# Tailings Removal and Dam Deconstruction Management Plan

## Macraes Operation



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|---|---|
| **Department** | **Mining** |
| **Location/Site** | **Macraes Operation** |

| Rev | Date | Description | By | Review | Approved |
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| A | 29 May 2026 | Hydraulic Mining Management Plan - DRAFT | Bernie O'Leary | Pieter Doelman, Knowell Madambi, Kerry Watson, Matt Curran, Pip Walker | |
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# Contents

# 1 INTRODUCTION

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

The objective of this management plan is to summarise key operation and management aspects of the removal and relocation of tailings and embankment fill from two tailings storages facilities (TSFs): Mixed Tailings Impoundment (or MTI) and SP10/SP11. This management plan gives effect to resource consent conditions x,y,z in the following sections [to be inserted once consents are granted]

The SP10 and SP11 TSFs contain approximately 28Mt of tailings. Complete removal of these tailings is required to enable the full mining extent of IM13. While all tailings within SP10 and SP11 must be reclaimed, part of the SP11 embankment will remain in place unless future design work determines that its full removal is required.

Hydraulic mining has been identified as the preferred method for tailings reclamation because it:

- Enables material to be removed safely within constrained pit geometries
- Reduces heavy equipment interaction risks
- Provides continuous flow of slurry to the Frasers TSF (FTSF)
- Integrates effectively with the Macraes Mine Water Management System (MWMS).

Under MP4, hydraulic mining will be used to remove tailings from SP10, SP11 and MTI, with all reclaimed material transported as slurry to FTSF Stage 3 for permanent storage. The nominal amount of MTI tailings that will be removed will be 38 Mt.

Embankment fill will also be removed progressively as the tailings height is reduced. Mining of embankment fill material will be undertaken using mechanical means using dump trucks loaded by an excavator or a wheeled loader.

# 2 RESOURCE CONSENT CONDITIONS

A copy of the relevant consent conditions is provided in Appendix A.

# 3 SITE LOCATION AND DESCRIPTION

OGNZL owns and operates the Macraes Operation at Macraes, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 1 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Frasers, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;
- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

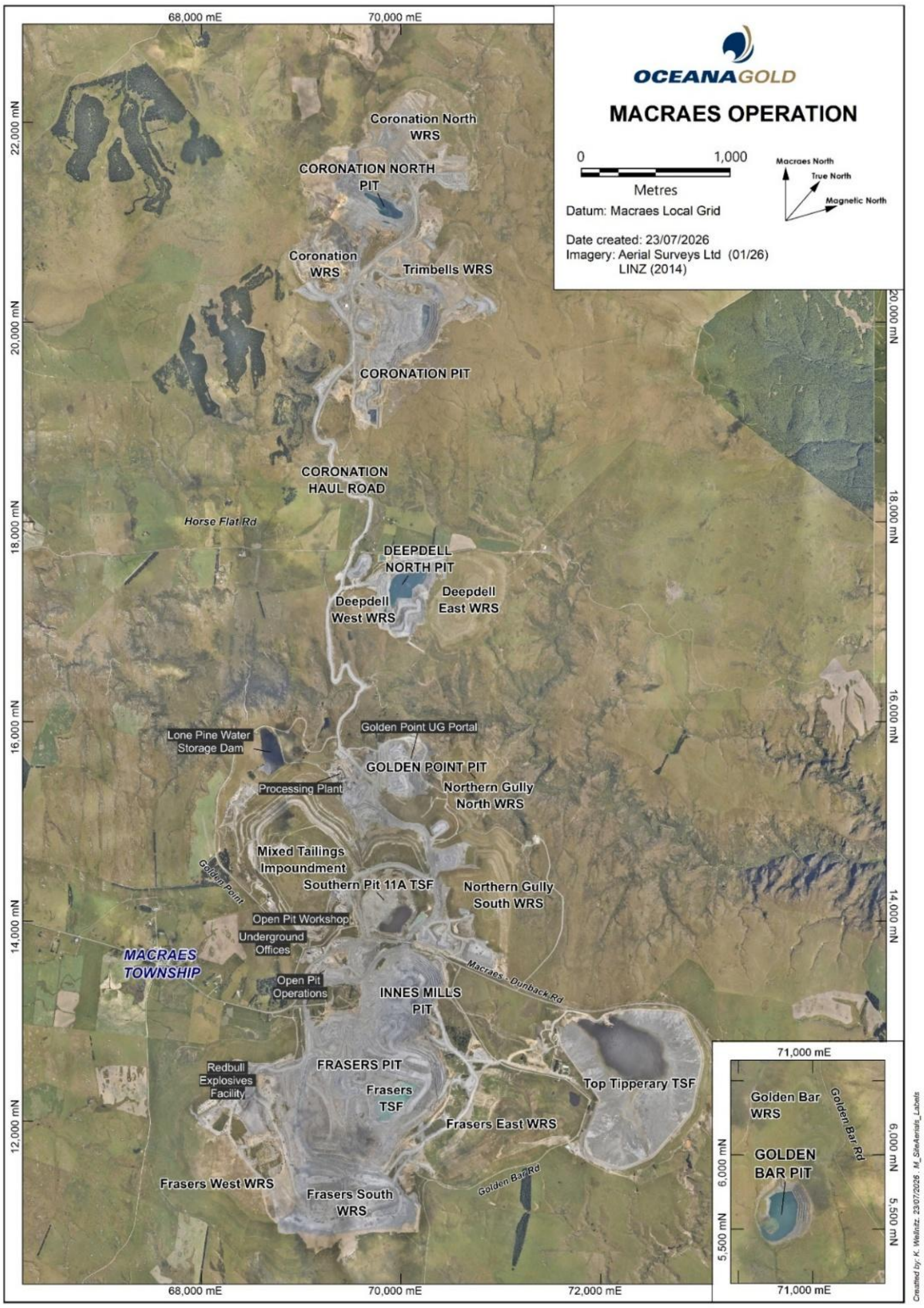


**Figure 1: Existing site layout at the Macraes Operation (as of July 2026)**

## 3.1 Project Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("**GPUG**").
- **Tailings management**, including:
  - Construction of the Frasers Tailings Storage Facility ("**FTSF**") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and

- Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("**MTI**"), Southern Pit Option 10 TSF ("**SP10**"), and Southern Pit Option 11A TSF ("**SP11**") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
  - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
  - Construction, operation and maintenance of a Water Treatment Plant; and
  - Ongoing operation and maintenance of the Mine Water Management System ("**MWMS**").
- **Infrastructure and roading works**, including:
  - Realignment of Macraes Road in two stages; and
  - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
  - Murphys Ecological Enhancement Area ("**MEEA**") near Murphys Creek, including predator fencing, access tracks, and site facilities;
  - Mt Highlay restoration area;
  - Cranky Jims Link shrubland enhancement area;
  - Murphys Link tussock protection area; and
  - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in Figure 2 below.

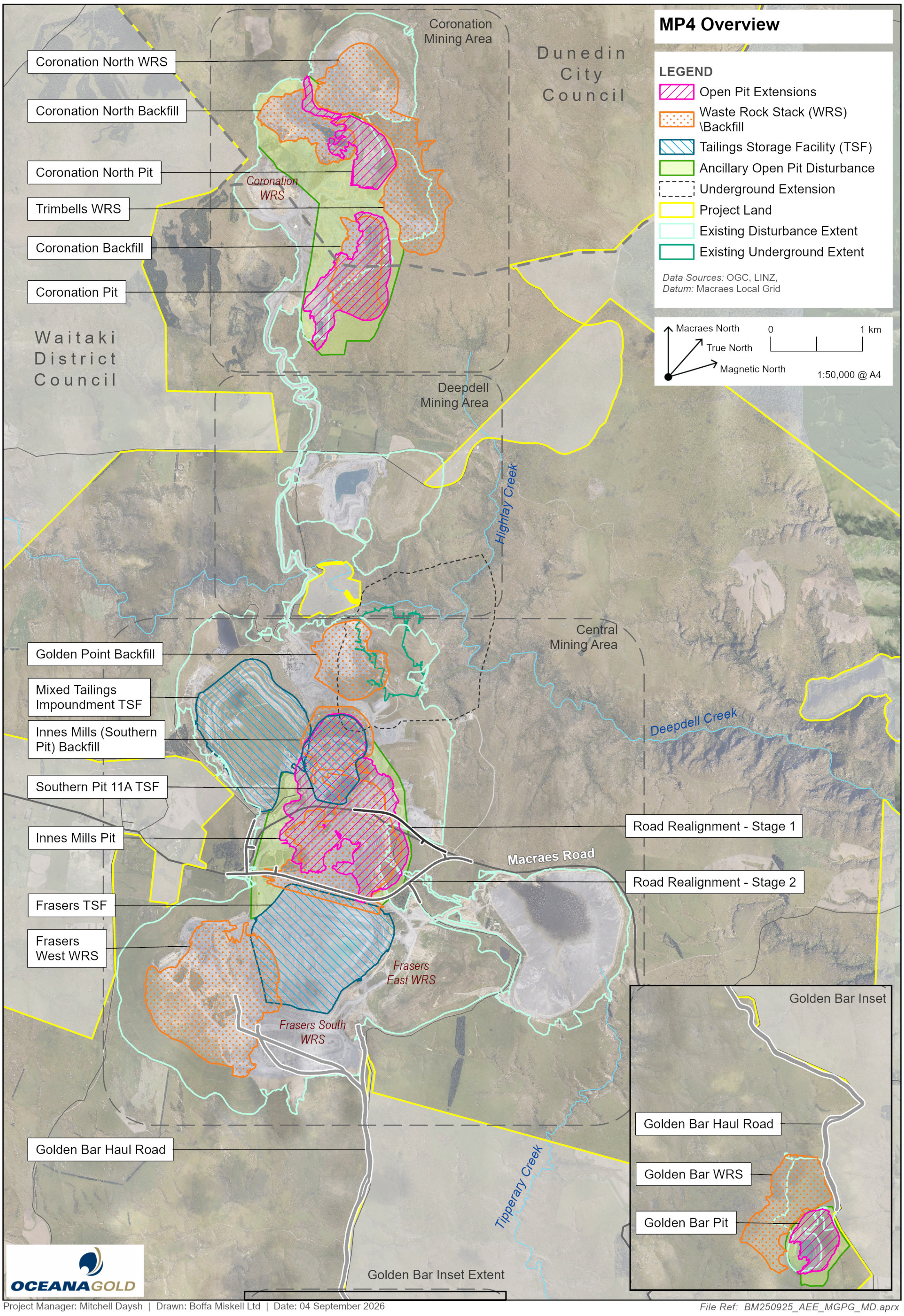


**Figure 2: MP4 Overview Plan**

The topography in the Macraes Flat area is dominated by a gently undulating remnant schist peneplain. Regional drainage patterns are dominated by east and north striking fault orientations and strike ridges of the east dipping foliation, with streams often extended along faults, joint sets, or more erodible lithological units.

The site contains several TSFs, including the Top Tipperary TSF (TTTSF), FTSF, the MTI, SP10 and SP11. Currently, all operational tailings are pumped to the FTSF for final deposition. A plan of the MTI, SP10 and SP11 TSF locations is presented in Figure 3.

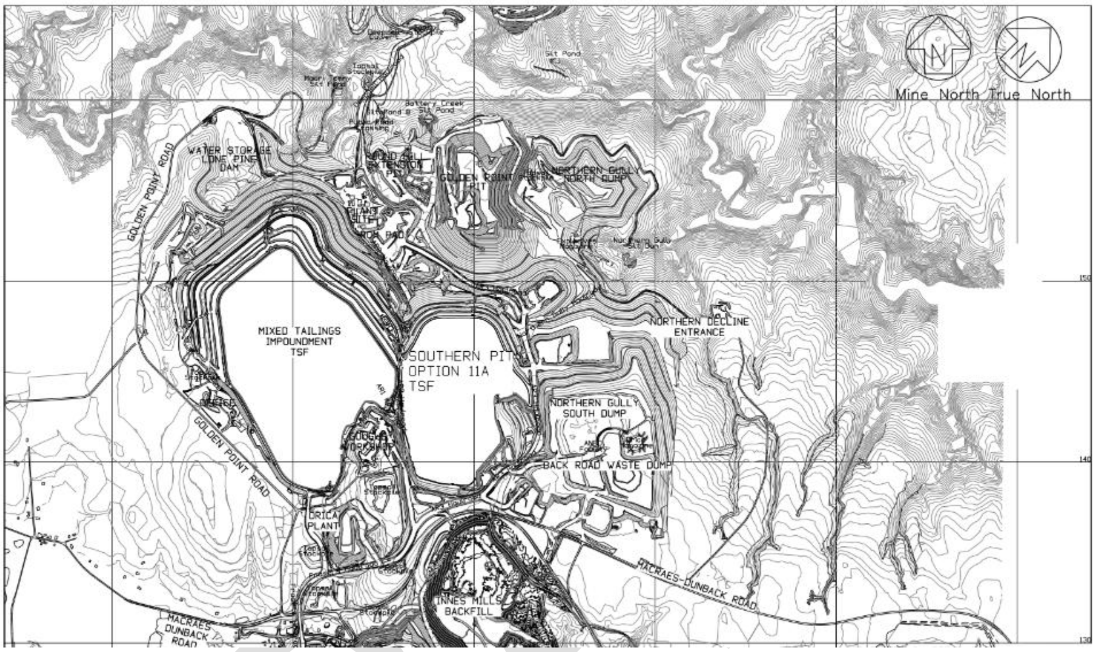


**Figure 3: TSF Site Layout**

# 4 TSF OPERATIONAL OVERVIEW

## 4.1 SP10 and SP11

The SP11 TSF lies immediately east of the MTI**.** Tailings deposition into SP11 began in March 2006**.** The facility is formed by a zoned earth and rockfill embankment constructed from mine waste rock. OceanaGold holds resource consent to raise the SP11 embankment height of RL551 and Building Consent to RL544, which is the current embankment crest level.

The MTI**,** located west of SP11, was the first tailings facility built at Macraes, with construction commencing in 1990. It received continuous tailings deposition until 2002, when a second TSF, SP10**,** was commissioned. After approximately 16 months of deposition into SP10, tailings discharge cycled back to MTI.

From 2003 to 2004, deposition alternated between MTI and SP10 to support staged embankment lifts, including raising the SP10 embankment to RL525**.**

Construction of the SP11 Embankment commenced in 2005**,** reaching RL525 in early 2006 and RL530 later that year. Tailings deposition into SP11 progressed from March 2006 to December 2007**,** during which time SP11 reached its design capacity and fully covered the underlying SP10 TSF (crest RL525). Thereafter, SP10 no longer functioned as a dam.

Following the filling of SP11, deposition reverted to MTI while the first upstream lift of SP11 to RL537 was constructed. Tailings were again discharged to SP11 between May 2009 and February 2010, after which the second upstream lift to RL544 was completed. SP11 then received a final period of tailings deposition between May 2011 and January 2012. No further tailings have been placed in SP11 since January 2012. Note that SP11 is also known as SP11A and these names are used interchangeably.

This sequence reflects the alternating deposition strategy used across MTI, SP10 and SP11 to manage embankment construction, storage capacity, and operational needs over time.

## 4.2 MTI

Construction of the MTI began in 1990, forming a zoned earth and rockfill embankment within Māori Tommy Gully. The structure was originally designed to a crest elevation of RL490, but was later redesigned to increase storage capacity, with the crest raised to RL515 by September 2001.

In late 2002, consents were granted to raise the embankment further to RL526 using a combination of downstream and upstream construction, followed by approval in May 2005 to extend the crest to RL527. The staged lifts above RL515 were completed between 2002 and 2005 including the placement of the rockfill mattress for this section of upstream construction.

Additional resource consents obtained in November 2006 allowed the crest to be progressively raised to RL551. Subsequent lifts were completed as follows:

- RL533 in 2007
- RL539 in 2010
- RL545 in 2012
- Final lift to RL548 in 2013, the current crest level.

Embankment construction followed strict technical specifications, including routine testing of fill properties (density, permeability, grading, moisture). Embankment performance has been monitored through piezometers, survey prisms, seepage measurements, and regular visual inspections.

Tailings deposition into MTI commenced on 10 February 1991. Initially, only flotation tailings were discharged, with concentrate tailings placed in a separate upstream impoundment. A mixed tailings strategy began in 1993, consolidating all tailings deposition into the MTI facility. Tailings were briefly separated again in 1998–1999 during a process plant upgrade but returned to mixed deposition thereafter, with tailings also directed to SP10/11 as required. Additional deposition capacity was added with the commissioning of the TTTSF in October 2013.

Throughout its life, tailings have been predominantly discharged sub-aerially from the embankment crest, forming extensive beaches and a decant pond to the south. MTI has also experienced several resting periods to support construction of embankment lifts and to optimise tailings consolidation before further upstream development.

The general layout of SP11 and MTI is presented in Figure 4.

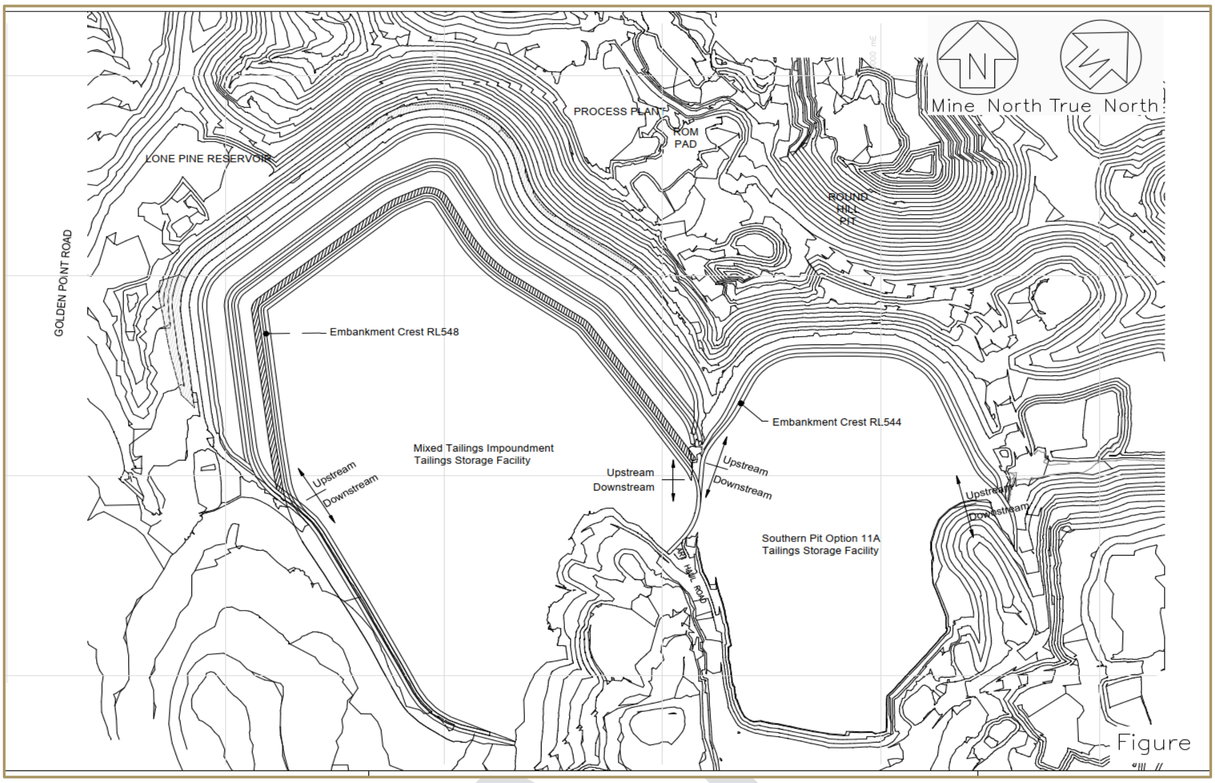


**Figure 4: General Layout of MTI and SP11 TSFs**

## 4.3 Dam Safety Management and Other Management Plans

All TSF's at the Macraes operation operate within New Zealand's dam safety and environmental regulatory framework, which includes compliance with resource management consents and building consents.

These consents contain conditions that, inter alia, include land use, tailings discharge, water management, embankment construction and TSF operation, maintenance and surveillance requirements.

These facilities have been designed and operated in alignment with the New Zealand Society on Large Dams **(NZSOLD)** dam safety guidelines, which form the national good practice benchmark for TSF design, monitoring, construction and performance management.

Dam safety legislation was enacted in 2022 (the Building (Dam Safety) Regulations 2022). The regulations provide a minimum level of acceptance for dam safety whereas the NZSOLD guidelines reflect recommended industry practice.

As required by the dam safety regulations, the Macraes Operation has a Dam Safety Assurance Programme (DSAP). The DSAP is a management system that applies to all tailings storage facilities on the Macraes mine site. Key elements of the DSAP are set out within referenced documents:

- Operation, Maintenance and Surveillance (OMS) manual
- Emergency Action Plan (EAP)
- Annual Intermediate Dam Safety Review (IDSR) reports
- Comprehensive Dam Safety Review (CDSR) reports

Table 1 below sets out these documents.

| Level | Source |
|---|---|
| Legislation | NZ Building Act 2004 |
| | NZ Building (Dam Safety) Regulations 2022 |
| | MBIE (2025) Guide to complying with the Dam Safety Regulations |
| Industry Guidelines and Standards | NZSOLD (2024) New Zealand Dam Safety Guidelines |
| | ICOLD (2022) Bulletin 194 Tailings Dam Safety |
| | GISTM (2020) Global Industry Standard on Tailings Management |
| Corporate Standards | OceanaGold - Statement of Position - Tailings Storage Facility Management 2021 |
| | OGC-450-STD-019-0 Environmental Performance Standards Manual |
| Macraes Site Documents | MAC-205-RMX-000 Macraes Tailings Management RACI |
| | Operation, Maintenance and Surveillance (OMS) Manuals<br>▪ MAC-205-MAN-001 OMS Manual – MTI (EGL ref 6961)<br>▪ MAC-205-MAN-002 OMS Manual – SP11A (EGL ref 6793)<br>▪ MAC-205-MAN-003 OMS Manual – TTTSF (EGL ref 6846)<br>▪ MAC-205-MAN-004 OMS Manual – FSTF (WSP PS204746-REP-024) |
| | Emergency Action Plans<br>▪ MAC-205-PLN-001 EAP – Macraes Tailings Storage Facilities |
| | MAC-205-EMP-000 Tailings Environmental Material Risk Management Plan |
| | MAC-253-PCP-000 Macraes Emergency Management Principal Control Plan |
| | MAC-253-TRP-003 Emergency Trigger Action Response Plans<br>(TARP 8 = TSF Failure, TARP 12 = Earthquake, TARP 14 = Flooding) |

The main design risks during hydraulic mining and deconstruction are stability of the existing TSFs, internal erosion from seepage or piping, and stability when subjected to design earthquake ground motions. These risks can be mitigated through control of construction staging, monitoring and surveillance, and by using a dam designer with appropriate experience. The NZDSG requires the design of High Potential Impact Classification (PIC) dams to be subject to peer review. A peer reviewer with High PIC dam experience will be engaged to review the design for building consent.

The risks associated with poor construction will be mitigated through using experienced personnel. The construction will be undertaken primarily by OGNZL personnel. OGNZL has two decades of experience in the construction of similar High PIC dams. On-site construction will be managed by competent supervisors with experience in the construction of similar High PIC dams.

Hydraulic mining will be designed and undertaken to ensure the existing upstream lifts do not cause liquefaction (static or seismic induced) leading to potential TSF failure to the environment outside the footprint of MTI. Hydraulic mining will require effective control of jetting water to avoid re-saturation of the tailings. This means that grade control and sump management will be supervised closely.

Detailed assessment of stability of the upstream lifts will be undertaken prior to the removal of tailings from a dam safety perspective. This will include the detailed assessment of the hydraulic mining decant pond pontoon position and its effect on stability.

The decant pond during hydraulic mining will be located as far away from the upstream lifts as practicable to minimise saturation of the upstream raised profile during normal hydraulic mining and to mitigate the pond flooding the area above the upstream lifts in the event of an extreme flood. Decant pond location will be reviewed in detailed design.

Management of environmental effects from hydraulic mining activities will fall under the umbrella of the site environmental management system including specific management plans for air quality; and noise, airblast, vibration and lighting.

Dust management will be undertaken throughout construction. Hydraulic mining will expose tailings surfaces. Areas with active hydraulic mining will remain wet. In areas where active hydraulic mining is not in place, dust will be controlled by spraying dry surfaces with water or a surface binding agent. Dust management will consider dam safety implications of creating saturated tailings against upstream embankments.

# 5 HYDRAULIC MINING METHODOLOGY

## 5.1 Overview of Hydraulic Mining Method and Dam Deconstruction

Hydraulic mining is a water-based reclamation method used to recover tailings by directing a high-pressure water jet onto a material face to break down, mobilise, and transport the material as slurry. It is widely used in tailings reclamation because it enables remote, continuous, and low-impact material recovery compared with mechanical methods.

Hydraulic mining relies on the key mechanisms described below and illustrated in Figure .

A water cannon (also known as a Remote Operating Mining Unit or ROMU) projects a high pressure jet typically 25-30 bar in tailings applications onto the tailings surface. The jet:

- Fractures the material
- Liquefies it
- Creates a flow path that transports the slurry to a sump or collection point.

The repulped tailings forms a slurry that flows by gravity towards a collection sump or trench. Accurate floor gradients and mining geometry are critical to ensure controlled flow and to prevent dead zones or uncontrolled run-off.

At the sump, high-density slurry pumps (typically 30–45% solids by weight in tailings applications) lift the material through pipelines for tailings deposition into the FTSF.

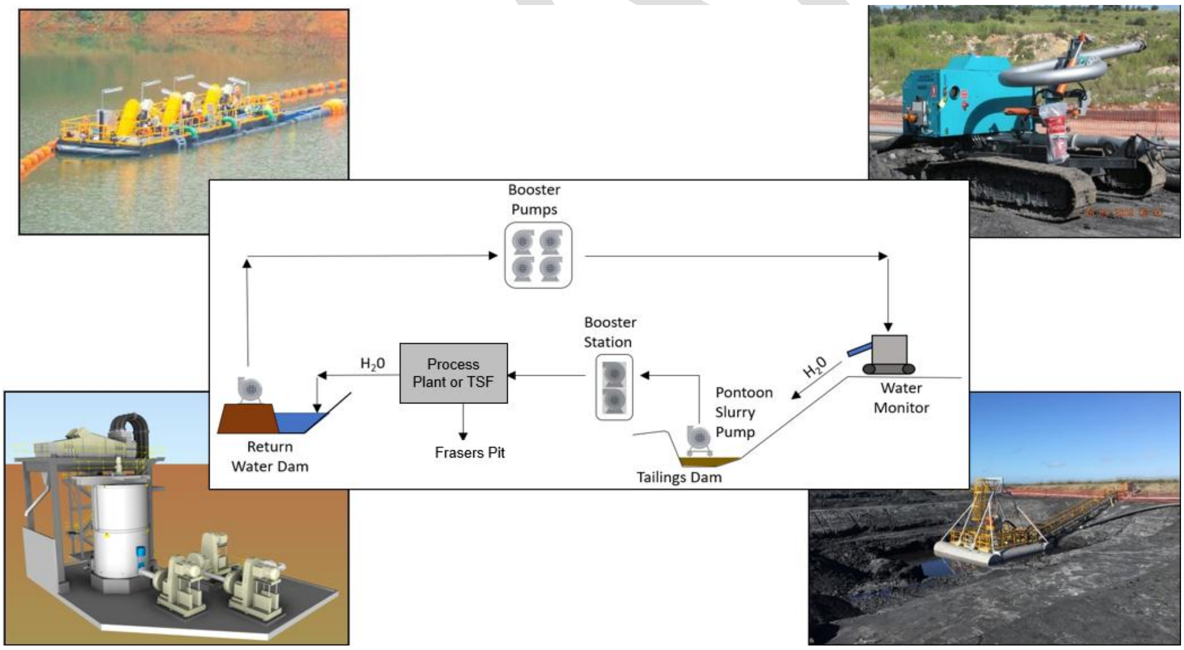


**Figure 5: Hydraulic Mining Process Flow Diagram**

### 5.1.1 SP11

The SP11 tailings are contained by a series of upstream constructed embankments and a primary downstream embankment. The upstream embankments were progressively raised over the tailings beach. These embankments comprise zoned earth fill and rockfill sourced from mine waste rock. As hydraulic mining advances, both the upstream embankments and the main downstream embankment will be progressively reclaimed using conventional excavator and truck methods. The locations of the upstream and downstream embankments are illustrated in Figure 6 with the cross section and geometry illustrated in Figure 7.

The SP11 haul road runs east–west across the SP11 TSF and was constructed using mine waste rock. This haul road, along with the capping layer on the SP11 tailings surface, will need to be removed ahead of hydraulic mining activities. The works will also include the dewatering of the existing water pond located on the southern side of the TSF.

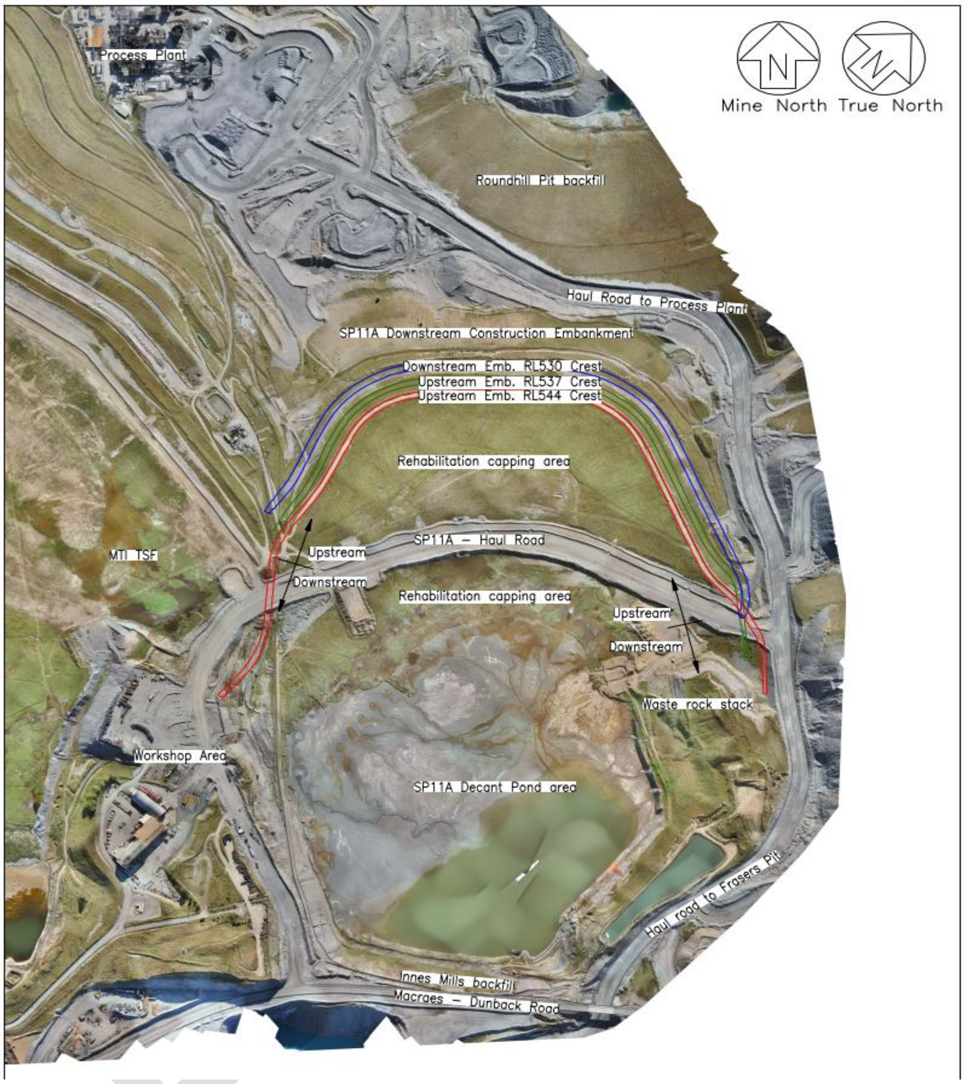


**Figure 6: SP11 Aerial View with Embankment RLs**

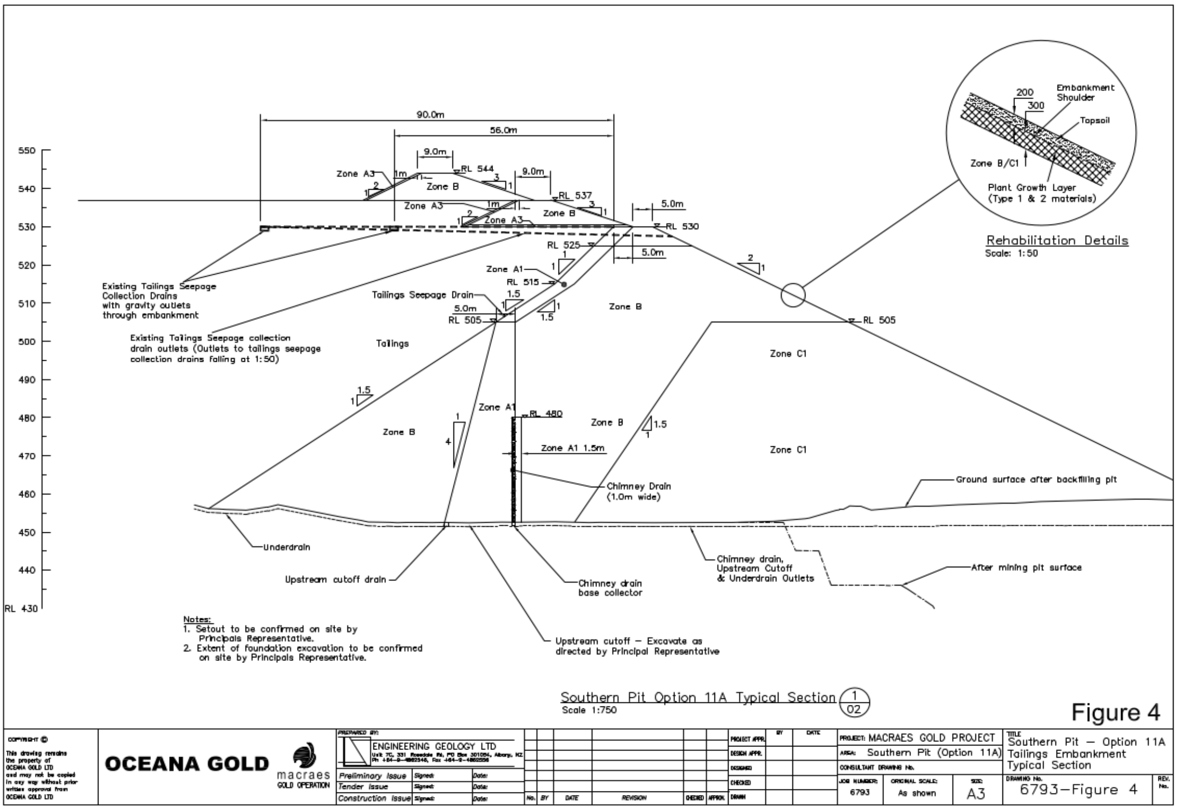


**Figure 7: SP11 Typical Embankment Section**

Sufficient freeboard must be maintained during SP11A remining and embankment deconstruction. This will be achieved through staging embankment deconstruction to follow tailings removal.

The design inflow design flood (IDF) has been assessed based on the 72-hour probable maximum precipitation event, with a climate change adjustment for the operational period. The adopted 72-hour rainfall depth is 806 mm.

The SP11A catchment increases with the removal of the upstream embankments, then stays relatively consistent throughout tailings relocation.

Prior to the removal of upstream embankments, sufficient storage for IDF will be developed within the impoundment to ensure freeboard is maintained at the crest of the lower embankment. This can be achieved by preferentially lowering tailings level in areas away from the embankment crest so IDF can be stored at the southern side of the impoundment, before deconstruction of each upstream embankment.

The PMF run-off volume during SP11A hydraulic mining is estimated at 530,000 m$^3$ (assessed at 530 mRL). The decant pond will be removed once hydraulic mining commences. The freeboard required above the level of flood resulting from a PMP event is 1 m. The required freeboard (i.e. storage depth below embankment) when the SP11A embankment is at 530 mRL has been assessed as 2.3 m.

### 5.1.2 MTI

The upper MTI tailings are contained by a series of upstream-constructed embankments that were progressively raised over the tailings beach. These embankments consist of zoned earth fill and rockfill derived from mined waste. As hydraulic mining progresses, all upstream embankment lifts between RL548 and RL515 (a height difference of about 33 m) will need to be reclaimed mechanically using conventional excavator and truck methods. A cross-section of the MTI upstream and downstream embankments is shown Figure .

Hydraulic mining will terminate at a tailings elevation of RL512, providing a 3 m freeboard below the remaining downstream embankment crest level at RL515 shown in Figure 9. The remainder of the downstream embankment will remain in place, together with the residual tailings located below RL512.

The MTI catchment size increases with the removal of the upstream embankments, therefore the greatest PMF volume is assessed at the final crest level of 515 mRL.

The maximum PMF run-off volume during MTI hydraulic mining is estimated at 981,550 $m^3$.

The existing decant pond will be drawn down before hydraulic mining commences, with water managed through the hydraulic mining water management system.

Prior to the removal of each upstream embankment, sufficient storage for IDF must be developed within the impoundment to ensure freeboard is maintained at the crest of the lower embankment. This can be achieved by preferentially lowering tailings level in areas away from the embankment crest so IDF can be stored towards the southern side of the impoundment before deconstruction of each upstream embankment.

As hydraulic mining progresses, the original ground surface at the southern end of MTI will be exposed, which falls towards the northern side of MTI.

The freeboard required above the level of flood resulting from a PMP event is 1 m. The total freeboard requirement (i.e. storage depth above tailings surface) is 5.4 m from the lowest tailings elevation.

The assessed freeboard for the concept closure surface (average tailings level 512 mRL, falling from 514.5 to 509 mRL) is 6.1 m from the lowest tailings elevation.

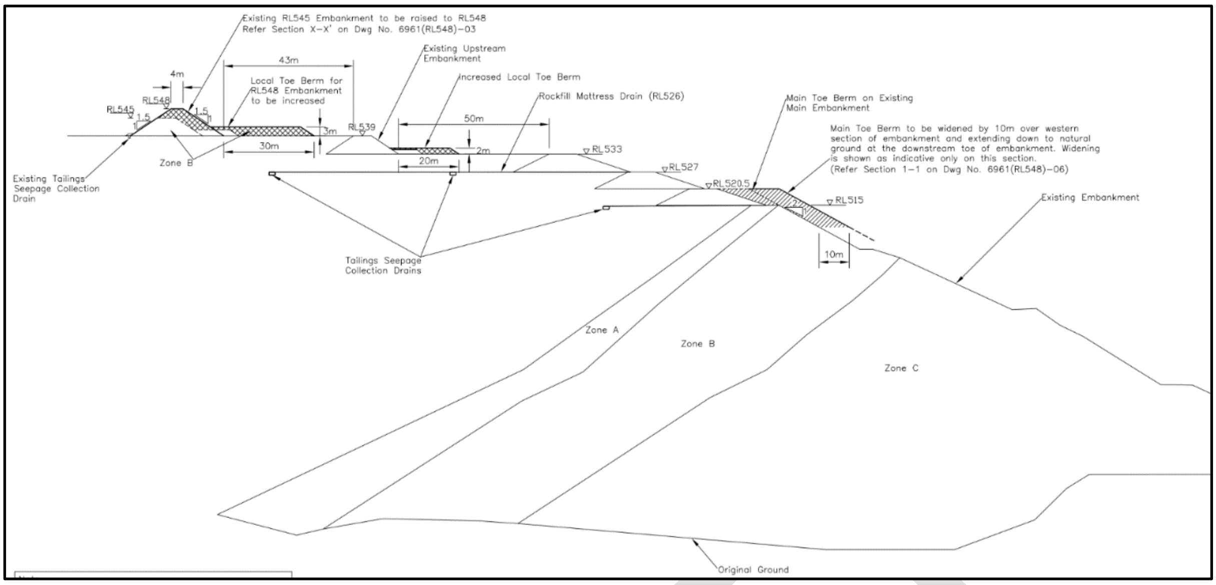


**Figure 8: MTI Embankment Typical Section**

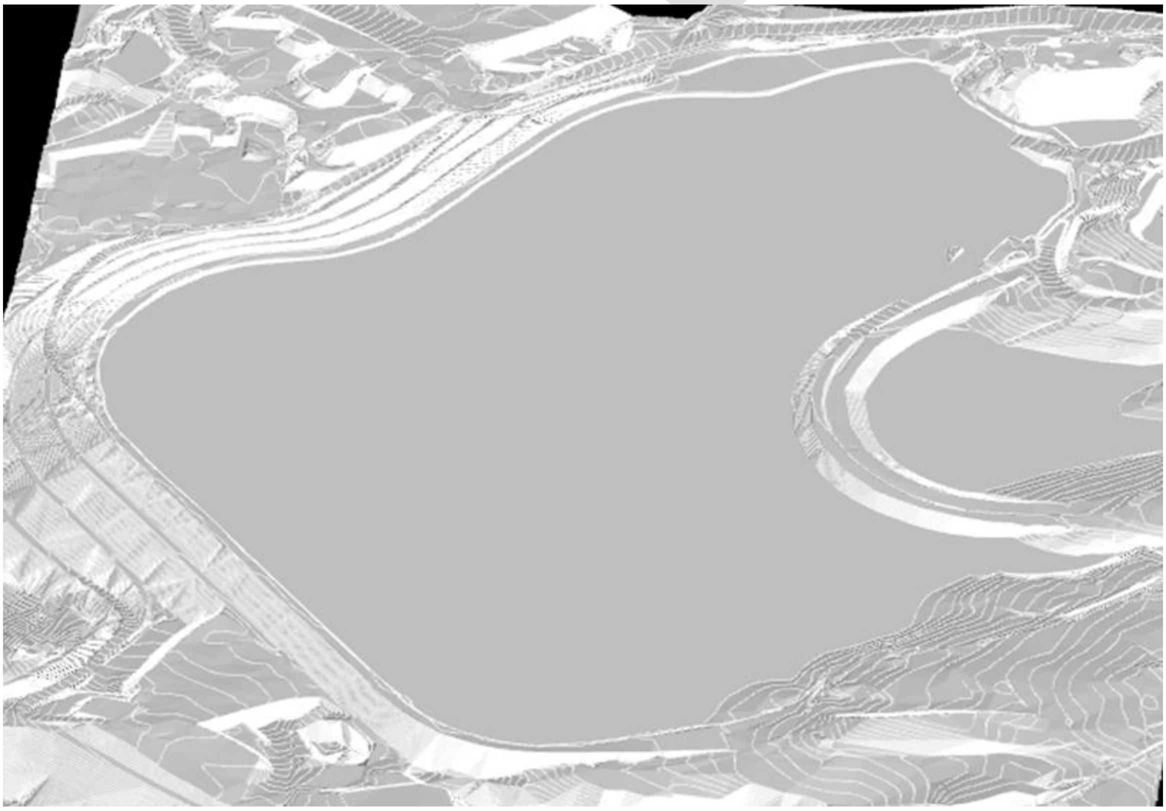

**Figure 9: MTI Tails at RL512 and Embankment at RL515**

## 5.2 Commissioning and Ramp-up

### 5.2.1 Dry Commissioning

Dry commissioning will involve verifying that all mechanical, electrical, and control systems function correctly before introducing water or slurry. This includes equipment installation checks, power-up tests, rotation checks, valve actuation, instrumentation calibration, control logic testing, and communication/SCADA (supervisory control and data acquisition) verification. Dry commissioning ensures that the system is mechanically complete and ready for safe wet operation.

### 5.2.2 Wet Commissioning

Wet commissioning will introduce water and slurry into the system for the first time. This stage validates hydraulic performance, including pump operation under load, monitoring of pressure and flow requirements, sump performance, slurry line velocity, and instrumentation under operating conditions. Wet commissioning ensures that the system performs as designed and can support initial mining operations.

### 5.2.3 Ramp-Up

Following successful wet commissioning, hydraulic mining will commence at reduced throughput and progressively increase as operational stability is achieved. A ramp-up will allow the mining, pumping, and water supply systems and the operating team to reach full, steady state production under controlled conditions.

## 5.3 Pontoon Sump Design

Before hydraulic mining can commence, a sump will be excavated within the tailings to allow for installation of the pontoon-mounted slurry pumping system for slurry collection during hydraulic mining. This sump is an engineered excavation with defined slope and bench requirements as presented in Figure  to accommodate return slurry piping, electrical connections, and access walkways for maintenance.

After completion of mining for each installed flitch, the pontoons will be relocated to the next bench level into a newly excavated sump.

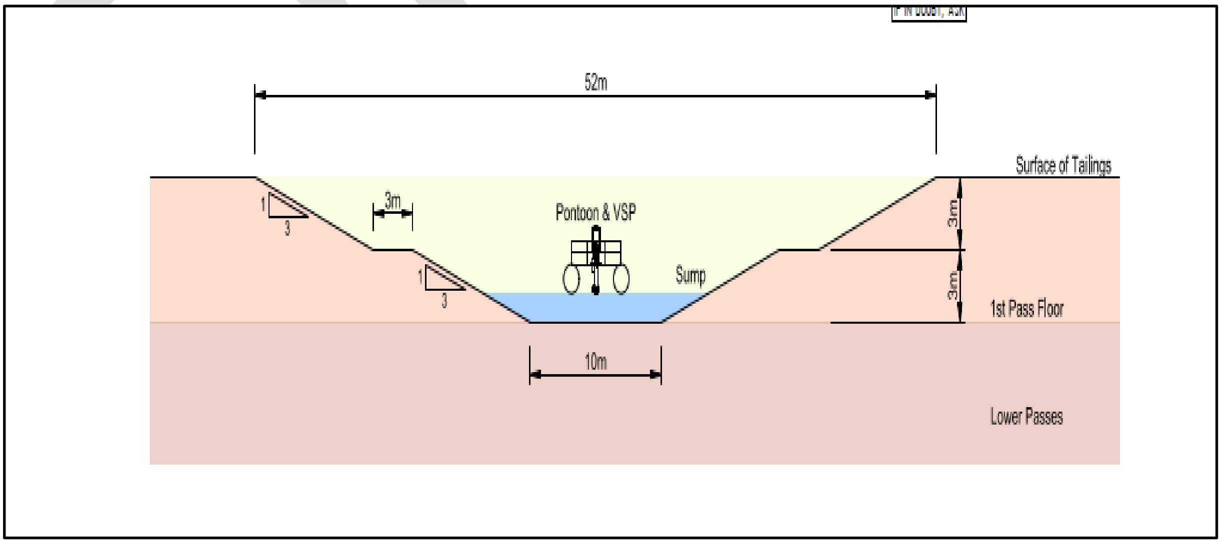


**Figure 10: Pontoon Sump - Concept Design at 6m depth**

## 5.4 Launder and Bench Development

The main launder and trenches will be hydraulically mined at an approximate side slope of 27° (1V:2H) with a maximum crest width of 45 m and a maximum bench height of 6 to 9 m. An overall floor grade (tailings beach angle) of 0.6% (H150:V1) has been designed, based on the current TSF beach angle, draining toward the slurry collection sump. The main launder must be developed first to establish the initial void required for subsequent mining blocks to drain into.

An example of conventional launder development is depicted in Figure 11.

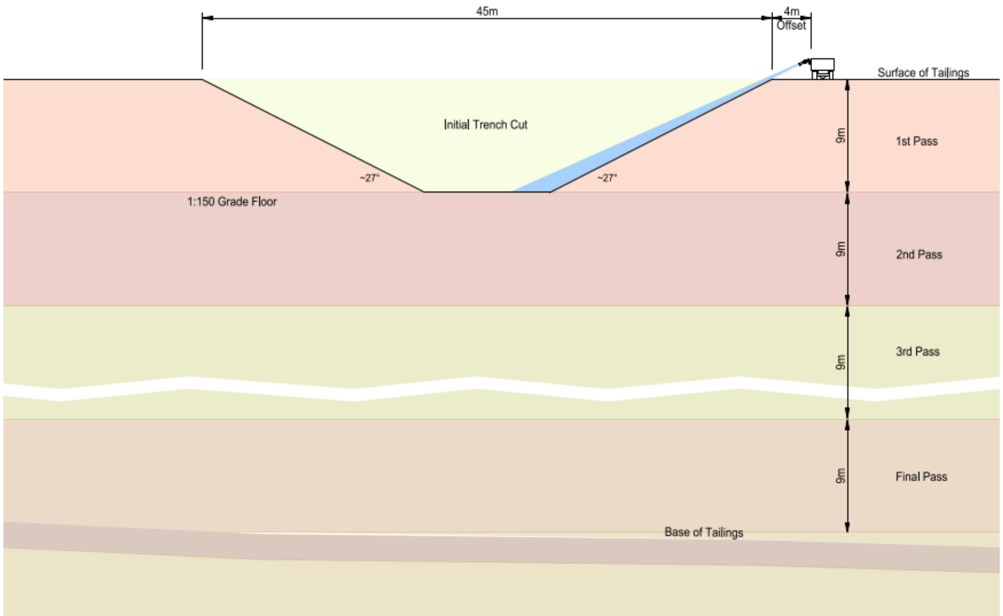


**Figure 11: Hydraulic Mining Launder Typical Cross Section example at 9m flitches**

Bench development is a critical component of the hydraulic mining process. Trenches mined from the main launder create defined mining blocks, as illustrated in Figure 2, Figure 13, and Figure 14. These trenches assist in dissipating pore pressures within the mining slope, thereby improving bench stability. Trenches also provide operational flexibility, allowing movement between mining blocks particularly important when a mining zone is more saturated and surface cracking begins to appear. Such cracking is an early indicator of potential instability and is typically observed in areas that have experienced prolonged saturation, such as former water storage pond locations on the TSF.


**Figure 12: Launder Development during Hydraulic Mining**


**Figure 13: Trench Development during Hydraulic Mining**


**Figure 14: Bench and Mining Block Development during Hydraulic Mining**

## 5.5 Pontoon Locations

Pontoon locations have been defined for each mining phase throughout the hydraulic mining development for SP11, SP10, and MTI. The pontoons are strategically positioned on either side of the common abutment separating the SP11 and MTI tailings facilities. The abutment comprises competent in-situ rock.

This configuration enables the following activities to be conducted progressively during hydraulic mining:

- Progressive deconstruction of the SP11 and MTI embankments: These materials are unsuitable for hydraulic mining and will be removed mechanically with excavators and trucks as mining advances.
- Safe installation of pontoon services: Power, pipelines, and associated services are placed on the abutment between the two embankments, keeping them clear of deconstruction works.
- Stable foundation for pontoon installation: The rock abutment provides a secure platform for lifting equipment to position the pontoons.
- Maximised tailings reclamation near the pit wall: Hydraulic mining recovers tailings as close as practical to the old Southern Pit highwall. After each bench drop, an estimated 2 m tailings skin will remain; this can be scraped by excavator and placed onto the next bench for recovery in the subsequent flitch.
- Exposure of historical access ramps: As mining progresses toward the pit wall, old in pit ramps become exposed, enabling support equipment to access the mining area and service hydraulic mining operations.

The strategic positioning of the pontoons will also help manage geotechnical risks associated with potential wetting or seepage into the embankments resulting from slurry collection during hydraulic mining. The initial pontoon location is offset by approximately 170 m from the constructed embankments. As the pontoons are advanced down the pit or along the southern highwall, this separation distance increases due to the expanding footprint created by the deconstruction of upstream raises. This process exposes additional tailings surface area that was previously covered by construction fill, thereby providing a substantial buffer that minimises hydraulic loading, reduces seepage risk, and maintains embankment stability.

The old Southern Pit highwalls that will be re-exposed by tailings removal are assumed to be stable for the purposes of this Management Plan. The pit wall geotechnical stability will be assessed prior to the commencement of hydraulic mining and associated operational activities. Particular consideration will be given to potential changes in groundwater conditions and seepage regimes resulting from hydraulic mining, which may influence pit wall stability.

### 5.5.1 SP11 Pontoon Locations

The SP11 pontoon locations are presented in Figure 15 and Figure 6.

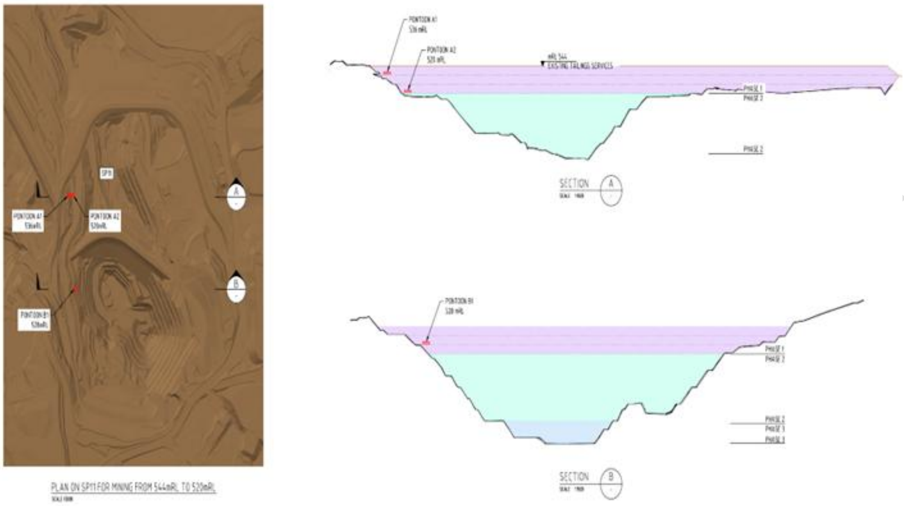


**Figure 15: SP11 Pontoon Locations from RL544 to RL520 (SP11 – Total Tailings Across Surface)**

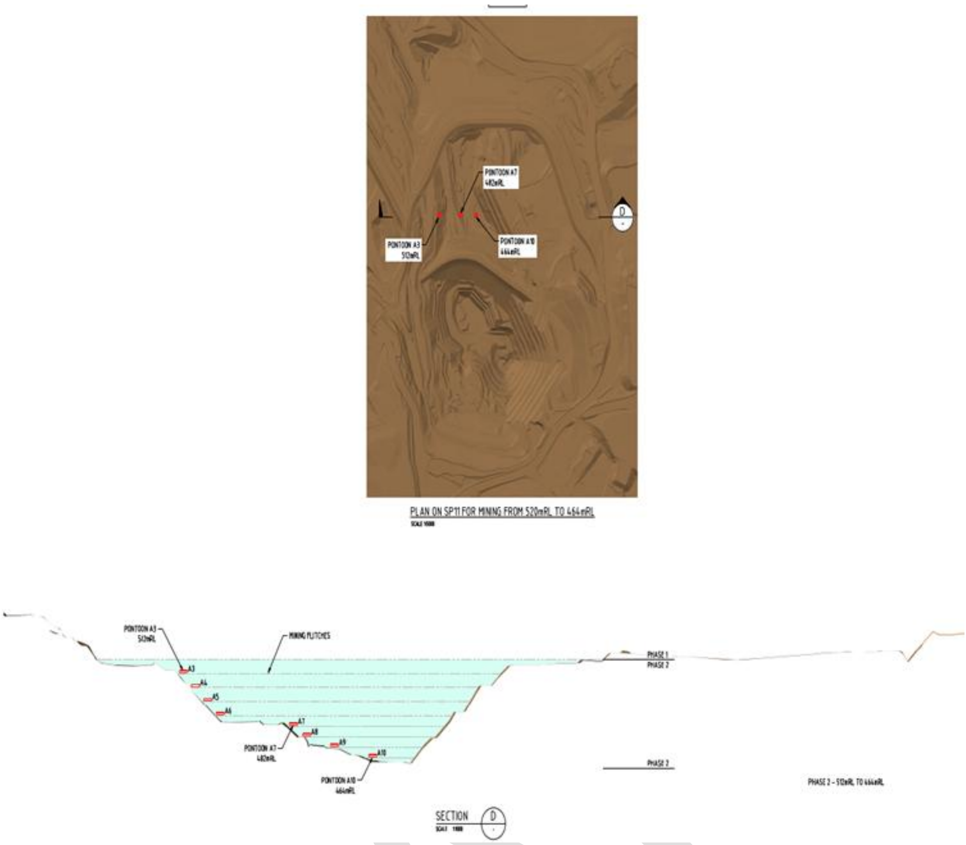


**Figure 16: SP11 Pontoon Locations from RL520 to RL464 (SP11 Post SP10 Embankment Exposure)**

### 5.5.2 SP10 Pontoon Locations

The SP10 pontoon locations are presented in Figure .

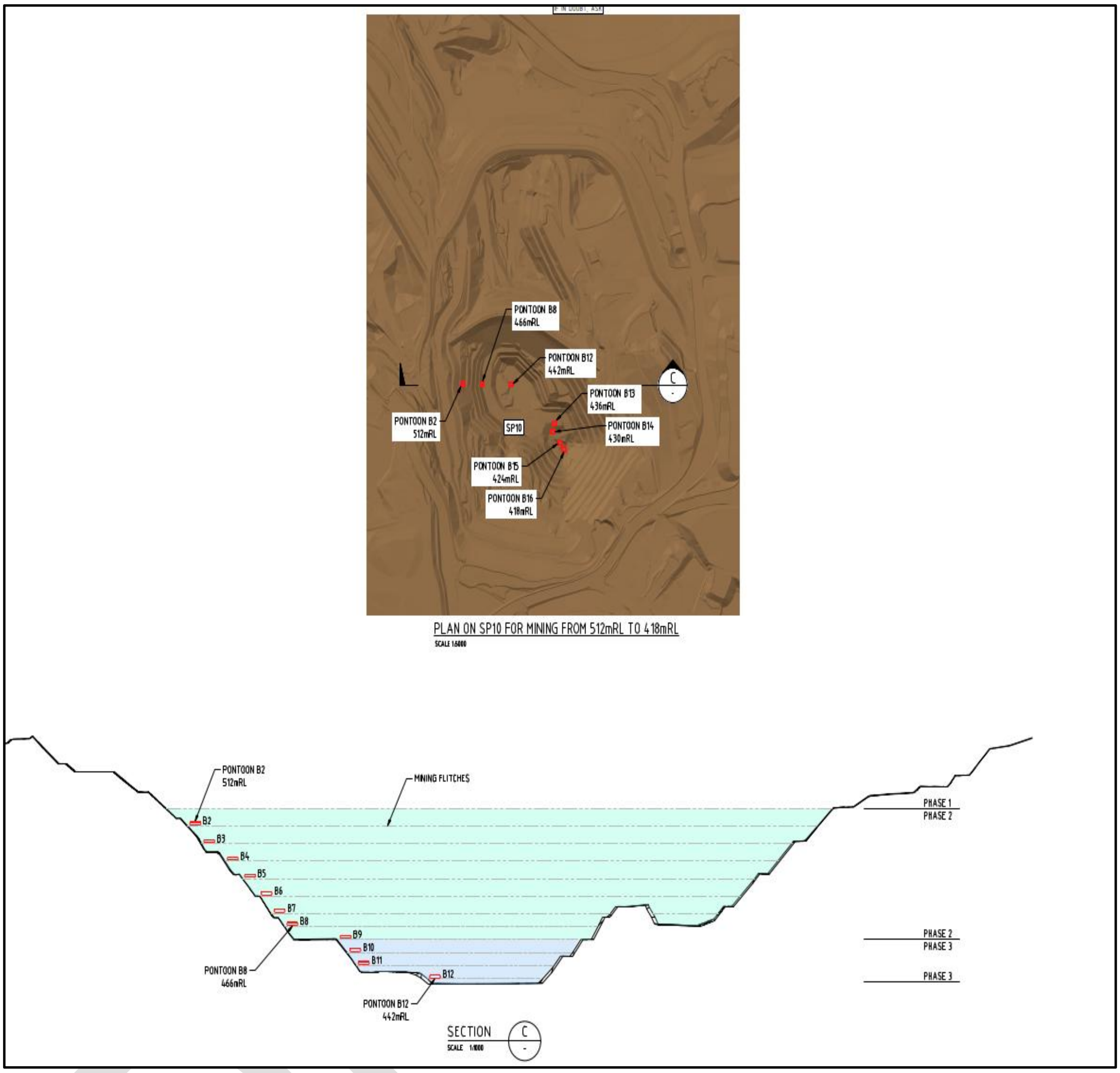


**Figure 17: SP10 Pontoon Locations from RL512 to RL418 (SP10 Post Embankment Exposure)**

### 5.5.3 MTI Pontoon Locations

The MTI pontoon locations are presented in Figure 18.

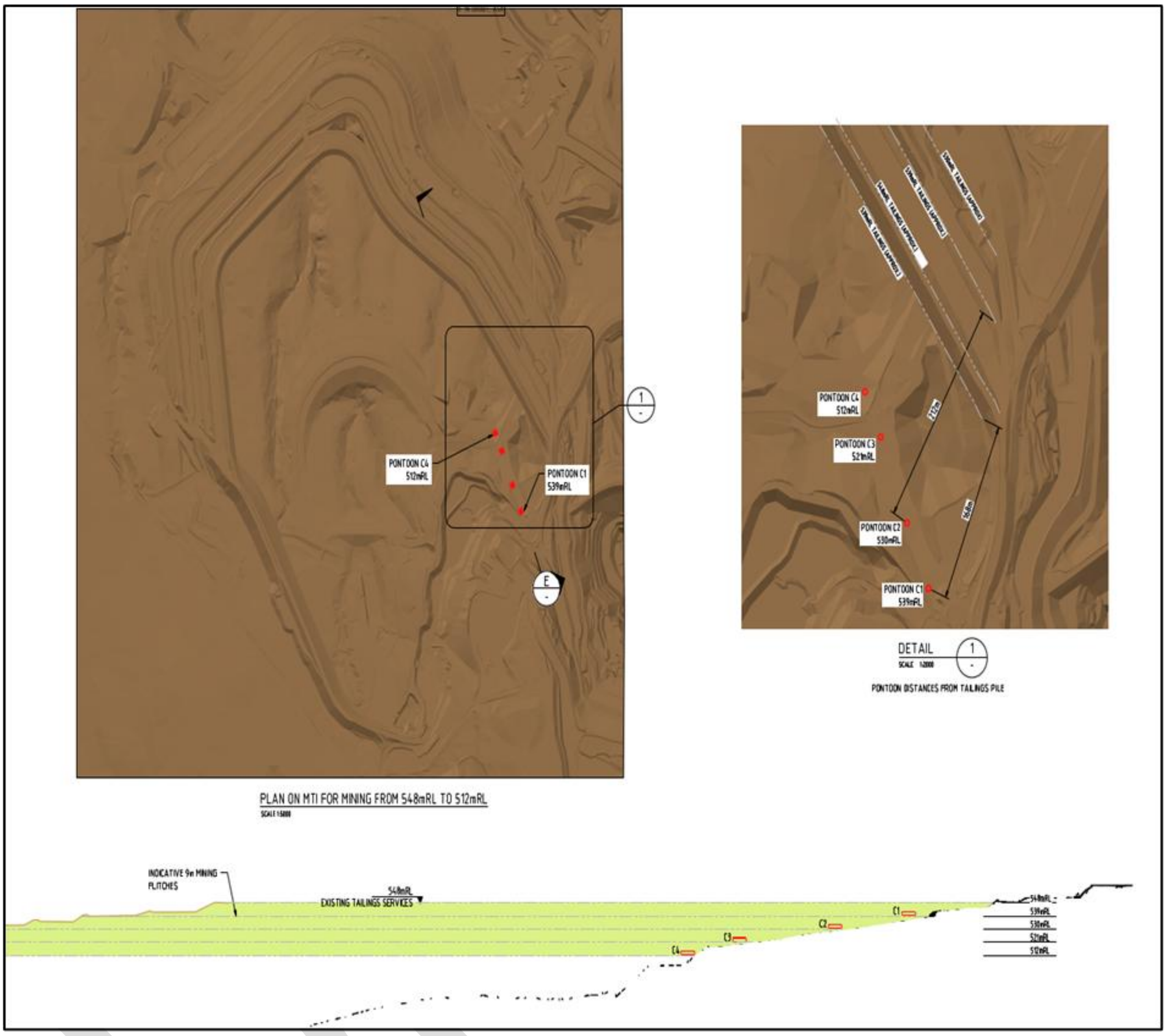


**Figure 18: MTI Pontoon Locations from RL548 to RL512**

## 5.6 Mining Phases, SP11, SP10 and MTI

The MP4 hydraulic mining plan and staged development are inherently complex due to a combination of topographical and operational constraints. Key constraints include the central embankment separating the SP10 and SP11 facilities and the progressive narrowing of the pit at depth. These constraints directly influence mining sequence, achievable production rates, and the timing and coordination of hydraulic mining infrastructure relocation.

To address these constraints, the mining plan has been developed around a phased operating strategy, whereby hydraulic mining is undertaken within discrete operating areas, SP11, SP10, or MTI throughout the life of the project. Each operating period is defined as a mining phase. The approach is based on maintaining production in one TSF while preparation works, including pontoon relocation and infrastructure setup, are undertaken in an alternate TSF.

The sequence involves mining in SP11 while SP10 is prepared for pontoon relocation, followed by a changeover to SP10 once the active flitch in SP11 has been fully reclaimed. This alternating sequence continues between SP11 and SP10 until SP11 is fully depleted. As SP10 extends to significantly greater depths than SP11, hydraulic mining equipment is subsequently relocated to MTI following completion of SP11, after which an alternating operational sequence is adopted between SP10 and MTI. The individual mining phases are described below and presented in Table Table 2: Mining Phases between SP11, SP10 and MTI2.

**Table 2: Mining Phases between SP11, SP10 and MTI**

| Phase | TSF | Range (RL) | Nominal Production (t/h) | ROMU Configuration | Notes |
|---|---|---|---|---|---|
| 1 | SP11 | 544 - 520 | 1,200 | 3 operating ROMUs + 2 standby | Sufficient surface area to support full ROMU deployment; initial high-productivity phase. Alternating between Pontoon A and Pontoon B |
| 2A | SP11 | 512 - 504 | 900 | 2 operating ROMUs + 1 standby | Reduced surface area with depth and internal SP10 embankment wall daylight; production adjusted accordingly. Alternating with SP10 – Pontoon B |
| 2B | SP11 | 496 - 464 | 450 | 1 operating ROMU | Reduced surface area with depth and internal SP10 embankment wall daylight; production adjusted accordingly. Alternating with SP10 – Pontoon B |
| 3 -4 | SP10 | 512 - 464 | 900 | 2 operating ROMUs + 1 standby | Reduced surface area with depth and internal SP10 embankment wall daylight; production adjusted accordingly. Alternating with SP11 – Pontoon A |
| 4 -5 | SP10 | 458 - 418 | 450 | 1 operating ROMU | Reduced surface area with depth; production adjusted accordingly. Alternating with MTI – Pontoon A |
| 5 | MTI | 548 - 512 | 1200 | 3 operating ROMUs + 2 standby | Sufficient surface area to support full ROMU deployment; initial high-productivity phase. Alternating with SP10 – Pontoon B |

### 5.6.1 SP11 – Phase 1 and Phase 2

**Phase 1** mining is initiated in SP11 at a nominal production rate of 1,200 tonnes per hour. At this stage, the available surface area is sufficient to accommodate three operating ROMUs, with provision for two additional ROMUs on standby. This production rate is maintained from elevation RL544 down to RL520.

**Phase 2** continues in SP11 as the available operating area reduces with depth. Production rates are reduced in line with decreasing surface area and pit geometry. Mining is undertaken at:

- 900 tonnes per hour between elevations RL512 and RL504, using two operating ROMUs with one ROMU on standby, and
- 450 tonnes per hour between elevations RL496 and RL464, using a single operating ROMU.

The slurry pontoon is installed at the lowest practicable elevation in SP11, at RL464, which is estimated to be 1 to 2 m above the in-situ rock surface, representing the finite base of the SP11 tailings. Residual tailings below this elevation are not recoverable by hydraulic means and will require mechanical reclamation, or alternatively mechanical excavation and stockpiling for subsequent hydraulic reclamation where practicable.

Upon completion of hydraulic mining in SP11, the hydraulic mining equipment and associated slurry pontoon infrastructure are relocated to the MTI.

### 5.6.2 SP10 – Phase 3 and Phase 4

**Phase 3** mining in SP10 is undertaken between elevations RL512 and RL464 at a nominal production rate of 900 tonnes per hour, reflecting the available operating area and flitch geometry.

**Phase 4** continues in SP10 from elevation RL458 down to RL418, with production reduced to 450 tonnes per hour due to the significantly reduced pit diameter and constrained surface area at depth. Tailings below RL418, estimated to be 1 to 2 m in thickness, cannot be reclaimed hydraulically due to limitations in slurry pickup at the pontoon pump intake and will therefore require mechanical reclamation.

### 5.6.3 MTI – Phase 5

Phase 5 mining commences in MTI between elevations RL548 and RL512. Mining in MTI will be undertaken in an alternating sequence with SP10 Phase 4 (RL458 to RL418), allowing for ongoing pontoon relocation and preparation works while maintaining continuous production.

This alternating operational approach between SP10 and MTI enables the progressive relocation of slurry pontoon structures to successive lift depths while maintaining continuous production. The strategy minimises downtime associated with infrastructure relocation and ensures hydraulic mining can continue in parallel with pontoon relocation activities until all tailings within the relevant sections have been recovered.

## 5.7 Production Rate Assumptions

The stated production rates are derived from the ROMU design capacity, available surface area per flitch, and assumed mining advance rates. Production has been modelled as constant, based on an assumed in-situ bulk density of 1.38 t/m³. This density has been calculated (as an average) based on the actual surveyed volume of deposited tailings and the corresponding dry tonnage of tailings placed.

These assumptions do not explicitly account for potential variability associated with consolidation effects, differential settlement, moisture content variations, or particle size distribution, as these material characteristics are currently not fully defined. As such, variability in actual production performance may occur as mining progresses, particularly with depth.

## 5.8 Operating Strategy and Pontoon Sequencing

The alternating operational approach between SP10 and MTI enables the progressive relocation of slurry pontoon infrastructure to successive lift depths while minimising production downtime. This strategy allows hydraulic mining to continue in one operating area while pontoon relocation and preparation activities are completed in the alternate area, thereby maintaining production continuity until all tailings within the respective sections have been reclaimed.

The operating strategy described should be read in conjunction with the pontoon location and layout drawings presented above. These drawings illustrate the planned installation locations and sequential movements of the slurry pontoons throughout the life of the hydraulic mining operation.

Two primary slurry pontoons are used under the operating strategy:

- Pontoon A, which will be initially installed in SP11 and is sequentially relocated within SP11 as mining progresses through successive flitches. Individual pontoon positions within SP11 are designated A1, A2, A3, etc., corresponding to each flitch or operating elevation. Upon completion of hydraulic mining in SP11, Pontoon A is relocated to MTI, where the same sequential positioning approach is applied.

- Pontoon B, which will be installed in SP10 and is sequentially relocated within SP10 only. Pontoon B positions are designated B1, B2, B3, etc., corresponding to successive SP10 flitches. Pontoon B remains within SP10 for the duration of SP10 hydraulic mining and is not relocated to other TSFs.

The mining sequence alternates between pontoon positions in accordance with the phased operating strategy, typically progressing in the order A1, B1, A2, B2, etc. This alternating sequence enables hydraulic mining to continue in one TSF while pontoon relocation, infrastructure setup, and preparation works are undertaken in the alternate TSF, thereby minimising production downtime and maintaining operational continuity.

The pontoon layout drawings in Section 5.4 provide a spatial representation of this sequencing logic and should be used as the primary reference for understanding pontoon movements, flitch transitions, and the relationship between mining phases and infrastructure relocation.

## 5.9 Alignment of Mining Phases and Production Scheduling

The mining phases defined in Section 5.6 are aligned with the production scheduling framework and reflect changes in achievable production rates associated with operating area, pit geometry, and elevation. Phase boundaries are therefore primarily driven by variations in available surface area and resulting ROMU deployment and throughput, rather than by the physical sequencing of mining between slurry pontoons.

Accordingly, while the phases are used to structure the production schedule and to define changes in nominal production rates at different elevations, they do not represent the detailed mining sequence or order of pontoon operation. The actual mining sequence is governed by the alternating pontoon operating strategy described above and illustrated in the pontoon layout drawings, whereby operations alternate between Pontoon A and Pontoon B positions (e.g. A1, B1, A2, B2) to maintain continuous production during pontoon relocation and preparation activities.

This distinction ensures that production scheduling reflects realistic operating constraints and throughput changes, while allowing flexibility in the day-to-day sequencing of pontoon movements within and between TSFs.

An overview of the development of the hydraulic mining methodology and phased operating strategy is provided below.

### 5.9.1 Initial SP11 Operations

Hydraulic mining will commence at Pontoon A1 within SP11 at the initial slurry pump installation elevation. Operations will be conducted between the current tailings surface at RL544 and the initial pontoon installation depth of RL536, corresponding to an eight-metre operating depth.

Mining will initially be undertaken using two ROMU units positioned at the pontoon, with reclamation progressing away from the sump to establish the main launder. Once the main launder has been developed, a secondary launder will be constructed to enable full production. At this stage, all three ROMU units will be deployed.

The establishment of secondary launders provides operational flexibility by allowing three active mining blocks and two standby blocks, each equipped with dedicated pipework and a ROMU. This configuration enables standby units to be brought into service immediately during pipework reconfiguration, routine servicing, or refuelling of operating ROMUs, thereby minimising production interruptions.

The initial pontoon location at A1 (RL536), as illustrated in Figure , allows for reclamation of tailings across the full extent of the TSF down to this elevation. Mining Block 2 will be prioritised to facilitate preparation works on the RL536 tailings surface, including excavation of the subsequent pontoon sump (B1) down to RL528, following completion of Block 2 reclamation.

Upon completion of hydraulic mining of the active flitch down to the RL536 level, operations will transition directly to Pontoon B1, enabling continued production without extended downtime while preparation works are completed at the alternate operating location.

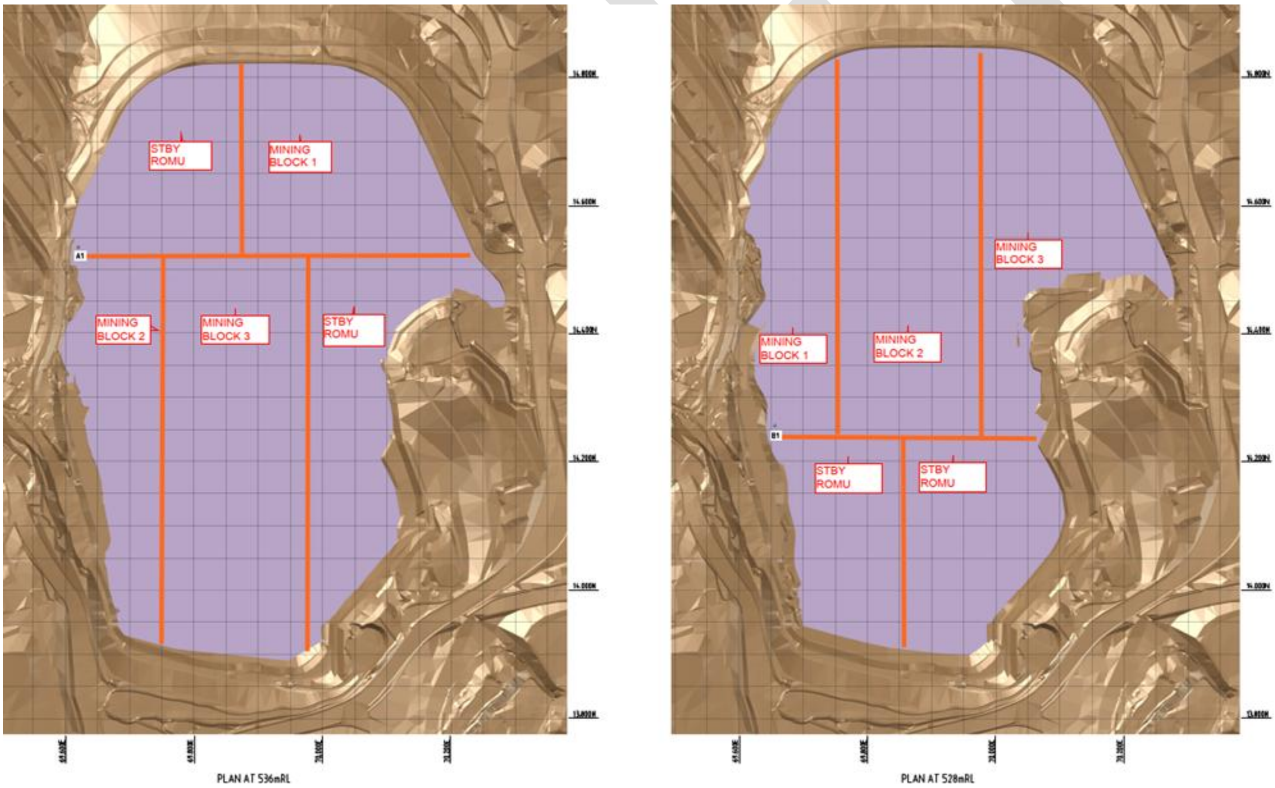


**Figure 19: RL536 - RL528 Mine Plan Layout SP11**

Hydraulic mining at Pontoon B1 follows the same methodology applied at Pontoon A1. Mining Block 1 will be prioritised to enable excavation, and preparation works for installation of Pontoon A at its subsequent location (A2) at RL520. As illustrated in Figure 20, continued mining progressively exposes the central embankment separating the SP10 and SP11 tailings facilities at RL525. The embankment may be managed under one of two potential approaches. The embankment could be progressively reclaimed using conventional excavator and truck methods, or alternatively, it could be left in place for the duration of hydraulic mining operations.

Once Pontoon A2 is installed at RL520, the adjacent tailings surface lies approximately five metres below the crest of the central embankment. To facilitate gravity flow of tailings from the SP10 area toward the SP11 area and into the A2 pontoon sump, two mechanically excavated trenches will be constructed through the embankment using an excavator. These trenches provide controlled flow paths, enabling effective hydraulic reclamation across the embankment interface while maintaining operational continuity.

The SP10 embankment is currently assumed to remain in place for the duration of the hydraulic mining reclamation of the SP11 and SP10 tailings. Potential options include progressive deconstruction as tailings flitches are reclaimed, or retention of the embankment for potential future use.

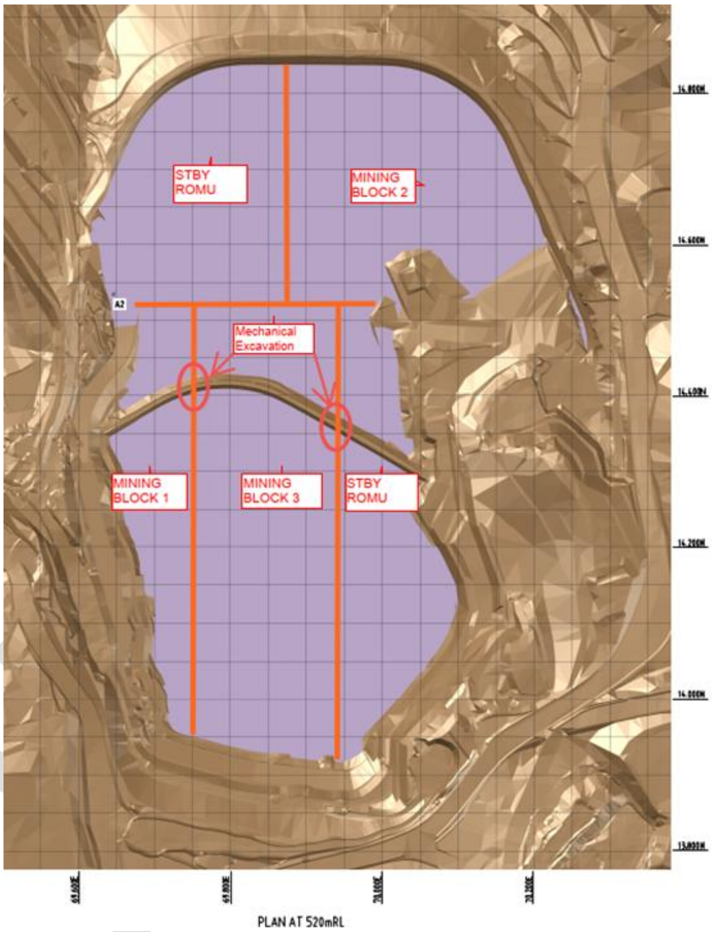


**Figure 20: RL520 (A2) Layout and Exposure of SP10 Embankment at RL525**

### 5.9.2 Transition to Alternating SP10 and SP11

Upon completion of the A2 mining flitch, hydraulic mining operations transition into two defined operating zones serviced by separate slurry pontoons: Pontoon A, servicing SP11, and Pontoon B, servicing SP10.

Under this arrangement, only one pontoon will be operated at any given time, while the alternate pontoon is lowered to its next operating elevation through excavation of the subsequent sump location. This sequencing allows hydraulic mining to continue uninterrupted in one TSF while pontoon installation, sump excavation, and associated preparation works are undertaken in the alternate TSF.

The alternating sequence between pontoon operation and pontoon installation is maintained throughout the remainder of the mining plan presented in Figure  and underpins the phased production schedule described in this report. This approach minimises non-operating time between flitches, improves operational flexibility, and enables efficient progression of hydraulic mining across SP11, SP10, and subsequently MTI, in accordance with the pontoon layout drawings and the production scheduling framework outlined above.

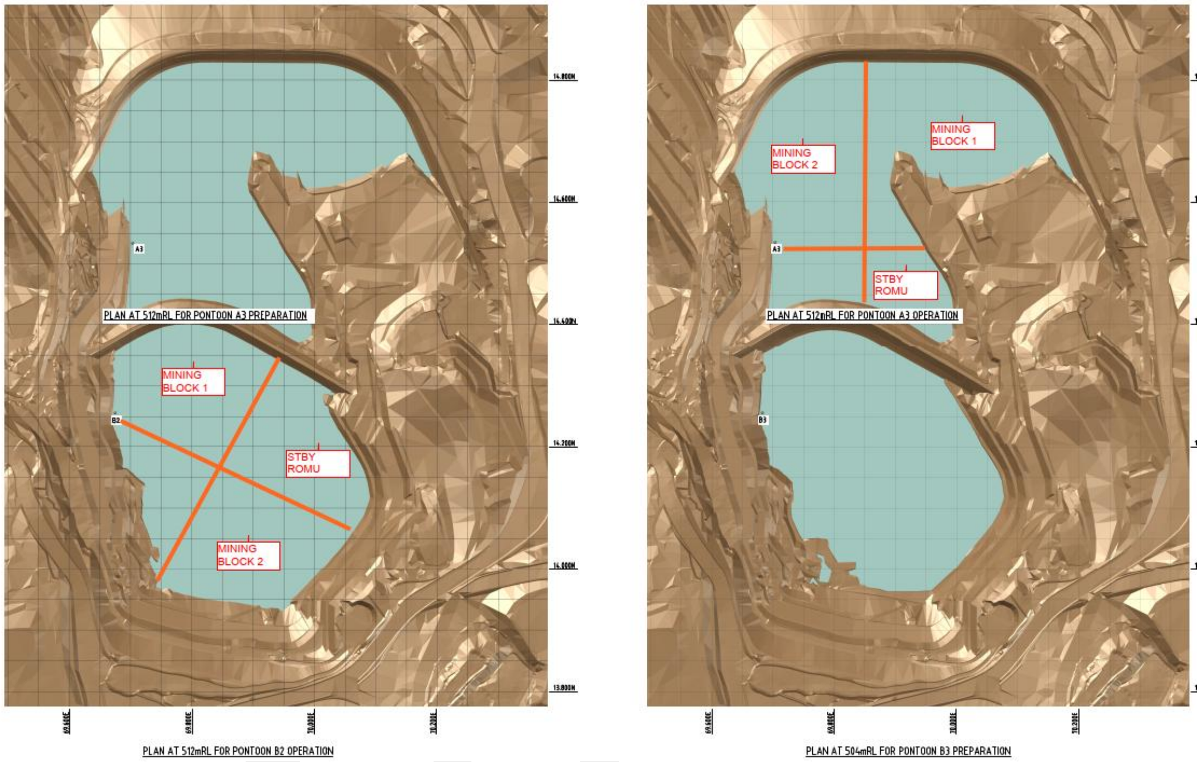


**Figure 21: SP11 and SP10 Operating Methodology and Pontoon Scheduling**

### 5.9.3 Transition to Alternating Pontoon Operations SP10 and MTI

Operations will transition between SP10 and the MTI once tailings have been fully reclaimed from the SP11 footprint as presented in Figure 20. At that time, the equipment that operated within SP11 (Pontoon A) will be relocated to the MTI, while hydraulic mining operations in SP10 continue.

During this period, SP10 is expected to operate at reduced production rates of 400–450 tonnes per hour, as the operational footprint progressively narrows with the reclamation of the final ~20 m of material, whilst the MTI will operate at nominal production of 1200 tonnes per hour.

Following installation of the MTI equipment, MTI operations will be commissioned, enabling the relocation of Pontoon B from SP10 to the next lower flitch elevation. Based on the current schedule, approximately 21 days of preparation works, and pontoon relocation are required per relocation event. A total of four pontoon relocations is anticipated during SP10 operations. During each relocation period, hydraulic mining will continue in the MTI, after which operations will immediately return to SP10 to recommence mining activities.

Hydraulic mining in the MTI will be paused during SP10 flitch reclamation, and this operating sequence will be repeated. SP10 is prioritised over the MTI to enable completion of all tailings reclamation in SP10 by the end of Q3 2032.

At that stage, a decision will be made to determine whether the remaining tailings in SP10 are better recovered using conventional excavator and truck methods and end tipped on MTI, or whether operations should continue in an alternating hydraulic mining sequence. This approach provides operational flexibility and allows for continuous production, while avoiding delays associated with the construction of a new sump.

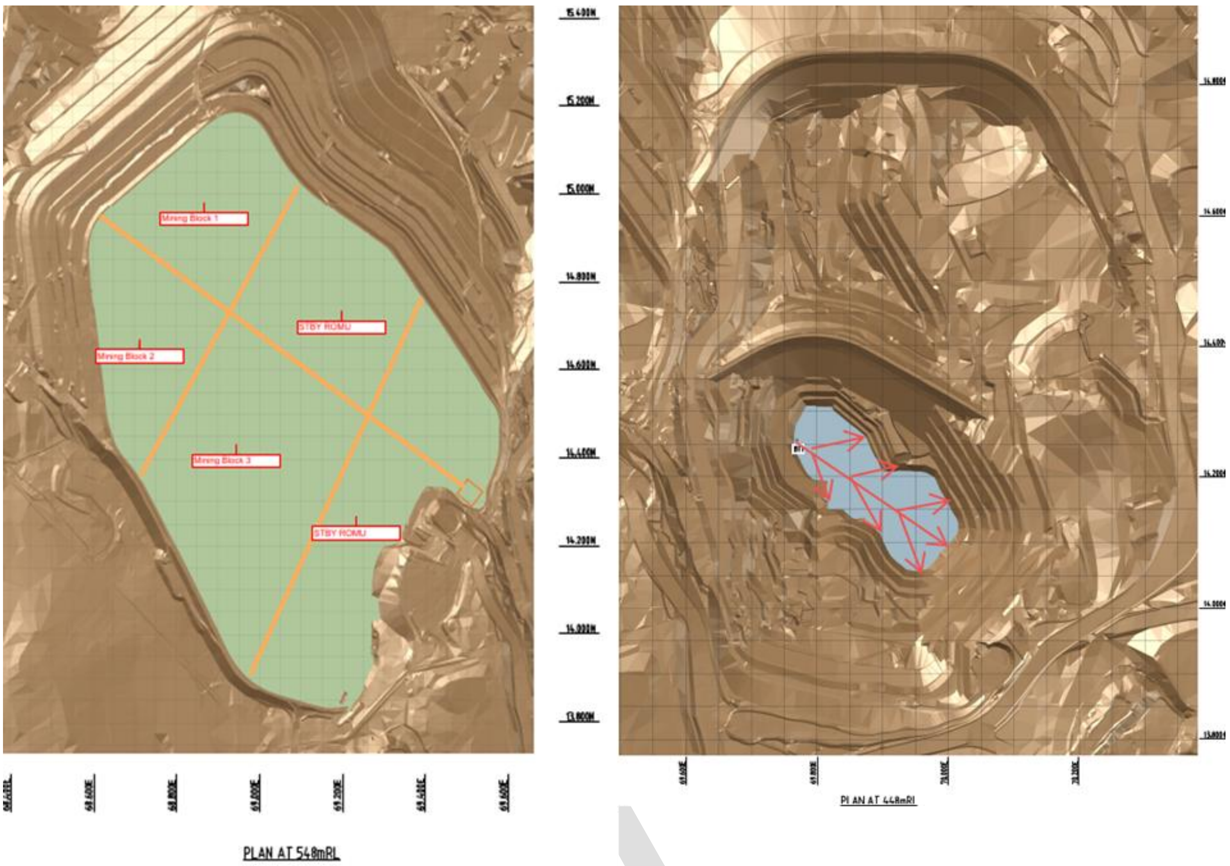


**Figure 22: Transition between SP10 and MTI**

# 6 HYDRAULIC MINING EQUIPMENT

## 6.1 ROMU Equipment

The ROMU equipment specifications are summarised in **Error! Reference source not found.**3. The ROMUs will be original equipment manufacturer (OEM) units owned and operated by Fraser Alexander, which currently re-mines approximately 55 tailings facilities across Africa and South America. The equipment selected for the project is considered fit for purpose based on the prevailing site conditions.

**Table 3: ROMU Equipment Specifications**

| Category | Parameter | Specification/Description |
|---|---|---|
| General | Equipment Type | Remote Operating Mining Unit (ROMU) |
| | Manufacturer (OEM) | Fraser Alexander |
| | Number of Units | Unknown |
| | Deployment History | Deployed across ~ 55 active tailings reclamation sites across Africa and South America |
| Production Capacity | Nominal Production Rate | 100 - 450 t/h (150 mm pipe diameter) |
| | Maximum Production Rate | 450 t/h |
| | Operating Availability | 95% assumed |
| | Typical Operating Hours | 22 h/day |
| Mechanical System | Mining Method | High pressure water supply, orifice |
| | Drive System | Diesel |
| | Movement | Hydraulic |
| | Mobility | Tracked |
| Water Management | Operating Pressure | 25-35 bar |
| | Quality | Can manage turbidity |
| | pH | 4-7.5 (stainless steel for more acidic water, otherwise mild steel) |
| Environmental | Dust Suppression | Capable |
| | Noise | 85 decibels |
| | Safety Systems | Emergency stop, guards, and interlocks |
| Site Suitability | Ground conditions | Suitable for site-specific conditions |
| | Climate Suitability | Proven performance in comparable environments |
| | Overall assessment | Deemed fit-for-purpose for Macraes |

**Figure 33: ROMU in Operation**

## 6.2 ROMU Pressure and Orifice Sizing

The ROMU operating pressure will be in the range of 25–30 bar per unit. Based on the degree of tailings consolidation in both SP11 and MTI, this pressure is considered sufficient to effectively cut through the tailings. The assumed operating pressure falls within the maximum rated capacity of each ROMU and provides adequate jet reach to promote rapid breakdown of the tailings and subsequent fluidisation, thereby maintaining a consistent slurry density at the working face.

Orifice sizes have been calculated based on the required flow rates and the estimated hourly production tonnage and are presented in Table 4 below.

**Table 4: ROMU Orifice Size**

| ROMU # | t/h | bar | Nozzle ID (mm) | Notes |
|---|---|---|---|---|
| 3 | 1200 | 25-30 | 55 | Each unit |
| 2 | 900 | 25-31 | 50 | Each unit |
| 1 | 450 | 25-32 | 52 | Unit |

The service provider shall maintain a nozzle size range of 30 mm to 60 mm to accommodate adjustments during the commissioning phase and transition to full operations.

## 6.3 ROMU Mining Advance Rate

Advance rates for the ROMU are calculated based on the assumed production rate (dry tonnes per unit), operating hours per day, in-situ tailings density (tonnes per cubic metre), and the assumed bench depth and width. Advance rates are sensitive to these input parameters and will be further refined during subsequent phases of the project as additional site-specific information becomes available.

Preliminary advance rates for the project are presented in Table 5. Block size conceptual layout is shown in Figure  below.

**Table 5: ROMU Preliminary Advance Rates**

| Description | Metric | Criteria | | | |
|---|---|---|---|---|---|
| Production | t/h | 1200 | 900 | 450 | 1200 |
| TSF | Section | SP11 | SP10/11 | SP10/11 | MTI |
| Operating hours | h/day | 22 | 22 | 22 | 22 |
| Dry density of material | m³ | 1.38 | 1.38 | 1.38 | 1.38 |
| Bench depth | m | 8 | 8 | 6 | 9 |
| Bench width | m | 12 | 13 | 14 | 12 |
| Advance rate | m/day | 62 | 64 | 79 | 55 |

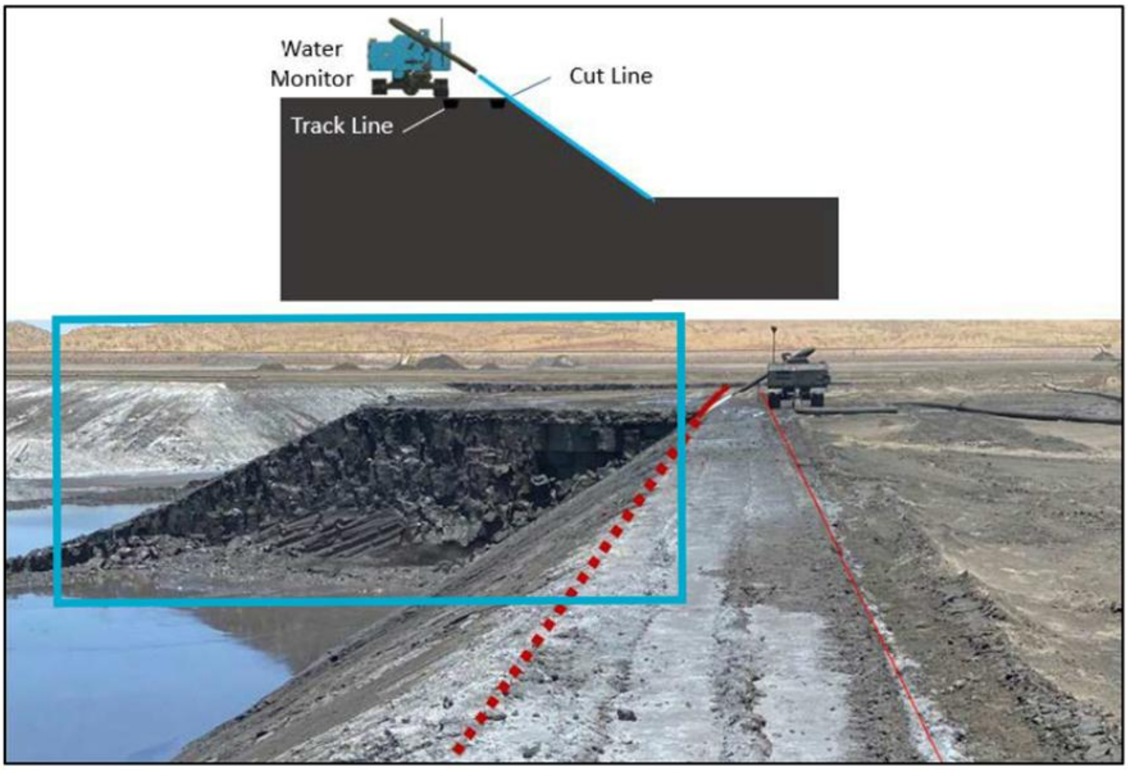


**Figure 24: ROMU Mining Block Size Illustration**

## 6.4 ROMU High Pressure Pipeline Sizing

Two different pipe materials are required to supply water to each ROMU. Connection points for both supply lines are taken directly from the main high-pressure water supply pipeline, which will be installed and sized as illustrated Figure 4.


**Figure 4: Preliminary High Pressure Supply Steel Pipeline**

For handling and flow-rate requirements, 200 mm Victaulic galvanised steel pipes will be reticulated from the main high-pressure supply line and progressively advanced down the TSF pit wall as hydraulic mining reclaims each flitch. These pipes are connected using SC77 shouldered Victaulic couplings, which allow for rapid coupling and uncoupling during mining advance and when transitioning ROMUs between operating and standby locations. It is important to note that these pipes should not be installed over uneven ground, across mined trenches, or suspended above ground, as such configurations may result in coupling displacement during pipeline pressurisation.

The second supply line extends directly from the Victaulic steel pipeline to the ROMU and consists of specialised double-jacketed layflat hoses. These hoses are designed to operate at pressures up to 40 bar and have a burst rating of 80 bar. Hose lengths of up to 100 m can be installed between the Victaulic take-off point and the ROMU as presented in Figure . The flexible hoses are sized to match the ROMU inlet requirements (150 mm internal diameter) and provide sufficient flexibility to accommodate mining advance while maintaining operational continuity. This configuration allows the ROMU to operate over distances of up to approximately 180 m without requiring additional Victaulic pipe extensions during operation.

**Figure 26: Flexible ROMU Supply Mining Hose**

Once the full length of the flexible hose has been used, the Victaulic pipeline will be extended to re-establish the connection point at the previous hose limit, after which mining can continue. Pipeline specifications are summarised in Table 6.

**Table 6: ROMU HP Supply Pipework**

| Description | Qty | Total (m) |
|---|---|---|
| Waterlord Extra HP Hose 152mm Black x 100.0m | 8 | 800 |
| Shouldered Pipe-Galvanised 200mm x 3.2mm x 6.00m | 450 | 3000 |

## 6.5 Process Water Demand

At peak operating conditions, with three ROMUs operating at a combined production rate of approximately 1,200 t/h, the estimated process water demand is 500 l/s. At mid-range operating conditions, with two ROMUs operating at a combined production rate of approximately 900 t/h, the estimated process water demand reduces to approximately 370 l/s. At the lower operating range, with one ROMU in operation, the estimated process water demand is approximately 185 l/s. These estimated demands are summarised in Table  below.

**Table 7: Estimated Water Demand by ROMU Operating Scenario**

| Operating Scenario | # ROMUs | Total Production Rate (t/h) | Estimated Water Demand (l/s) | Notes |
|---|---|---|---|---|
| Phase 1 and 5 | 3 | 1200 | 500 | Total demand for all 3 ROMU |
| Phase 2 and 3 | 2 | 900 | 370 | Total demand for both ROMU |
| Phase 2 and 4 | 1 | 450 | 185 | Total demand for a single ROMU |

It is important to note that the process water demand estimates exclude gland water, flushing water, make-up water requirements, any water losses into the tailings or through rainfall and evaporation.

## 6.6 Skid Steer Loader for TSF Pipe Handling and Ancillary Works

### 6.6.1 Equipment Description and Application

A rubber-tracked Skid Steer Loader (SSL) is proposed for use on the TSF to support pipe installation activities and general light civil works. The unit is fitted with a pipe grab attachment, which allows secure handling, lifting, and manoeuvring of Victaulic pipe sections that are placed within the pipe grab bucket. This configuration enables efficient installation and relocation of pipework over long distances across the TSF footprint, significantly reducing manual handling and installation time.

The skid steer loader has an operating weight of approximately 4,400 kg and a rated engine power of 55.4 kW, providing sufficient power and traction for TSF operations while maintaining a low ground pressure profile. The rubber-tracked configuration is particularly suited to tailings environments, offering improved flotation, reduced rutting, and enhanced stability when operating on variable surface conditions commonly encountered on active and inactive TSF surfaces.

### 6.6.2 Suitability for TSF Operations

A skid steer loader is well suited for work in and around the TSF due to its compact size, low mass, and high manoeuvrability. These characteristics allow the machine to operate safely within constrained areas, including between pipe corridors, around embankment crests, and on prepared tailings surfaces.

The relatively low operating weight reduces the risk of excessive bearing pressure on the tailings surface, making the unit appropriate for use in areas where larger earthmoving equipment may be restricted due to geotechnical or operability constraints. This is particularly advantageous during pipe installation campaigns where frequent repositioning and alignment of pipe strings is required.

### 6.6.3 Pipe Installation and Handling

The primary attachment for the skid steer loader is a pipe grab, purpose-designed to securely grip pipe sections and facilitate controlled placement. When used in conjunction with Victaulic piping systems, the pipe grab enables:

- Rapid alignment and installation of pipe sections
- Safe handling of pipes over extended distances
- Reduced reliance on manual labour and temporary lifting aids
- Improved installation productivity and consistency.

This method supports a faster pipe installation rate compared to manual or crane-assisted methods, particularly for smaller-diameter pipelines and frequent reconfigurations typical of TSF operations.

### 6.6.4 Additional Attachments

In addition to the pipe grab, the skid steer loader is supplied with up to eight interchangeable attachments, enhancing its versatility and overall value to TSF operations. Key attachments relevant to TSF activities include:

- Trencher (or Delver):
  Suitable for excavating small trenches for pipe placement, drainage lines, or minor service installations.

- Auger Attachment:
  Can be used to assist with on-site testing activities such as Vane Shear Testing (VST), as well as for small-diameter drilling applications.

- 4-in-1 Multipurpose Bucket:
  Enables loading and transport of small material volumes, trimming and contouring of uneven TSF surfaces, and preparation of pipe corridors prior to installation.

These attachments allow the skid steer loader to perform a wide range of ancillary tasks, reducing the need for additional specialised equipment and improving overall operational efficiency on the TSF. A Skid Steer Loader with a pipe grab attachment is illustrated in Figure .


**Figure 27: Skid Steer Loader with Pipe Grab Attachment**

## 6.7 Utility Task Vehicle (UTV)

### 6.7.1 Equipment Description and Application

A four-wheel drive Utility Task Vehicle (UTV) is proposed for use on the TSF to support personnel transport, inspections, shift handovers, and light coordination activities. The UTV will be used to move operational and technical staff efficiently between key points across the TSF and associated infrastructure, enabling timely inspections and effective shift transitions.

In addition to personnel transport, the UTV is configured to carry tools and small equipment required for routine servicing and inspection of the ROMU, as well as associated infrastructure such as refuelling pods and SC77 pipe clamps. The vehicle provides a practical and flexible transport solution for day-to-day TSF operational support.

### 6.7.2 Load Capacity and Performance

The proposed UTV has a tray load capacity of approximately 300 kg, allowing it to safely transport tools, consumables, small spares, and inspection equipment alongside personnel. When fully loaded, the UTV has an operating weight of approximately 1 tonne, which is significantly lower than that of a light-duty vehicle (LDV) offering similar transport functionality.

The reduced operating weight results in lower ground pressures, making the UTV particularly suitable for TSF environments where surface conditions may be variable and where minimising disturbance to tailings surfaces is desirable.

The UTV is 4x4 driven, providing enhanced traction and mobility across unsealed roads, tailings beaches, embankment crests, and prepared TSF surfaces. This capability ensures reliable access to inspection locations under a range of operating and weather conditions.

The UTV is well suited for use on the TSF due to its compact footprint, low mass, and off-road capability. Compared to conventional LDVs, the UTV offers:

- Improved manoeuvrability in confined or uneven areas
- Reduced risk of bogging or surface damage on tailings
- Easier access to pipe corridors, perimeter roads, and inspection points.

These attributes make the UTV an effective platform for routine inspections, operational supervision, and rapid response activities across the TSF.

### 6.7.3 Personnel Transport and Operational Support

The UTV enables efficient transport of staff between operational areas, supporting:

- Routine TSF inspections
- Shift handovers and supervision activities
- Rapid access to maintenance or operational issues
- Transport of small tools and inspection equipment.

By consolidating personnel and equipment transport into a single platform, the UTV reduces reliance on multiple vehicles and improves operational efficiency.

# 7 OPERATIONAL MONITORING AND CONTROL

## 7.1 ROMU Operation and Control Philosophy

The ROMUs are state-of-the-art mining systems designed to be operated remotely from a centralised command centre, as illustrated in Figure 5, by a trained control room operator. This remote operating capability significantly improves both operational efficiency and safety by reducing the need for personnel to work near active mining areas or be exposed to the challenging environmental conditions experienced at the Macraes Operation. The ROMUs will be directed by the operator in accordance with the mine plan requirements and the operational controls established by site operations.

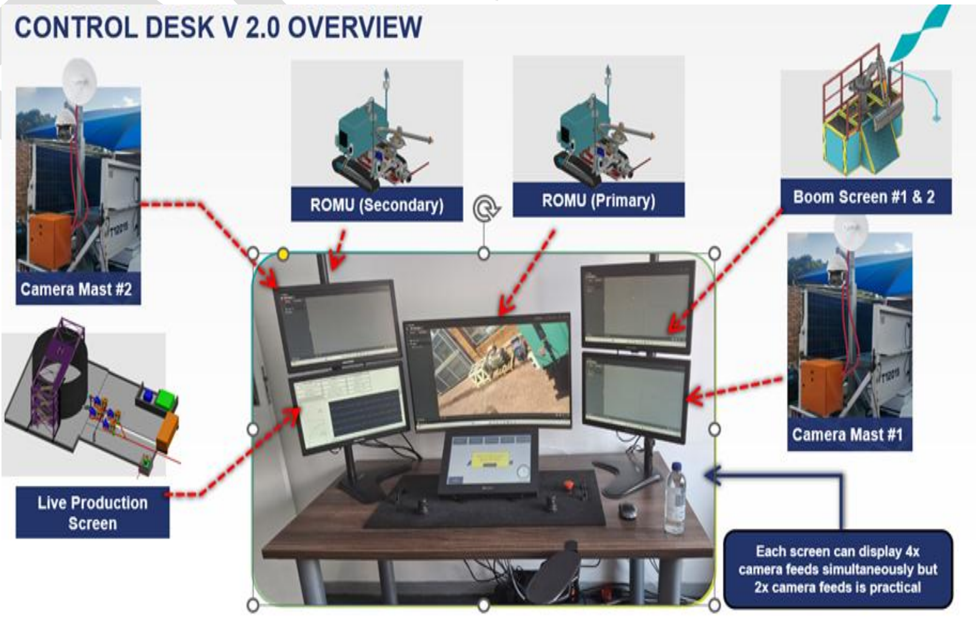


**Figure 5: Remote Mining Unit Command Centre**

Each ROMU is equipped with self-cleaning camera systems and dedicated lighting stations, ensuring continuous visual clarity for the operator and allowing the equipment to be operated with minimal physical intervention in the field. This configuration supports high availability and reduces downtime associated with manual cleaning or inspection activities.

The ROMU are also fitted with an integrated Programmable Logic Controller (PLC) system that continuously monitors critical operational parameters, including water pressure and flow rates. These parameters are essential for effective control of the mining process and maintaining stable, predictable operating conditions. Any deviations or changes in water pressure or flow are automatically communicated to the command centre, where the control room operator can log the data in real time and take appropriate corrective action to ensure safe and efficient system performance.

The command centre is equipped with control desks capable of operating up to two ROMUs simultaneously as illustrated in Figure 29. During peak production rates of approximately 1,200 tonnes per hour, two control desk operators are required to manage the three active ROMUs. The ability to switch seamlessly between operating units and standby units is fully integrated into the PLC control system, providing operational flexibility and ensuring continuity of production in the event of equipment changeovers or maintenance requirements.

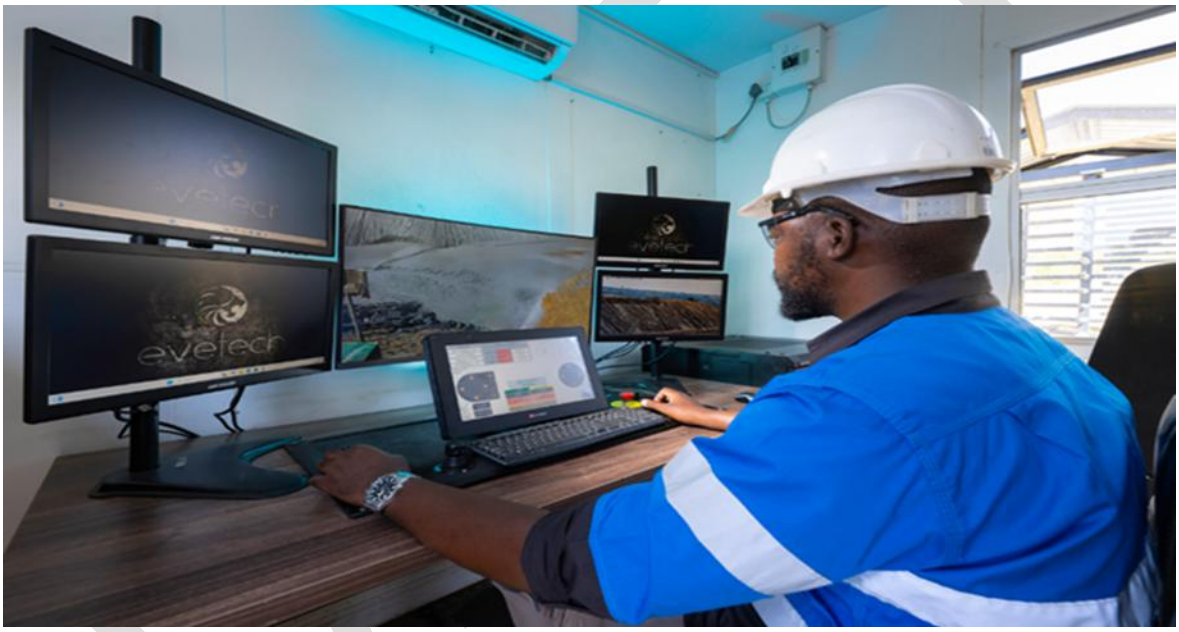

**Figure 6: ROMU Control Desk Operation**

**Figure 30: Mobile Repeater Station for Alternative ROMU View**

Monitoring and operational controls for the project will apply across the entire TSF areas and are not limited solely to the operation of the ROMUs. The ROMUs will occupy and traverse the surface of tailings deposits and active mining areas, requiring a coordinated approach to site inspections, access control, and operational oversight to ensure safe interaction between equipment, personnel, and ground conditions.

Operational control of site activities will be maintained through a combination of remote system monitoring, field inspections, and structured communication between the command centre and site personnel. ROMU operations will be coordinated in accordance with the mine plan and site operational controls to ensure interaction with other site activities is effectively managed.

Monitoring will include:

- Real-time oversight of ROMU operating parameters via the control system.
- Coordination of ROMU movements and operating areas to avoid conflicts with other site activities.
- Ongoing review of site conditions that may influence ROMU performance or access, including weather conditions and water management.

Where site or operating conditions fall outside acceptable limits, ROMU operations may be modified, suspended, or restricted until conditions are reassessed and controls are confirmed to be effective.

## 7.2 Geotechnical Hazards and Controls

Key geotechnical hazards associated with slope instability during hydraulic mining include:

- Localised slumping or cracking of near-surface tailings, particularly within the upper desiccated crust and exposed hydraulic mining faces.
- Softening of exposed tailings due to saturation arising from rainfall, seepage, or hydraulic mining activities.

- Progressive retreat and unintentional over-steepening of the hydraulic mining face or benches beyond intended spatial or geometric limits due to operational variability or loss of control of the mining advance.
- Elevation of the phreatic surface within the retaining slope mass, resulting in reduced effective stress and stability.
- Rapid loading conditions, where excavation progresses too quickly for adequate drainage to occur, potentially resulting in undrained or strain-softening response in contractive tailings layers.
- Insufficient drainage or localised ponding, which may occur through wet patches, surface seepage, cracking of the surface crust, or water spouting from the face, indicating elevated pore pressures and potential instability.
- Inadvertent movement of vehicles or mobile equipment too close to retained slope crests, resulting in increased local loading and reduced stability.
- Sensitivity analyses indicate full height undrained behaviour may result in severe consequences including potential loss of plant and equipment.

The above hazards will be managed through implementation of the baseline hazard controls. The following baseline controls will be undertaken throughout hydraulic mining operations to maintain stability under anticipated drained conditions:

- Full ground investigation and characterisation of tailings and piezometric conditions to identify areas where contractive, undrained behaviour may be more representative of ground response to excavation than drained conditions.
- Minimum ROMU setback distances from retained slope crests.
- Staged and controlled hydraulic mining advance, limiting the rate and extent of excavation to promote drainage and avoid rapid loading.
- Routine visual inspection of exposed slopes and faces, focusing on cracking, excessive deformation, wet patches, seepage, or surface instability.
- Groundwater and pore pressure monitoring, including pre-mining baseline confirmation and ongoing monitoring during operations.
- Operational management of sacrificial mining faces, recognising that localised face sloughing is expected and managed as part of normal operations.

Where undrained or adverse conditions are observed, defined stop-work triggers / triggers-based response / escalation responses will be activated. Key triggers and recommended responses include:

Observable triggers include:

- Persistent wet patches or localised ponding indicating insufficient slope drainage.
- Development or opening of surface cracks within the retained slope zone.
- Water spouting or boiling from the mining face.
- Accelerated face deformation beyond expected operational sloughing.

Response actions include:

- Reduction or temporary cessation of hydraulic mining rates to allow dissipation of excess pore pressures.
- Temporary pause in mining to re-establish drained conditions.
- Operational flattening of slope geometry to reduce driving forces and restore target stability levels (FoS ≥ 1.3) beneath operating equipment; and
- Enhanced monitoring and reassessment of slope performance prior to resuming operations.

## 7.3 Shift Inspections

Routine inspections at the start of each shift of tailings surfaces and mining areas will be a fundamental control measure prior to and during ROMU operations. Inspections will be undertaken to confirm that ground conditions are suitable for equipment access and occupation and that no adverse conditions are present that could compromise operational safety or productivity.

Inspection activities will include:

- Assessment of tailings surface condition, including trafficability, ponding, soft or saturated areas, cracking, erosion, or instability.
- Identification of changes in surface geometry or drainage patterns that may affect ROMU access or operation.
- Confirmation that exclusion zones, bunding, and demarcated access routes are clearly defined and maintained.
- Verification that mining areas are free from obstructions, uncontrolled water accumulation, or geotechnical hazards.
- Ensure there is no ponding of water occurring within the existing upstream embankment lifts and that water jetting and water flows are directed away from these lifts.

Inspection frequency and responsibility will be defined through site procedures, with additional inspections triggered following significant rainfall events, changes in deposition or mining methodology, or observed changes in ground conditions.

## 7.4 Shift Handover and Site Walkovers

A structured shift handover process will be implemented to ensure continuity of operations and effective transfer of information between operating crews. Shift handovers will capture any hazards identified during the previous shift, remedial actions taken, ROMU operating status, site conditions, inspection findings, and any abnormal conditions.

In addition to control room handovers, physical site walkovers will form part of the monitoring and control strategy. These walkovers will focus on confirming tailings surface conditions, active mining areas, water management features, and ROMU access routes. Findings from site inspections will be communicated back to the command centre, corrected and recorded to support ongoing risk management.

## 7.5 Standard Operating Procedures

Detailed operational procedures will be in place to support the monitoring and control framework outlined above.

These procedures will include:

- Pre-start and periodic inspection requirements.
- Defined acceptance criteria for tailings surface access.
- Weather and rainfall based operating triggers.
- Formalised shift handover and recording of site inspections.

These procedures will ensure that ROMU operations are integrated into the broader site operating model and that risks associated with operating on tailings surfaces and within active mining areas are effectively managed.

# 8 ROLES AND RESPONSIBILITIES

## 8.1 Staffing Plan and Shift Structure

The hydraulic mining operation will operate on a continuous 2 hours per day, 7 days per week basis to maximise ROMU utilisation and support stable water and tailings management. A 7-days-on / 7-days-off (7/7) roster has been selected as the base operating model, reflecting customary practice for continuous mining and tailings operations and providing a balance between operational continuity, workforce fatigue management, and personnel retention.

This plan defines the roles, functional coverage, and shift structure required to support operations safely and reliably. Detailed role descriptions, competency matrices, and final headcount optimisation will be developed further.

## 8.2 Operational Readiness

This will require the development of appropriately skilled personnel capable of managing both remote and field-based activities. This includes control room operators, field inspection personnel, maintenance teams, and supervisory staff.

Key people-related readiness actions include:

- Definition of ROMU operator competency requirements and training modules for equipment
- Development of site-specific training focused on TSF access, tailings surface conditions, and climate-driven operational risks.
- Simulation-based training for control room operators prior to live operation.
- Establishment of clear roles and responsibilities across control room, field, and management functions.

## 8.3 Shift Structure

Operations will be organised into two 12-hour shifts per day, comprising a day shift and a night shift, with full operational capability maintained across both shifts.

- Shift length: 12 hours.
- Roster: 7 days on / 7 days off.
- Coverage: Continuous 24/7 operations.
- Shift rotation: Day and night shifts alternated on successive rosters

This structure allows for consistent operational handover, sufficient overlap for critical communications, and predictable workforce scheduling.

## 8.4 Day-Shift Coverage

### 8.4.1 Mining Manager

The OGNZL Mining Manager shall have overall responsibility for the tailings and embankment fill removal. The responsibilities include:

- The operational readiness of all people, equipment, systems and infrastructure prior to commencing mining operations.
- Surveillance and monitoring tasks as outlined in the respective OMS manuals for each TSF.

- Reporting of monitoring data, observations and any dam safety related issues or concerns to Engineering Geology Ltd (the TSF engineer of record), Taking remedial action as necessary.
- Monitoring any pit wall movement during mining of the IM13 pit and ensuring remedial actions are undertaken.
- Managing the interface between the activities of tailings removal and removal of embankment fill.

### 8.4.2 Hydraulic Mining Superintendent (Day Shift)

A Hydraulic Mining Superintendent will be present on-site during each day shift on a 4-days-on/3-days-off (4/3) roster and reports to the OGNZL Mining Manager.

- This arrangement provides operational management coverage across seven days per week.

Responsibilities include training and competency of all staff, ensuring the safe operation and maintenance of equipment, and support to the operational supervisors.

### 8.4.3 Planner (Day Shift)

A dedicated Planner will work on-site during day shift on a five-days-per-week (5/2) basis.

The Planner is responsible for short-term and medium-term operational and maintenance planning, including:

- Development and coordination of ROMU operating schedules.
- Maintenance planning and work prioritisation in alignment with the ROMU maintenance strategy.
- Coordination of planned maintenance windows with operational requirements.
- Integration of operational, maintenance, and water management activities.

The Planner role provides continuity, improves schedule adherence, and reduces the risk of reactive maintenance and unplanned downtime.

## 8.5 Shift-Based Operational Roles (24/7)

Each operational shift (day and night) will include the following roles:

### 8.5.1 Shift Supervisor

Overall responsibility for safe execution of operations on shift, including coordination of ROMU activities, water management, maintenance response, and compliance with site procedures.

### 8.5.2 ROMU Control Room Operators

Generally two operators will be responsible for the remote operation and monitoring of the hydraulic mining units, including production control, response to alarms, and coordination with field and maintenance personnel.

### 8.5.3 Mechanical Technician

Trade-qualified mechanical support providing first-line maintenance, inspections, and fault response for ROMUs, pumping systems, pipelines, and associated mechanical infrastructure.

### 8.5.4 Electrical Technician

A trade-qualified electrical and control systems technician will be responsible for fault finding, diagnostics, and maintenance of electrical, instrumentation, and control systems associated with ROMUs and plant.

### 8.5.5 Mechanical System (Pumping) Control Room Operators

Responsible for monitoring and controlling mechanical systems from the control room, including pumps, pipelines, water distribution and return systems, and supporting infrastructure.

### 8.5.6 Pipe Moving Crew

Field-based personnel (3 per shift) will be responsible for pipeline and hose relocation, alignment, inspection, and general pipe handling activities required to support hydraulic mining progression.

The crew includes a trained and licensed Skid Steer Loader operator and a UTV operator, enabling:

- Safe mechanical handling and movement of pipelines and hoses.
- ROMU refuelling activities in the field.
- Transport of personnel between ROMU locations, pumping stations, and work fronts, subject to access and safety constraints.

This capability reduces manual handling risk, improves task efficiency, and supports timely response to operational and maintenance requirements across the hydraulic mining operations.

## 9 RECORD KEEPING AND REPORTING

The SCADA system will collect and record operational data such as water cannon pressures, water flow rates, water usage, the quantity of tailings pumped, equipment run time and availability. Shift reports will be generated and comprise:

- Workplace inspections: Conducted every shift and will include hazards identified; remedial actions taken; condition of the working benches, faces, launders and sumps; equipment condition.

  A written copy of this report will form part of the handover information for the oncoming shift crew.

- Production report: A record of the production data for each shift including tailings pumped; water flow rates and overall water usage for the shift; ROMU locations and operating hours; pump run time for the pontoon pumps and stage pumps; pump run time for the high pressure water pumps; causes of any downtime or delays; services work undertaken such as pipeline relocations; equipment operating hours for the shift including time spent excavating pontoon sumps; maintenance activities for the shift.

A monthly report will also be generated summarising key safety statistics and production data.

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# 10 LIST OF ACRONYMS

| Acronym | Meaning |
|---|---|
| BOD | Basis of Design |
| CAD | Computer-Aided Design |
| Cw | Solids by weight |
| d/t | Dry tonnes |
| Dt/h | Dry tonnes per hour |
| EGL | Engineering Geology Ltd |
| FoS | Factor of Safety |
| FTSF | Frasers Tailings Storage Facility |
| HP | High Pressure |
| ID | Internal Diameter |
| IM11 | Innes Mills Stage 11 |
| IM12 | Innes Mills Stage 12 |
| IM13 | Innes Mills Stage 13 |
| LDV | Light-Duty Vehicle |
| l/s | Litres Per Second |
| m/day | Metres per day |
| ML | Million Litres |
| MP4 | Macraes Phase 4 Project |
| RL | Metres Reduced Level |
| MTI | Mixed Tailings Impoundment |
| MT | Million Tonnes |
| MWMS | Mine Water Management System |
| NZSOLD | New Zealand Society on Large Dams |
| OEM | Original Equipment Manufacturer |
| OGNZL | Oceana Gold (New Zealand) Limited |
| P80 | Passing eighty per cent |
| PLC | Programmable Logic Controller |
| PMF | Probable Maximum Flood |
| PMP | Probable Maximum Precipitation |
| PSD | Particle Size Distribution |
| RL | Reduced level |
| ROMU | Remote Operated Mining Unit |
| SC77 | Victaulic Coupling |
| SCADA | Supervisory Control and Data Acquisition |

| Acronym | Meaning |
|---|---|
| SP10 | Southern Pit 10 Tailings Storage Facility |
| SP11 or SP11A (used interchangeably) | Southern Pit 11 (or 11A) Tailings Storage Facility |
| t/h | Tonnes Per Hour |
| TSF | Tailings Storage Facility |
| SSL | Skid Steer Loader |
| TTTSF | Top Tipperary Tailings Storage Facility |
| µm | Micron |
| UTV | Utility Task Vehicle |

# 11 REFERENCES

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3. Macraes Phase Four Open Pit Extensions – Geotechnical Stability, PSM, August 2026
4. Air Quality Management Plan, Macraes Mine, Oceana Gold (New Zealand) Limited, August 2026;
5. Water Quality Management Plan, Oceana Gold (New Zealand) Limited, August 2026;
6. Water Monitoring Plan, GHD, August 2026.
7. Macraes Phase 4 Landscape Rehabilitation Strategy and Management Plan, Boffa Miskell, August 2026

## APPENDIX A: RELEVANT RESOURCE CONSENT CONDITIONS

*To be inserted when issued*