 Unless otherwise approved in writing by the Director, if concentrations of parameters in Column 1 of the Table of NPUG Outfall Investigation Trigger Levels exceed the levels in Column 3, then the following actions must be undertaken:
  - 1.1 The Director must be notified within 24 hours of the person responsible becoming aware of the exceedance;
    - 1.1.1 The notification must include details of the limit that has been exceeded, the amount of the exceedance, the nature of the exceedance, and any immediate actions taken in response to the exceedance known at the time of the notification.
  - 1.2 an investigation into the possible causes must be conducted and a report summarising the outcomes of the investigation and management actions taken in response to the exceedance submitted to the Director within one month.
- 2 Table of NPUG Outflow Investigation Trigger Levels

<b>Column 1 Parameter</b>	<b>Column 2 Unit of measurement</b>	<b>Column 3 Investigation trigger levels</b>
Copper (total)	(µg/L)	383
Nickel (total)	(µg/L)	138
Cobalt (total)	(µg/L)	129
Zinc (total)	(µg/L)	300

**EM2 Management of NPUG outflow water**

Unless otherwise approved in writing by the Director, NPUG outflow water can only be discharged to South Lens.

**EM3 South Lens Outflow investigation trigger levels**

**1** Unless otherwise approved in writing by the Director, for each 3 month period shown in Column 1, if the concentrations of parameters in Columns 2 or 3 or 4 or 5 or 6 or 7 of the Table of South Lens Outflow Investigation Trigger Levels are exceeded, then the following actions must be undertaken:

**1.1** The Director must be notified within 24 hours of the person responsible becoming aware of the exceedance;

**1.1.1** The notification must include details of the limit that has been exceeded, the amount of the exceedance, the nature of the exceedance, and any immediate actions taken in response to the exceedance known at the time of the notification.

**1.2** an investigation into the possible causes must be conducted and a report summarising the outcomes of the investigation and management actions taken in response to the exceedance submitted to the Director within one month.

**2** Table of South Lens Outflow Investigation Trigger Levels

<b>Column 1 Months (inclusive)</b>	<b>Column 2 Total Copper (µg/L)</b>	<b>Column 3 Total Cobalt (µg/L)</b>	<b>Column 4 Total Nickel (µg/L)</b>	<b>Column 5 Total Zinc (µg/L)</b>	<b>Column 6 Electrical Conductivity (µS/cm)</b>	<b>Column 7 Total Suspended Solids (mg/L)</b>
December to February	35	125	90	16	1573	30
March to May	38	121	92	17	1617	30
June to August	31	107	81	17	1583	30
September to November	45	97	75	17	1403	30

**Flora And Fauna****FF1 Natural values preclearance survey**

**1** Unless otherwise specified in writing by the Director, no more than 60 days prior to commencement of any vegetation clearance on The Land, a natural values preclearance survey must be undertaken in accordance with the *Guidelines for Natural Values Surveys - Terrestrial Development Proposals, Policy and Conservation Advice Branch, Department of Primary Industries, Parks, Water and Environment, version 1.2, May 2021*, of the area of vegetation to be cleared for the new access track, as shown in Figure 12 of the EIS.

**1.1** the persons conducting the survey must be appropriately qualified to conduct the survey.

**1.2** a report outlining the findings of the survey must be submitted to the Director for approval prior to the commencement of vegetation clearance.

## **Hazardous Substances**

### **H1 Storage and handling of hazardous materials**

- 1** Unless otherwise approved in writing by the Director, environmentally hazardous materials held on The Land must be:
  - 1.1** stored within maintained and functional impervious bunded areas, spill trays or other containment systems; and
  - 1.2** managed to prevent unauthorised discharge, emission or deposition of pollutants:
    - 1.2.1** to soils within the boundary of The Land in a manner that is likely to cause serious or material environmental harm;
    - 1.2.2** to groundwater;
    - 1.2.3** to waterways; or
    - 1.2.4** beyond the boundary of The Land.

### **H2 Spill kits**

Spill kits appropriate for the types and volumes of materials handled on The Land must be kept in appropriate locations and maintained in a functional condition to assist with the containment of spilt environmentally hazardous materials.

## **Monitoring**

### **M1 Water quality monitoring requirements**

- 1** Unless otherwise specified in writing by the Director, water quality monitoring must be undertaken in accordance with the Table of Surface Water Monitoring at Attachment 3, as follows:
  - 1.1** the items numbered in Column 1 must be sampled or tested at the locations listed in Column 2, for the parameters listed in Column 3, in the units listed in Column 4 at the frequencies listed in Column 5, using the techniques listed in Column 6; and
  - 1.2** resultant monitoring data must be reported to the Director in accordance with the requirements set out in Column 7.

### **M2 Samples and measurements for monitoring purposes**

- 1** Any sample or measurement required under these conditions must be taken and processed in accordance with the following:
  - 1.1** sampling and measuring must be undertaken by a person with training, experience, and knowledge of the appropriate procedure;
  - 1.2** the integrity of samples must be maintained prior to delivery to a testing facility;
  - 1.3** sample analysis must be conducted by a testing facility accredited by the National Association of Testing Authorities (NATA), or a testing facility approved in writing by the Director, for the specified test;
  - 1.4** details of methods employed in taking samples and measurements and results of sample analysis, and measurements must be retained for at least three (3) years after the date of collection; and
  - 1.5** sampling and measurement equipment must be maintained and operated in accordance with manufacturer's specifications and records of maintenance must be retained for at least three (3) years.

### **M3 Monitoring reporting and record keeping**

- 1** Unless otherwise specified in writing by the Director, a Monitoring Report, in an electronic format approved by the Director, must be submitted to the Director quarterly, with the first report to be submitted 31 December 2024. As a minimum, the Monitoring Report must include the following information:
  - 1.1** the laboratories at which sample analyses were carried out;
  - 1.2** contact details for a person responsible for managing monitoring programs;
  - 1.3** summary statistics of all monitoring results, including;
    - 1.3.1** water quality monitoring;
    - 1.3.2** monitoring of flow rates, including the WWDS flow rate (and duration) and North Pit eastern side pipeline flow rate; and
    - 1.3.3** deformation monitoring of the WWDS.
  - 1.4** Deformation trigger levels for the implementation of the Upper Broderick Creek Diversion Scheme.
  - 1.5** detail of each investigation trigger level exceedance; and
  - 1.6** summary of management actions undertaken in response to each investigation trigger level exceedance.
- 2** The Monitoring Report must also provide a comparison of the monitoring results from NPUG outfall and North Pit surface water, whilst samples of North Pit surface water are collected.
- 3** A record of all Monitoring Reports submitted to the Director must be maintained and copies of all test reports referenced to the relevant quarterly Monitoring Reports kept for a minimum period of three (3) years.

### **Waste Management**

#### **WM1 Waste Rock Management Plan**

- 1** Unless otherwise approved in writing by the Director, a revised Waste Rock Management Plan must be submitted to the Director for written approval within 3 months of the date of issue of these conditions. The revised Plan must contain the following:
  - 1.1** A description of the waste rock management procedures for the NPUG mine. This is to include:
    - 1.1.1** updated schedule of waste rock backfill dumping by waste rock type;
    - 1.1.2** procedures for classifying waste rock types extracted from the NPUG mine;
    - 1.1.3** program for the tracking of PAF waste rock volumes backfilled into North Pit;
    - 1.1.4** program for updating NPUG waste rock volume estimates.
  - 1.2** A description of the North Pit Backfill Dump, including:
    - 1.2.1** any remedial actions to be undertaken of North Pit prior to the commencement of backfilling;
    - 1.2.2** description of backfilling procedures; and
    - 1.2.3** strategies to ensure that PAF waste rock is not exposed on the outer batters of the dump for an extended period of time, such that it is likely to generate AMD. This is to include actions to be undertaken during any temporary closure of the mine, or temporary cessation of mining from NPUG. It is to also take into account the potential loss of material that may be forming a batter to PAF waste rock once breakthrough of the pit floor occurs.

- 2 The management of waste rock on The Land must be undertaken in accordance with the revised Waste Rock Management Plan, including any amendment to or substitution of that Plan.

**WM2 PAF waste rock management**

Unless otherwise approved in writing by the Director, a total of no more than 100,000 tonnes of PAF waste rock is to be backfilled into North Pit.



## Schedule 3: Information

### Legal Obligations

#### **LO1 EMPCA**

The activity must be conducted in accordance with both the conditions in this document and the obligations of the *Environmental Management and Pollution Control Act 1994* (EMPCA) and subordinate regulations. The conditions of this document do not replicate legislated obligations; therefore, you should ensure you are aware of your obligations under EMPCA and subordinate regulations.

#### **LO2 Storage and handling of dangerous goods, explosives and dangerous substances**

- 1 The storage, handling and transport of dangerous goods, explosives and dangerous substances must comply with the requirements of relevant State Acts and any regulations thereunder, including:
  - 1.1 *Work Health and Safety Act 2012* and subordinate regulations;
  - 1.2 *Explosives Act 2012* and subordinate regulations; and
  - 1.3 *Dangerous Goods (Road and Rail Transport) Act 2010* and subordinate regulations.

#### **LO3 Aboriginal relics requirements**

- 1 Aboriginal relics, objects, sites, places and human remains regardless of whether they are located on public or private land, are protected under the *Aboriginal Heritage Act 1975*.
- 2 Unanticipated discoveries of Aboriginal heritage must be reported to Aboriginal Heritage Tasmania on **1300 487 045** as soon as possible.

#### **LO4 MRDA**

Operations must be undertaken in accordance with a mining plan approved by the Director of Mines and a Mining Lease issued under the *Mineral Resources Development Act 1995* (MRDA).

### Other Information

#### **OI1 Waste management hierarchy**

- 1 Wastes should be managed in accordance with the following hierarchy of waste management:
  - 1.1 waste should be minimised, that is, the generation of waste must be reduced to the maximum extent that is reasonable and practicable, having regard to best practice environmental management;
  - 1.2 waste should be re-used or recycled to the maximum extent that is practicable; and
  - 1.3 waste that cannot be re-used or recycled must be disposed of at a waste depot site or treatment facility that has been approved in writing by the relevant planning authority or the Director to receive such waste, or otherwise in a manner approved in writing by the Director.

#### **OI2 Notification of incidents under section 32 of EMPCA**

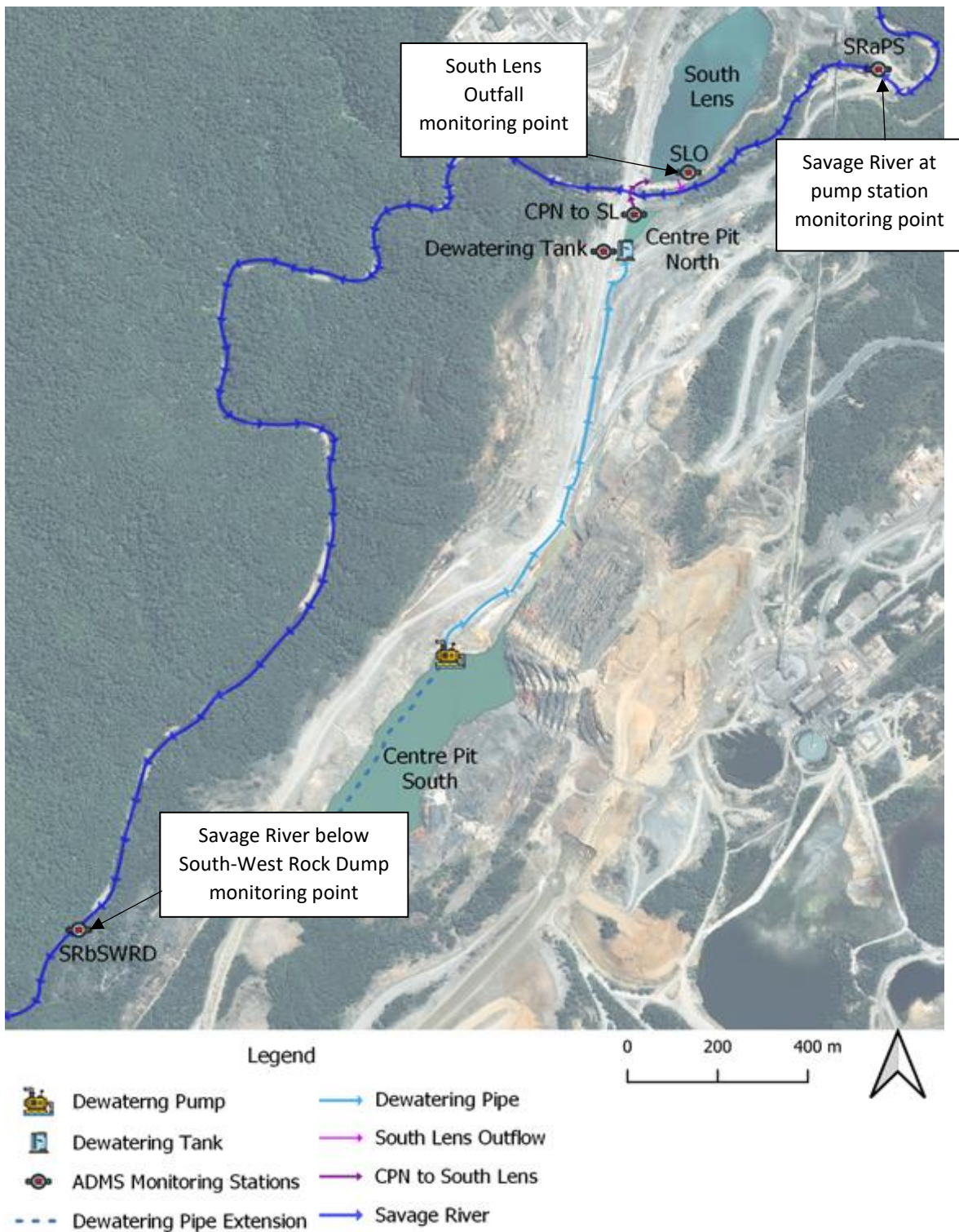
Where a person is required by section 32 of EMPCA to notify the Director of the release of a pollutant, the Director can be notified by telephoning **1800 005 171** (a 24-hour emergency telephone number).

**OI3 Release of Relevant Information**

Under the provisions of Section 23AA of EMPCA relevant information relating to monitoring of environmental impacts required under these conditions may be subject to publishing or public release by the Director.

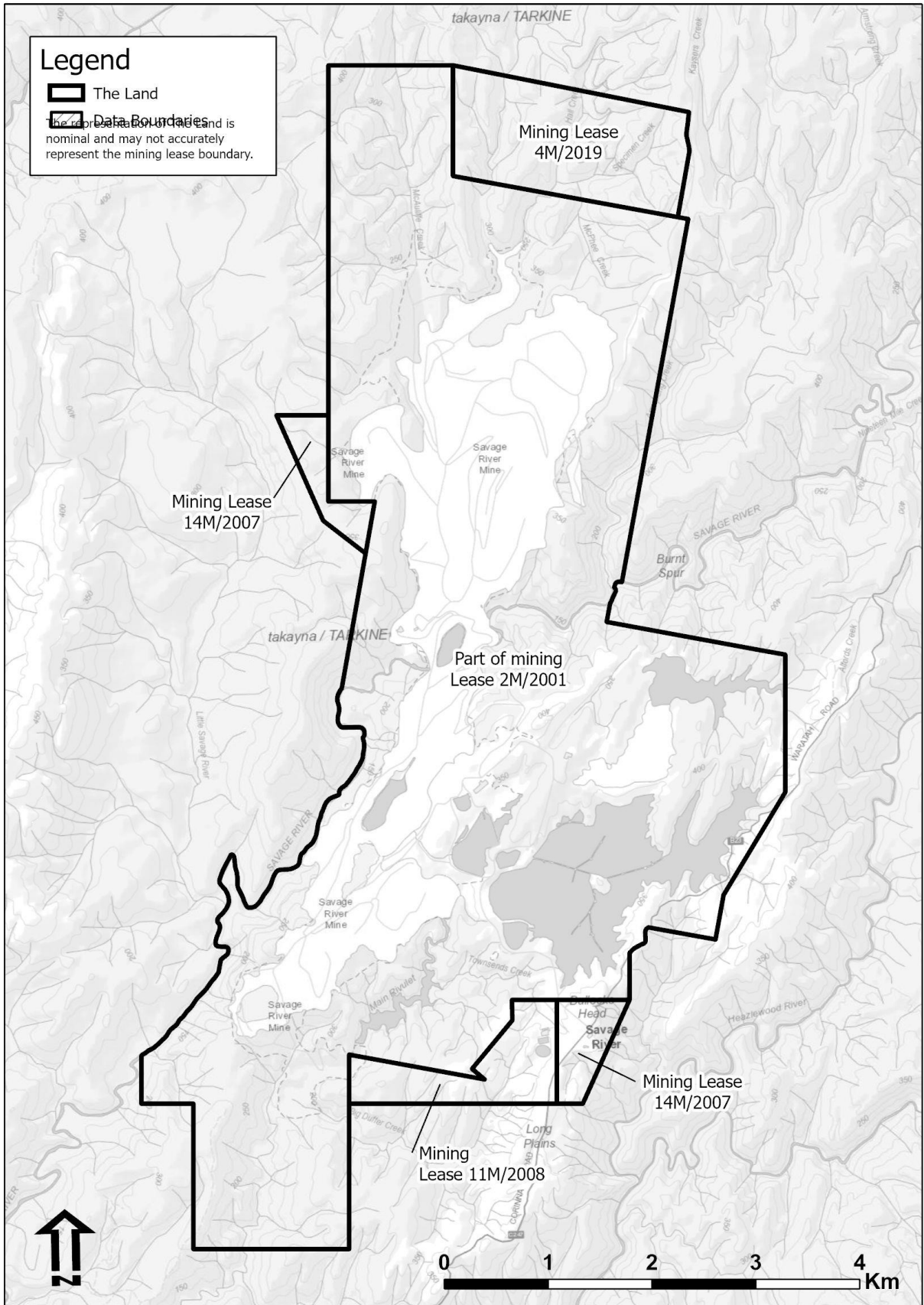
### Maps showing location of South Lens and Savage River monitoring sites

SRaPS (Savage River above Pump Station), SLO (South Lens Outflow), SRbSWRD (Savage River below South-West Rock Dump)



# The Land

(Mining Leases 4M/2019, 14M/2007, 2M/2001, 11M/2008)



**Table of surface water monitoring**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>	<b>Column 5</b>	<b>Column 6</b>	<b>Column 7</b>
<b>Item No.</b>	<b>Location description</b>	<b>Parameters</b>	<b>Units</b>	<b>Frequency</b>	<b>Technique</b>	<b>Reporting</b>
1	North Pit underground outflow monitoring point at: Easting 350453 Northing 5407119	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl)	mg/L	Fortnightly	Grab sample for laboratory analysis of all parameters.	Fortnightly via email.
		pH, conductivity, turbidity, flow	pH units, µS/cm, NTU, L/s	12 hourly	Online continuous	Fortnightly via email.
2	North Pit underground seeps	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl)	mg/L	Monthly for 6 months	Grab sample for laboratory analysis of all parameters.	Monthly via email.
		pH, conductivity, turbidity, flow	pH units, µS/cm, NTU, L/s	Monthly for 6 months	In field sample.	Monthly via email.
3	South Lens Outflow ('SLO', as shown at Attachment 1)	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl)	mg/L	Fortnightly	Grab sample for laboratory analysis of all parameters.	Fortnightly via email.
		pH, conductivity, turbidity, flow	pH units, µS/cm, NTU, L/s	12 hourly	Online continuous	Fortnightly via email.
4	North Pit surface dewatering monitoring point at: Easting 350252 Northing 5407589	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl)	mg/L	Fortnightly until sampling is no longer possible	Grab sample for laboratory analysis of all parameters.	Fortnightly via email.
		pH, conductivity, turbidity, flow	pH units, µS/cm, NTU, L/s	Fortnightly until sampling is no longer possible	In field sample.	Fortnightly via email.
5	Savage River at Pump	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr,	mg/L	Fortnightly	Grab sample for laboratory analysis of all parameters.	Fortnightly via email.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Item No.	Location description	Parameters	Units	Frequency	Technique	Reporting
	Station ('SRaPS', as shown at Attachment 1)	Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl) pH, conductivity, turbidity, flow	pH units, $\mu\text{S}/\text{cm}$ , NTU, $\text{m}^3/\text{s}$	12 hourly	Online continuous	Fortnightly via email.
6	Savage River below South-West Rock Dump ('SRbSWRD', as shown at Attachment 1)	TSS, alkalinity, acidity, sulphate, total and dissolved metals (Al, As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Zn), cations (Ca, Mg, Na, K), anions (F, Cl) pH, conductivity, turbidity, flow	mg/L pH units, $\mu\text{S}/\text{cm}$ , NTU, $\text{m}^3/\text{s}$	Fortnightly 12 hourly	Grab sample for laboratory analysis of all parameters. Online continuous	Fortnightly via email. Fortnightly via email.



ENVIRONMENT PROTECTION AUTHORITY