Ernest Henry Operations – RL 1150 m Project

Application for an Amendment of Environmental Authority (EPML00899713) – Environmental Assessment Supporting Information

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24 October 2023

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1 Introduction

1.1 Purpose

The purpose of this document is to provide supporting information for an application to amend Environmental Authority (EPML00899713, dated 5 June 2020) in place for the Ernest Henry Operation (EHO).

The amendment of the Environmental Authority is required to authorise:

- An increase in the volumetric limit of the EHO – Tailings Storage Facility(TSF) from 130,000,000 m^3 (cubic metres) to 136,000,000 m^3.
- Production from RL (Relative Level) 1200 metres (m) to RL 1150 m, the extra 50m being made up of an additional 2 production levels in addition to the existing 18 production levels.

Collectively, these amendments are denoted as the RL 1150 m Project (the Project).

This document provides information that is supplementary to, and should be read in conjunction with, the completed Environmental Authority Amendment - Application Form[1].

This document provides more detailed responses to that provided in the Application Form on the requirements of the Act and associated regulations, policies andguidelines.

This document comprises:

- A summary of the relevant documents that prescribe the approved activities and form the basisof the existing Environmental Authority.
- A description of the existing and the new propose.d activities at EHO for which an amendmentto the Environmental Authority is sought.
- Supporting information and impact assessments to address the requirements of the *Act* and associated regulations, policies, guidelines and forms.

1.2 Scope

The scope of the amendment is summarised as:

- Increase in the total maximum volume limit of tailings deposited in the existing TSF from 130,000,000 m^3 (cubic metres) to 136,000,000 m^3.
- Continuation of mining activities from RL 1200 m (metres) to RL 1150 m, an addition of 50m or 2 production levels.

1.3 Document Structure

The supporting information is set out the in the following structure:

- The site and project description (Section 2).
- The proposed Environmental Authority amendments (Section 3).
- The Environmental Authority amendment application requirements (Section 4).
- Environmental values (EVs), emissions or releases likely to be generated by the proposed activities, and an assessment of potential impacts and risks to EVs (Section 5).
- Management practices proposed to be implemented to prevent or minimise impacts (Section 5).
- Conclusions (Section 6).

[1] Application form: Environmental Protection Act 1994 – Application to amend and environmental authority. (Document reference ESR/2015/1733 – Version 21.00, 3 May 2023)

2 Site and Project Description

2.1 Site Ownership and Environmental Authority Holder

Ernest Henry Mine Pty Ltd (EHMPL); an Evolution Mining company operates EHO. Environmental Authority number EPML00899713 is held by EHMPL.

2.2 Site Location

EHO is a large, copper-gold mining operation located in the Nort West Mineral Province in north-west Queensland, approximately 38 kilometres (km) north-east of Cloncurry on the traditional lands of the Mitakoodi People. The location of EHO and the mining lease boundaries are shown in **Figure 2-1**.

The EHO mining leases have a total area of approximately 2,200 hectares (ha).

The site is accessed from the town of Cloncurry via Ernest Henry Road. Cloncurry is a rural township of approximately 3,000 residents on the Townsville/Mount Isa railway line and Barkly Highway.

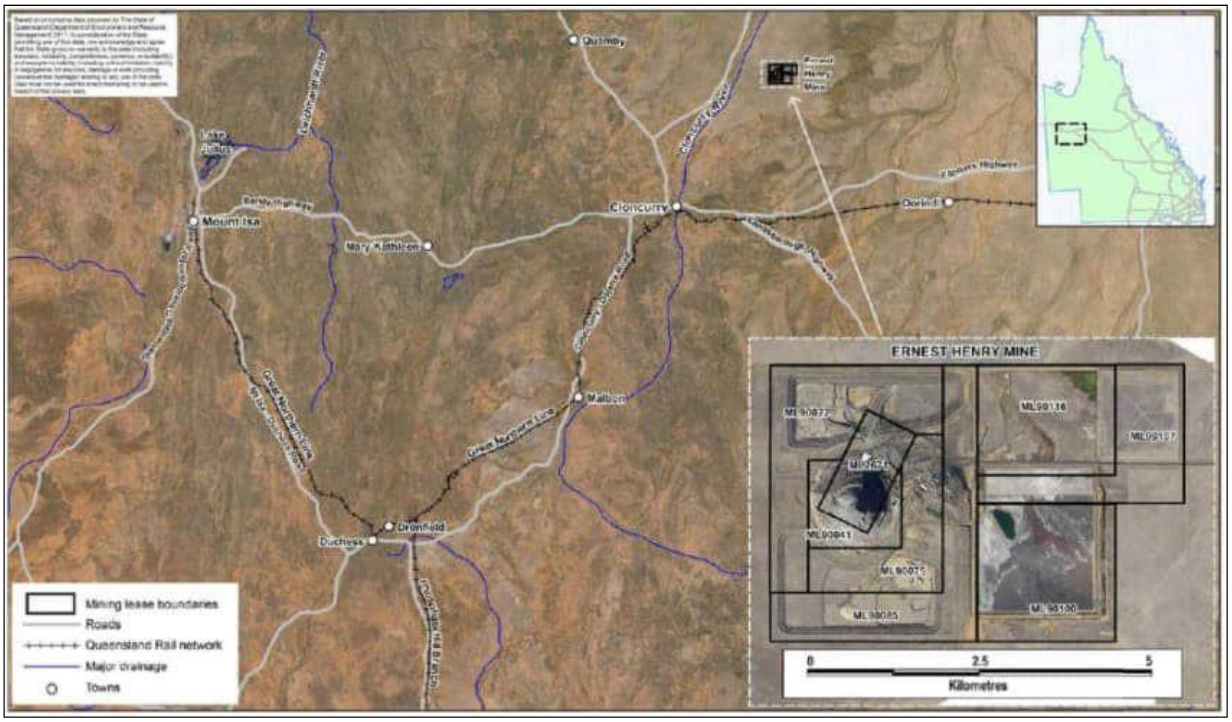


Figure 2-1 Location of EHO and Mining Leases

2.3 Site Identification, Real Property Description and Mining Tenure

The EHO is located on eight contiguous mining leases (ML 2671, ML 90041, ML 90072, ML 90075, ML 90085, ML 90100, ML 90107, ML 90116) totaling 2,201.77 ha. The name, date of grant, date of expiry and area of the mining leases is provided in **Table 2.1**.

All mining leases (except ML 90041, which expires 30 November 2037) expire in either 2025 or 2026. Applications for renewal will be undertaken pursuant to the *Mineral Resources Act 1989*.

The Project will be completed within the current approved mining leases.

Table 2-1 EHO Mining Lease names, date of grant and expiry, and area

Mining Lease	Name	Date of Grant	Date of Expiry	Area (ha)
ML 2671	Savage 33	28/11/1974	30/11/2025	129.5
ML 90041	Ernest Henry 1	1/12/1995	30/11/2037	92.77
ML 90072	Ernest Henry A	1/12/1995	30/11/2025	382.1
ML 90075	Ernest Henry B	1/12/1995	30/11/2025	221.4
ML 90085	Ernest Henry C	1/4/1996	31/3/2026	375.2
ML 90100	Ernest Henry D	1/6/1996	31/5/2026	400.3
ML 90107	Ernest Henry E	1/9/1996	30/8/2026	280.2
ML 90116	Ernest Henry F	1/10/1996	30/9/2026	320.3
Total				2201.77

A term lease (Lot 100 SP108163 Term Lease 203701) issued under the *Land Act 1994* underlies EHO. The Term Lease (for business (mining)) is for a period of 50 years, valid from 18 August 1995 to 17 August 2045.

The Term Lease was transferred to EHMPL in November 1996. The surrounding land tenure is the Fort Constantine Station Pastoral Lease (Lot 80 SP280693) in the Parish of Constantine, in the County of Beaconsfield.

2.4 Site Overview

2.4.1 Site General Arrangement

An aerial photographic image of the mine and surrounds is provided in **Figure 2.2**. The general arrangement of the EHO site is shown in **Figure 2.3**. The main components of the mine comprise:

- The open pit mine (no longer operational) and underground sub-level cave mining operations
- Processing plant (also known as the concentrator)
- Tailings Storage Facility (TSF)
- Tailings Evaporation Dam (TED)
- Tailings Evaporation Dam Extension (TEDx)
- Process Evaporation Dam (PED)
- Southern waste rock dump (SWRD)
- Northern waste rock dump (NWRD)
- The Ernest Henry Road, which forms the main access road to the mine

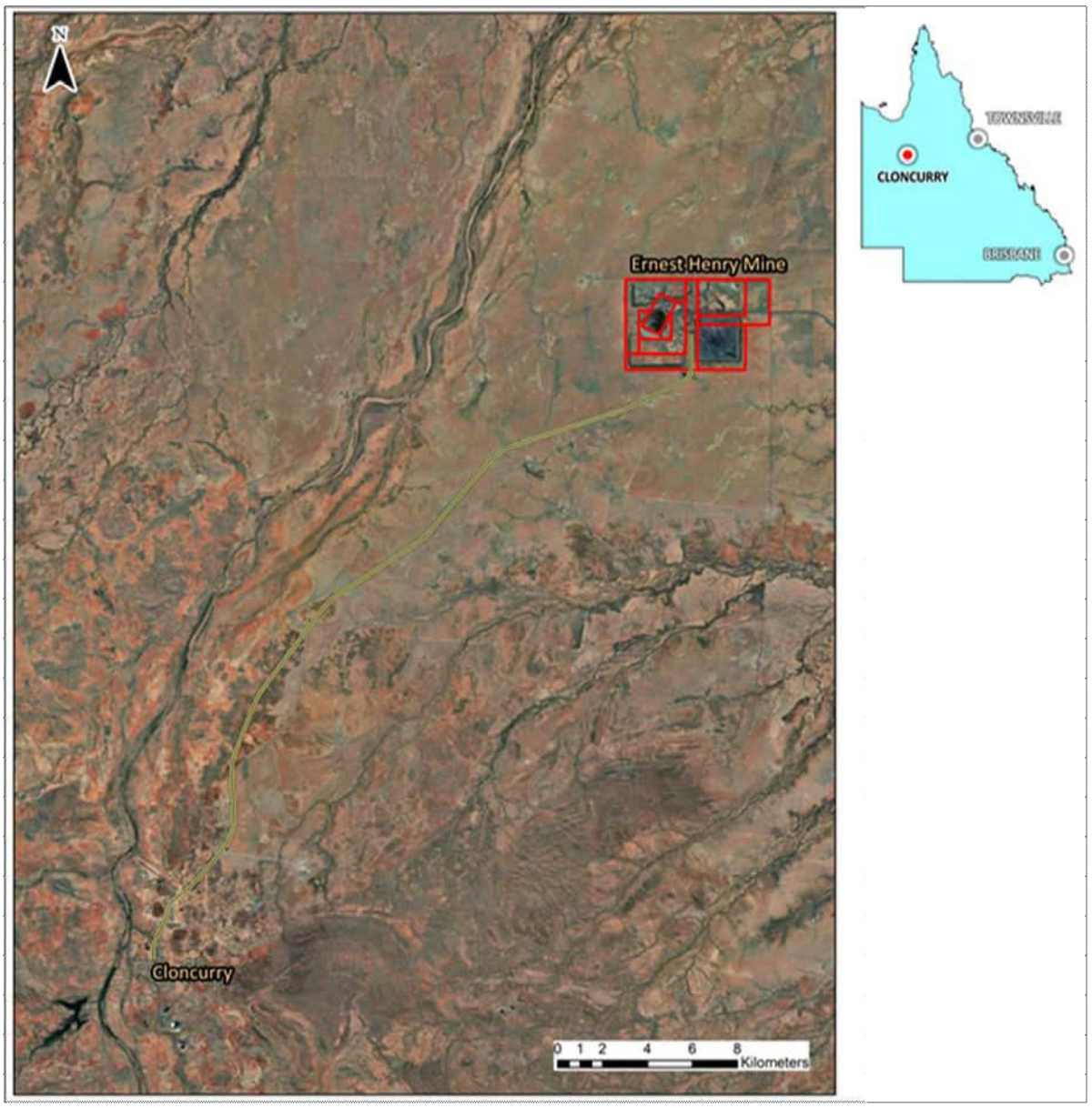


Figure 2-2 Aerial Image of the EHO with lease outlines

Figure 2-3 EHO current site layout

2.4.2 Geology

The Ernest Henry copper-gold deposit is located in the Cloncurry district within the Eastern Succession of the Mount Isa Inlier (refer to **Figure 2-4** for surficial geology). The orebody is hosted within the Mount Fort Constantine volcanics, a sequence of intensely altered felsic to intermediate metavolcanics (dacite, andesite and basalt) and metasedimentary rocks that are Paleoproterozoic (1,740 million years) in age.

The orebody has no natural surface outcrop and lies beneath approximately 50 m of Phanerozoic cover comprising of clays, gravels and sands. The Ernest Henry deposit is a breccia pipe plunging approximately 45 degrees to the south-southeast and is bounded between northeast trending ductile shear zones (**Figure 2-5**).

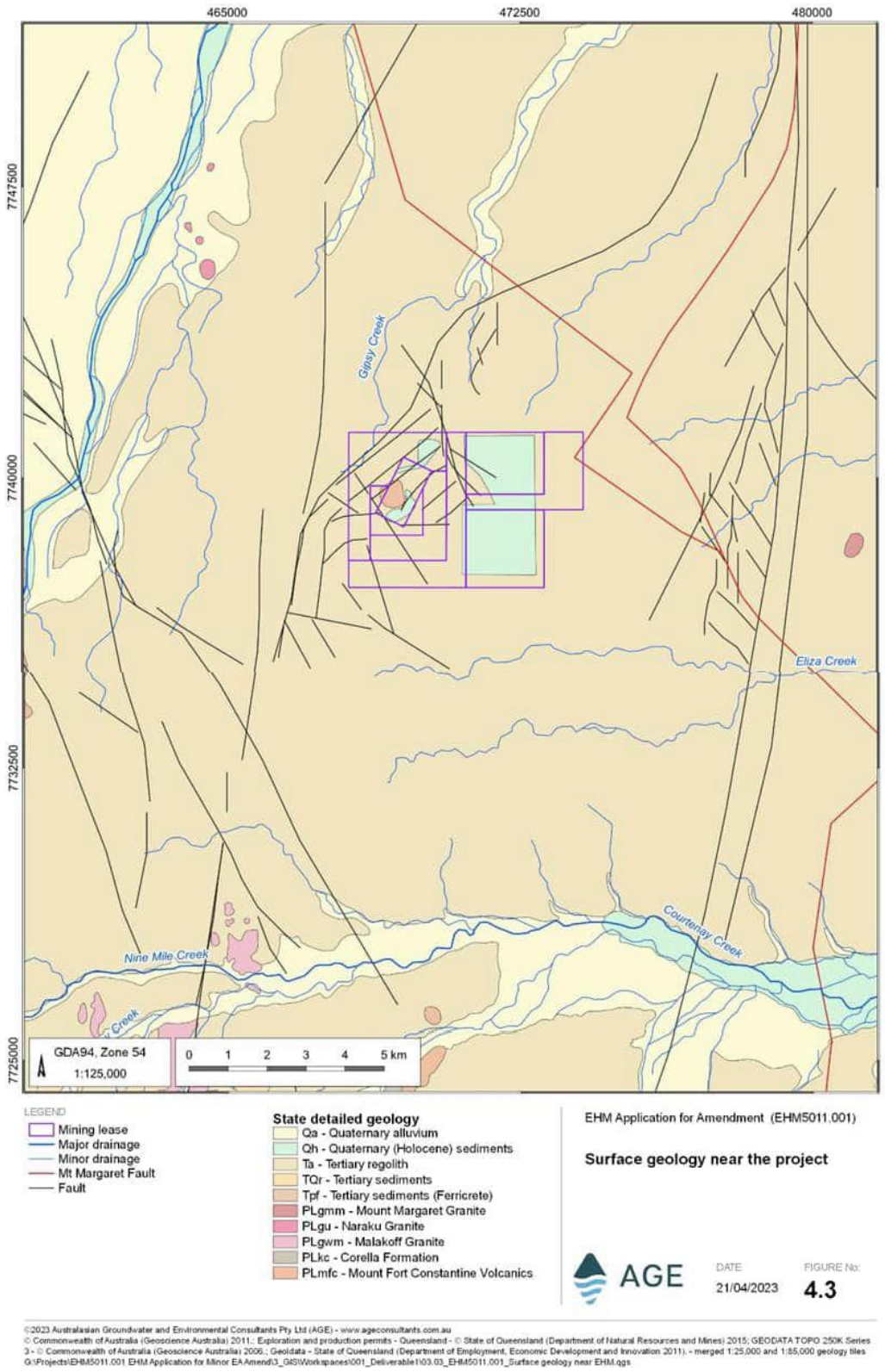


Figure 2-4 EHO Surface Geology Setting

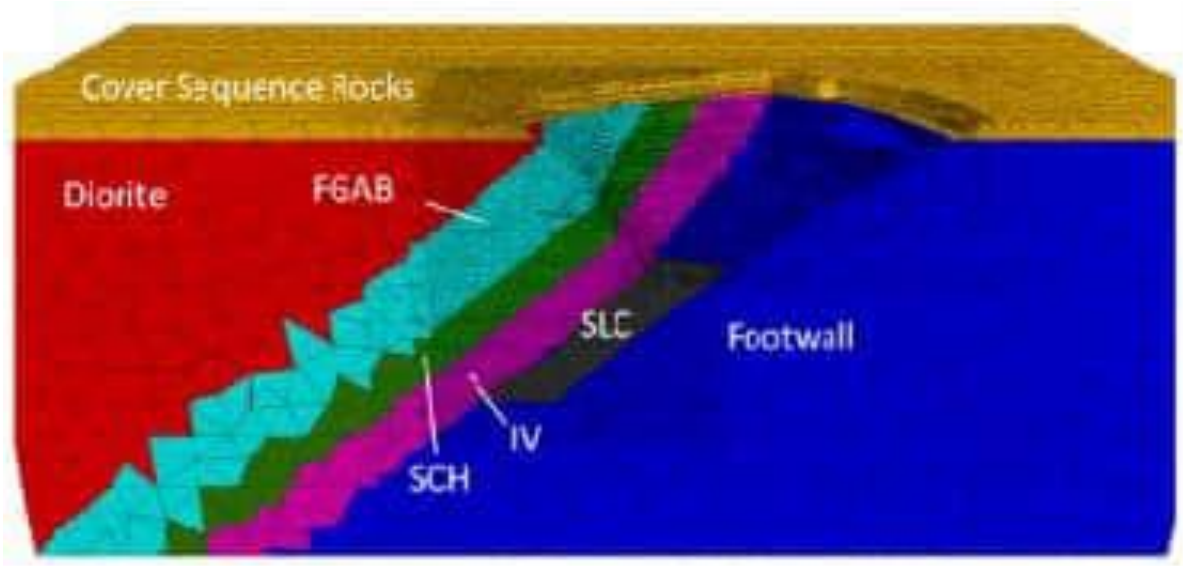


Figure 2-5 EHO conceptual cross section of geology and aquifer framework

2.4.3 Natural surface water drainage

The nearest major waterway is the Cloncurry River, located 7 km to the west of EHO. The Cloncurry River rises to the south in the Selwyn Ranges and ultimately flows to the Gulf of Carpentaria via the Flinders River (**Figure 2-6**). The mine lies within the upper catchments of:

- Gipsy Creek, an ephemeral tributary of the Cloncurry River, which joins the river 40 km to the north of EHO
- Eliza Creek, an ephemeral tributary of the Williams River, which has a confluence with the Cloncurry River approximately 90 km north of EHO

The locations of surface water features and groundwater users in the surrounding area are shown in **Figure 2-6 and Figure 2-7**.

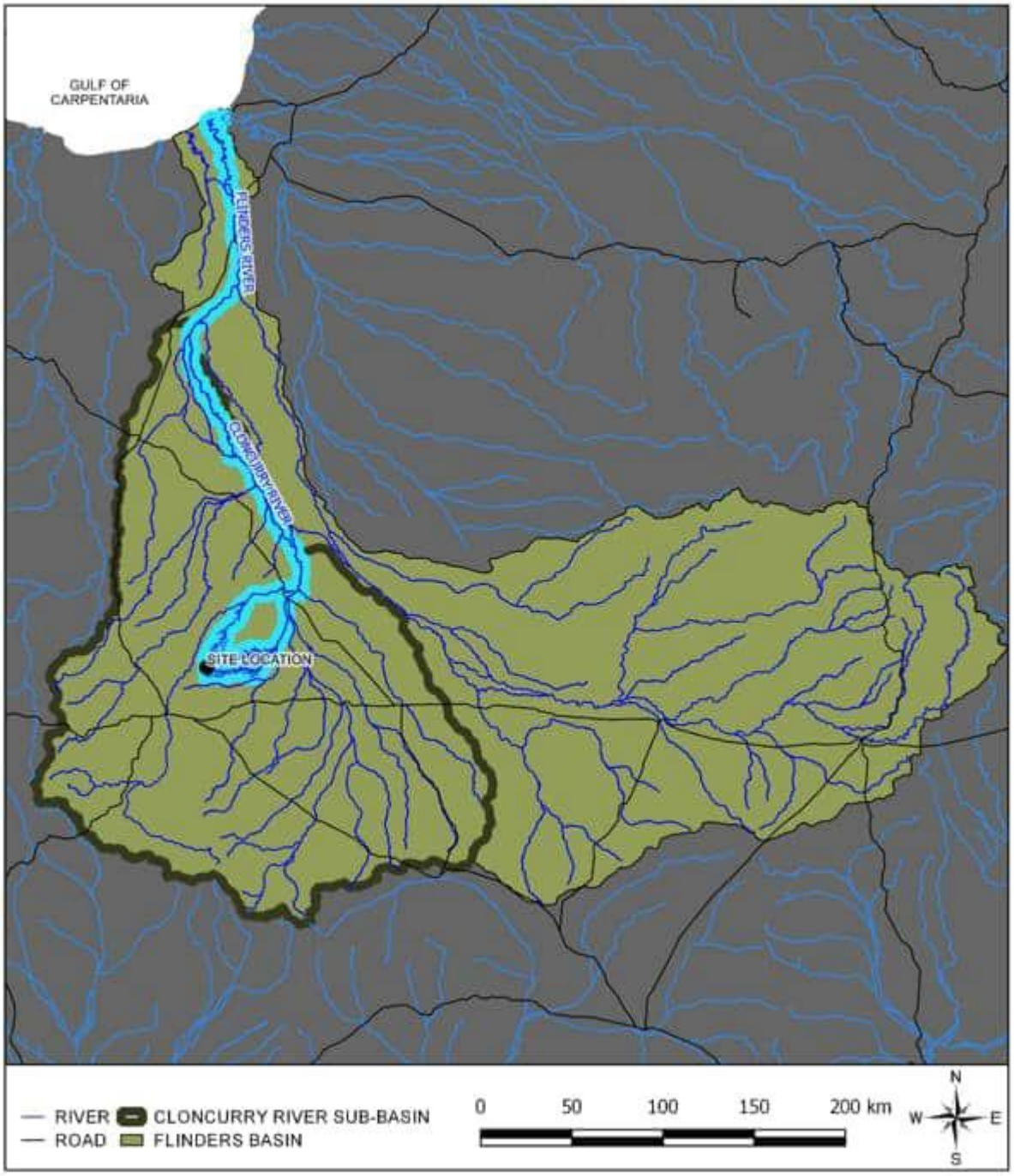


Figure 2-6 EHO Location and surface water catchment

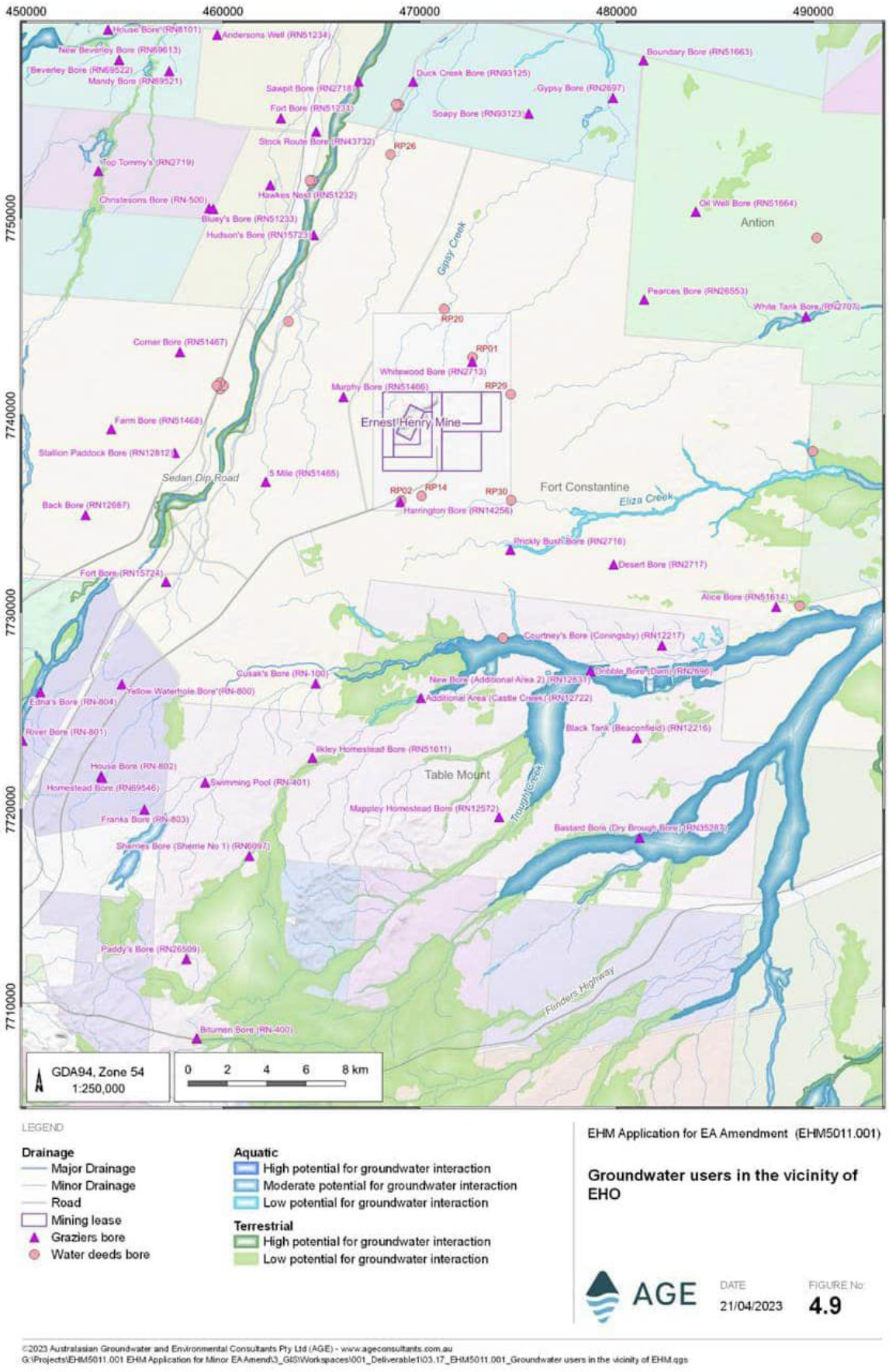


Figure 2-7 EHO Location and surface water features including groundwater users

2.5 Description of Existing Site Activities

2.5.1 Overview of existing Ernest Henry Operations

EHO is an operating underground mine, with ore extraction via sub-level caving mining methods. Open pit mining at EHO ceased in 2011, however, the underground works are accessed via a decline from the previously mined open pit.

Sub-levels (a series of interconnected tunnels) are developed at 25m vertical intervals within the ore body. The ore is drilled and blasted on these sub-levels with ore then transported and tippeddown an ore pass where it flows under gravity to the lower portion of the mine. The ore is then transferred to the crusher and subsequently hoisted to surface via a hoisting shaft and headframe. Once at surface, the ore is conveyed to a stockpile at the processing plant. Sub-level caving allows for the controlled caving of the ore. As the ore is extracted, it naturally caves and fills the voids, creating a gravity flow that enables efficient ore recovery. Processing is via a conventional grind/float/dewater processing plant to produce a copper-gold concentrate.

The processed copper-gold concentrate is transported by covered road train to Mt Isa for further processing (smelting). The smelted product is then transported by rail to Townsville for refining before dispatch through the Townsville Port.

Process plant tailings are deposited as a slurry in a paddock style TSF, which has been raised several times via upstream lifts.

Waste rock from historical open-pit mining was deposited in two dedicated waste rock emplacements located immediately to the north and south of the pit; the NWRD and the SWRD. As the mine is now underground there is no waste rock disposed of routinely in the WRD's but all waste rock continues to be managed on site in accordance with the Waste Rock Management Plan (EHO, 2022).

2.5.2 Mining

Mining of the underground orebody utilises sub-level caving mining methods. The sub-level caving mining method relies on the orebody 'caving' under both induced (via drill and blast) and naturally occurring fractures within the rock mass. The ore is then extracted from a series of levels as mining progresses.

The sub-level cave operation is designed to cave the rock mass above the active operating area. This, in turn, due to the characteristics of the overlying rock, results in some surface expression of subsidence from the caved material. The subsidence zone for the existing EHO sub-level cave mine, as modelled to the RL 1200 m level (Appendix A; Beck Engineering, 2023a), extends from the footprint of the existing open pit to the south and encroaches into the SWRD. Section 5.6.3 - Subsidence Assessment provides a summary of subsidence extents. Appendix B provides a subsidence modelling report for the proposed RL 1150 m level (Beck Engineering, 2023b).

Figure 2-8 provides schematics of sub-level caving operations.

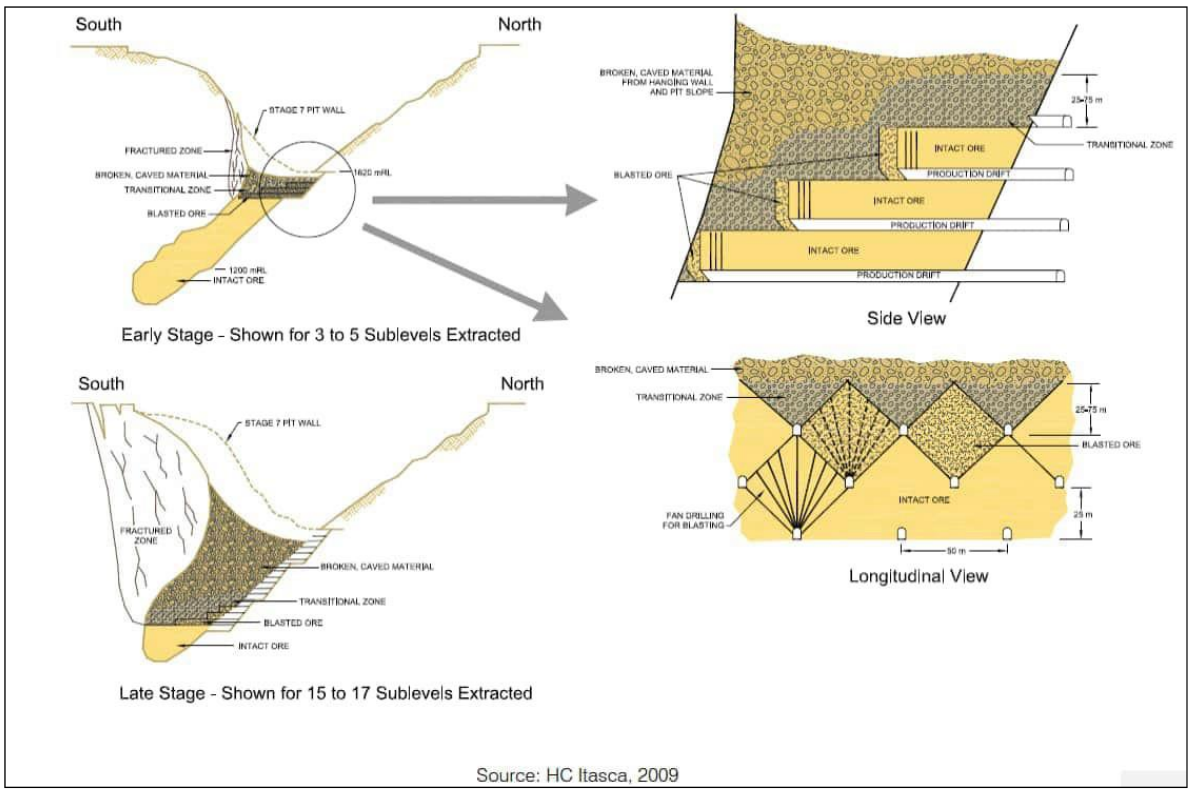


Figure 2-8 Schematic of sub-level cave operation at Ernest Henry Operation

In sub-level cave mining, there is minimal (if any) waste rock material produced and brought to surface, with the exception of some ore dilution from hanging wall waste rock, forming part of the processed ore.

Existing exhaust shaft(s) for ventilation are situated within the open-pit footprint and nearby surrounds.

Dewatering of the underground mine is via the existing mine dewatering bore network and underground sumps. Water make is pumped to surface and utilised in the concentrator for processing. The drawdown is monitored through a network of monitoring bores. Approximately 10-12 megalitres are extracted from the underground workings per day. The drawdown model was most recently reviewed in 2022 with the model accurately predicting the drawdown in a conservative manner.

Ore is brought to the surface via a dedicated hoist shaft and transported to the existing primary crusher via an overland conveyor.

Conceptual illustration of the existing sub-level caving operation is shown in **Figure 2-8** and the sub surface mineralization and infrastructure in **Figure 2-9**.

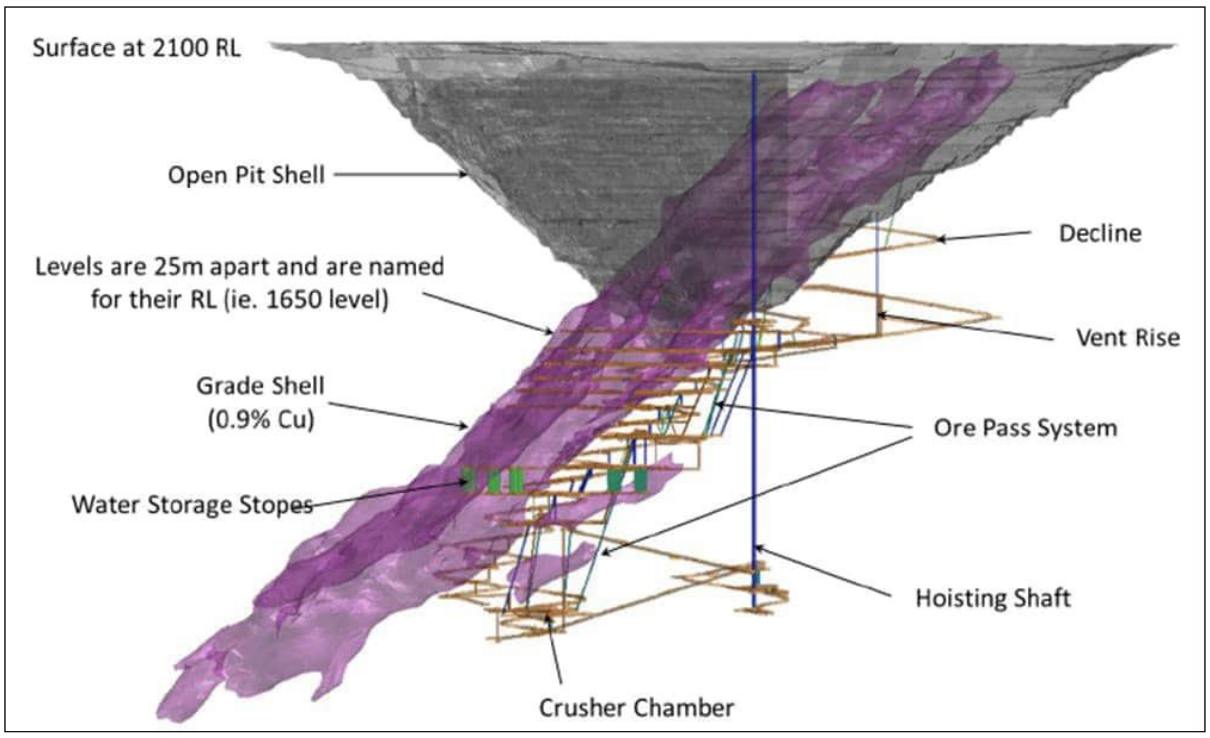


Figure 2-9 ***EHO ore body (grade shell), pit shell, and underground decline (looking west)***

Surface infrastructure for sub-level cave mining is shown in **Figure 2-10** and includes:

- Ore hoist shaft, which then transfers ore to the overland conveyor and the primary crusher.
- Ventilation shaft(s), which are also present at various locations within existing disturbance areas.
- Mill, concentrator (ore processing plant), administration, and other support facilities.

Figure 2-10 ***EHO Surface infrastructure required for underground mining operations***

2.5.3 Waste rock management

The ongoing underground mining operations associated with the Project will not generate waste rock for disposal on the existing waste rock dumps. The following section provides an overview of historical waste rock management at EHO during open cut mining operations.

2.5.3.1 Waste rock management plan

Waste rock management is carried out in accordance with the Waste Rock Management Plan (EHO, 2022). The following provides an extract of key management principles of managing potential acid forming material at EHO.

Early in the development of the EHO project, the former owner (Xstrata) commenced static geochemical testing that verified that some of the waste rock units (e.g. Black Shale) had the potential to produce acid drainage within short periods of time: these units were classified as acid forming (AF).

Other units were classified as being potentially acid forming (PAF) using static test methods but continued to produce neutral pH drainage with slightly to moderately elevated salts and metals for many years: i.e. PAF samples with long lag times to the onset of acid conditions. Non-acid forming (NAF), NAF-low sulphur waste and acid consuming waste units were also identified within the EHO waste rock analysis.

Reactive black shale found in the Mesozoic cover sequence is an AF unit at EHO that contains sulphide minerals and is highly reactive. When the rock is mined, and the sulphide minerals are exposed to the atmosphere, the sulphide minerals oxidise at the mineral boundary to produce acid. The acid is mobilised by water and the acids is significantly neutralised by acid consuming minerals along the flow path. Under these conditions the result is the production of neutral pH drainage that is elevated in salts (sulphate > calcium and magnesium > sodium, chloride and bi-carbonate ions). Even at circum-neutral pH, elements such as cadmium (Cd), manganese (Mn) and zinc (Zn) may remain in solution but these metals / metalloids do not feature significantly in waste rock dump drainage.

It was suggested that any seepage from the NWRD and SWRD would be dominated by circum-neutral to mildly alkaline pH seepage with slightly to moderately elevated concentrations of salts and metal(loids), which has proven to be the case.

2.5.3.2 Waste rock dump design approach

The SWRD and NWRD design utilised the following well-established best practice control strategies to reduce water and oxygen ingress to minimise oxidation, seepage generation and transport, and ultimately the release of contaminants:

- Waste characterisation and segregation with ongoing validation.
- Retention of low hydraulic conductivity clays beneath the footprint of the WRD.
- Placement of an internal clay bund inside the footprint of the dump to retard the lateral movement of seepage.
- Encapsulation of waste rock with proven net acid generation (AF shale) in low permeability clay cells.
- Placement of AF cells in the central section of the dumps (100 m from the external boundary of the WRD footprint) meaning they receive minimal infiltration from the batter slopes.
- Higher tier cells specifically designed based on modelling to minimise infiltration.
- Selective placement of remaining waste to avoid sulphate containing material being exposed on external batters.
- Placement of alkaline generating layers over PAF/AF materials to assist in neutralisation of any AMD generated.
- Under dump seepage collection channels installed (although URS 2005 suggested that the fall in the drains may not be adequate to efficiently direct seepage to the void, lateral seepage would still be intercepted by surface drainage at the toe of the dumps).
- Isolation of seepage and run-off from the receiving environment by the installation of seepage collection drains and storages at the toe of the WRD's and retention of storage capacity by pumping of retained seepage and stormwater to evaporation dam (PED).

- Construction of a stable landform with effective use of rock armouring to minimise batter erosion.
- Placement of a good quality growth layer to allow for effective revegetation and long-term erosion protection.

2.5.3.3 Waste rock dump cover construction

The proposed cover design of the NWRD and SWRD is a 3 m cap of low sulphate waste across the surface of the WRD (OKC, 2010). Topsoil is then spread over the upper surface of the WRD to a depth of 0.5 m. The WRD surfaces are to be shaped in such a way to promote surface run off of incident rainfall.

2.5.3.4 NWRD cover

The NAF low sulphate waste was moved from north of the western ramp to the top of the NWRD between the eastern and western ramps. Approximately 283,000 lcm (loose cubic metres) of material was moved and an excess of 9,000 lcm is modelled to remain. The NWRD was then capped with topsoil to a depth of 0.5 m. Approximately 347,000 lcm of topsoil is required according to the model. Approximately 28% of the NWRD has been rehabilitated to date.

2.5.3.5 SWRD cover

A large proportion of the SWRD has already received the cover system with 3m of competent low sulphate rock covered with 0.5 m of topsoil. The smaller portion of the SWRD surface will be rehabilitated over the next 2-3 years, in the same way as the rest of the WRD. Approximately 59% of the SWRD has received its cover to date.

Surface Water and Seepage Management

Surface water and seepage management is discussed in Section 5.4 and in Appendix D - Surface Water Assessment Report.

2.5.4 Ore Processing Plant

The Project involves the ongoing operation of the ore processing plant. The Project does not involve any changes to the annual throughput of the plant.

The ore processing plant uses conventional processing methods and equipment for production of a copper-gold concentrate (with trace amounts of silver).

Ore is delivered from the underground to the primary crusher and ore handling system. Ore is brought to the surface via a 1,000 m hoisting shaft where it is then delivered by conveyor to the crushed ore stockpile.

The process plant has capacity to process ore from surrounding mines under toll processing agreements (approved under the existing Environmental Authority A7-5). Third party ore is delivered to the Run of Mine ore stockpile and is then fed through the surface crusher and conveyed to the crushed ore stockpile.

Copper, gold (and trace silver) (in concentrate) are recovered from the ore using traditional grinding and flotation methods in the concentrator. The plant has a current processing rate of ~6.8Mtpa (8.5Mtpa capacity and scalable to ~11 Mtpa). The concentrator incorporates grinding (four mills), conventional flotation and dewatering. A single copper-gold concentrate is produced by a rougher and a three-stage cleaning circuit. The concentrate is processed at Glencore's Mount Isa smelter (~150km trucking distance) and metal is refined at Glencore's Townsville refinery.

Cyanide is no longer used at EHO.

Transport of concentrate from site is by covered road-trains.

Process plant tailings are pumped to the TSF for disposal (refer to Section 2.5.5).

A schematic simplified process flow diagram for the EHO process plant is shown in Figure 2-11.

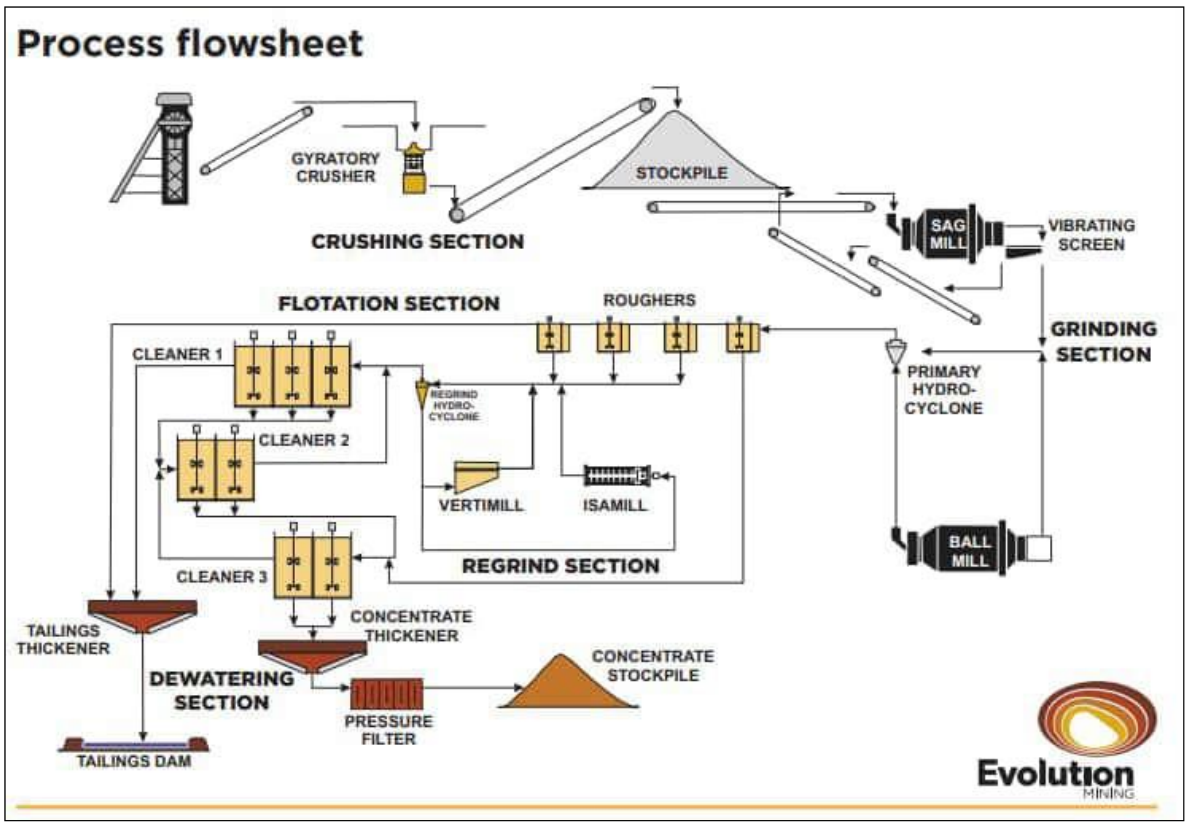


Figure 2-11 EHO simplified process flow diagram of the processing plant

2.5.5 Tailings characterisation

2.5.5.1 Overview

The Project involves ongoing mining and ore processing operations that will continue to generate tailings for storage in the TSF. An amendment to the total volumetric capacity limit listed in the Environmental Authority is required to authorise the ongoing deposition of tailings. The Project does not specifically require authorisation of a TSF lift, and the TSF will continue to operate as per the existing Environmental Authority and associated operational practice. No changes to the geochemistry of the tailings are anticipated.

The following description of EHO tailings characterisation was adapted from the TSF Operations, Maintenance and Surveillance Manual Plan (EHO, January 2023).

The general subsurface conditions revealed by historical boreholes (ATC Williams-2010, Coffey- 2017 and Coffey-2019) is that the tailings are typically comprised of sandy silt, or a sand/silt mixture. The relatively uniform nature of the tailings throughout the storage indicates tailings are not segregating.

The tailings are typically grey in colour. The particle sizes of the tailings ranged from silt sized particles to medium grained sands and some clay. Tailings bulk density is reported as 1.7 t/m^3 (2018 Surveys) with an average moisture content of 16 percent.

2.5.5.2 Tailings Geochemistry

The geochemistry of EHO lithological units, ores and wastes can be apportioned to three element groups that are hosted by discrete rock-forming minerals:

- Lithophile elements (i.e., Al, Ba, Be, Cr, Li, Mn, Rb, Sr, V) are contained within aluminosilicate, 29 sulphide and oxide minerals.
- Chalcophile elements (i.e., As, Cd, Co, Cu, Mo, Ni, Pb, Sb, Se, Zn) are hosted by 29 sulphide minerals.
- Uranium is accounted for by uraninite, brannerite and coffinite.

By comparing the various rock data sets with crustal abundance values, the following observations can be made:

- All lithological units as well as the tailings and waste rocks are invariably enriched in chalcophile elements (As, Co, Cu, Mo, Sb, Se) and U compared to crustal abundances. This enrichment is caused by major trace amounts of 29 sulphides and traces of uranium minerals.
- All lithological units as well as tailings possess lithophile element concentrations (Al, Ba, Be, Cr, Li, Mn, Rb, Sr, V) that are below or similar to crustal values.

Geochemical testing of the tailings material is undertaken on a regular basis to characterise the potential acid generating nature of the tailings. Analysis may include:

- Net Acid Production Potential (NAPP)
- Net Acid Generation (NAG)
- Acid Neutralising Capacity (ANC)
- Total Sulphur (S)
- Major cations including calcium (Ca), magnesium (Mg), potassium (K), sodium (Na)
- Metals including arsenic (As), copper (Cu) and molybdenum (Mo)

In 1999, EHO initiated a long-term kinetic leach column project to study the geochemistry of waste rocks. In 2000, two columns were added to the project to investigate the leaching behaviour of tailings. The two tailings samples contained elevated concentrations of copper, manganese, arsenic and molybdenum compared to the Australian contaminated land guidelines (NEPM). Kinetic leach column monitoring is undertaken regularly to monitor acid producing potential of tailings material.

2.5.5.3 Acid base accounting

The bulk of EHO tailings suggest that the tailings have an Uncertain-PAF (potential acid forming) classification. However, sufficient buffering capacity is available to prevent net acid generation in the short term as indicated by TSF water quality results and geochemical test work from site kinetic tests.

The EHO TSF has previously received tailings from the Mount Margaret Mine at E1 and Monakoff and, ore processed from Mt Colin and Rocklands [third party]. Both Mount Margaret Mine and Mt Colin tailings were classified as NAF (SRK 2013, SRK 2014, SRK 2014a). Based on geochemical assays and assessment of geochemical abundance indices, SRK (2013) concluded that the geochemical signatures of the Mount Margaret Mine and EHO tailings would be similar and test work indicated that concentrations of key solutes (Cu, Co, Mo and U) were likely to be lower in Mount Margaret Mine tailings (SRK 2014). Based on the proportion of Mt Colin and Rocklands tailings it was assessed that these would have similar geochemistry to EHO tailings, SRK (2014) and SRK (2014a) concluded that the co-disposal of Mt Colin and Rocklands tailings at EHO would not change the potential environmental hazards associated with the EHO TSF.

Available total sulphur analyses from metallurgical tests showed that Mount Margaret Mine tailings had lower sulphur content than the EHO tailings; therefore, the overall potential for acid generation would be lower.

Prior to processing of any new third-party ore a geochemical assessment of the ore must be undertaken and be provided to the administering authority as per the ENVIRONMENTAL AUTHORITYcondition A7-5.

The risks posed by the TSF can therefore be characterised based on existing and historic information. No change is proposed to the nature of tailings to be generated at EHO and as such there are no new hazards associated with the tailings arising from the project.

Monthly tailings composite assays are used to characterise the element composition of deposited tailings. This assists in determining geochemical risk as well as an elemental mass balance for the processing circuit.

2.5.5.4 Cyanide

In 2013 EHO amended its Environmental Authority to allow the introduction of cyanide into the concentrator facility to suppress iron sulphides and other impurity elements. Cyanide usage ceased in 2014, and residual cyanide has not been detected in any tailings discharge or surrounding groundwaters.

2.5.6 Tailings disposal

The Project involves ongoing mining and ore processing operations that will continue to generate tailings for storage in the TSF. An amendment in the total volumetric capacity limit of the Environmental Authority is required to authorise the ongoing deposition of tailings. The Project does not require authorisation of a further TSF lift, and the TSF will continue to operate as per the existing Environmental Authority. No changes to the geochemistry of the tailings are anticipated and the annual deposition of tailings to the TSF will not change if the project is approved.

The TSF is a constructed clay-lined dam that has been raised via upstream-lifts as designed and approved by a Registered Professional Engineer Queensland (RPEQ) and was always designed to be a free draining structure to minimize surface ponding and minimize the phreatic surface. Typically, thickened tailings are deposited in the north-western corner of the TSF at 65-75% solids (although other deposition locations are used).

Tailings supernatant migrates south-east towards decant structures on the eastern wall. The supernatant filters through decants and the embankments allow the drainage of supernatant via a non-woven geotextileseparator placed on the upstream faces of the TSF embankments.

Tailings supernatant is collected in the Eastern Collector Drain, where it flows north to the TED for containment where evaporation takes place. Additional storage and evaporation capacity is provided by the TEDx: an extension of the TED, located adjacent and immediately to the east of the TED. The layout and major features of the TSF and evaporation dams are shown in **Figure 2-12**.

Typically, the TSF is raised in a staged approach every two years in line with production requirements. The north cell is raised to provide capacity for disposal while the south cell raise is constructed. To meet current capacity requirements, another lift of both cells is planned and is within the Environmental Authority approved height of 48 m maximum depth at the spillway.

A number of initiatives are currently underway to enhance the operational effectiveness of drainage and seepage management of the TSF including:

- Quality Assurance testing to be undertaken on 34 vibrating wire piezometers already installed in the TSF which monitor the phreatic surface and pore pressures in the TSF in real time via the VDV telemetry system.
- Development of multiple spigot points for tailings discharge on the cell wall to provide better control on the location of the decant pond, to locate it in a more central point within the cell and optimize drain down efficiency.
- Modification of TSF drainage system to incorporate sub surface interception trenches and piped transfer of decant water. This will connect the existing seepage drainage system, promote the drain down of decant water in the TSF and is designed to lower the phreatic surface.

These initiatives will further improve the free drainage capacity of the TSF and as well as improving wall stability and also ensure that seepage is collected and managed appropriately in line with the philosophy of continuous improvement.

Moving forwards EHO focus is on maximizing the collection of drain down from the TSF and further initiatives in addition to those listed above may be rolled out in the future, all of which will limit the potential for drain down water to enter groundwater.

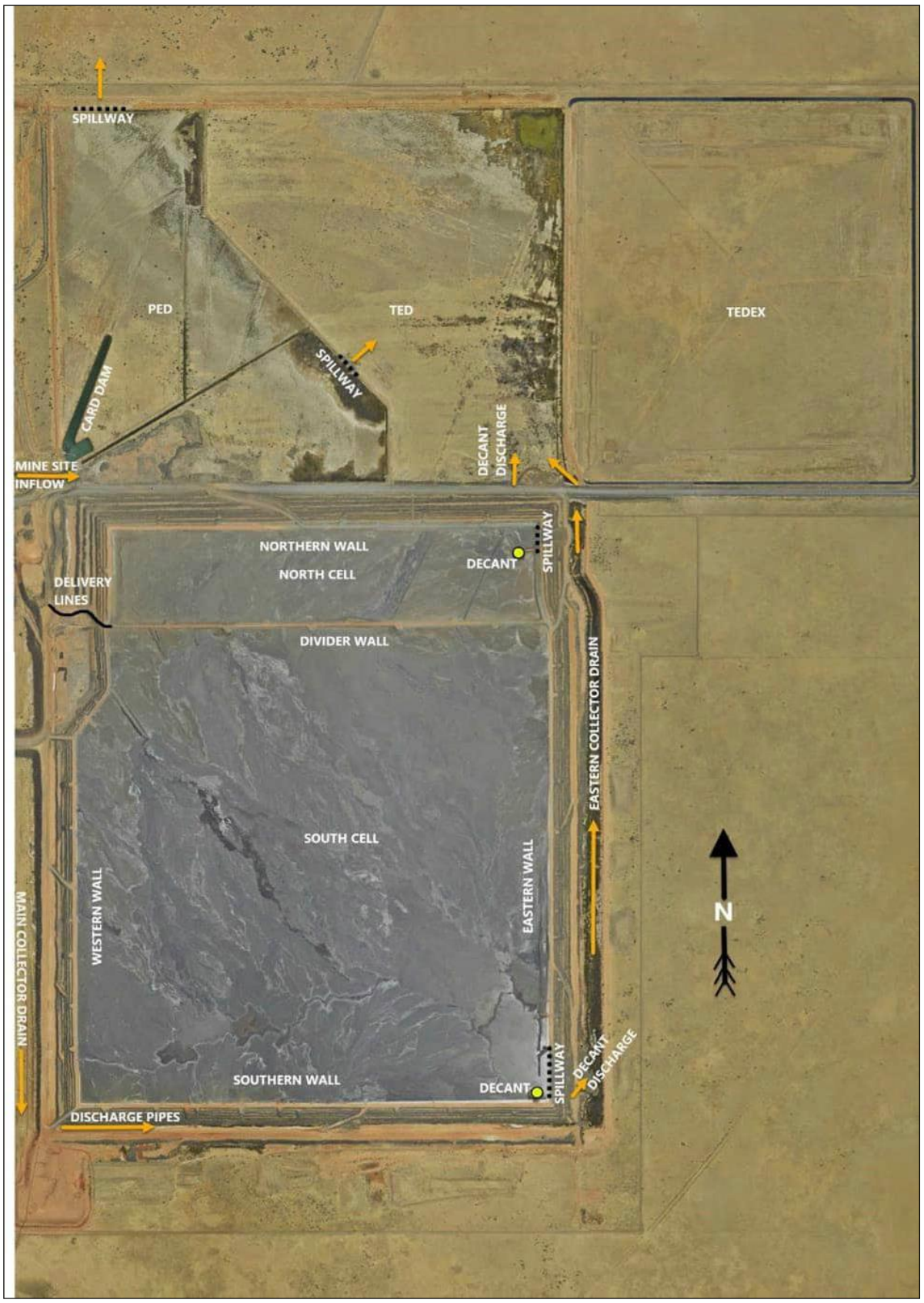


Figure 2-12 Location of main components of the EHO TSF

2.5.7 Mine water management system

In summary, the Project does not propose any changes to the mine water management system.

Mine water is managed via a suite of established water management infrastructure. A schematic of the mine water management is shown in **Figure 2-13**. A detailed description of the mine water management system is provided in Appendix D – Surface Water Assessment Report (ATC Williams, 2023) and is summarised below.

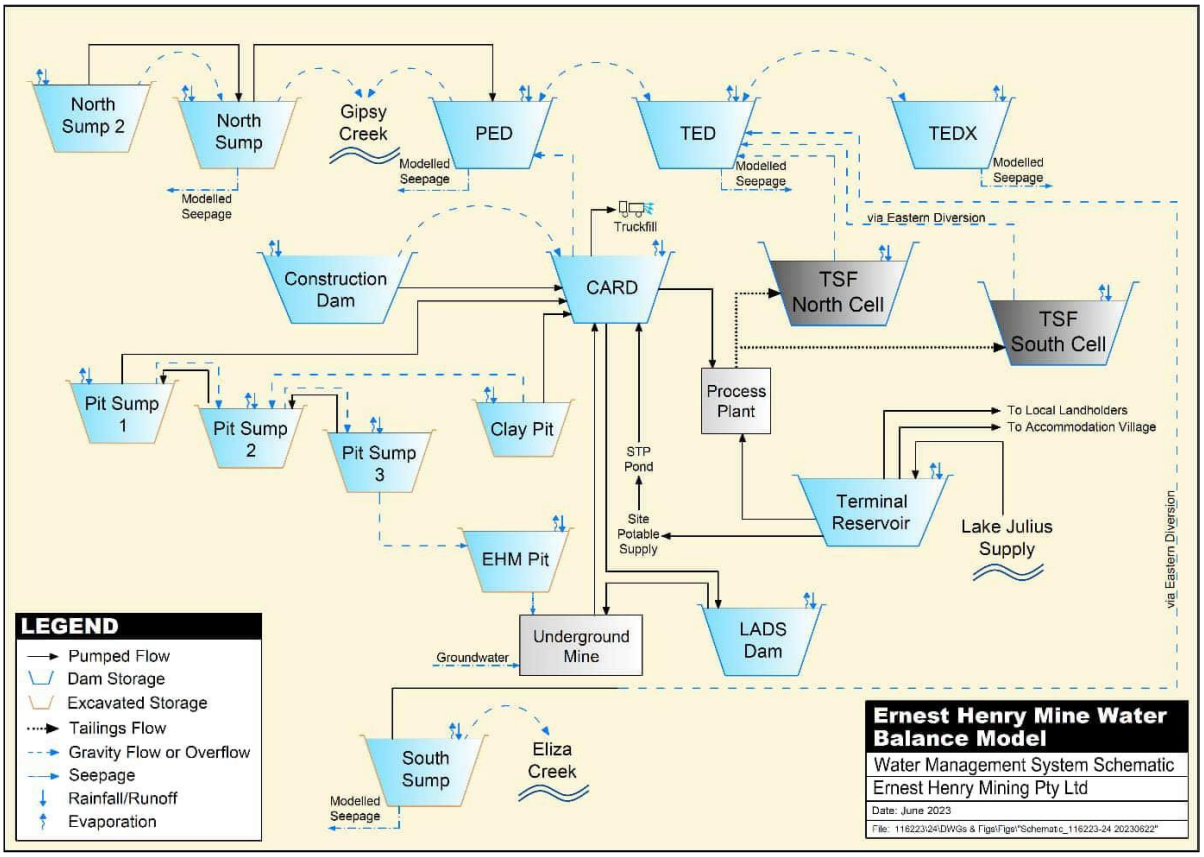


Figure 2-13 Schematic of the water management infrastructure at EHO

The locations of the various components of the water management system at surface are shown in **Figure 2-14**. Surface water catchments (including land use type for determination of infiltration rates) across the operation are also shown in **Figure 2-14**.

Raw water is sourced from groundwater infiltration and rainwater captured across the site. When groundwater and surface water make is not sufficient for water demand within the overall site water balance, raw water is supplemented via supply from Lake Julius.

Rainwater is captured in a number of catchments (**Figure 2-14**) and is ultimately stored in on-site storage dams for reuse, evaporation or infiltration, or controlled discharge to the receiving environment under the conditions of the Environmental Authority.

The process plant uses water sourced from rainfall or underground workings, with supplementary supply from Lake Julius. Water is also recovered from the tailings stream and re-used in the process plant, noting that a controlled percentage of water is required to allow pumping and deposition of tailings across the TSF. Thickened tailings solids content is approximately 68% solids, and approximately 32% water.

Drainage from the TSF drains to the TED which would then if required, overflow to the TEDx if the design capacity of the TED was ever exceeded.

The PED contains site water run-off and excess groundwater pumped from the open pit/underground sumps.

Groundwater is pumped from sumps in underground workings via a series of pumps and pipes to surface and stored in on-site storage dams for reuse. The current underground mine water management process is described below:

1. Drain water, cave water and aquifer water from the underground mine is removed via a series of storage sumps, pumps and pipelines.
2. Groundwater make from underground workings is pumped into the CARD. The CARD stores site water for beneficial reuse by EHO, such as:

- Used for dust suppression, where the water is sprayed on surfaces such as haul roads and then lost to evaporation.
- Used in the process plant for processing ore.
- Stored in the LADS Dam, where it can then be used in underground mine operations.

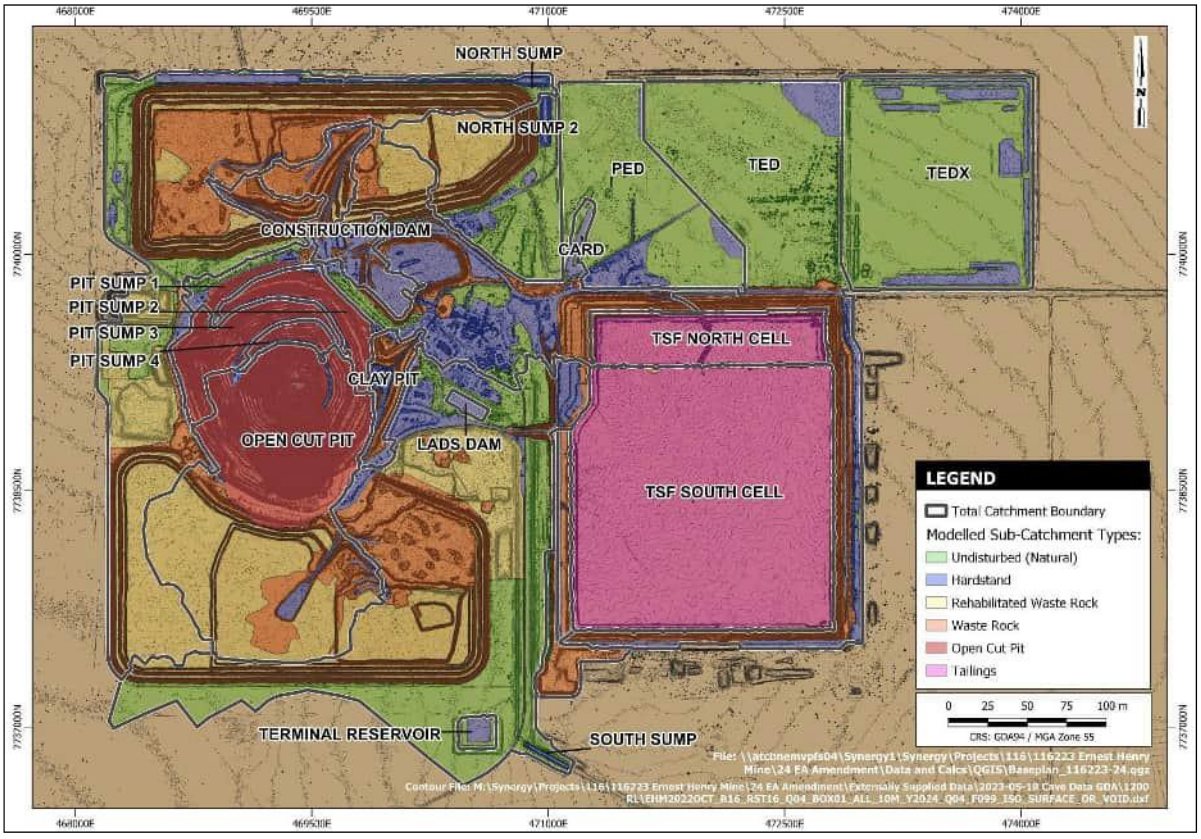


Figure 2-14 Map of land use and surface water catchments at EHO (at year 2024 with mining to RL 1200 m).

2.5.8 Environmentally Relevant Activities

The Environmental Authority authorises the following environmentally relevant activities on the mining leases that underlie the Ernest Henry Operation:

- Environmental Protection Regulations 2019 - Schedule 3, 14: Mining iron ore.
- Environmental Protection Regulations 2019 - Schedule 3, 17: Mining copper ore.
- Environmental Protection Regulations 2019 - Schedule 3, 16: Mining gold ore.

- Environmental Protection Regulations 2019 – Schedule 2, 07 – Chemical Manufacturing 3: Manufacturing, in a year, a total of 200t or more of any of the following (d) explosives.
- Environmental Protection Regulations 2019 – Schedule 2, 07 – Chemical Manufacturing 6: Manufacturing, in a year, the following quantities of inorganic chemicals, other than inorganic chemicals to which items 1 to 4 apply (d) more than 100,000t.
- Environmental Protection Regulations 2019 – Schedule 2, 08 – Chemical Storage 2: Storing 50t or more of chemicals of dangerous goods class 6, division 6.1 under subsection (1)(b).
- Environmental Protection Regulations 2019 – Schedule 2, 08 – Chemical Storage 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c).
- Environmental Protection Regulations 2019 – Schedule 2, 31 – Mineral processing 2: Processing, in a year, the following quantities of mineral products, other than coke (b) more than 100,000t.
- Environmental Protection Regulations 2019 – Schedule 2, 33 – Crushing, milling, grinding or screening more than 5,000t of material in a year.
- Environmental Protection Regulations 2019 – Schedule 2, 60 – Waste disposal 1: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a) (d) - more than 200,000t.
- Environmental Protection Regulations 2019 – Schedule 2, 60 – Waste disposal 2: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(b) (b) - 2,000t to 5,000t.
- Environmental Protection Regulations 2019 – Schedule 2, 62 – Resource recovery and transfer facility operation 1: Operating a facility for receiving and sorting, dismantling, baling or temporarily storing- (c) category 2 regulated waste.
- Environmental Protection Regulations 2019 – Schedule 2, 62 – Resource recovery and transfer facility operation 1: Operating a facility for receiving and sorting, dismantling, baling or temporarily storing- (d) category 1 regulated waste.
- Environmental Protection Regulations 2019 – Schedule 2, 63 – Sewage Treatment 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of (b)(ii) - more than 100 but not more than 1500EP otherwise.

No additional Environmentally Relevant Activities are required for the Project.

2.5.9 Notifiable Activities

Notifiable activities are defined in Schedule 3 of the *Environmental Protection Act 1994*. The following notifiable activities are/have been relevant for EHO:

- *Environmental Protection Act 1994,* Schedule 3, 6 Chemical Manufacture or Formulation.
- *Environmental Protection Act 1994,* Schedule 3, 7 Chemical Storage (other than petroleum products or oil under item 29).
- *Environmental Protection Act 1994,* Schedule 3, 15 Explosives Production or Storage.
- *Environmental Protection Act 1994,* Schedule 3, 20 Landfill (disposing of waste).
- *Environmental Protection Act 1994,* Schedule 3, 24 (a) & (b) Mine Wastes.
- *Environmental Protection Act 1994,* Schedule 3, 25 Mineral Processing.
- *Environmental Protection Act 1994,* Schedule 3, 29 (b) Petroleum or Oil Storage.

No additional notifiable activities associated with the Project are anticipated.

2.6 Description of Proposed Activities

The Project will allow for continuation of mining activities. The main components and activities of the Project include:

- Continuation of production from RL 1200 m to RL 1150 m via the existing exploration and development decline and development of additional access declines and drifts as required.
- Ongoing production at the existing rates of approximately 6.6 to 6.8 Mtpa (concentrate).
- Ongoing mining within the existing granted mining leases.
- Ongoing mining operations using the existing mining fleet, workforce, and mining and processing infrastructure with a small increase in ore haulage rates to the existing crusher and hoist. Existing mining methods will continue.
- Production of approximately 10.0 Mt of tailings (dry mass) for deposition in the existing TSF. The next TSF lift is within the existing conditions of the Environmental Authority, with the exception of the overall TSF volumetric capacity, which is the subject of this application for amendment.
- Minimal, if any, additional waste rock will be produced. It is anticipated that any waste rock generated will be used to backfill underground workings, or if brought to surface, used in TSF lifts.

2.7 Consideration of Alternatives

The Project will allow the EHO to continue to mine the Ernest Henry copper-gold deposit. EHO seeks to mine the mineral ore that can be economically extracted, processed, and marketed to provide an economic return to investors and the State of Queensland by way of taxes and royalties. This objective is consistent with the objects of the *Mineral Resources Act 1989* and mining leases granted for the operation.

The planning process for the ongoing mining operation has been derived through further definition of the orebody, geological resource modelling, and mine modelling, to determine the extent of economically mineable ore that can be safely extracted. The main ore body can be mined using the existing mining methods, mining fleet, mining workforce and process plant. The existing technologies and equipment are specifically designed for and well suited to the ongoing mining, extraction and processing of the ore.

The existing TSF will have capacity following the next proposed lift to accommodate ongoing production associated with development to RL 1150m. The Project is predominantly focused on ongoing operations, with a corresponding increase in the TSF volumetric capacity limit, as stated in the Environmental Authority.

The SWRD will continue to subside into the existing open cut void as underground mining continues to the south, along the orebody. EHO has considered options for management of the SWRD. These included: partial and full relocation of the waste rock dump; and allowing it to subside and naturally backfill the pit void. In summary, the anticipated costs and environmental impacts associated with partial or full relocation (new land disturbance likely required for a new waste rock dump location; greenhouse gas emissions from avoidable haulage etc.) informed the decision that natural subsidence and backfill of the open pit void is the most viable option.

3 Proposed Environmental Authority Condition Amendments

3.1 Basis of Current Environmental Authority

3.1.1 Summary of Environmental Authority amendments

The parameters of the mining operation are as described in the original EIS and amended via a series of subsequent Environmental Management Plans and Environmental Authority Amendment Applications.

A summary chronology of Amendments to the EHO Environmental Authority includes:

- Ernest Henry Project, Impact Assessment Study, January 1995
- Amendment via updated Environmental Management Plan (EHM - Xstrata, 2009)
- Amendment via updated Environmental Management Plan (EHM - Xstrata, February 2012)
- Amendment via NRA letter seeking amendment to Environmental Authority Dated 4 July 2014)
- Amendment via Environmental Authority Amendment Application for the Processing of Third-Party Ore (September2015)
- Amendment via Environmental Authority Amendment Application – Groundwater (EHM September 2015)
- Letter to EHP seeking amendment of Groundwater Control Limits - Environmental Authority Condition Table C11(Dated 24 February 2017)
- Letter to EHP seeking amendment of Groundwater Control Limits - Environmental Authority Condition Table C11(Dated 21 June 2017)
- Amendment via Environmental Authority Amendment Application – Groundwater Bores (EHM July 2018)
- Authorisation via request for Environmental Authority Authorisation – High sulphur waste in TSF wall (Condition C4-5)(EHM 25 June 2021)

In particular, the Environmental Management Plan (EHM - Xstrata, February 2012), sets out the continuation of mining to RL 1200 m and Environmental Authority Amendment Application for the Processing of Third- Party Ore (September 2015).

3.1.2 Authorisation for underground mining to RL 1200 m

The relevant sections of the 2012 Environmental Management Plan are set out below.

Environmental Management Plan (EHM - Xstrata, February 2012 (as amended))

Section 2.3: Reserves and Mine Life

***'The second stage (full SLC operation) would mine …via SLC methods to the 1200 m RL**, with additional surface infrastructure (including a hoisting shaft and surface conveyor for ore haulage) located wholly within existing surface disturbance areas.*

…

2.4.4 Full Sub-Level Cave Operation

…

Works are currently scheduled to the 1200 m RL, however the orebody is open at depth and may continue below this level in the future. The geotechnical, subsidence and environmental studies associated with this EM Plan are for the full SLC operation to the 1200 m RL.'

3.2 Proposed Changes to the Authorised Activities for the Project

The Project requires the following changes to the existing Authorised Activities:

- Increase in the tailings volume limit from 130,000,000 m^3 to 136,000,000 m^3.

- Undertaking mining from RL 1200 m to RL 1150 m.

All other aspects of the Project, including duration and timing, mining operations, processing and tailings deposition are considered to be consistent with the existing Authorised Activities of the existing Environmental Authority.

3.3 Proposed Changes to Environmental Authority Conditions

Table 3-1 outlines the existing conditions and the proposed amendments to the EHO Environmental Authority Schedule H, Table H2. Bold text represents the additions, strikethrough text represents the proposed deletions.

Table 3-1 Existing Schedule H, Table H2 conditions and proposed amendments

Existing **Environmental Authority Table H2 Basic Details of Regulated Dam**

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Name of Regulated Dam	Surface area of dam at spillway (ha)	Max. volume of dam at spillway (m3)	Max. Depth of dam at spillway (m)	Spillway Level (mAHD)	Use of Dam
Tailings dam including Evaporation dam	740	130,000,000	48	TBD	The permanent containment of tailings and potentially contaminated water from the production of copper/gold concentrate at the Ernest Henry Mine

Proposed **amendment to Environmental Authority Table H2 Basic Details of Regulated Dam**

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Name of Regulated Dam	Surface area of dam at spillway (ha)	Max. volume of dam at spillway (m3)	Max. Depth of dam at spillway (m)	Spillway Level (mAHD)	Use of Dam
Tailings dam including Evaporation dam	740	~~130,000,000~~ **136,000,000**	48	TBD	The permanent containment of tailings and potentially contaminated water from the production of copper/gold concentrate at the Ernest Henry Mine

4 Environmental Authority Amendment – Application Requirements

4.1 Environmental Authority Amendment – Overview

The Act provides the key legislative framework for environmental management and protection in Queensland. The objective of the Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in thefuture, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). To meet its objective, the Act sets out a program for the identification and protection of environmental values (EVs) and creates a range of regulatory tools for managing the activities of individuals or companies.

The holder of an Environmental Authority may, at any time pursuant to Section 224 of the Act, make an application to the administering authority seeking an amendment to the Environmental Authority.

Chapter 5 of the Act specifies the process and information requirements for an application to amend an Environmental Authority. It also defines the administering authority's considerations in the assessment of the application to amend an Environmental Authority, including the conditions which may be included in the Environmental Authority by the administering authority.

4.2 Section 226 (Requirements for amendment applications generally) Provisions and Requirements

Section 226 of the Act specifies the requirements for making a valid application to amend an Environmental Authority. These application requirements have been addressed and set out in **Table 4-1**.

Table 4-1 Response to Environmental Protection Act 1994 Section 226 – Requirements for Amendment Application Generally

Requirement	How requirement has been addressed
1(a) Be made to the administering authority	This application has been submitted to the Department of Environment and Science as the administering authority of the *Environmental Protection Act 1994*.
1(b) Be made in the approved form	Application form (ESR/2015/1733; Version 20.00: Last reviewed: 03 MAY 2023) has been completed and attached to this application and the application has been submitted via the DES online application portal.
1(c) Be accompanied by the fee prescribed under a regulation	The amendment application fee was paid upon lodgement via DES' onlineapplication portal.
1(d) Describe the proposed amendment	The proposed amendment is described in detail in this document.
1(e) Describe the land that will be affected by the proposed amendment	The land that will be affected by the proposed amendment is described in Section 2.3 of this document.
1(f) Include any other document relating to the application prescribed by a regulation.	No additional prescribed documents under a regulation are required to be included for this application. All documents required to be provided with the application have been included.
2 However, subsection (1)(d) and (e) does not apply to an application for a condition conversion.	The application is not for a condition conversion.

4.3 Section 226AA (Requirement for amendment application by holder of environmental authority and PRCP schedule) Provision and Requirements

EHO does not hold a Progressive Rehabilitation and Closure Plan (PRCP) schedule and hence this section does not apply.

4.4 Section 226A Requirements for amendment applications for environmental authorities - Provision and Requirements

Section 226A of the *Act* sets out requirements for amendment applications for an Environmental Authority. These application requirements have been considered by EHO and a description of how these matters have been addressed has been set out in **Table 4-2** for consideration by DES.

Table 4-2 Response to Environmental Protection Act 1994 Section 226A Requirements for amendment applications for environmental authorities

Requirement	How requirement has been addressed
Describe any development permits in effect under the *Planning Act 2016* (Planning Act) for carrying out the relevant activity for the authority.	The activity is a mining activity conducted on mining Leases and therefore no development permits are in effect for carrying out therelevant activity under this environmental authority.
State whether each relevant activity will, if the amendment is made, comply with any eligibility criteria for the activity.	The application is for a proposed amendment to a site-specific Environmental Authority and therefore is not required to comply with the eligibility criteria.
If the application states that each relevant activity will, if the amendment is made, comply with any eligibility criteria for the activity – include a declaration that the statement is correct.	As above.
State whether the application seeks to change a condition identified in the authority as a standard condition.	The current Environmental Authority is site-specific and not subject to standard conditions.
If the application relates to a new relevant resource tenure for the authority that is an exploration permit or GHG permit—state whether the applicant seeks an amended environmental authority that is subject to the standard conditions for the relevant activity or authority, to the extent it relates to the permit; and	The application is not for an exploration permit or GHG permit.
Include an assessment of the likely impact of the proposed amendment on the EVs including: a) a description of the EVs likely to be affected by the proposed amendment b) details of any emissions or releases likely to be generated by the proposed amendment c) a description of the risk and likely magnitude of impacts on the EVs d) details of the management practices proposed to be implemented to prevent or minimise adverse impacts	Section 5 presents an assessment of the likely impact of the project on EVs. a) A description of the existing EVs is provided in Section 5 of this document. b) There are no new emissions or releases anticipated if this Project is approved. c) The Project is a continuation of existing operations from RL 1200 to RL 1150. The risks and likely magnitude of impacts to EVs are not anticipated to change. d) Existing management practices will continue to be implemented at EHO to prevent and minimise the potential for adverse impacts.

Requirement	How requirement has been addressed
e) if a PRCP schedule does not apply for each relevant activity—details of how the land the subject of the application will be rehabilitated after each relevant activity ends.	e) EHO does not hold a Progressive Rehabilitation and Closure Plan (PRCP) schedule and hence this section does not apply. The Environmental Authority rehabilitation goals will remain unchanged and will remain achievable as per current operations. The rehabilitation objectives will also remain unchanged and continue to apply. There will be changes to the areas of different disturbance types (a reduction in waste rock dump area, and a corresponding increase in residual void area). Refer to Section 5.6.7 of this document for further details.
Include a description of the proposed measures for minimising and managing waste generated by any amendments to the relevant activity.	EHO has existing waste management arrangements in place to ensure management of non-mining wastes in accordance with the requirements of the Environmental Authority. Waste volumes and waste management practices will not change as a result of this Project.
— Includes details of any site management plan or environmental protection order that relates to the land the subject of the application.	The land is not subject to a site management plan and no environmental protection orders are in place at the time of the application being submitted.
— Include any other document relating to the application prescribed under a regulation.	No additional prescribed documents under a regulation are required to be included for this application. All documents required to be provided with the application have been included.

4.5 Section 227AA Requirements for Amendment Applications - Underground Water Rights - Provisions and Requirements

Section 227AA of the *Act* sets out requirements for amendment applications for an EA. These application requirements have been considered by EHO and a description of how these matters have been addressed has been set out in **Table 4-3** for consideration by DES.

Table 4-3 Responses to Environmental Protection Act 1994 Section 227AA Requirements foramendment applications – underground water rights

Requirement	How requirement has been addressed
This section applies for an amendment application if— (a) the application relates to a site-specific environmental authority for— (i) a resource project that includes a resource tenure that is a mineral development licence, mining lease or petroleum lease; or (ii) a resource activity for which the relevant tenure is a mineral development licence, mining lease or petroleum lease; and (b) the proposed amendment involves changes to the exercise of underground water rights.	The amendment application is for a site specific environmental authority for a resource activity on a mining lease. The resource activity will continue to exercise underground water rights through the extraction of water on the granted Mining Leases from underground workings for safe access. A groundwater assessment was undertaken to determineif there would be a change to the current exercising of underground water rights (Appendix C). The assessment indicates that minor additional inflow to theunderground workings would occur from the mining to RL 1150 due to the dewatering of deeper rocks and that the extraction of this water from the underground workings will cause negligible additional drawdown (less than five centimeters) in bores that already sit in the cone of depression by existing mining operations. These effects were previously modelled, predicted to occur, approved, and are currently monitored and managed under existing operational arrangements. Existing make good arrangements established under the existing water licence are in place and will continue to have effect.
(2) The application must also state the matters mentioned in section 126A(2).	Section 5.4 and the detailed technical report provided in Appendix C state the matters mentioned in section 126A(2).

4.6 Assessment Level Decision Criteria

Following the submission of an application to amend an Environmental Authority, DES as the administering authority of the *Act* will make an assessment-level decision to determine whether the amendment application is a minor or major amendment.

Under the definitions in Section 223 of the Act, a major amendment is defined as an amendment that is 'not a minor amendment'. A minor amendment is also defined under Section 223 of the Act.

4.7 Application Requirements - Guidelines

The following DES technical guidelines have been considered in the identification of Environmental Values and Assessment of Impacts in Section 5 of this document:

- Application requirements for activities with impacts to air (ESR/2015/1840).
- Application requirements for activities with impacts to land (ESR/2015/1839).
- Application requirements for activities with noise impacts (ESR/2015/1838).
- Application requirements for activities with impacts to water (ESR/2015/1837).
- Application requirements for activities with waste impacts (ESR/2015/1836).

5 Environmental Values and Assessment of Impacts

5.1 Environmental Values Overview

Section 9 of the Act defines environmental value as:

(a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or

(b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

Environmental values have been assessed and considered below in this report, which includes the identification and assessment of environmental value protection under the following Environmental Protection Policies:

- Environmental Protection (Air) Policy 2019 (Section 5.2).
- Environmental Protection (Noise) Policy 2019 (Section 5.3).
- Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (Section 5.4).
- Waste minimization and management has been assessed against the DES strategy: - Queensland's Waste Management and Resource Recovery Strategy.

5.2 Air

5.2.1 Environmental Values

Environmental Protection (Air) Policy 2019

The *Environmental Protection (Air) Policy 2019* (EPP Air) establishes environmental values (EVs) for the air environment as per section 9(b) of the *Environmental Protection Act 1994*. The EPP Air identifies the EVs for the air environment and outlines the air quality objectives for different types of sensitive receptors. The EVs to be enhanced or protected under the policy are:

- The qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems.
- The qualities of the air environment that are conducive to human health and wellbeing.
- The qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property.
- The qualities of the air environment that are conducive to protecting agricultural use of the environment.

Site-Specific Environmental Values

Particulate emissions to the atmosphere in the surrounding area primarily relate to pastoral activities, with the extent of impacts controlled by seasonal factors related to soil moisture and pasture condition. There are no long-term records of ambient air quality in the EHO area prior to mining operations (EHM, 2012).

The EHO is remote from sensitive residential or commercial receptors; the nearest sensitive receptor (Stanbroke Station) is 11 km away from site. There have not been any recent air quality complaints regarding the EHO operation, hence no site-specific air quality monitoring campaigns have recently been completed. Air EVs are managed at EHO in accordance with the existing Environmental Authority.

5.2.2 Emissions and releases associated with the proposed activity Environmental Values

The Project is a continuation of the current operation and will not generate any significant new air emissions. The existing air quality management measures will continue to be implemented, I.e., sprays on conveyors, dust suppression on roads, moisture content of concentrate. No significant changes in air emissions are expected as a result of the Project.

5.2.3 Potential risks and impacts to environmental values, management, and mitigation measures

No changes are expected to air quality, and no change to existing air emissions are expected to arise as a consequence of the proposed Environmental Authority amendment.

Dust management actions include:

- Regular monitoring of dust to ensure thresholds are not reached
- Dust suppression by water cart of all ore and waste rock haulage circuits
- Dust suppression spray systems at the crusher, crushed ore stockpile, and concentrate product stockpile
- Covered concentrate haulage trucks
- Wheel wash for all vehicles leaving site
- The enforcement of speed limits for vehicles

5.3 Noise (Acoustic)

5.3.1 Environmental Values

The *Environmental Protection (Noise) Policy 2019* (EPP Noise) establishes environmental values for the acoustic environment as per the *Environmental Protection Act 1994*. The EPP Noise identifies the environmental values for the acoustic environment and outlines the acoustic quality objectives for different types of sensitive receptors. The EVs to be enhanced or protected under this policy are:

(a) The qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems.

(b) The qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following:

(i) Sleep

(ii) Study or learn

(iii) be involved in recreation, including relaxation and conversation

(c) The qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Site-Specific Environmental Values

The distance to noise sensitive receptors is approximately 11 km, and due to the geometry of the topsoil stockpiles, NWRD and SWRD and TSF they provide acoustic shielding of processing plant and other significant noise sources from those receptors.

The EHO is located within a very low noise environment due to the site's location in a pastoral land use and isolation from any town, industry or major roads. Background levels recorded prior to the commencement of the EHO were in the order of 20 dBA. There were no vibration sources in the area prior to the mining project. No complaints have been received from the community regarding noise associated with mining activities (EHM, 2023).

The Project is to occur in an area located within the EHO in which authorised mining and noise-producing activities already occur. Noise and vibration are managed under ongoing management practices.

5.3.2 Emissions and releases associated with the proposed activity

The Project is a continuation of current mining activities and hence there are no additional noise emissions expected to be generated.

5.3.3 Potential risks and impacts to environmental values, management, and mitigation measures

The proposed Project will not generate any additional impacts to noise sensitive EVs in addition to existing site activities.

Currently, noise and vibration are managed at EHO to maintain noise and vibration emissions at levels that are acceptable to the community and the workforce. Given the distance between the mine and the nearest sensitive noise place (approximately 11 km), no new noise control strategies are required beyond those already in place to provide a safe working environment for employees.

5.4 Water

5.4.1 Environmental Values – Introduction

The *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (Qld) (EPP Water) establishes environmental values for Queensland's waters and wetlands as per section 9(b) of the *Environmental Protection Act 1994*. The established environmental values recognise the need for protection of the suitability of water for aquatic ecosystems, aquatic foods, aquaculture use, agricultural use, recreational use, drinking, industrial purposes, and cultural and spiritual values. These EVs are protected from the effects of pollution by achieving water quality objectives (WQOs)—the measures for indicators of water health (e.g., the concentration levels of physico-chemical and toxicant parameters).

Under the *Environmental Protection Act 1994*, the EPP Water must be used to assess activities that might affect Queensland's water and wetland environments. The EVs and WQOs under the EPP Water must be considered in assessment processes and inform decisions about proposed activities that have the potential of releasing contaminants to Queensland waters.

5.4.2 Environmental Values - Surface Water

On a regional scale, catchments in the EHO project area drain to the Cloncurry River, which originates to the south and flows north to join the Flinders River, ultimately discharging into the Gulf of Carpentaria. The river is located seven kilometres to the west of the EHO site area. The Cloncurry River has a seasonal flow and its sole commercial use is stock watering (EHM, 2012) The position of EHO within regional catchments is shown in **Figure 2-6**.

At a local scale, the surface hydrology of the site is characterised by shallow ephemeral streams. EHO is located within the upper catchment of Gipsy and Eliza Creeks, that flow north and southeast from the site respectively **Figure 2-7**. Gipsy Creek joins the Cloncurry River 45 km to the north of the site. Eliza Creek joins the Williams River 38 km to the east, which eventually joins the Cloncurry River.

5.4.3 Environmental Values – Groundwater

This section adapts and summarises assessments provided in Appendix C (AGE, 2023).

5.4.3.1 Environmental Values – Groundwater - Biological integrity of ecosystems

The biological integrity of ecosystems may be supported by groundwater if they are a groundwater dependent ecosystem (GDE). The groundwater data, public data, and the conceptual hydrogeological understanding at EHO indicate there are no GDEs near the mine; further details are provided below.

According to the Groundwater Dependent Ecosystems Atlas (GDE Atlas; BoM & DSITI, 2016), there are ecological areas in the region of the EHO that are potentially dependent on groundwater to some degree for ecological function. These potential areas are mapped in **Figure 2-7**, which shows there are no GDEs within approximately 4 kilometres of the EHO mine lease boundary.

The GDE Atlas provides an indication of the potential groundwater dependence of ecosystems across the state and is obtained through application of a standardised method (DSITI, 2015). The Atlas was generated by catchment scale mapping that integrated local expert knowledge and the best available spatial data (DSITI, 2015). Notwithstanding this, there can be discrepancies between mapped areas and true on-site ecological characteristics, especially in remote areas. There have been a number of ground-based studies conducted in the vicinity of EHO, none of which have identified the presence of any GDE's.

A terrestrial GDE is an ecosystem that is present above the ground surface and is reliant on groundwater below the ground surface (e.g., vegetation that can access groundwater for transpiration from the water table). There are no potential terrestrial GDEs mapped within approximately 4 km of EHO (**Figure 2-7**). The vegetation types within the area of EHO are dominated by open grassland and sparse woodland. As groundwater levels within the Mesozoic and Proterozoic aquifersare typically more than 18 m below surface, and the maximum root depth for ecosystems in tropical savannah is approximately 15 m (Eamus, Hatton, Cook, & Colvin, 2006), vegetation at EHO is not expected to be dependent on groundwater.

The definition of an aquatic GDE is an ecosystem (be it an aquatic, riparian or wetland ecosystem) that is dependent to some degree on the surface expression of groundwater. Therefore, for an aquatic GDE to be present, a surface expression of groundwater must be suspected or identified. The GDE Atlas (**Figure 2-7**) shows mapped areas of potential aquatic GDEs to the southeast of the ML along Eliza Creek (low potential) and to the south along Courtenay Creek (moderate potential).As stated above, these zones are approximately 4 km from the ML boundary. There are no known locations of groundwater expression to the surface in the vicinity of EHO. The potential existence of springs in the area was precluded following numerous discussions with landholders and extensive field surveys (EHM, 2009), and is supported by the results obtained through the Receiving Environment Monitoring Program (REMP). This is also supported by the pre-mining groundwater levels for the Mesozoic strata being approximately 18 m to 20 m below ground level. The Mesozoic units are therefore sub-artesian, and springs are highly unlikely to occur (EHM, 2009).

A subterranean GDE is an ecosystem that is dependent to some degree on the sub-surface expression of groundwater and exists within the subsurface and may include stygofauna and cave ecosystems. There are no mapped subterranean GDE areas (**Figure 2-7**), and no known caves or sinkholes within the vicinity of EHO. Therefore, it is concluded that there are also no subterranean GDEs present in the vicinity of EHO.

5.4.3.2 Environmental Values – Groundwater - Beneficial use in agriculture

Groundwater in the wider region around EHO is only used for: a) livestock (cattle) drinking purposes; and b) industrial purposes. There are 11 established pastoral groundwater users neighbouring EHO who all hold Water Deeds with EHMPL (Appendix C, Table 4.2). The Water Deeds outline the terms of make-good conditions negotiated between the parties and EHMPL. Under these terms, Evolution supplies Lake Julius water to graziers whose groundwater supplies have the potential to be impacted by mining activities. The basis of the make-good supply was the current useable capacity (CUC) of the bores, which was devised at the outset of the deeds (Appendix C, Table 4.2). The graziers' bores located by a previousaudit, which included both registered and unregistered bores, are shown in **Figure 2-7**.

Based on the information from neighbouring pastoral properties, the primary aquifers used forlivestock (cattle) drinking purposes are the Gilbert River Formation and the Quaternary alluvium. A secondary aquifer used for this purpose is the sandstone layers of the Wallumbilla Formation.

The main controls on the groundwater quality and quantity within the Quaternary alluvium are the flows and water quality within the Cloncurry River, not the groundwater quality in the underlying Mesozoic or Proterozoic rocks. Therefore, there is no link between groundwater users / receptors around the Quaternary aquifer and the potential sources of impact at EHO (AGE, 2015).

5.4.3.3 Environmental Values – Groundwater - Suitability of the water for industrial use

The Queensland Department of Resources (formerly the Department of Natural Resources and Mines) licensed dewatering operations associated with mining under the provisions of the Water Act 2000 (Qld). The licence covers mine dewatering activities from the Wallumbilla Formation (Carpentaria 1 Management Unit) and the Gilbert River Formation (Carpentaria 2 Management Unit), and are outlined in Appendix C, Table 4.3.

Licence number 93189J is currently active at EHO, permitting the groundwater extracted from the pit and underground (Appendix C, Section 4.4). According to the Water Resource (Great Artesian Basin) Plan 2006, the Carpentaria 2 Management Unit relates to the Gilbert River Formation and the Eulo Queen Group. No volumetric limit is associated with the EHO water licence and pumping occurs as necessary to achieve the required dewatering to maintain safe mine operations.

5.4.3.4 Environmental Values – Groundwater - Cultural and spiritual values of the water

The cultural and spiritual values of groundwater at EHO are likely linked to the cultural and spiritual values of surface waters, as no discharge of groundwater to surface water has been identified. There is at least one study (Barber, 2013) that details the values placed on surface water and groundwater by Indigenous people in the Flinders catchment. This work cautions that not all indigenous values are cultural, and the values discussed include adequate water for wildlife and agriculture (Barber, 2013). Therefore, it is considered appropriate to value groundwater according to the EVs described above, which likely underpin its cultural value.

5.4.4 Emissions and releases associated with the proposed activity – Surface Water

An assessment of the potential changes in the performance of the existing EHO mine water management system was carried out for the Project. The results of the assessment are provided in Appendix D (ATC Williams, 2023).

The assessment:

- Provides a description of the EHO mine surface water management system (with no significant changes proposed to the system for the Project).
- Describes the operational water balance model, including key data.
- Presents predictive results for the proposed amended operation, including key forecast changes.

The assessment shows that the Project does not result in significant changes in the performance of the mine water management system. In summary, the simulated storage spill risks (a measure of the overall mine water management system performance) shows no increase in spill risk and a small reduction in spill risk associated with the south sump. (**Table 5-1**, Source, Appendix D, Table 5).

Table 5-1 EHO mine water management system – simulated storage spill risks

Storage	Annual Spill Risk	
	Mining to RL 1,200 m	Mining to RL 1,150 m
North Sump	4.5%	4.5%
South Sump	31.3%	28.9%
PED	0.7%	0.7%

(Source: Appendix D, ATC Williams 2023).

In summary, there is no anticipated increase in the risk of discharges to surface waters associated with the Project. The reduction in annual spill risk for the south sump is a result of catchment changes over time related to the subsidence footprint.

Changes in water quality in the groundwater sumps may occur as rainfall infiltration interacts with the additional caved rock mass associated with the Project. However, this inflow of water is a fraction of the total inflows to the EHO mine water balance.

The potentially affected water (lower pH) would be mixed with groundwater inflows in the sumps of the underground workings, and then pumped to the CARD for use in the process plant. This stream comprises a fraction of the water supply to the process plant and would be further diluted.

Finally, the diluted stream of lower pH water from the Project affected water will also be pH corrected by lime dosing that occurs currently to ensure processing water is fit for use, prior to use in the process plant.

A preliminary review of tailings dam water quality showed that the average pH was 7.56(from 77 sampling events, from 25/10/2015 to 21/11/2022).

A preliminary review of TED water quality showed that the average pH was 7.52 (from 98 sampling events, from 07/08/2013 to 10/03/2023).

In view of the above, it is not anticipated that the Project will significantly affect water quality in the TSF, TSF Drain and TED.

5.4.5 Emissions and releases associated with the proposed activity – Groundwater

An assessment of groundwater impacts associated with the Project has been prepared (Appendix C, AGE 2023). The results of the assessment (Appendix C, Section 10) are summarised below.

The majority of the site that has the potential for interactions with groundwater (NWRD, PED, TED, TEDx) will remain unchanged by the Project.

The Project could potentially affect groundwater interactions associated with the SWRD and the TSF. However, this increase in mining depth from the currently authorised RL 1200 m to the proposed RL 1150 m is modelled to result in an increase in subsidence at the surface from 245m (RL1200m) to 370m (RL1150m) from the current pit wall, representing an additional 125m of subsidence associated with this project, equating to an additional subsidence area of approximately 113 Ha (as detailed below in section 5.6.6). This is likely to result in increased infiltration rate of rainfall through the rock into the underground workings and sumps.

The additional caved rock and subsided material from the Project is predicted to affect groundwater in the following ways:

- Inflows to the underground workings are expected to increase. However, the predicted increase in inflow is equivalent to approximately 0.5% of the current, cumulative volume of water removed from the underground and pit.
- Increased recharge via rainfall infiltration through subsided areas may increase and could report to sumps in the pit or underground. However, the predicted increase is potentially 0.5 megalitres per month (0.1% of currently measured inflows), which is considered to be a negligible increase to the total expected inflows from the pit and underground.
- Drawdown is modelled to marginally increase. However, the predicted increase is less than five centimetres in any groundwater monitoring or production well; therefore, the proposed changes are considered to cause negligible additional drawdown and these potential changes have been communicated to the surrounding landholders.
- In relation to the final void lake level:
    - The pit void is expected to slightly expand (due to subsidence and most of the future subsidence area is already within the pit void catchment), which will cause an increase in evaporation, therefore, the final void pit lake level is expected to be similar to, or slightly lower than, existing estimates, as a result of the proposed changes to operations.
    - Existing modelling indicates the pit will remain a sink due to the planned diversion of external catchments at closure, and as such, the pit lake with a reduced equilibrium level is also likely to continue to act as a sink (Appendix C, Section 6.3).

- The pit lake will respond to rainfall events of varying magnitudes and an increase in pit water level can be expected. Modelling of various rainfall events and the associated response in pit water levels has been undertaken and is illustrated in **Table 5.2**.

Table 5-2 Predicted pit water level rise associated with various rainfall events

AEP (Duration 72 Hours)	Rainfall (mm)	RL1150			RL1200		
		Catchment Area (ha)	Runoff Volume (ML)	Water level rise in pit (m)	Catchment Area (ha)	Runoff Volume	Water level rise in pit (m)
1 in 100	392	384.72	1508.12	1.24	384.21	1506.10	1.32
1 in 500	499		1919.77	1.58		1917.21	1.68
1 in 1000	547		2104.44	1.73		2101.63	1.85

- In relation to final void lake water quality:
  - Due to the possible exposure of additional PAF material from subsidence; the pit lake water quality may initially have higher acidity (e.g., pH between 4 and 4.5). However, due to the presence of acid-consuming components present in the pit wall rock and subsided materials, and due to the alkalinity of groundwater inflows, this acidity is expected to be neutralised over time.
  - Historical pit lake water quality modelling indicated that the pit lake water quality would be affected by acid mine drainage, elevated salinity, and metals, and hence unlikely to be suitable for reuse (Appendix C, Section 7.2). The pit lake water will have higher salinity than currently modelled due to the geochemical reactions that may lead to the initial acidic (pH < 4) pit lake water. However, as long as the pit lake continues to act as a sink to groundwater after mine closure the lower quality pit lake water is not expected to influence the surrounding groundwater, and, no beneficial use of the pit lake was originally planned; therefore, the change does not represent a nett deterioration.

The increased tailings production and subsequent 4.6% increase in the TSF volume capacity will be accommodated within the existing height of TSF embankments authorised in the EA, therefore this fact coupled with the range of initiatives designed to improve the rate of drain down, collection of drainage and lowering of the phreatic surface, there will be reduction in the maximum possible driving force of TSF leakage (which correlates to the height of the head pressure in the tailings). TSF operation (excluding the ranges of new initiatives discussed above and the change being sought by the project) is expected to continue in accordance with the current requirements of the environmental authority.

5.4.6 Potential risks and impacts to environmental values, management, and mitigation measures – Surface Water

The existing surface water mitigation measures, management approach, monitoring and reporting arrangements will continue to be applied at EHO.

The existing mine water management system has been modelled to continue to perform at the same standard with the Project in place.

No additional surface water management measures were considered necessary for the Project.

5.4.7 Potential risks and impacts to environmental values, management, and mitigation measures - Groundwater

The groundwater assessment concluded that, with the ongoing implementation of current management actions and control measures, there will be no significant residual impacts to groundwater EVs as a direct result of this amendment application.

The existing groundwater mitigation measures, management approach, monitoring and reporting arrangements will continue to be applied at EHO.

No additional groundwater management measures are anticipated to be required for the Project, however although not part of the amendment application another project relating to management of groundwater at the PED / TED has commenced and will progress towards managing those issues independently.

5.5 Wetlands

5.5.1 Environmental Values

The location of the EHO site in relation to GDEs as mapped by WetlandMaps is provided in **Figure 5-1**. The location of the EHO site in relation to GDEs as mapped by the Bureau of Meteorology is provided in **Figure 5-2**.

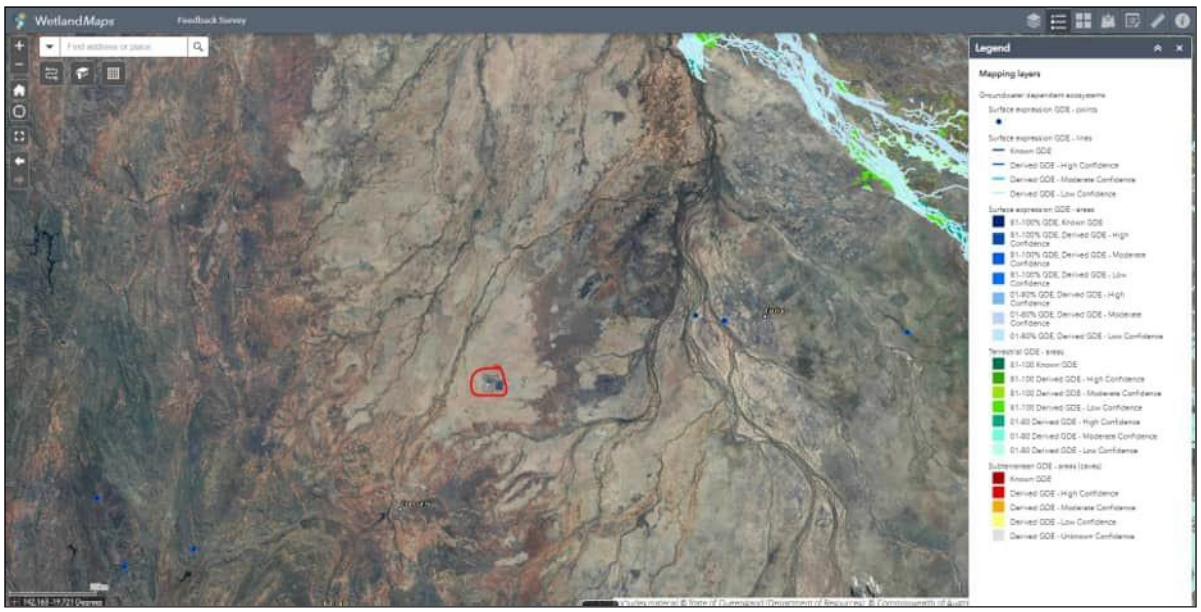


Figure 5-1 Location of the EHO site in relation to GDEs as mapped by WetlandMaps.

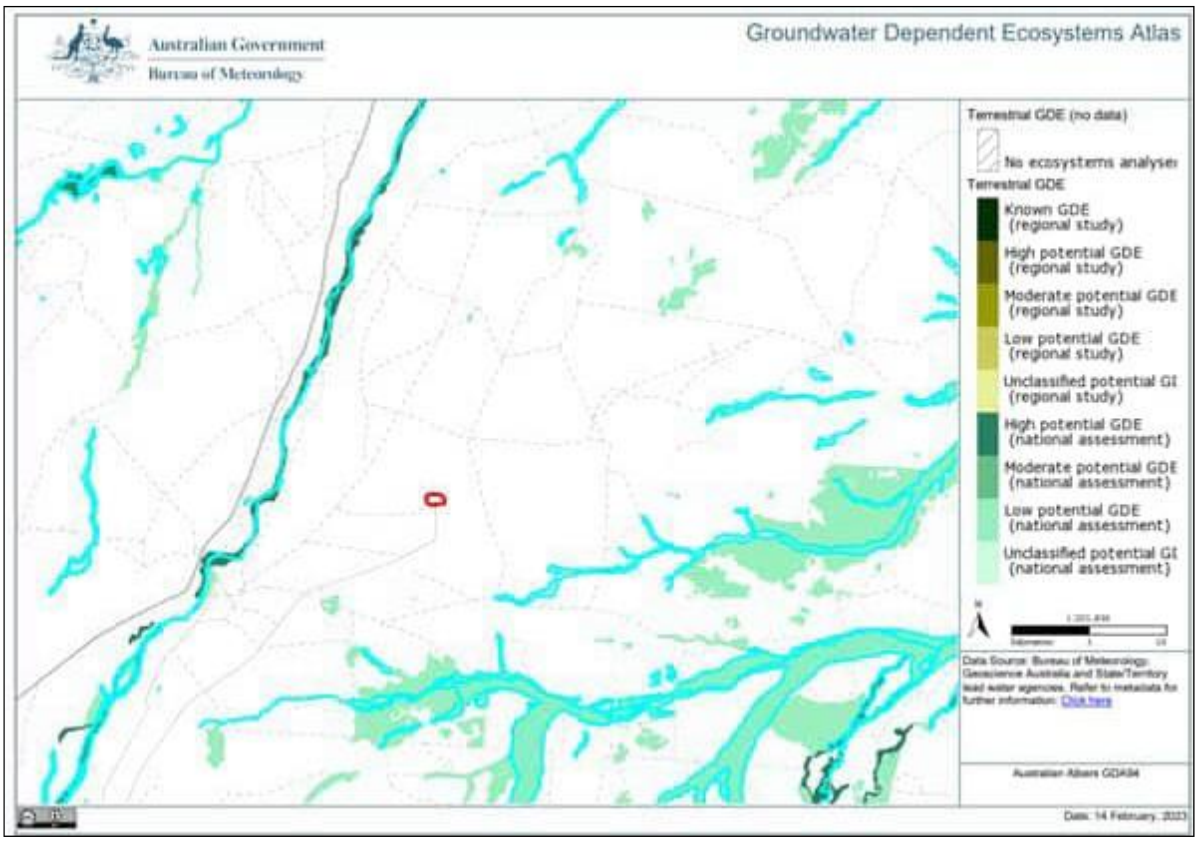


Figure 5-2 Location of the EHO site in relation to GDEs as mapped by the Bureau of Meteorology.

The groundwater assessment discusses the potential for GDEs near the EHO site (Appendix C, AGE 2023). The assessment noted that the site groundwater data, public GDE data, and the conceptual hydrogeological understanding at EHO all indicate that there are no GDEs near the mine. As such, there are no GDEs relevant to this application, and they are not considered as receptors. Further details documenting the absence of GDEs around the EHO site are provided in Appendix C Section 4.9.1.

5.5.2 Emissions and releases associated with the proposed activity

Given the absence of GDEs near the EHO site, and the very small changes to groundwater associated the Project, no effects on GDEs are anticipated.

The surface water management system will continue to operate at the same level of performance with the Project in place, hence the Project will not result in any changes to surface water discharges and any changes to wetlands that are located significantly downstream of the site.

5.5.3 Potential risks and impacts to environmental values, management, and mitigation measures

There are no anticipated risks and impacts to the EVs of Wetland and GDEs associated with the Project.

5.6 Land

5.6.1 Environmental Values

There are no additional impacts to land associated with the Project, with the expanded subsidence area fully contained within the existing disturbance envelope of the SWRD.

The land EVs of the current EHO mine site and surrounding area are described as follows.

EHO commenced in 1995 and comprised a large operating open-pit, two large active waste rock emplacements, an active tailings storage facility and associated infrastructure. The EHO waste rock emplacements are the dominant feature in the local area. Other than EHO, the terrain surrounding the mine site is largely featureless with the nearest prominent landform, Mount Fort Constantine(38 m high), approximately 11 km to the southwest.

The land use in the surrounding area is extensive cattle grazing on native pastures. The strongly seasonal nature of rainfall is the primary determining factor limiting the agricultural applications of the land.

The heavy, cracking-clay soils in the area have low to moderate nutrient status, particularly for nitrogen and phosphorus, and are mildly alkaline. The black soils are generally more than two metresdeep, grading into orange clays with depth.

The concentrations of trace metals in the soils and sediments, except for copper and aluminium in some of the orange clays, identified prior to mining commencing, are typical of background levels found in the surrounding area.

Minor infestations of invasive woody weeds were present prior to development of the EHO, including Parkinsonia (*Parkinsonia aculeata*) and Prickly Acacia (*Acacia nilotica*).

No land contamination had been detected in the area prior to the commencement of the EHO project.

Environmentally sensitive area mapping from DES indicated no Category A, B or C environmentally sensitive areas exist within or near the EHO site (Appendix E). Environmentally sensitive areas are as defined under the Environmental Protection Regulation 2019 and their presence impacts the legality of mining in the area as described under the *Environmental Protection Act 1994.*

A desktop ecological assessment has been undertaken to understand potential ecological values at the EHO mine site concerning matters of national environmental significance (MNES) and matters of state environmental significance (MSES).

5.6.2 Matters of National Environmental Significance

A search of the Commonwealth Protected Matters Search Tool was undertaken to identify relevant MNES which have the potential to occur within, or in proximity to the EHO site. A 5 km search buffer was used to extend the search area to a nominal area of influence (approximate potential extent of mining noise, air and water effects).

The results from the search tool were as follows:

World Heritage Properties: None

National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	11
Listed Migratory Species:	13
Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

The 11 listed threatened species comprised seven bird species, three mammalian species (ghost bat, bilby and Julia Creek Dunnart) and one shark species (freshwater sawfish).

The 13 migratory species comprised 12 bird species, and one shark species (freshwater sawfish).

The 18 listed marine species comprised 17 avian species and 1 reptile species.

Since the beginning of operations, there has been one reported sighting of listed fauna. The Julia Creek dunnart (*Sminthopsis douglasi*) was spotted 5 km from the EHO site. Its status under the *Environment Protection and Biodiversity Conservation Act 1999*, is vulnerable, and as such, it maybe considered a MNES. The Project is unlikely to introduce any new activities that could affect the habitat of, or directly impact any individuals of this species.

No sightings of fauna considered MNES have been recorded on the EHO site since the commencement of EHO activities.

5.6.3 Matters of State Environmental Significance

MSES are defined under the State Planning Policy 2017. A search of the site and surrounds using the Queensland Government State Planning Policy Interactive Mapping System was undertaken to identify relevant MSES which have the potential to occur within, or in proximity to the EHO site. The results are displayed in **Figure 5-3** below and presented in full in Appendix F.

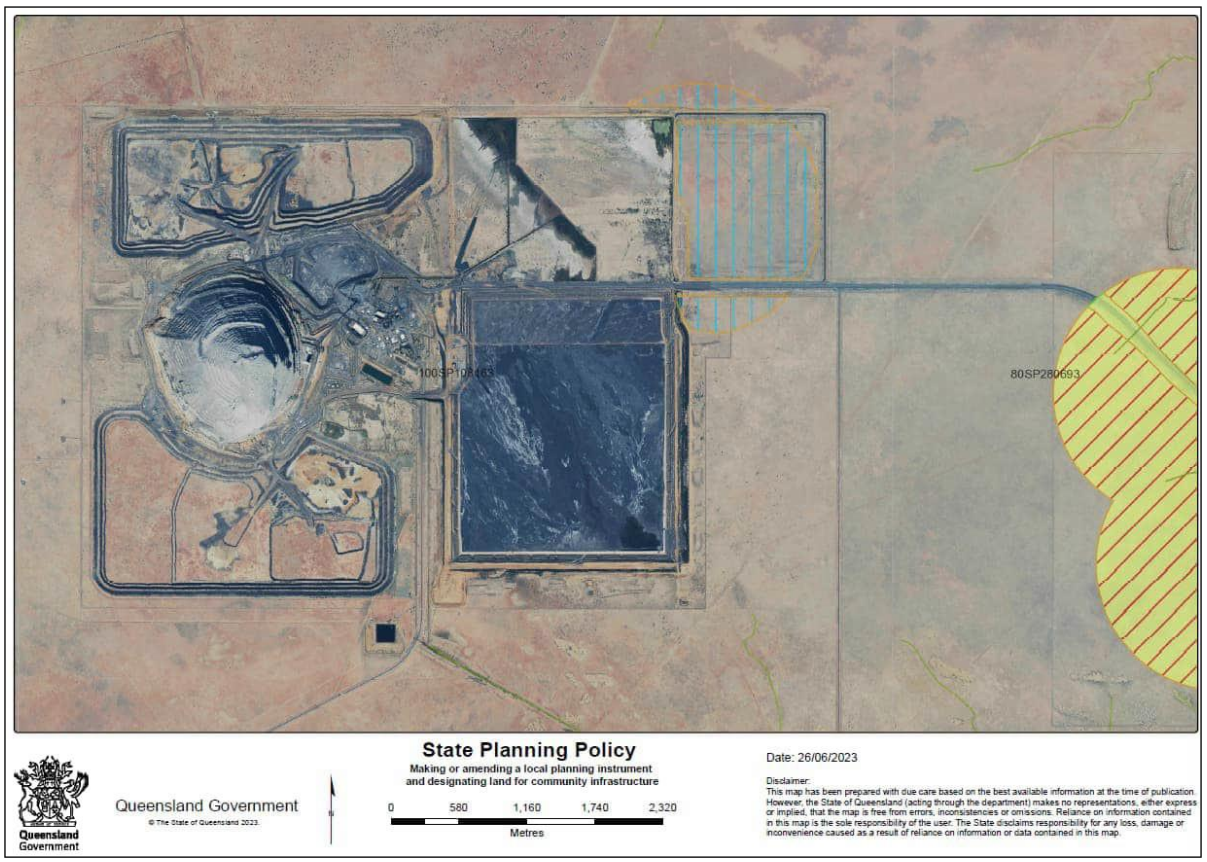


Figure 5-3 MSES mapped at EHO site and surrounds.

MSES located within the EHO site area include:

- MSES – Wildlife habitat (special least concern animal) (blue vertical hatch) is mapped over and around the TEDx (special least concern animal as per *Nature Conservation Act 1992*).

MSES located in the immediate surrounds (2 km distance) of the EHO site area include:

- MSES - Regulated vegetation (intersecting a watercourse) (green line over drainage lines) is mapped to the north, east and south of the site. It is noted that the mapped area to the south is along a man-made drainage line that drains to Eliza Creek.
- MSES - Wildlife habitat (endangered or vulnerable) (red diagonal hatch) and MSES - Regulated vegetation (essential habitat) (yellow highlight) is mapped to the east, at the Mount Margaret Mining tenements (endangered or vulnerable as per Environmental Offsets Regulation 2014).

5.6.4 Emissions and releases associated with the proposed activity

There will be no significant increase in predicted emissions or releases to land associated with this Environmental Authority amendment application.

Potential releases of water from the interaction of rainfall with potentially acid-forming material (as identified and discussed in Section 5.4) will be managed as per current site practices and infrastructure with no additional emissions or releases to land anticipated.

Section 5.4 confirms that potentially contaminated groundwater generated from exposed acid-forming material will be drawn into the “groundwater sink” on site where MNES and MSES are not present. It is not expected to travel off site where it could potentially adversely impact significant flora and fauna. Additionally, the potentially acid-forming materials will remain on site in areas already impacted by existing mining activities (TSF, WRD, final void). Surface water runoff from these sites will be managed in accordance with the Site Water Management Plan and monitored as per the REMP. Groundwater captured from the underground workings is proposed to be reused in the process plant circuit and as such will not increase the poor-quality water management budget at the site.

5.6.5 Potential risks and impacts to environmental values, management, and mitigation measures

It is expected that no additional land disturbance outside of the existing disturbance footprint will result from the proposed Project and that no vegetation clearance is required for the proposed activities.

Geotechnical modelling has shown that the ongoing mining will continue to result in ongoing subsidence and destabilisation of overlying strata. The extent of which is modelled and discussed further in Section 5.6.6.

No sightings of threatened fauna have been recorded on site since the commencement of EHO activities. Off site, one reported sighting of the Julia Creek dunnart (*Sminthopsis douglasi*) was located approximately 5 km from the mine site. This indicates a low likelihood of MNES and MSES fauna to be present on site in the future, and therefore minimal direct impacts to fauna are expected. Ongoing monitoring and reporting of fauna on site will continue in accordance with EHO standard procedure.

As there are no MNES or MSES flora or fauna that are located within the Project footprint, it is expected that there will be no direct impacts to MNES or MSES. The TEDx will continue to operate as per current management practice, and hence the MSES – Wildlife habitat (special least concern animal) that is mapped over and around the TEDx will not be affected by the Project. The MSES Regulated vegetation (intersecting a watercourse) surrounding the site may receive discharges from the site, however this Project will not increase the risk to those values. Management of flora and fauna identified as significant will continue as per current EHO practices/procedures.

The potential risks and impacts to the environmental values of water related to the subsidence of the SWRD into the pit are identified in Section 5.4 above.

5.6.6 Subsidence Assessment

5.6.6.1 Existing conditions

Historic sublevel caving (SLC) operations at EHO have resulted in a progressive subsidence of the southern wall of the original open pit. The extent of subsidence at year 2022 (i.e., existing conditions) is shown in **Figure 5-4**. A zone of rock mass damage envelops the cave zone, as does a zone of permanent rock mass movement, with the magnitude of the displacements being highest around the immediate cave zone boundary and decreasing with distance away from the cave (Beck Engineering, 2023a).

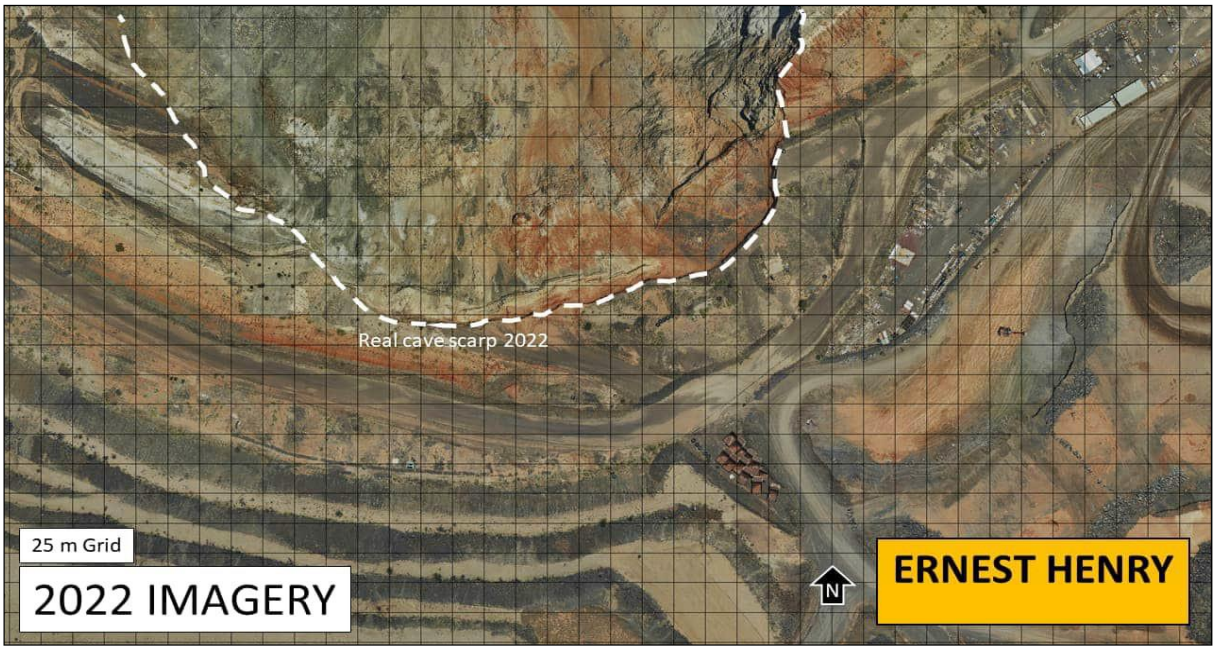


Figure 5-4 Aerial imagery from 2022 showing the zone of subsidence at year 2022 (i.e., existing conditions at 2022)(Beck Engineering, 2023a).

5.6.6.2 Assessment of subsidence from underground mining operations

Cave propagation and surface subsidence for EHO activities were modelled by Beck Engineering for RL 1200 m (Appendix A) and RL 1150 m (Appendix B) (Beck Engineering, 2023a and 2023b, respectively). The caving process is expected to continue as the SLC operations advance to RL 1200 m and beyond to RL 1150 m.

5.6.6.3 Mining operations to RL 1200m

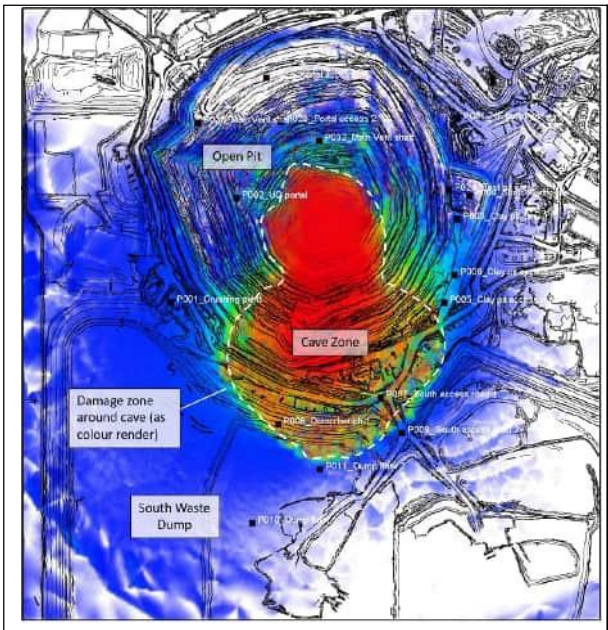
Subsidence from the completion of current operations to RL 1200m is modelled to extend the cave zone progressively 245 m south of the original open pit and consequently undercut the SWRD material. As the northern edge of the waste dump material is undercut by the caving process, it would rill into the subsidence crater located within the existing pit.

5.6.6.4 Mining operations to RL 1150m

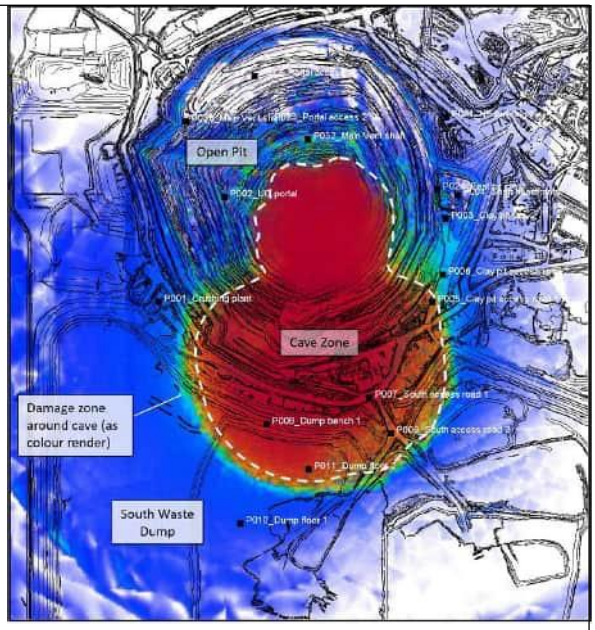
Subsidence from proposed operations to RL 1150m is modelled to extend the cave zone approximately 370 m to the south of the original open pit (approximately 125m further than RL 1200m activities). The cave zone is expected to expand primarily towards the south, southeast and southwest. The cave zone will further undercut the SWRD material. The undercut material is modelled to continue to rill into the subsidence crater (within the existing pit). The forecast change in the area affected by subsidence when mining from RL1200m to RL1150m totals approximately 113Ha (as detailed below), with moderate subsidence located largely within the current pit shell, and slight to negligible subsidence (defined in Appendix B) totaling approximately 90 Ha, as shown in Figure 5-5.

Impact Category	**Subsidence areas (Ha)**
Moderate	22.53
Slight	23.91
Very Slight	30.59
Negligible	35.86

The modelled extents of subsidence for mining operations to RL 1200 m and to RL 1150 m are shown in **Figure 5-5.** This figure shows the increase in subsidence cave zone as mining continues to RL 1150 m.



Source: Beck Engineering 2023a: RL 1200 m – Figure 8.



Source: Beck Engineering 2023b: RL 1150 m – Figure 3-19.

Figure 5-5 Plan view showing forecast cave outline at EHO at end of mining activities to RL 1200 m (Beck Engineering, 2023a, Figure 8) and to RL 1150 m (Beck Engineering, 2023b, Figure 3-19)

The caved rock is forecast to fill the lower benches of the open pit at the end of RL 1150 m SLC mining. This material would be primarily composed of broken rock which has caved from around the orebody, as well as some SWRD material that has rilled into the cave from above.

There are no significant air gaps forecast to remain within the cave zone at the conclusion of the underground mine plan and no further growth of the cave is forecast following closure.

EHO will continue to monitor subsidence in accordance with current Environmental Authority conditions.

Through the subsidence of the SWRD into the final residual void (passively by not actively relocating), no new land is required to be disturbed to relocate the section of the waste rock dump that will subside.

5.6.7 Rehabilitation

The proposed amendment does not seek to amend the rehabilitation objectives or the conditions within the current as they relate to rehabilitation.

No changes to the domain boundaries or rehabilitation objectives are proposed for the TSF as a result of the Project, which only seeks an increase in the total volume limit for the TSF.

The site has been issued a transitional notice to develop a PRCP which will shortly be under development. It is anticipated that any alterations to the domain boundaries will be incorporated into the PRCP.

The current Environmental Authority conditions relating to the rehabilitation objectives refer to conditions F1-1, F1-4, and the Post Mine Land Use Plan (PMLUP) that is to be developed in accordance with condition F3-1 of the EA. Condition F2-1 of the Environmental Authority also includes outcomes for residual voids.

Condition F1-1 is as follows:

> *Land disturbed by mining must be rehabilitated in accordance with Table F1 (Rehabilitation Requirements).*

Table F1 (Rehabilitation Requirements) identifies the rehabilitation objectives as those "*In accordance with condition (F1-4) and the post mine land use plan required under condition (F3-1)"*

Condition F1-4 is as follows:

> *All land subject to mining activities must be rehabilitated to:*
>
> *(a) a stable landform and with a self-sustaining vegetation cover and species that are similar to adjoining undisturbed areas;*
>
> *(b) a safe landform, which is non-polluting, geo-chemically and geo-technically stable.*
>
> *(c) ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by mining activities; and*
>
> *(d) ensure that the water quality of any residual void or water bodies constructed by mining activities meets criteria for subsequent uses and does not have potential to cause environmental harm.*

Condition F2-1 is as follows:

> *Residual voids must comply with the following outcomes:*
>
> *(a) residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.*

Further clarity on the rehabilitation objectives for each domain is provided in the PMLUP that was prepared to address condition F3-1 of the EA.

The rehabilitation objectives specified in the PMLUP for the residual void are to:

> *Make safe for humans and wildlife by maximising stability of the residual void walls and minimising opportunities for access.*
>
> *The quality of the pit lake will not diminish the environmental values in the receiving environment.*

The rehabilitation objectives specified in the PMLUP for the SWRD are to:

> *Make safe for humans and wildlife by maximising stability based on agree designs (Note batters to be rock armoured)*
>
> *Stormwater and seepage managed to prevent environmental values identified in the receiving environment from being diminished.*
>
> *Minimise accelerated erosion by providing soil conditions that promote the establishment and maintenance of adequate ground cover on berms and plateaus (note rock armouring present on batters).*
>
> *Establish a vegetation community on berms and plateau that is self-sustaining (ecologically functional) and minimises the potential for degradation of the surrounding pastoral leases.*

There is no change to these objectives proposed in this Environmental Authority amendment application.

As discussed in section 5.6.6 Subsidence Assessment above, subsidence is currently occurring mining to the depth of RL 1200 m (see Section 5.6.6 above).

The PMLUP identifies native habitat as the post-mine land use for the SWRD. This is expected to be retained and transitioned as the post-mine land use for rehabilitation of the SWRD domain area that is outside of the subsidence zone.

In accordance with the accepted Land Outcome Document (LoD), (the PMLUP), the residual void will be managed as a non-use management area. The residual void will be made safe through exclusion bunding (and fencing as required), which will be specified by the Sustainability team at EHO and will be non-polluting through continuing to act as a groundwater sink following closure (refer to section 5.4). The completion criteria will be included in the PRCP.

Where safe access is impeded by the subsidence, the affected SWRD area will form part of the final void. The current rehabilitation objectives of the Environmental Authority for the final void will continue to apply.

The remaining SWRD area that can be safely accessed will be integrated into the waste rock landform to be stable and rehabilitated to a non-polluting, safe, stable, and self-sustaining landform. The current rehabilitation objectives of the Environmental Authority for the waste rock dump will continue to apply.

The residual void perimeter bund (and fencing if required) will be extended around the entireperimeter of the final void and include the SWRD, for practical construction of the bund and maximisation of the rehabilitation objectives. This will exclude livestock and humans from accessing the final void and SWRD.

Drainage and seepage from the SWRD and within the bund will be either directed to the pit or to the existing site water management system where it is anticipated that, following closure, water that does not report to the pit will meet criteria that enables it to be directed to the receiving environment.

5.7 Waste Minimisation and Management Practices

The Project is not anticipated to affect existing EHO waste minimisation and management practices. No changes to these practices are proposed and no amendments are proposed to the Environmental Authority in Schedule E – Waste.

The management and mitigation of the impacts associated with mining waste (waste rock, wastewater, mineral process residues, etc.) produced from the proposed project has been addressedin the sections above.

It is anticipated that the Project will not contribute any additional non-mining waste to what is currently being produced in accordance with the existing EA.

6 Conclusions

This document describes the proposed activities associated with the Project requiring an amendment to the existing EA. Specifically, the amendment of the Environmental Authority is required to authorise:

- An increase in the volumetric limit of the Ernest Henry Operations – Tailings Storage Facility (TSF).
- Production to extend from from RL 1200 m to RL 1150 m.

Collectively, these amendments are denoted as the RL 1150 m Project (the Project).

The Project is contained entirely within the existing mining leases. The Project is a continuation of existing operations, using existing mining fleet, mining methods, equipment and existing processing plant and TSF. The continued use of the TSF is not anticipated to introduce any new impacts and a range of measures are being scheduled to optimize operational performance of the TSF, which will also realise environmental benefits.

There are no direct impacts to any areas outside of the existing mining leases.The Project is not anticipated to result in any potential impacts to the following EVs:

- Air – No change to the existing surface operations that could affect air quality EVs. The nearest receptor is approximately 11 km from the EHO site. Air quality will continue to be managed under EHO's management plans and in accordance with the EA.
- Noise (acoustic) – No change to the existing surface operations that could affect noise (acoustic) EVs. The nearest receptor is approximately 11 km from the EHO site. Noise will continue to be managed under EHO's management plans and in accordance with the Environmental Authority.
- Waste minimisation and management practices – no change to existing non-mining waste management, and non-mining waste will continue to be managed under EHO's Waste Management Plan and in accordance with the Environmental Authority.

The assessment of the potential for the Project to affect surface water, groundwater, wetlands and land environmental values is summarised below:

- Surface water and wetlands – The nearest surface water environmental values are the surface water receiving environments of Eliza Creek and Gipsy Creek. There are no wetlands in close proximity to the EHO site. The performance of the EHO mine water management system will not significantly change as a result of the Project. Mine water quality in the TSF, PED, TED and TEDx is not expected to change significantly. No significant risks or impacts to surface EVs are expected.
- Groundwater – The nearest site-specific groundwater environmental values are the groundwater users (grazier bores or water deed bores). The assessment of impacts to groundwater concluded that there would be minimal (<5cm) change to water levels at the nearest bores. In the event of any impacts existing make good provisions and agreements with the landholders will be fulfilled.
- Land – No MSES or MNES are to be impacted, however, ongoing monitoring and reporting will continue as per EHO's current Environmental Management Plans. Land subsidence will continue within the already disturbed locations of the SWRD and open pit. Monitoring and adjustments to safety procedures and potential rehabilitation requirements in the pit and surrounding area will continue.

In summary, the ongoing production from RL 1200 m to RL 1150 m:

- Will result in additional subsidence above the underground workings that is anticipated to result in the subsidence of host rock and SWRD subsiding and rilling into the open pit. This would occur for an additional horizontal distance of 125 m to the south of the RL 1200 m extent of subsidence. This will not change the rehabilitation targets or objectives of the Environmental Authority or the PMLUP and will not significantly affect the overall closure outcomes of the mine, which will be confirmed in the PRCP in due course.

- Could potentially result in very minor changes to groundwater within the EHO site boundaries. The effect on groundwater resources at nearest users will be a very minor incremental increase in drawdown (less than <5 cm). This additional drawdown is minimal and has been communicated to surrounding landholders who are comfortable with the level of predicted change and have the make good requirements to rely on in the event of any unforeseen impacts.

Also, the increase in the volumetric limit of the EHO TSF from 130,000,000 m^3 to136,000,000 m^3:

- Will be accommodated within the existing height of TSF embankments authorised in the current Environmental Authority.
- Will not result in any change in the risk of seepage from the TSF as the Project is within the dimensions authorised in the Environmental Authority, with the exception of total volumetric limit and a range of other initiatives will reduce the risk of seepage from the TSF.
- Will not result in any material change to the operation of the TSF.
- Will not change the rehabilitation and closure targets and objectives of the TSF under the existing Environmental Authority and PMLUP, to be confirmed and detailed in the PRCP in due course.

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