BENDIGO-OPHIR GOLD PROJECT MINE CLOSURE PLAN

August, 2025

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Key information

ITEM	DETAIL
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Tenement information

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MINE CLOSURE MANAGEMENT
GREENROAD GROUP

SANTANA MINERALS LIMITED

MATAKANUI GOLD LIMITED

BENDIGO-OPHIR GOLD PROJECT MINE CLOSURE PLAN

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EXECUTIVE SUMMARY

Matakanui Gold Ltd (MGL) is proposing to establish the Bendigo-Ophir Gold Project (BOGP), which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. **This report frames the current understanding of the project within the surrounding environment at closure and describes the strategies to be implemented by MGL to manage closure risks and to meet the proposed closure outcomes for the BOGP Project, addressing the key areas of: safety, cultural heritage, infrastructure, contamination, geotechnical stability, revegetation, hydrology, hydrogeology, workforce and relinquishment.**

This report will be updated every three years to reflect new knowledge acquired during mine operations and ensure preparedness for closure.

Purpose

This Mine Closure Plan (MCP) has been developed to describe the strategies to be implemented by MGL to appropriately manage closure risks and to meet the proposed closure outcomes for the BOGP Project. These actions include activities related to mining and infrastructure associated with development and implementation of the Project.

This MCP has been prepared to:

- Support the assessment of the Project under the *Fast-track Approvals Act* 2024.
- Assist MGL in the planning and management of rehabilitation and closure requirements across proposed operations by informing Life of Mine (LOM) planning, operational activities and the development of closure cost estimate provisions;
- Reflect the current knowledge and requirements for closure, identify focus areas for future work and inform risk mitigation and management strategies;
- To consider how to meet conditions pertaining to closure, which are in draft at the time of MCP development; and
- Inform key stakeholders as to how MGL plans to meet its mine rehabilitation and closure requirements for the BOGP.

Scope

The BOGP involves mining four (4) identified gold deposits worthy of economic extraction. The most significant is the Rise and Shine ("RAS") deposit. The Come in Time (“CIT”), Srex (“SRX”) and Srex East (“SRE”) are smaller in size. The defined orebodies are planned to be mined by open pit methods. Underground mining is planned for the deeper parts of the RAS orebody in the later years of development. The majority of the mining activities, ancillary facilities and associated infrastructure will be located in the Shepherds Valley. Access, and service and administration offices are planned to be located on the adjoining Ardgour Terrace. The BOGP also involves the abstraction of groundwater from the Bendigo Aquifer for use in mining-related activities and the realignment of Thomson Gorge Road via Ardgour Station.

The BOGP is estimated to have a total operational project life of 31 years, including the pre-development, construction, operation and active closure phases.

Postmining Land Use

Post-mining land use (PMLU) options are considered in the context of relevance to the wider regional environment, post-mining land capability, acceptability to stakeholders, and predicted ecological sustainability with regard to the local and regional environment. The proposed land use provides for the development of closure outcomes and informs completion criteria to verify such outcomes.

The proposed PMLU is to return the majority of the land to pastoralism with areas of ecological uplift, in line with the current surrounding and underlying land use. Landscape changes resulting from mining, including the retention of pit voids in the post-closure landform, may result in some disturbed areas within the closure boundary being unsuitable for the proposed PMLU.

Land use options considering access requirements for stakeholders and the public will continue to be investigated throughout the life of the project in consultation with local communities, pastoralists and other stakeholders.

Closure Strategy

The following closure strategies will be implemented to manage risks associated with closure of the BOGP:

- Engineered landforms (ELFs) will be rehabilitated with design informed by consideration of waste characterisation and ecological and hydrological factors to ensure long term stability.;
- To reduce the potential for Neutral Mine Drainage (NMD) generation, overburden will be carefully managed during operations. Layered ELF construction, as well as capping of final slope profiles is planned to minimise the potential for air and water ingress. The current construction methodology recommends that ELFs are constructed in low-height lifts dumping next to a tip-head and dozing over the edge to control segregation;
- During the project life, overburden will be used in the Tailings Storage Facility (TSF) embankment construction in the upper Shepherds valley and otherwise placed in ELFs in Jean Creek and the upper Shepherds valley. SRX and SRE over-burden will be stored in a dedicated ELF in the RAS valley. CIT pit will be backfilled to sit appropriately within the surrounding topography profile. SRE pit will be backfilled and covered by the SRX ELF;
- Tailings (waste fines) will be stored in the engineered tailings storage facility (TSF) in Shepherds Valley. The TSF is designed and will be constructed in accordance with the NZ Dam Safety Guidelines 2024 but will additionally be buttressed by the Shepherds Creek ELF on the downstream side. The final landform will be capped with overburden and topsoil. Water will run onto the surface from the surrounding catchment towards the north valley wall, then west towards the ELF into a diversion channel on the north side of the ELF to Shepherds creek;

- Management plans implemented for relevant environmentally and culturally significant values, and protection of agreed social and cultural heritage values and sites in accordance with Cultural Values Statements and Heritage authorities;
- Implementation of progressive rehabilitation to promote revegetation, and monitoring of rehabilitation to inform closure planning, closure outcomes and refinement of completion criteria;
- Placement of safety bunding or structures around mine pit voids to manage risks associated with inadvertent public access post-closure. Designs will consider the need for ongoing public access associated with existing access agreements with pastoral stations, and stakeholder post-closure access requirements;
- All infrastructure will be removed, except for infrastructure buried more than 1 m below the ground surface, unless agreed with the landowner; and
- Environmental modelling including geochemical, geotechnical, surface water, and groundwater will be undertaken on an iterative basis during the LOM to inform operations, mine planning/design and closure planning to ensure no unacceptable impacts.

Closure Outcomes

Closure outcomes are the overarching outcomes that are being sought in relation to mine closure and the post mining landscape. Outcomes are typically high level in nature, while the closure completion criteria that underpin each objective provide clarity and the detail on how each given objective will be measured and met. Outcomes are developed considering the context of the operation, the closure knowledge base, planned or likely impacts, identified risks, stakeholder expectations in relation to the end state and relevant industry guidance (local, national and international as applicable).

Closure outcomes will continue to be refined during the life of the mine as relevant based on new information, changes to stakeholder expectations, evolving industry standards and changes in risk profiles, while still ensuring that outcomes meet the bottom line requirements of the conditions of consent.

The closure outcomes that have been set for the BOGP are:

NUMBER	ASPECT	CLOSURE OUTCOME
1	Safety	Safety hazards have been appropriately managed, and effective controls are in place.
2	Cultural heritage	Key heritage values have been protected during closure implementation.
3	Infrastructure	All infrastructure not required to support post mining land use(s) has been removed and appropriately disposed.
4	Contamination	Contamination caused by the operation is appropriately remediated or managed.
5	Geotechnical stability	The final landform is geotechnically stable.
6	Revegetation	Disturbed areas have been appropriately revegetated in accordance with the consent conditions.

NUMBER	ASPECT	CLOSURE OUTCOME
7	Hydrology	Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls.
8	Hydrogeology	Pit lakes have developed in line with modelled parameters, as demonstrated through model calibration.
9	Workforce	A strategy has been implemented that manages impacts of closure on the workforce.
10	Relinquishment	Closure implementation is to the satisfaction of key stakeholders, enabling relinquishment of tenure and associated obligations held by MGL.

Risk Assessment and Management of Key Issues

A total of 22 closure risks have been identified for the project at this stage of planning. Risks have been separated to identify which stage of the life of mine they may occur in, from closure planning to operations, closure implementation and post closure.

The risk register will remain a live document that is subject to regular review and serves to aid the planning and operational teams to manage risk throughout the mine life. The risk profile for the project is appended as Appendix D. High and Significant rated risks will be the priority management focus.

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1 INTRODUCTION

1.1 Purpose and Scope

This Mine Closure Plan (MCP) has been developed to describe the strategies to be implemented by Matakanui Gold Ltd (MGL) to manage closure of the BOGP operation. This includes activities related to mining and infrastructure associated with development and implementation of the Project.

This MCP has been prepared to:

- Support assessment of the Project under the *Fast-track Approvals Act* 2024.
- Assist MGL in the planning and management of rehabilitation and closure requirements across proposed operations by informing life of mine (LOM) planning, operational activities and the development of closure provisions;
- Reflect the current knowledge and requirements for closure, identify focus areas for future work and inform risk mitigation and management strategies;
- To consider how to meet conditions pertaining to closure, which are in draft at the time of MCP development; and
- Inform key stakeholders how MGL plans to meet its mine rehabilitation and closure requirements for the BOGP.

The scope of this MCP includes, but is not limited to:

- The Rise and Shine (RAS) and Srex (SRX) open pits, which are planned to form partial pit lakes at closure;
- RAS Underground which is planned to be backfilled with cement paste;
- Come-In-Time (CIT open pit, planned to be progressively backfilled with waste rock from the RAS Open Pit and profiled to integrate with the surrounding terrain;
- Srex East (SRE) open pit which will be backfilled with waste rock before being covered with overburden to form the engineered landform (ELF) for the adjoining SRX pit;
- A conventional hard rock gold processing plant constructed in the lower Shepherds Valley, along with associated processing infrastructure and ancillary activities, including mine offices, carparks, maintenance workshops and equipment servicing infrastructure, raw material and process chemical storage, laboratory and warehousing and a fuel depot;
- Non-operational infrastructure on the Ardgour Terrace, including security, first aid and administrative offices, geology facilities, high voltage substation and temporary construction workers accommodation;
- A plant in the lower reaches of the Shepherds Valley to require the realignment of Shepherds Creek;
- A tailings storage facility (TSF) in the upper Shepherds Valley (including clean water diversion drains) which will utilise waste rock from mining activities;

- ELFs to permanently store overburden waste rock that is not processed, located in the Jean Creek and upper/ middle Shepherds Creek Valleys (Shepherds Creek ELF), in the RAS Valley (SRX ELF), and in an unnamed creek west of RAS pit (WELF);
- Temporary topsoil and low-grade ore (LGO) (brown rock) stockpiles and biological rehabilitation resource storage areas;
- Extraction of groundwater for water supply from a bore field in the Bendigo Aquifer, and supporting facilities and infrastructure for surface water management;
- Supporting infrastructure including an upgrade of Ardgour Road and parts of Thompson Gorge Road (TGR), internal mine access and haul roads, water pipelines and underground utilities, and the power transmission line and associated infrastructure;
- Realignment of part of Thomson Gorge Road, via Ardgour Station (Ardgour Rise), planned to provide public access through to the Manuherikia Valley; and
- Main explosives magazines and emulsion mixing facilities (located outside the project site on Ardgour Station).

This MCP excludes:

- All exploration disturbance and infrastructure outside of the closure boundary; and
- Third party infrastructure and operations in the region.

1.2 Ongoing Technical Studies

While every effort has been made to present a comprehensive MCP it is acknowledged that several technical studies essential to informing detailed closure outcomes and strategies are still in progress and have not yet been finalised. In particular, baseline environmental studies related to flora and fauna are ongoing. These studies aim to establish site-specific environmental baselines that will guide the development of rehabilitation strategies and closure completion criteria. These studies will feed into the Rehabilitation Management Plan which is also currently being drafted and will be included in the next revision of the MCP.

In addition, both the Social Impact Assessment and the Cultural Impact Statement for the Project are still under development. The water load balance model and the Mine-Influenced Water Management Plan, both of which are critical for assessing water-related closure risks and informing long-term water management strategies, also remain under preparation at the time of the MCP preparation.

Future versions of the MCP will be updated accordingly to integrate the results of these works, refining closure strategies, completion criteria, and post closure monitoring programs in alignment with regulatory expectations and industry best practice standards.

1.3 Knowledge Base

The knowledge base that supports this MCP, including key site characteristics, environmental values, land use context, and materials characterisation, is provided in Appendix C. This information underpins the closure risks, opportunities, and strategies presented throughout this document and provides the technical foundation for the development of closure objectives, outcomes, and completion criteria.

2 PROJECT SUMMARY

2.1 Proponent Information

The proposed BOGP is owned by MGL (NZBN 9429041420614) which is a New Zealand-registered company and a fully owned subsidiary of SMI (ACN 161 946 989), which is an Australian-registered company.

In recent years MGL have progressed an extensive gold exploration program within the Project Area. The exploration works are being undertaken under Minerals Exploration Permit (MEP) 60311 and Minerals Prospecting Permit (PEP) 60832 issued by New Zealand Petroleum and Minerals (NZPAM), and a succession of land use consents. The exploration program follows a line of gold bearing mineralisation across farmland lying predominantly within Bendigo and Ardgour Pastoral Stations which has outstanding landscape values, indigenous vegetation, and archaeological and heritage values.

The BOGP has been identified as a listed project under the *Fast-Track Approvals Act 2024*.

2.2 Location And Land Uses

The BOGP is located in the Dunstan Mountains of Central Otago New Zealand, within the Central Otago District Council (CODC) and Otago Regional Council (ORC), approximately 26 km north-east of Cromwell (Figure 1).

The Project is predominantly underlain by private pastoral leases, with Bendigo Station intersecting most of the closure boundary to the south-west, and Ardgour Station intersecting a smaller portion to the north-east (Figure 2). Adjacent to the north-west of the Project Area is private freehold land owned by Cherri Holdings Limited.

The MEP overlays part of three Crown Land reserves straddling the ridgeline of the Dunstan Mountains on either side of Thomson's Saddle (TSD). The Bendigo Historic Reserve lies to the west, and the Ardgour Conservation Reserve lies to the east, directly adjacent to the closure boundary. The Neinei i kura Conservation Area is situated to the northwest. All reserves are administered by the Department of Conservation (DOC). Matakanui Station lies to the east which is leasehold land administered by Land Information New Zealand (LINZ).

The mine site is located between incised valleys of Otago schist rock and contained within two valley systems, the RAS Creek valley and the Shepherds Creek valley. The topography of the BOGP rises from the Bendigo terraces at 370 mRL to the top of the proposed RAS pit crest at approximately 770 mRL.

2.3 Operation Overview

2.3.1 Life of Asset

The BOGP is estimated to have a total operational project life of 31 years including pre-development, construction, operations and active closure phases. Table 1 presents an indicative mining schedule for the BOGP. Schedules are revised throughout the LOM and are subject to mine planning and scheduling changes.

Table 1. Indicative mining schedule.

YEAR	MINING PHASE	DESCRIPTION OF PHASE
0 to 0.5	Startup	Pioneering / RAS pre-strip, initial Jean Creek Silt Pond, earthworks at process plant.
0.5 to 2	Project development	Construction of process plant, TSF, Shepherds Creek Silt Pond, North Diversion Channel, commissioning, RAS pre-strip.
3 to 4.5	RAS pit mining	Operations
4.5 to 5	RAS pit with UG development	Operations
6 to 11	RAS pit plus RAS UG	Operations
	RAS pit plus RAS UG plus CIT pit	Operations
	RAS Pit plus RAS UG, plus CIT backfilled, plus SRX	Operations
10 to 13	RAS UG continues with CIT and SRX open pit feeds	Operations
11 to 31	Closure implementation (all mining halted)	Active closure of pits, TSF, and wider site, plus construction of active water treatment plant (option)
31 onwards	Post-closure	Closure monitoring and maintenance

2.3.2 Mining Process and Key Infrastructure

Mining will occur by both open pit (RAS, CIT, SRX and SRE pits) and underground methods (RAS pit). Processing is estimated to be a conventional single stage crush, single stage grind via a semi-autogenous grinding (SAG) mill, gravity gold recovery, with a follow up cyanide leach to carbon recovery prior to electro-winning and final smelting to produce ore on site. The process plant will be located in the lower Shepherds Valley. The ROM pad for ore stockpiling and blending into the process plant will be positioned immediately east of the process plant. Processed ore will be transported off-site by vehicle.

The process tailings will be pumped to a conventional wet TSF facility constructed in the upper Shepherds valley. The TSF will be constructed as a containment facility and according to the New Zealand Dam Safety Guidelines 2024. In addition, the entire TSF will be buttressed by the Shepherds Creek ELF. Spigots will be placed to produce a decant pond away from the embankment.

The mine site and supporting infrastructure is located in the lower Shepherds Creek valley, positioned across two areas, the first comprising the processing plant and mining operations within the valley and the second area positioned outside the valley to the north, providing non-operational infrastructure (Section 1.1). The explosives magazines and emulsion factory will be located outside of the RAS and Shepherds Valleys.

A water management strategy is being developed, informed by the water and load balance model. Initial water management will focus on clean water diversion and sediment and erosion control. Sediment and erosion control processes will be addressed by the Erosion and Sediment Control Management Plan (ESCMP). An Operational Water Management Plan will govern a water management system addressing sediment and erosion control, treatment of tailings discharge waters, and management of mine impacted water (MIW) (e.g., seepage from the TSF and ELF) by control and pumping of water to the TSF impoundment.

Active closure of the site commences post-Year 11 with final rehabilitation of mine domains and transition from water storage and reuse to water treatment by an active water treatment plant. It is expected that ongoing passive water treatment will be required in the post-closure phase for the TSF, Shepherds Creek ELF, open pit(s) and underground seepage. Passive treatment (and/or enhanced passive treatment that includes the addition of chemicals) is expected to utilise pit lakes and engineered wetlands that rely on nitrate and sulfate reducing bacteria to remove contaminants. Further work is planned to understand spatial requirements, treatment efficiencies, and costs.

Table 2 provides details of additional proposed development components for the BOGP based upon the current Project Description (Santana Minerals Ltd, 2025). Figure 3 depicts the layout of the proposed operations.

Table 2. Proposed development components.

COMPONENT	**DESCRIPTION**
Site Access and Ore Transportation (Thomson Gorge Road)	The main public road currently providing access to the Project Area is Thomson Gorge Road. Upgrades are proposed to the intersection of Ardgour Rd with State Highway 8 (SH8) and to the lower part of Thomson Gorge Road to facilitate increased volume and size of vehicles accessing the site. The western portion of the Thomson Gorge Road will be closed early in the project and public access over the Dunstan Range will be by a new road, parallel to the ridge immediately north of Shepherds Valley, called Ardgour Rise. Ardgour Rise will pass through an existing easement in the DOC reserve and then rejoin with Thomson Gorge Road (TGR) at Thomson's Saddle. The new alignment will be installed prior to closure of Thomson Gorge Road and will remain in perpetuity. Dedicated haul roads will be constructed on the project site to transport ore and overburden. The haul roads will not be open to the public. At closure, the site access road and the surface facilities will be decommissioned.
Waste Rock Storage	Non-ore-bearing waste rock volumes are currently estimated to be 201 Mt. Approximately 5.7 Mt will be used to backfill the CIT and SRE pits. The remainder of the waste rock will be stored in ELFs. Other closure resources such as competent material for armouring purposes, habitat creation and brown rock (oxidised rock) will be stockpiled in dedicated areas. As the schedule allows, material will be transferred to a final location on rehabilitated areas.
TSF	The process tailings will be pumped to a conventional wet TSF facility constructed in the upper Shepherds Valley with a capacity of 4.9 Mt. The TSF will be constructed as a containment facility with contingent capacity for the 72-hour probable maximum precipitation (PMP) rainfall event with 1m of freeboard. The entire TSF will be buttressed by the Shepherds Creek ELF. Spigots will be placed to produce a decant pond away from the embankments. The proposed embankment is zoned, requiring compaction and conditioning of the upstream portion of the embankment, to achieve performance requirements. Chimney drains are proposed for the initial starter embankment for the TSF until an effective tailings beach can be established against the embankment. Upstream cut off drains are proposed at final embankment height to intercept non impacted water from the surrounding catchment.
Topsoil Management	Topsoil will be salvaged and stockpiled for use in rehabilitation. Some topsoil in the RAS Valley floor contains elevated arsenic, particularly in the historic mining areas. These soils will be stripped and stockpiled in RAS Valley for rehabilitation in RAS Valley.

COMPONENT	DESCRIPTION
Water Supply	Service water will come from a borefield in the Bendigo aquifer and be pumped via a pipeline to water storage tanks east of the process plant. Additional water storage capacity will be maintained within the Shepherds Silt pond located at the toe of the ELF. The full capacity of the silt pond will be 100,00m3 with 70,000m3 allowed for silt control and 30,000m3 providing redundancy for when work is required on the TSF return-water or site water bore pipelines and pumps. As mining progresses pit and underground dewatering plus the collection of mine impacted water will result in borefield make-up water requirements being substantially reduced. The project will need a freshwater storage dam to balance the demand and supply requirements and constraints. It is planned to construct the storage dam in the lower Shepherds Valley. The benefits of this are: • Efficient storage location (embankment to storage); • Adjacent to the process plant and infrastructure area; • Minimum flows can be maintained to the lower Shepherds Creek; and • Potential for dilution before releasing impacted water, if necessary. Mine impacted water will be collected in seepage or silt ponds. Seepage will be returned to the TSF for reuse in the process. Water from the silt pond will be used for dust suppression or in the process plant.
Haul Roads	Haul roads will be created to serve the operation as it grows. Initially there will be hauls road off RAS pre-strip to the WELF and to Shepherds Valley via Jeans Creek for the construction of the TSF embankment. Soon after a haul road from RAS to the ROM pad/mine infrastructure area, and a haul road from the RAS Valley connecting with the Shepherds haul road to the process plant. Later haul roads to the CIT and SRX pits will be required.
Power	A new 66 kv above-ground powerline will be installed from the existing Lindis Crossing sub-station to the processing plant site following the existing road reserve corridor.

2.3.3 Open Pit and Underground Mining

The proposed RAS mine comprises a surface mining pit and underground workings, each following the RAS Shear Zone and associated stockwork mineralised rock. The open cut pit has a planned extent of 30 ha, crest elevation at approximately 700 metres AMSL, and pit base elevation of approximately 385 metres AMSL.

The RAS underground (UG) portal targets the continuation of the orebody down plunge and beneath the open pit. The underground workings extend from an elevation of approximately 384 metres AMSL from the parts of the final pit wall comprising gold ore, down-dip along the RAS mineralisation anomaly to an ultimate deepest elevation of 242 metres AMSL. The underground and open cut will operate concurrently for two years. The underground will continue to operate for a further four years for a total mine life of approximately 9 years. Both modes of ore recovery would result in water make (seepage into the mining area) from fractures or pores in the surrounding fractured schist rock.

The RAS underground is designed as a mechanised operation with ramp haulage. Extraction is via open stopping with cemented paste backfill. Twin portals service a twin ramp development, which leads to a simple haulage (intake) and egress/return network system. The underground workings stand off from the selected final Stage 5 Pit by 30m.

The SRX and SRE deposits are located in the upper part of Rise and Shine Creek 1.5 to 2 km upstream of the RAS deposit. Currently the known mineralisation at SRX covers an area of approximately 22 ha.

SRE is offset by 200 m east from SRX and covers an area of 16 ha. SRE pit is planned to be backfilled to surface at closure and the SRX ELF constructed on the footprint.

CIT pit will be backfilled with TZ3 waste rock to pre-mining topography following cessation of mining, and an ore stockpile constructed on the footprint which will be reclaimed and processed prior to closure.

2.3.4 Mine Landforms

Mineral waste generated by mining will be progressively placed in three permanent ELFs and backfilled into CIT and SRE pits. Waste rock from RAS will be placed in the Shepherds Creek ELF located in Jean Creek and upper/middle Shepherds Creek valley, a western ELF (WELF) located west of the RAS pit, as well as used in the construction of the TSF embankment. Waste rock from SRX and SRE will have a separate dedicated ELF located in the RAS valley (SRX ELF).

The ELFs will be constructed in 4 - 6 metre lifts, compacted using haul trucks and flattened with a dozer to achieve stable final slopes. Construction will be staged to deliver the final faces of the landform design as early as possible in the schedule, enabling progressive rehabilitation. Slope angles will be designed to reflect the natural contours of the surrounding mountain environment, ensuring visual integration with the landscape. Earthworks will include appropriate erosion control and surface water management features. Rehabilitation treatments will vary depending on the final slope profile and aspect, with topsoil or subsoil applied as needed, followed by seeding to support vegetation establishment. The Shepherds Creek ELF has a direct impact area of 111 ha. A downstream sediment dam will be constructed to collect all ELF run-off for the settling of solids before either release back into Shepherds Creek or for use as service water within the mining and processing operation.

Construction of the Shepherds Creek ELF includes scheduling to create slopes available for rehabilitation as soon as practical, including contours and surface features (e.g. rock, vegetation) that will help integrate the ELF with adjacent landforms. A layer of capping will be applied to limit oxygen penetration into the waste rock and reduce the potential for the generation of oxidation products, such as arsenic (As) and sulfate (SO^{4}) as seepage.

Construction will be in small lifts with haul trucks dumping next to the tip-head and dozing over the edge to control segregation. Rehabilitation of this feature will include the establishment of 1:3 batters, which will be rehabilitated to enable the establishment of indigenous vegetation on the lower slopes and grazing above on the upper reaches and plateau.

The WELF will be the first ELF constructed, utilising short-haul pre-strip material. It will be sheeted with topsoil and established as a site for rehabilitation trials, with a particular focus on the establishment of annual herb species. The WELF is anticipated to be completed within the first two years of operations, providing an estimated eight-year period for undisturbed monitoring and assessment of rehabilitation performance.

2.4 Closure Plan Boundary

The closure (plan) boundary informs the legal obligations that apply to closure based on the tenements, licencing, and relevant approvals that apply to the areas within the boundary. Figure 4 shows the closure boundary for the BOGP, which comprises an area of 1082.75 ha, and intersects MEP 60311 and PEP 60832 and a succession of land use consents (detailed further in Section 3). The MEP overlays parts of three DOC administered areas. Minimum Impact Exploration Agreements were in place for the initial term of the Exploration permit; these agreements are currently being renewed.

The closure boundary is predominantly underlain by private pastoral leases, with Bendigo Station intersecting most of the closure boundary to the south-west, and Ardgour Station intersecting a smaller portion to the north-east (Figure 2).

The closure boundary excludes:

- Power transmission lines to the substation on Ardgour Terraces - these are expected to be installed and owned by the State power supplier and MGL will hold no liability to remove these at closure; and
- A proposed Pest Exclusion zone situated northwest of the mine footprint, within the Project Area. This will be a managed fenced area which will remain in perpetuity. As closure activities are not associated with this zone, it does not form part of the closure boundary.

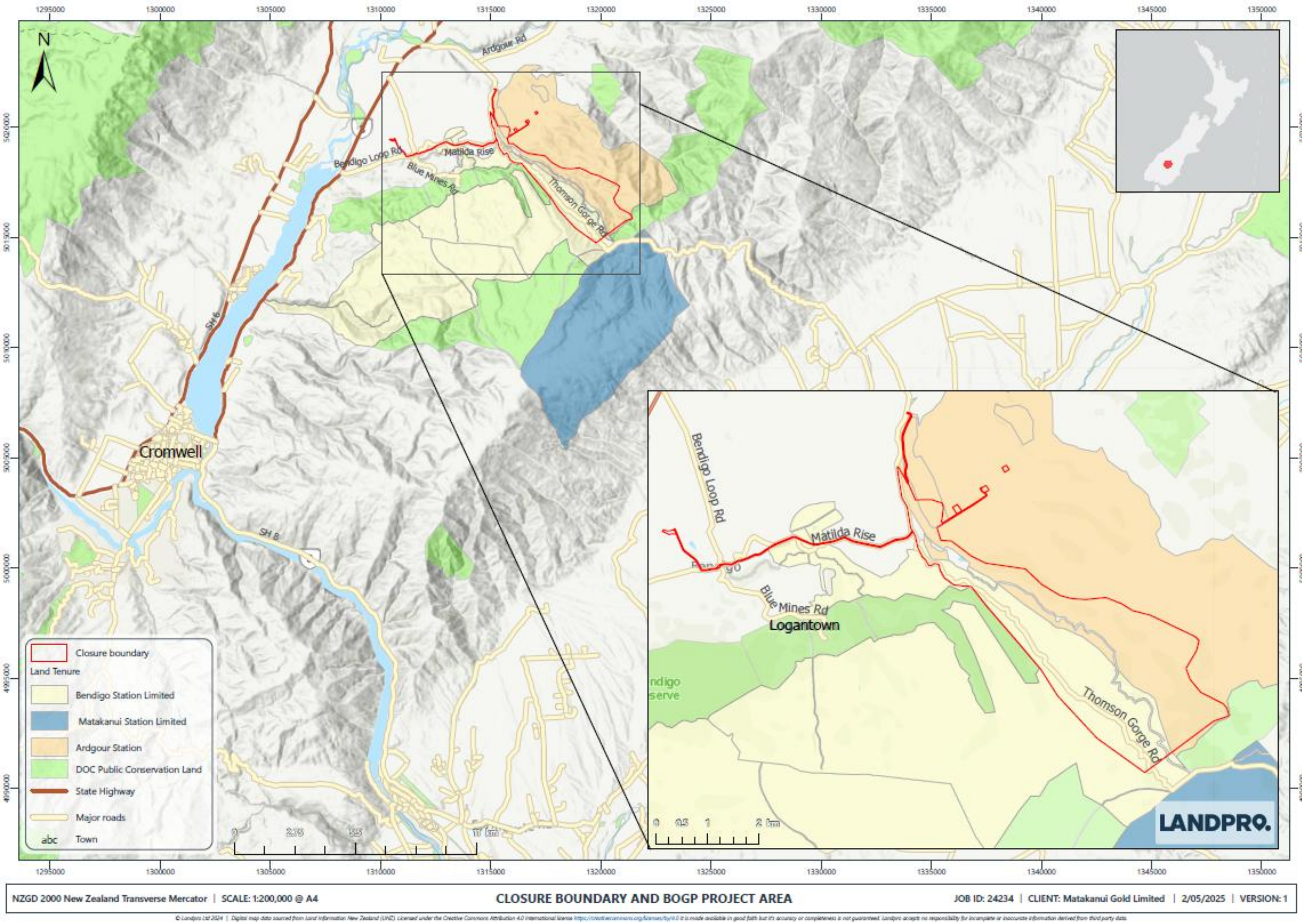


Figure 1. BOGP regional location.

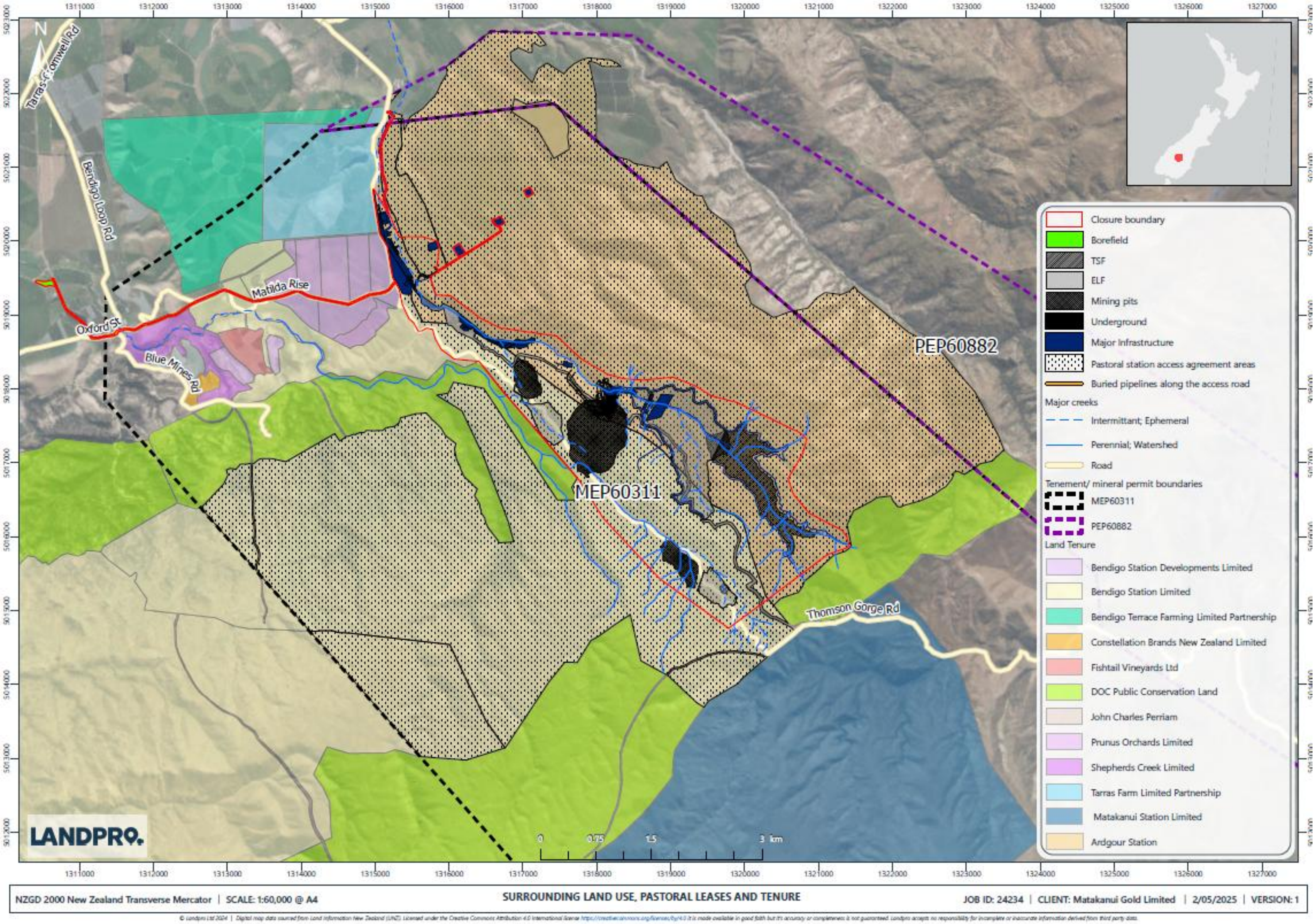


Figure 2. Surrounding land use, pastoral leases and tenure.

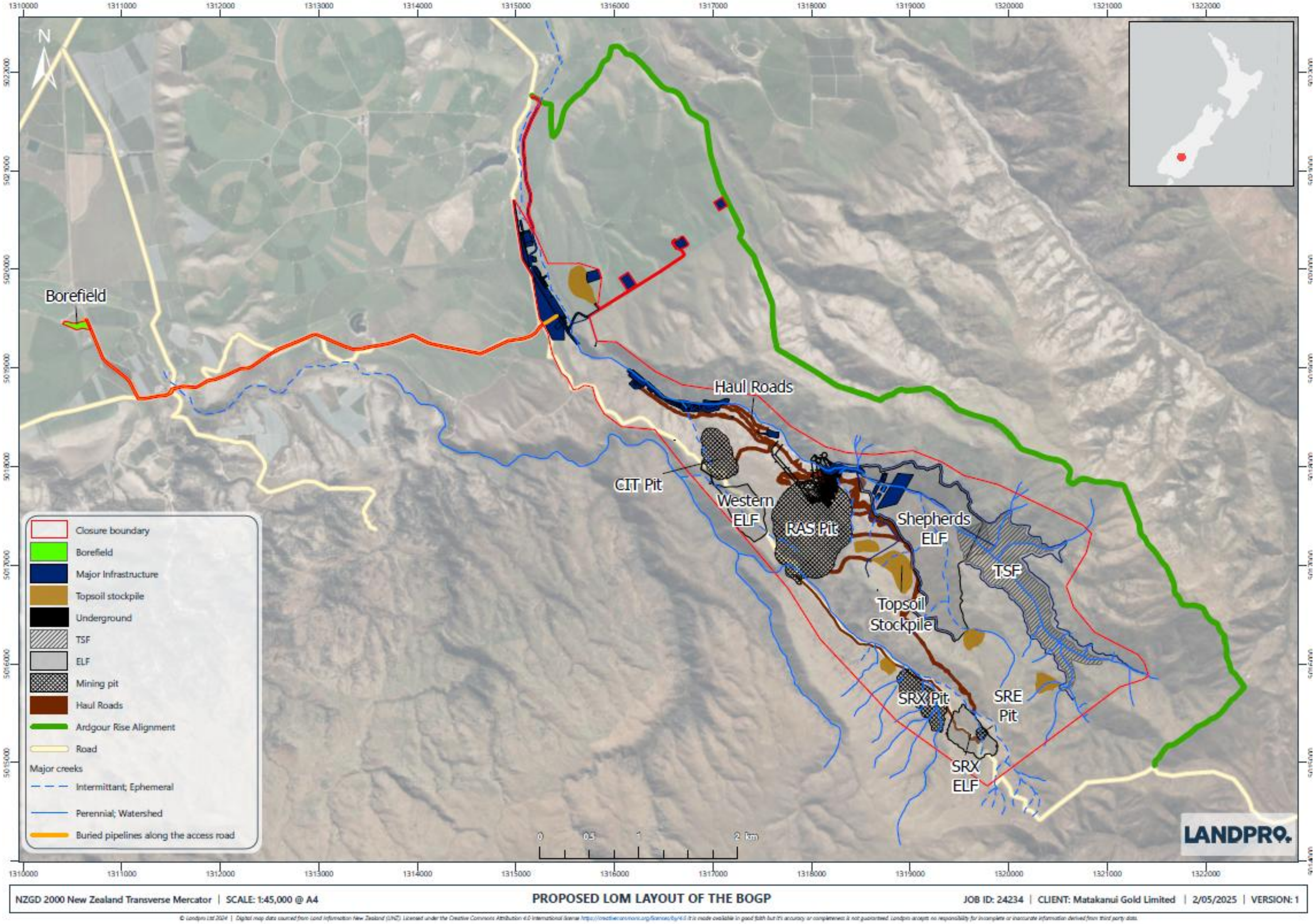


Figure 3. Proposed LOM layout of the Bendigo-Ophir Gold Project.

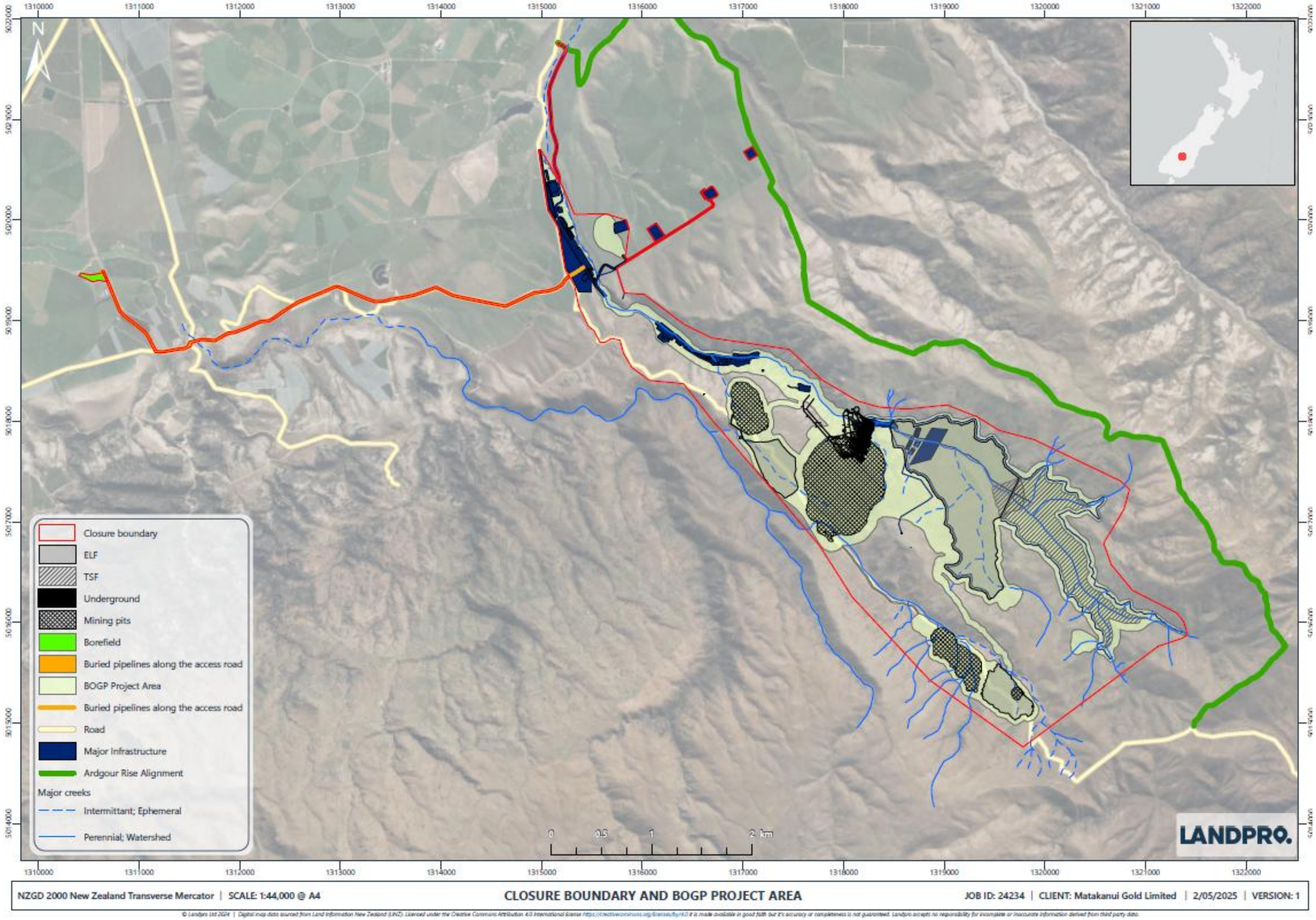


Figure 4. Closure boundary and Bendigo-Ophir Gold Project Area.

3 LEGAL FRAMEWORK

Current exploration works are being undertaken under Minerals Exploration Permit 60311 (Tier 1) and Minerals Prospecting Permit 60882 (Tier 2) pursuant to the *Crown Minerals Act* 1991, and a succession of resource consents issued pursuant to the *Resource Management Act* 1991.

The BOGP has been identified as a listed project under the *Fast-track Approvals Act* 2024. The provisions of this Act will therefore be the primary legislation which applies in relation to the project application. The *Resource Management Act* (RMA) is relevant to the project to the extent that the *Fast-track Approvals Act* cross-references RMA provisions. This is also the position in relation to the *Crown Minerals Act* 1991, *Conservation Act* 1987, *Wildlife Act* 1953 and the *Heritage New Zealand Pouhere Taonga Act* 2014.

3.1 Legal Framework Relevant to Closure

The BOGP Legal Obligations Register (Appendix B) outlines current obligations related to rehabilitation and closure for the Project. It is expected that once project approvals are granted, further specific closure obligations will apply as indicatively outlined in Section 3.2.

The register lists closure-related obligations arising from the following:

- Fast-track Approvals Act 2024;
- Crown Minerals Act 1991;
- Resource Management Act 1991;
- Conservation Act 1987;
- Reserves Act 1977;
- Wildlife Act 1953;
- Heritage New Zealand Pouhere Taonga Act 2014; and
- Private Land Access Agreements.

The register also identifies legislation, standards and guidelines that may not apply specifically to the BOGP in the exploration and development phase, but that may be relevant to closure generally, as well as non-legislative commitments and obligations such as those formally made to project stakeholders.

The register will be updated on an iterative basis to ensure the currency of component instruments and to include the addition of new instruments as appropriate, such as obligations that may arise through approvals processes. A comprehensive legal review will be required as closure approaches to ensure that all relevant obligations are identified and fulfilled.

3.2 Consent Conditions

Mining consent conditions for rehabilitation and closure are expected to include the following indicative aspects:

- Progressive Rehabilitation – MGL will rehabilitate disturbed areas progressively as mining advances, incorporating revegetation with native species where appropriate, and ensuring ongoing monitoring for stability and ecological function;

- MCP Requirements – A MCP must be reviewed periodically (triennially) to incorporate new data, and a final MCP will be submitted two years prior to closure implementation to the consenting authority;
- Financial Assurance– MGL will provide financial assurances (rehabilitation bonds) for rehabilitation and closure costs, with annual reassessment to ensure adequacy based on site conditions and closure cost estimates;
- Post-mining Land Use – A clear PMLU will be developed in consultation with landowners, iwi, local communities, and regulatory bodies; and
- Stakeholder Consultation – MGL will undertake regular engagement regarding rehabilitation and closure with landowners, iwi, local communities, and stakeholders.

3.3 Relevant Guidelines and Standards

Closure planning has been prepared in accordance with relevant content of the guidelines and standards listed in Table 3. Where applicable, New Zealand and International Standards have been supplemented by Australian and/or Western Australian Standards and Guidelines, as part of striving for best practice.

Table 3. Guidelines and standards relevant to rehabilitation and closure at BOGP.

GUIDELINE OR STANDARD	AUTHOR
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)	Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council
Guidelines for Preparing Mine Closure Plans (2025)	Western Australian Department of Mines and Petroleum and Environmental Protection Authority
Guidelines for Preparing Mine Closure Plans (2023)	Western Australian Department of Mines and Petroleum and Environmental Protection Authority
Environmental Monitoring and Reporting Guidance for the Resource Management Act (2020)	New Zealand Ministry of Environment
Environmental and Social Impact Assessment Good Practice Statements (2013)	Environment Institute of Australia and New Zealand
A Framework for Developing Mine-site Completion Criteria in Western Australia – Mine Closure and Completion (2016)	Western Australian Department of Innovation, Industry, Science and research
Guidance Materials Characterisation Baseline Data Requirements for Mining Proposals (2016)	Western Australian Department of Mines and Petroleum
Best Practice Guidelines for Mine Rehabilitation in New Zealand (2019)	New Zealand Ministry of Environment
Guidelines for Assessing Environmental Effects under the Resource Management Act 1991 (1999)	New Zealand Ministry for Environment
Guidelines for Managing Contaminated Land (2011)	New Zealand Ministry of Environment
Guideline for the Assessment of Environmental Factors: Rehabilitation of Terrestrial Ecosystems (2006)	Western Australian Environmental Protection Authority
Global Industry Standard on Tailings Management	International Council of Mining and Metals, UN Environment Programme, Principles for Responsible Investment
Integrated Mine Closure: Good Practice Guide 2nd Ed (2019)	International Council of Mining and Metals
International Committee of Large Dams (ICOLD) Standards	International Committee of Large Dams (ICOLD)
Mine Closure Guidelines (2006)	New Zealand Minerals Industry Association
Mine Rehabilitation in the Australian Minerals Industry (2016)	Minerals Council of Australia
National Environmental Standards (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health (2011)	Environmental Protection Authority (EPA) New Zealand
People, Place and Environment Series: Social Impact Guide (2016)	Waka Kotahi
Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects (2015)	International Association for Impact Assessment
Water Quality Guidelines: Guidelines for the Resource Management Act 1991 (1994)	New Zealand Ministry for Environment

4 STAKEHOLDER CONSULTATION

4.1 Identification of Stakeholders

A Social Impact Assessment (SIA) Scoping report has been completed, representing an interim assessment preceding a comprehensive SIA to inform the resource consent application for the BOGP (GHD, 2024). The report identifies and evaluates potential social impacts within the socio-economic area of influence, identifies potential social risks, outlines a proposed stakeholder engagement framework, and articulates further investigation and assessment which will be incorporated into closure planning as the project progresses.

Overarching stakeholder groups have been identified and are presented in Table 4.

Table 4. Stakeholder groups relevant to closure planning for the BOGP.

STAKEHOLDER GROUP	STAKEHOLDERS
Community	Bendigo Pastoral Station Ardgour Pastoral Station Matakanui Pastoral Station Local businesses, chambers and associations Healthcare providers in the local, district and regional communities
Local community	Residents of Bendigo, Tarras, Cromwell, Clyde and Alexandra
Mana whenua	Te Rūnanga o Ngāi Tahu
Emergency Services	Fire and Emergency, Police, Ambulance
Education facilities	Schools in the local and district community
Recreation user groups	Various groups in the local and district community
Internal	MGL employees and contractors
District and Regional Government	Strategic planners CODC ORC
Central Government	DOC Environmental Protection Authority (EPA) Land Information New Zealand (LINZ) Toitū Te Whenua Te Arawhiti (Office for Māori Crown Relations) WorkSafe New Zealand
Non-government	Other surrounding mining operators Tourism New Zealand Vineyards in the Bendigo region Service providers (e.g. power)

4.2 Stakeholder Consultation Strategy

MGL have commenced engagement with the community and key stakeholders to share key attributes about the project and to understand their concerns and aspiration in relation to the project through regular stakeholder drop-in sessions in Cromwell and Tarra and targeted consultation. Early community engagement sessions have indicated that use and potential contamination of water, access routes, earthquake risks, energy demand, and the eventual closure of the mine are all important factors for the community.

Early and ongoing stakeholder communication throughout the exploration and development phases, including local communities, government agencies, environmental groups, and other interested parties, is integral to closure planning and will continue throughout the LOM. Stakeholder knowledge can enhance the effectiveness of closure strategies and lead to better outcomes, as well as enabling the identification and management of risks. Stakeholder participation in closure planning fosters trust and transparency and enables understanding of concerns and expectations that can be considered in iterative planning.

Stakeholder engagement focus areas throughout the LOM are proposed to consist of the following items:

- Share updates with key stakeholders on the operation's progress, monitoring and compliance, the ongoing rehabilitation efforts, and the closure planning process;
- Identify the main concerns and issues of key stakeholders regarding the design and management of rehabilitation and closure activities;
- Define expectations and track progress toward agreement upon post-mining land use and closure outcomes;
- Develop management actions through relevant Management Plans to guide operations and inform ongoing closure planning and consultation; and
- Where feasible, adjust the design or management of proposed rehabilitation and closure activities to address the concerns or issues raised by key stakeholders.

Engagement with certain parties is required or encouraged as part of some legislative requirements (Section 3), though this may not always feature closure planning. A Stakeholder Engagement Plan is managed by MGL and contains guidance regarding records of engagement relevant to rehabilitation and closure.

4.3 Stakeholder Consultation Summary

Periodic engagement forums (weekly, fortnightly and monthly) are undertaken with community members in regional centres close to the Project Area, in addition to monthly meetings with key regulatory and iwi stakeholder groups. Ad-hoc engagement is also undertaken where stakeholders seek specific information.

Consultation with stakeholders to date has consisted of communicating key messages under the following themes:

- MGL’s vision for the project;
- Project footprint, layout and design features;
- Overview of nature of mine operations and visibility to public;
- Commitment to rehabilitation planning and implementation throughout the LOM;
- Intentions regarding community engagement and post-mining outcomes;
- Collaborative engagement with mana whenua;
- Commitments regarding emissions and environmental impacts; and
- Anticipated economic and social benefits.

Regular engagement forums will continue throughout the LOM, and the format, timing, and subject matter will be adjusted in response to changing information requirements and key project milestones.

5 POST-MINING LAND USE

This section discusses the pre-mining land use, the proposed mining activities and the proposed post mining land use. As the BOGP is being developed in stages, construction activities will be undertaken concurrently with operational activities. Because of the staged approach, closure planning knowledge may develop at different rates for different locations across the Project Area.

5.1 Pre-mining Land Use

Since European settlement, land uses in the region have included pastoralism (cattle grazing), exploration, mining, and conservation. Except for some infrastructure associated with pastoral activity, the Project Area is largely undeveloped. Other operational mine developments are located within the region, but none are in proximity to the Project Area.

5.1.1 Mining

The area has a rich gold endowment with gold produced up to the 1940's from the rich Bendigo lodes of the Bendigo goldfield and from numerous small alluvial / workings along the RAS Valley and the Manuherikia Basin at Tinkers / Matakanui and Devonshire goldfields.

Mining activities commenced within and around the Project Area from the mid-1860s, with two methods predominating - alluvial sluicing and hard rock mining with battery stamping. There are six main areas in which mining claims were focused: RAS, Alta, Eureka, CIT, Shepherds Creek, and Thomsons Creek (Lawrence, Lewis, & Scrivener, 2019). Multiple mining syndicates and companies have mined the various gold bearing reefs constructing new, and often recycling older, mines, batteries, water races and tramways from the 1860s through until the 1940s.

5.1.2 Registered Abandoned Mines

Three abandoned Crown mines are registered by New Zealand Petroleum and Minerals in proximity to the Project Area, as detailed in Table 5 and shown in Figure C1 of Appendix C.

Table 5. Registered abandoned mines (NZPM, 2024).

SITE ID/ MINE NAME	OPERATOR NAME	OPERATION TYPE	COMMODITY	EASTING (NZTM 2000)	NORTHING (NZTM 2000)
O10222 – Cromwell Mine	The Cromwell Gold Company Ltd	Underground	Gold	1313529.112	5017300.952
O10228 – Bendigo	New Bendigo Gold Mining Company Ltd	Underground	Gold	1314856.763	5016778.193
O10601 – Rise and Shine	Bendigo Rise and Shine Gold Mining Company Ltd	Underground	Gold	1318759.990	5016181.155

There have been several modern mining explorations over the Bendigo-Ophir Project Area since the 1980's. Recent exploration work has focused on the Bendigo and RAS goldfields which have been recognised as similar to the successful Macraes gold mining deposit. Both Bendigo-Ophir and Macraes have gold concentrations and prospects within bedrock metamorphic schist with exploration concentrated along the known shear zones. These prospects occur in multiple north-west and south-east trending shear zones that extend intermittently for 30 kilometres in strike length (Lawrence, Lewis, & Scrivener, 2019).

The exploration works have involved surface or underground data collection using soil, rock, stream-sediment sampling, pitting, trenching and drilling. This has been done using both hand (minimum impact activities) and mechanical drilling methods.

5.1.3 Pastoralism

The Project Area has a rich history of colonial pastoral occupation, beginning in 1858 with Run 223 (now known as Matakanui Station) which encompasses the area southeast of Thompson’s Saddle (Lawrence, Lewis, & Scrivener, 2019). Run 223 was operated by five different entities before 1914, with its homestead located in the Manuherikia Valley, outside the pastoral lease. Run 238 (Morven Hills Station) was granted the same year, stretching from Lindis Pass in the north to Cromwell Gorge in the south. Within this area a stone woolshed and farmstead were established in the Lindis Valley, along with another woolshed and stone buildings off Ardgour Road south of Tarras. In 1910, Run 238 was subdivided into smaller stations, including Bendigo and Ardgour, which are part of the current Project Area.

The Bendigo and Ardgour Pastoral Stations fall within the tenure of the closure boundary, with Matakanui Station to the east and the private property owned by Cherri Holdings to the northwest. An agreement is in place with the owners of Ardgour Station for the purchase of its lease, contingent upon external approvals for the Project.

5.2 Proposed Post-mining Land Use

Post-mining land use (PMLU) options are considered in the context of relevance to the wider regional environment, post-mining land capability, acceptability to stakeholders, and predicted ecological sustainability with regard to the local and regional environment. The proposed land use provides for the development of closure outcomes and informs completion criteria to verify such outcomes.

The proposed PMLU is to return the majority of the land to pastoralism, as per the current surrounding and underlying land use. Landscape changes resulting from mining, including the retention of pit voids in the post-closure landform, will result in some disturbed areas within the closure boundary being unsuitable for this proposed PMLU.

Examples of alternative options for beneficial PMLUs in the region include recreation and tourism, such as for walking trails and heritage sites, renewable energy developments, and agricultural purposes in addition to pastoralism such as viticulture.

A proposed pest exclusion zone situated north of the mine footprint, within the Project Area but outside of the closure boundary, will be an approximate 30 ha fenced area managed for ecological offsets, and is planned to remain in perpetuity.

Land use options will continue to be investigated throughout the life of the project in consultation with local communities, pastoralists and other stakeholders. Post-mining access requirements for stakeholders and the public will be refined as further investigations are completed. This will be progressed throughout the LOM, and outcomes incorporated into future versions of the MCP.

6 CLOSURE LANDFORM

6.1 Post-mining Landform

The post-mining landform is the resulting landform at the completion of the operational phase of the life of mine. It assumes that the full life of mine plan has been executed. As described in Section 2, the post-mining landform will include ex-pit ELFs, a TSF, two open pits and the backfilled CIT pit, and areas of disturbance for supporting infrastructure. Some sections of the ELFs will have been subject to progressive rehabilitation during the operational phase. The post-mining landform is shown in Appendix E.

6.2 Post-closure Landform

The post-closure landform is the final landform at the completion of all demolition, earthworks and rehabilitation activities. For Bendigo-Ophir the post-closure landform will consist of rehabilitated ex-pit ELFs, two backfilled pits (CIT and SRE), pit lakes in the RAS and SRX pits, a rehabilitated TSF, wetland areas and a range of vegetation communities, depending on the relevant post mining land use(s) at a domain level. The post-closure landform is shown in Appendix E.

7 CLOSURE RISK ASSESSMENT

7.1 Risk Assessment Framework

To support the development of this MCP and the closure strategies it details, MGL undertook a closure risk assessment to identify and assess likely closure risks, based on current knowledge and understanding. A framework for assessing these risks was utilised which aligns with the Australian and New Zealand Risk Management Standard (AS/NZ ISO 31000:2018).

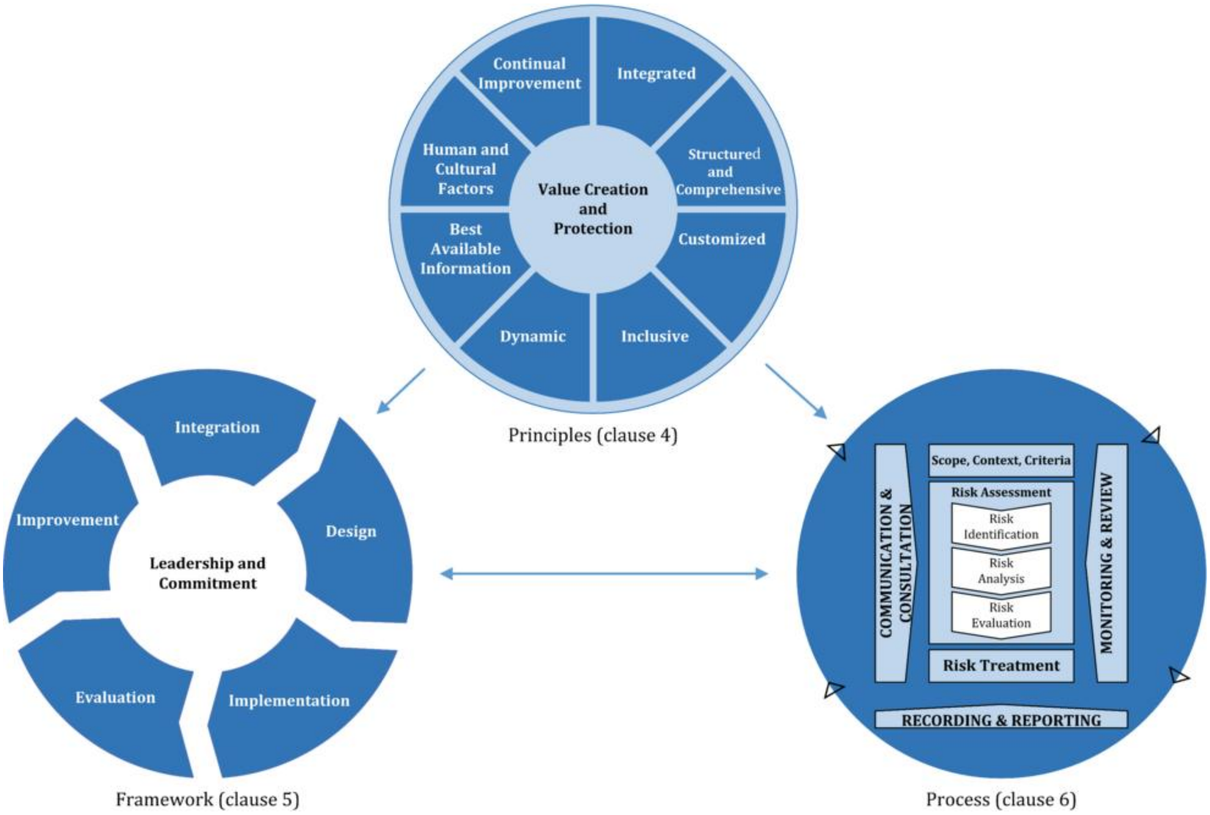


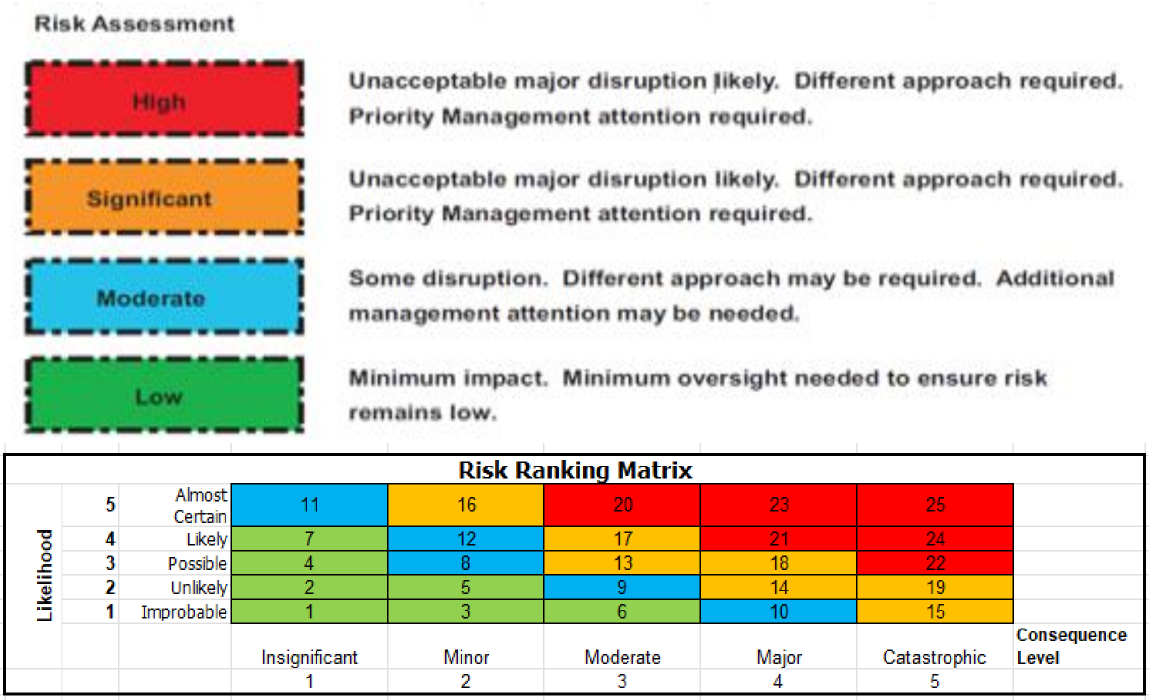
Figure 5. AS/NZ ISO 31000:2018 Risk Management Standard Framework for identifying and managing risk.

7.2 Risk Identification and Evaluation

The process for identifying risks included:

- Reviewing the existing knowledge base and technical work for the site;
- Reviewing stakeholder consultation feedback to date;
- Drafting relevant risks;
- Understanding and documenting existing controls;
- Undertaking a risk evaluation for each identified risk and then ensuring a review of these ratings by relevant technical representatives; and
- Drafting and confirmation of relevant actions.

Risks were evaluated using a 5x5 likelihood and consequence matrix, as outlined in Figure 6.



Risk Assessment

Rating	Description
High	Unacceptable major disruption likely. Different approach required. Priority Management attention required.
Significant	Unacceptable major disruption likely. Different approach required. Priority Management attention required.
Moderate	Some disruption. Different approach may be required. Additional management attention may be needed.
Low	Minimum impact. Minimum oversight needed to ensure risk remains low.

Risk Ranking Matrix

Likelihood							
	5	Almost Certain	11	16	20	23	25
	4	Likely	7	12	17	21	24
	3	Possible	4	8	13	18	22
	2	Unlikely	2	5	9	14	19
	1	Improbable	1	3	6	10	15
		Consequence Level	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5

Figure 6. Risk evaluation matrix for Bendigo-Ophir MCP.

7.3 Site Risk Profile

A total of 22 closure risks have been identified for the project at this stage of planning. Risks have been separated to identify which stage of the life of mine they may occur in, from closure planning to operations, closure implementation and post closure.

It is expected that the risk register will remain a live document that is subject to regular review and serves to aids the planning and operational teams to manage risk throughout the mine life. The (residual) risk profile for the project is detailed in Figure 7 and a copy of the register is appended as Appendix F. High and significant rated risks will be the priority management focus.

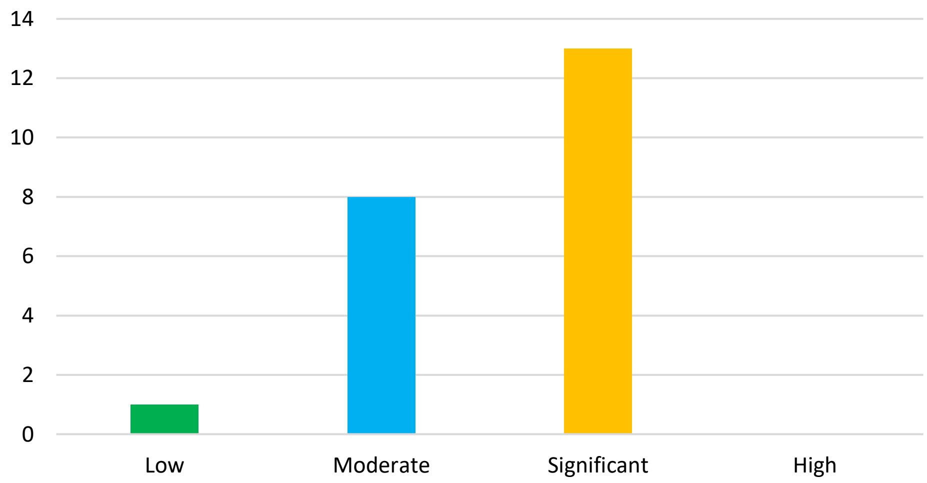


Figure 7. Risk profile for closure of the BOGP.

8 CLOSURE OUTCOMES AND COMPLETION CRITERIA

8.1 Closure Strategy

The following closure strategies will be implemented to manage risks associated with closure of the BOGP:

- ELFs will be rehabilitated with design informed by waste characterisation, and ecological and hydrological factors to ensure long term stability;
- To reduce the potential for NMD generation, overburden will be carefully managed during operations. Layered ELF construction, as well as capping of final slope profiles is planned to minimise the potential for air and water ingress. The current construction methodology recommends that ELFs are constructed in small lifts dumping next to a tip-head and dozing over the edge to control segregation;
- During the project operational phase, overburden will be used in TSF embankment construction in the Shepherds valley and otherwise placed in ELFs in Jean Creek and the upper Shepherds valley. SRX and SRE over-burden will be stored in a dedicated ELF in the RAS valley. CIT and SRE open pits will be backfilled to integrate with the surrounding topography profile;
- Tailings (waste fines) will be stored in the engineered tailings storage facility (TSF) in Shepherds Valley. The TSF is designed and will be constructed in accordance with the NZ Dam Safety Guidelines 2024 but will additionally be buttressed by the Shepherds Creek ELF on the downstream side. The final landform will be capped with overburden and topsoil. Water will run onto the surface from the catchment to the south and east to the north valley wall, then towards ELF. There will be a cut in the TSF embankment to allow water to run west into the diversion drain to Shepherds creek;
- Management plans will be implemented for relevant environmentally and culturally significant values, and to protect agreed social and cultural heritage values and sites in accordance with Cultural Values Statements and Heritage authorities requirements;
- Implementation of progressive rehabilitation to promote revegetation, and monitoring of rehabilitation to inform refinement to closure planning, closure outcomes and completion criteria;
- Placement of safety bunding around mine pit voids to manage risks associated with inadvertent public access post-closure. Designs will consider the need for ongoing public access associated with existing access agreements for pastoral stations, and stakeholder post-closure access requirements;
- All infrastructure will be removed, except for infrastructure buried more than 1 m below the ground surface; and
- Environmental modelling including geochemical, geotechnical, surface water, and groundwater will be undertaken on an iterative basis during the LOM to inform operations, mine planning/design and closure planning to ensure no unacceptable impacts.

An Operational Water Management Plan will govern a water management system addressing sediment and erosion control, treatment of tailings discharge waters, and management of MIW (e.g., seepage from the ELF) by control and pumping of water to the TSF impoundment. The active closure phase of the BOGP will include, but not be limited to, the following activities pertaining to surface water management:

- Profiling of the tailings surface for final closure landform;
- Decommissioning of the Process Plant and Infrastructure area;
- Construction of a water treatment plant and passive treatment ponds in Process Plant area;
- Management of the underground portal and removal of pumps;
- Rehabilitation capping of the ELFs and TSF;
- Formation of weir to control surface water discharge off rehabilitated TSF surface to outlet channel;
- Final rehabilitation of outlet channel along north side of Shepherds Creek ELF i.e. North Diversion Channel; and
- Redirection of SRX pit and SRX ELF water to the RAS pit.

8.2 Closure Outcomes

Closure outcomes are the overarching outcomes that are being sought in relation to mine closure and the post mining landscape. Outcomes are typically high level in nature, while the closure completion criteria that underpin each objective provide clarity and the detail on how each given objective will be measured and met. Outcomes are developed considering the context of the operation, the closure knowledge base, planned or likely impacts, identified risks, stakeholder expectations in relation to the end state and relevant industry guidance (local, national and international as applicable).

Closure outcomes will continue to be refined during the life of the mine as relevant based on new information, changes to stakeholder expectations, evolving industry standards and changes in risk profiles.

The closure outcomes for the BOGP are detailed in Table 6.

Table 6: Closure outcomes for Bendigo-Ophir.

NUMBER	ASPECT	OBJECTIVE
1	Safety	Safety hazards have been appropriately managed, and effective controls are in place.
2	Cultural heritage	Key heritage values have been protected during closure implementation.
3	Infrastructure	All infrastructure not required to support post mining land use(s) has been removed and appropriately disposed.
4	Contamination	Contamination caused by the operation is appropriately remediated or managed.
5	Geotechnical stability	The final landform is geotechnically stable.
6	Revegetation	Disturbed areas have been appropriately revegetated as required by consent conditions.

NUMBER	ASPECT	OBJECTIVE
7	Hydrology	Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls.
8	Hydrogeology	Pit lakes have developed in line with modelled parameters, as demonstrated through model calibration.
9	Workforce	A strategy has been implemented that manages impacts of closure on the workforce.
10	Relinquishment	Closure implementation is to the satisfaction of key stakeholders, enabling relinquishment of tenure and associated obligations held by MGL.

8.3 Closure Completion Criteria

Completion criteria provide the detail as to how closure outcomes will be demonstrated to ultimately allow relinquishment to be achieved. In line with industry expectations, criteria ideally are:

- **S**pecific;
- **M**easurable;
- **A**chievable;
- **R**elevant; and
- **T**ime-bound (SMART).

The completion criteria for BOGP, as detailed in Table 7, have been developed based on current knowledge and are considered preliminary at this stage of development. Completion criteria, like closure outcomes, should continue to be refined during the planning and operational phases of mining, based on new information, changes to stakeholder expectations, evolving industry standards and changes in risk profiles. Over time these criteria will continue to be refined and progress to detailed SMART criteria.

Table 8 outlines the specific compliance limits for surface water and groundwater as outlined in (Mine Waste Management, 2025). These limits will be incorporated into a Water Management Plan, which is currently under development. While the criteria in this table have been defined for the operational phase, they are currently assumed to apply to closure and will be refined as operations progress.

Table 7: Closure completion criteria for Bendigo-Ophir.

NUMBER	ASPECT	OBJECTIVE	COMPLETION CRITERIA	MONITORING AND VALIDATION	TIMEFRAME
1	Safety	Safety hazards have been appropriately managed, and effective controls are in place.	Safety 1: Access to underground mine workings has been prevented and in accordance to WorkSafe requirements.	Engineer report confirming access has been sealed. Regulatory inspection.	During closure implementation phase.
			Safety 2: Access to the potentially unstable pit edge zone has been prevented.	Geotechnical stability assessment. Safety bund locations spatial data. Regulatory inspection.	Prior to tenure relinquishment.
2	Cultural heritage	Key heritage values have been protected during closure implementation.	Heritage 1: All areas have been subject to appropriate survey coverage prior to closure related disturbance.	Heritage survey coverage spatial data.	Prior to closure implementation.
			Heritage 2: Significant heritage places have been avoided by closure implementation and final landform design.	Heritage survey coverage spatial data. Final footprint spatial data.	At completion of closure implementation earthworks.
			Heritage 3: The visual amenity of the final landform has been designed to consider heritage values where possible.	Visual impact assessment (using 3D final landform terrain model).	Prior to closure implementation. Confirmed again at completion of closure implementation earthworks.
3	Infrastructure	All infrastructure not required to support post mining land use(s) has been removed and appropriately disposed.	Infrastructure 1: All above ground infrastructure, unless required and agreed to support post mining land use(s) has been demolished or otherwise removed and sent offsite for re-use, recycling or disposal.	Demolition report. Recycling or waste management report.	During closure implementation phase.
			Infrastructure 2: All safely accessible below ground infrastructure has been demolished or otherwise removed and sent offsite for re-use, recycling or disposal.	Demolition report. Recycling or waste management report.	During closure implementation phase.
			Infrastructure 3: All electrical equipment has been de-energised.	Make safe report.	Prior to closure implementation.

NUMBER	ASPECT	OBJECTIVE	COMPLETION CRITERIA	MONITORING AND VALIDATION	TIMEFRAME
			Infrastructure 4: Buried services less than 1m below ground level have been removed.	Buried services plan. Earthworks report.	During closure implementation phase.
			Infrastructure 5: Ownership transfer has occurred to post mining land user(s) for any infrastructure being retained to support post mining land use(s).	Legal documentation outlining ownership transfer.	Prior to tenure relinquishment.
4	Contamination	Contamination caused by the operation is appropriately remediated or managed.	Contamination 1: Appropriate contaminated sites investigation has been completed.	Baseline (pre-construction) assessment. Detailed Site Investigation report.	Prior to closure implementation.
			Contamination 2: All identified contamination has been assessed and appropriate remediation measures have been implemented.	Remediation Plan. Monitoring reports. Independent Auditor assessment.	Prior to tenure relinquishment.
			Contamination 3: Areas that are not remediated are suitably registered as Contaminated Sites.	Registration of Contaminated Sites under the appropriate category.	Prior to tenure relinquishment.
			Contamination 4: Monitoring indicates that residual contamination is within acceptable parameters.	Surface water monitoring reports. Ground water monitoring reports. Soil sampling reports.	Prior to tenure relinquishment.
			Contamination 5: Residual liabilities for Contaminated Sites have been agreed.	Liabilities are understood and accountability has been determined and legally agreed.	Prior to tenure relinquishment.
5	Geotechnical stability	The final landform is geotechnically stable.	Stability 1: The rehabilitation design for the Engineered Landforms is based on a suitable factor of safety (FoS).	Geotechnical report detailing the risk-based approach to determining appropriate FoS. As built rehabilitation construction report. Geotechnical stability monitoring.	Prior to tenure relinquishment.
			Stability 2: The rehabilitation design for the Tailings Storage Facility is based on a suitable FoS.	Geotechnical report detailing the risk-based approach to determining appropriate FoS. As built rehabilitation construction report. Geotechnical stability monitoring.	Prior to tenure relinquishment.

NUMBER	ASPECT	OBJECTIVE	COMPLETION CRITERIA	MONITORING AND VALIDATION	TIMEFRAME
			Stability 3: Highwalls near public access routes have appropriate safety controls implemented (rock barriers, fencing).	Final rehabilitation construction report. Geotechnical inspection.	Prior to tenure relinquishment.
6	Revegetation	Disturbed areas have been appropriately revegetated to support the post mining land use(s).	Revegetation 1: Vegetation consistent with the consent conditions has been established on disturbed areas.	Rehabilitation monitoring reports and trend analysis.	Prior to tenure relinquishment.
			Revegetation 2: In areas designated for conservation as the post mining land use, the vegetation structure, density and diversity are representative of appropriate analogue areas.	Rehabilitation monitoring reports and trend analysis.	Prior to tenure relinquishment.
			Revegetation 3: No new weed species are present that were not present prior to disturbance.	Baseline vegetation surveys. Weed monitoring reports	Prior to tenure relinquishment.
			Revegetation 4: Erosion if present does not impact sensitive areas or compromise revegetation outcomes.	Erosion monitoring reports and trend analysis.	Prior to tenure relinquishment.
			Revegetation 5: Fauna habitat features are present in the rehabilitated areas.	Rehabilitation monitoring reports confirm the presence of rip lines/swales/surface roughness to encourage leaf litter retention, presence of logs and rocks and other habitat features.	Prior to tenure relinquishment.
7	Hydrology	Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls.	Hydrology 1: Surface water flows have been reinstated where agreed.	Surface water management plan. Independent assessment by Engineer.	Prior to tenure relinquishment.
			Hydrology 2: Surface water management structures are in place where required (diversions, bunds, rock armouring).	As built rehabilitation construction report. Independent assessment by Engineer.	During closure implementation phase.
			Hydrology 3: Appropriate water quality treatment options have been implemented.	Water quality monitoring.	During closure implementation phase.
			Hydrology 4: Water quality is within expected parameters for key analytes (as per Table 8)	Water quality monitoring.	Prior to tenure relinquishment.

NUMBER	ASPECT	OBJECTIVE	COMPLETION CRITERIA	MONITORING AND VALIDATION	TIMEFRAME
8	Hydrogeology	Pit lakes have developed in line with modelled parameters, as demonstrated through model calibration.	Pit lake 1: Pit lake water levels are developing in line with predicted trends.	Pit lake model calibration report. Pit lake level monitoring.	During closure implementation phase. Recalibrated prior to tenure relinquishment.
			Pit lake 2: Pit lake water quality is predicted to remain within modelled parameters.	Pit lake model calibration report. Water quality monitoring.	During closure implementation phase. Recalibrated prior to tenure relinquishment.
9	Workforce	A strategy has been implemented that manages impacts of closure on the workforce.	Workforce 1: A workforce management strategy has been prepared and implemented.	Workforce management strategy.	Prior to closure implementation.
			Workforce 2: Employees not required to support closure implementation have received appropriate support to redeploy either internally or externally at the cessation of operations.	Independent assessment of workforce management strategy.	During closure implementation phase.
			Workforce 3: Employees required to support closure implementation have received appropriate support to redeploy either internally or externally at the cessation of closure implementation.	Independent assessment of workforce management strategy.	Post closure implementation phase.
10	Relinquishment	Closure implementation is to the satisfaction of key stakeholders, enabling relinquishment of tenure and associated obligations held by MGL.	Relinquishment 1: Completion criteria have been demonstrated to have met agreed parameters or are otherwise agreed to be acceptable.	Final verification audit report detailing all monitoring, analysis and validation against completion criteria. Report indicates criteria satisfactorily achieved.	Prior to tenure relinquishment.

Table 8: Recommended water quality compliance limits for BOGP

PARAMETER (UNITS ARE MG/L UNLESS STATED OTHERWISE)	**SURFACE WATER RECOMMENDED COMPLIANCE LIMIT(S)**	**GROUND WATER RECOMMENDED COMPLIANCE LIMIT(S)**
pH (unitless)	6.5 - 9.0	–
Turbidity (NTU)	5 (over a 5-year rolling period, 80% of samples, when flows are at or below median flow, are to meet the limit)	–
Ammoniacal-nitrogen (NH_3-N)	≤0.24 (annual median) <0.4 (annual 95th %)	–
Nitrate-nitrogen (NO_3-N)	<2.4 (annual median) <3.5 (annual 95th %)	11.3 (MAV*)
Cyanide (CN^-)	0.011 (un-ionised HCN, measured as [CN], ANZG 2018)	0.6 (MAV)
Sulfate ($SO4^{2-}$)	If hardness <100 mg/L ($CaCO_3$), or chloride <5 mg/L, sulfate compliance limit = 500 mg/L. If the hardness is 100–500 mg/L and if the chloride is 5 – <25 mg/L, sulfate compliance limit is: Sulfate (mg/L) = [-57.478 + 5.79 (hardness mg/L CaCO3) + 54.163 (chloride mg/L)] * 0.65 If hardness is between ≥25 and ≤500 mg/L, the sulfate limit is (mg/L): [−1276.7+5.508*(hardness mg/L $CaCO_3$) + 1.457*(chloride mg/L)] * 0.65 A minimum of 12 samples must be collected over any rolling 12-month period. For compliance limits in the points above, no more than 20% of samples collected over a rolling 12-month period may exceed the relevant compliance limit. An acute compliance limit = 1,000 mg/L averaged over 4 days and not to be exceeded more than once in a one year period, or in more than 10% of samples.	≤250 (taste threshold)
Sulfide (S^{2-})	≤0.0015	–
Aluminium (Al) (diss**)	0.00063 – 3.2 (chronic) 0.001 – 4.8 (acute) (US EPA 2018)	1 (MAV)
Antimony (Sb) (total)	0.074 (chronic) 0.250 (acute)	0.02 (MAV)

PARAMETER (UNITS ARE MG/L UNLESS STATED OTHERWISE)	SURFACE WATER RECOMMENDED COMPLIANCE LIMIT(S)	GROUND WATER RECOMMENDED COMPLIANCE LIMIT(S)
Arsenic (As(V)) (diss)	≤0.042	0.01 (MAV)
Cadmium (Cd) (diss)	≤0.0004 See Table 9 for adjustment algorithm	0.004 (MAV)
Chromium (Cr) (diss)	≤0.0033 (CrIII) ≤0.006 (CrVI) See Table 9 for adjustment algorithm	≤0.05 (MAV, Total Cr)
Cobalt (Co) (diss)	0.001 (chronic) 0.11 (acute, not to exceed) See Table 9 for adjustment algorithm	<1 (livestock drinking water)
Copper (Cu) (diss)	≤0.0018 See Table 9 for adjustment algorithm	≤0.5
Iron (Fe) (total)	–	≤0.3
Lead (Pb) (diss)	–	0.01 (MAV)
Manganese (Mn) (diss)	–	0.4 (MAV)
Molybdenum (Mo)	≤0.034	<0.01
Selenium (Se) (diss)	–	<0.02
Strontium (Sr) (diss)	–	4
Uranium (U) (diss)	–	0.03 (MAV)
Zinc (Zn) (diss)	≤0.015 See Table 9 for adjustment algorithm	≤1.5

"—" = no limit recommended.

** MAV = Maximum acceptable value.*

*** diss = dissolved.*

Table 9: Adjustment algorithm for water quality compliance limits

PARAMETER (UNITS ARE MG/L UNLESS STATED OTHERWISE)	SURFACE WATER ADJUSTMENTS (ALSO SEE APPENDIX A)
Al (diss)	https://www.epa.gov/sites/default/files/2018-12/aluminum-criteria-calculator-v20.xlsm
Cd (diss)	HMTV = TV (H/30)0.89, where hardness-modified trigger value(HMTV) = (µg/L), trigger value (TV) (µg/L) at a hardness of 30 mg/L as $CaCO_3$; H, measured hardness (mg/L as $CaCO_3$) of a fresh surface water.
Cr (diss)	Chromium (mg/L) = Toxicity value (mg/L) / $(H\ (mg/L)/30)^{0.82}$
Co (diss)	Cobalt (µg/L)= exp{(0.414[ln(hardness $CaCO_3$ mg/L)] – 1.887}
Cu (diss)	$Bioavailable\ copper = Dissolved\ copper \div (DOC/0.5)^{0.977}$ where copper is in µg/L and DOC is dissolved organic carbon, in mg/L.
Zn (diss)	Zinc (mg/L) = Toxicity value (mg/L) / $(H\ (mg/L)/30)^{0.85}$

9 CLOSURE IMPLEMENTATION

9.1 Closure Domains

Areas of the operation with similar features and with similar decommissioning, rehabilitation and closure requirements have been grouped into domains. The distribution of closure domains for the respective mine areas are presented in Figure 8.

Closure domains of the BOGP operation comprise:

- Pit voids remaining at closure;
    - Below water table voids; and
    - Backfilled voids.
- ELFs remaining at closure;
    - NMD external ELFs.
- Ex-pit TSF;
- Infrastructure; and
- Haul roads and other disturbance

Closure measures for each domain are detailed in Section 9.2.

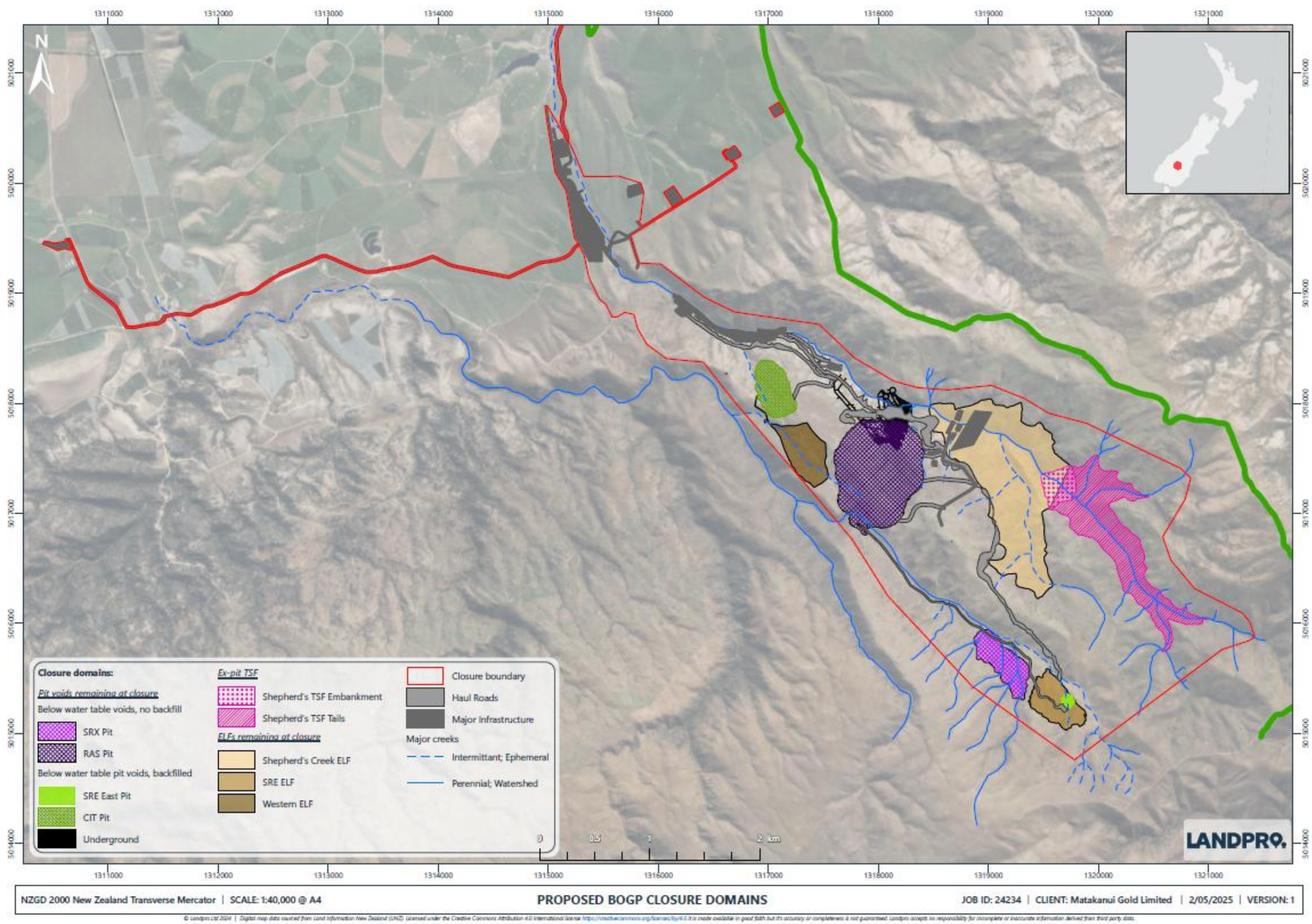


Figure 8. Proposed BOGP closure domains.

9.2 Indicative Closure Work Program

As the project is in the exploration and development phase, the BOGP Closure Work Programs presented are considered preliminary and will continue to be developed over the LOM to provide detailed closure implementation requirements, final landform designs and closure strategies.

The Closure Work Program for each domain presents key information relevant to each domain, including:

- Domain features, status and closure date;
- Relevant closure design information;
- Closure assumptions;
- Preliminary closure outcomes relevant to each domain;
- Closure monitoring and maintenance requirements; and
- Closure strategy and key tasks for rehabilitation and closure.

9.3 Pit Voids

Table 10 summarises the Closure Work Program for the below water table, no backfill pit domain.

Table 10. Below water table pit, no backfill domain Closure Work Program.

FEATURE	PROGRAM SUMMARY
Domain features	Two pit lakes: RAS pit SRX pit
Estimated closure date	Year 11
Post-mining land use	Rehabilitated land / Mine-impacted land not in use
Relevant closure outcomes	Safety hazards have been appropriately managed, and effective controls are in place. Key heritage values have been protected during closure implementation. Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls. Pit lakes have developed in line with modelled parameters, as demonstrated through model calibration.
Specific closure assumptions	Prior to final closure, appropriate evaluation and implementation of measures to restrict inadvertent public access.
Landform design	Rehabilitation of non-backfilled pit voids is limited to some exposed faces. **RAS and SRX pits:** reduce steep areas of benching where practicable. Safety bund design and placement based on Potentially Unstable Pit Edge Zones (PUPEZ).
Closure and rehabilitation materials required	Competent NAF mineral waste to construct abandonment bunds. Material appropriate for the construction of armouring. Topsoil and subsoil for use as growth medium, as required. Seed mix as required.

FEATURE	PROGRAM SUMMARY
Closure monitoring and maintenance	Access assessment. Geotechnical monitoring. Assessment of safety bunds. Pit lake model calibration. Water quality monitoring.
CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Construction of safety bunds /structures .
Decommissioning and closure	Cessation of dewatering pumping and removal of pumping infrastructure. Final closure of safety bund and pit ramp. Installation of signage, if required. Ripping of bench surfaces, where required.
Premature closure	Revise closure outcomes to final state and agree with relevant stakeholders. Access to pit made safe by construction of safety bund (where required) and blocking pit ramps. Monitoring and Maintenance program revised and implemented.

Table 11 summarises the Closure Work Program for the below water table, backfill pit domain.

Table 11. Below water table pit, backfill domain Closure Work Program.

FEATURE	PROGRAM SUMMARY
Domain features	CIT pit SRE pit Underground Portal
Estimated closure date	Year 5 – Year 11
Post-mining land use	Rehabilitated land, some of which will be suitable for pastoral use.
Relevant closure outcomes	Safety hazards have been appropriately managed. Disturbed areas have been appropriately revegetated to support the post-mining land use(s). Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls.
Specific closure assumptions	The SRX ELF will not present geotechnical or surface water management risks. Surface water management implications for receiving environments are appropriately managed. Risks associated with the proximity of the SRX ELF footprint to the RAS Creek are understood and managed post-closure.
Landform design	CIT: Backfill to surface. SRE: Backfill to surface and construction of SRX ELF.
Closure and rehabilitation materials required	Material appropriate for the construction of armouring and cover system design. Topsoil and subsoil for use as growth medium. Seed mix.
Closure monitoring and maintenance	Geotechnical monitoring. Revegetation monitoring. Surface water monitoring. Weed monitoring.

CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Implementation of progressive rehabilitation during operations.
Decommissioning and closure	Progressive backfill as mine schedule allows. Earthworks to reprofile topography to closure design criteria, as required. Ripping of bench surface, where required. Application of capping and topsoil and planting with seed of native provenance.
Premature closure	Access to pit made safe by construction of safety bund (where required) and blocking pit ramps. Monitoring and maintenance program revised and implemented. Revise closure outcomes to final state and agree with relevant stakeholders.

9.3.1 Engineered Landforms

Table 12 summarises the Closure Work Program for the ELF domain.

Table 12. ELF domain Closure Work Program.

FEATURE	PROGRAM SUMMARY
Domain features	Shepherds Creek ELF SRX ELF Western ELF (WELF)
Estimated closure date	Year 10
Post-mining land use	Rehabilitated land, some of which will be suitable for pastoral use
Relevant closure outcomes	The final landform is geotechnically stable. Disturbed areas have been appropriately revegetated to support the post-mining land use(s). Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls. Contamination caused by the operation is appropriately remediated or managed.
Specific closure assumptions	High erodibility material has been preferentially tipped within the ELFs to avoid exposure on surfaces where possible. ELFs are constructed in accordance with suitable and agreed design criteria and rehabilitated in accordance with appropriate standards and procedures. All material with potential to generate metalliferous drainage has been encapsulated during operations. Capping and armouring material is readily available, and placement is adequate to prevent long term rilling and gullying, and creation of metalliferous drainage.
Landform design	Construction of lifts, compacted to reduce water and air inflow and reduce seepage. Erosion and surface water management features included in design, as appropriate. Scour protection is required where ELF toe is modelled to be at risk of erosion due to high velocity flood water. Contouring, and application of capping and armouring material, as required. Topsoil/ subsoil applied and seeded with native or pasture species.

FEATURE	PROGRAM SUMMARY
Closure and rehabilitation materials required	Rock armour material of low – moderate erodibility. Material appropriate for the construction of capping. Topsoil and subsoil for use as growth medium. Seed mix.
Closure monitoring and maintenance	Landform construction monitoring. Post closure landform stability monitoring. Erosion monitoring. Revegetation and fauna monitoring. Surface and groundwater monitoring. Weed monitoring.
CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Implementation of progressive rehabilitation during operations. Monitoring inventories and scheduling required rehabilitation materials where possible.
Decommissioning and closure	Earthworks to reprofile topography to closure design criteria. Construct toe bunds, crest bunds, and safety berms to design criteria, as appropriate. Encapsulation and capping with low/non-arsenic waste rock (TZ3).
Premature closure	Encapsulation of any potentially metalliferous drainage material not completed progressively during operations. Finalise detailed rehabilitation designs. Revise closure outcomes to final state and agree with relevant stakeholders. Revised materials rehabilitation inventory. Final reshaping and rehabilitation of any waste landforms not completed progressively during operations.

9.3.2 Tailings Storage Facility

Table 13 summarises the Closure Work Program for the TSF domain.

Table 13. TSF domain closure work program.

FEATURE	PROGRAM SUMMARY
Domain features	Shepherds Creek TSF
Estimated closure date	Year 11 – Year 13
Post-mining land use	Rehabilitated land
Relevant closure outcomes	Safety hazards have been appropriately managed, and effective controls are in place. The final landform is geotechnically stable. Contamination caused by the operation is appropriately remediated or managed. Disturbed areas have been appropriately revegetated to support the post mining land use(s). Water quality and hydrological function meet agreed parameters, and the final landform integrates appropriate surface water management controls.
Specific closure assumptions	TSF has been constructed to design. Waste fines surface has dried sufficiently to allow safe access.
Landform design	Current design is a downstream construction embankment, with a 1 V to 2 H downstream slope and 1 V to 1.5 H

FEATURE	PROGRAM SUMMARY
	upstream slope with an 8 m final crest width. Tailings delivered as a conventional slurry from the process plant and discharged using a combination of spigots and end pipe methods. Final Shepherds Creek TSF closure design will be determined during operations. Diversion channel along north side to remain in perpetuity, final location established from start of mine life. Additional drains will be cut to allow water onto rehabilitated surface at closure.
Closure and rehabilitation materials required	Inert capping material. Material required to re-profile batter slopes, if required. Topsoil and subsoil for use as growth medium. Seed mix.
Closure monitoring and maintenance	Landform construction monitoring. Post closure landform geotechnical stability monitoring. Erosion monitoring. Revegetation monitoring. Surface and groundwater monitoring.
CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Monitoring inventories and scheduling required rehabilitation materials where possible.
Decommissioning and closure	Capping with overburden and topsoil across the surface to depth required by rehabilitation design. Planting riparian species on the margins, determined by the proposed final level of the tailings on completion of mining. Earthworks to reprofile topography to closure design criteria.
Premature closure	Capping of tailings material. Finalise detailed rehabilitation design. Revise materials rehabilitation inventory. Final reshaping and rehabilitation to meet the closure design. Revise closure outcomes to final state and agree with relevant stakeholders.

9.3.3 Infrastructure

Table 14 summarises the Closure Work Program for the Infrastructure domain.

Table 14. Infrastructure domain closure work program.

FEATURE	PROGRAM SUMMARY
Domain features	Areas where infrastructure is located including but not limited to roads, rail, powerlines and power related infrastructure, communications infrastructure, pipelines, borefields, pump stations, laydowns, wash downs, ANFO facilities, water treatment facilities, workshops, laboratories, buildings, plant, camps, fuel facilities and any associated disturbances.
Estimated closure date	**Process plant:** Year 11 **Other:** Various
Post-mining land use	Rehabilitated land, some of which will be suitable for pastoral use. Passive water treatment on plant site.
Relevant closure outcomes	Safety hazards have been appropriately managed. All infrastructure not required to support post mining land use(s) has been removed and appropriately disposed.

FEATURE	PROGRAM SUMMARY
	Contamination caused by the operation is appropriately remediated or managed. Disturbed areas have been appropriately revegetated to support the post mining land use(s).
Specific closure assumptions	Processing infrastructure will be decommissioned, removed and disturbance rehabilitated. Removal of below-ground infrastructure will occur to a depth of 1 m. Infrastructure will be sold, salvaged, or recycled as appropriate. Contaminated sites assessment has been completed prior to active closure implementation, and remediation measures are in place if required. Chemicals and hazardous materials are appropriately removed and managed prior to decommissioning phase. Pipelines have been drained and chemicals and hazardous materials (from pipelines and elsewhere across the site) have been removed.
Landform design	Where linear infrastructure is removed, reinstate drainage lines where appropriate. A water treatment facility will be established on the former plant site following plant decommissioning. **Plant Site:** Remove concrete foundations and infrastructure to a depth of 1 m. Stack an earthen platform against the base of the cut to rehabilitate the slope. **Office / camp area:** Rehabilitate in accordance with closure design criteria and agreed PMLU.
Closure and rehabilitation materials required	Topsoil and subsoil for use as growth medium. Seed mix.
Closure monitoring and maintenance	Revegetation monitoring. Surface water monitoring.
CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Monitoring inventories and scheduling required rehabilitation materials where possible.
Decommissioning and closure	Drain pipelines and remove hazardous materials. Demolition and removal of plant concrete foundations (to 1 m). Where infrastructure is removed, reinstate drainage lines where appropriate. Undertake contaminated sites assessment and remediation measures, if required. Dispose of inert materials that are not retained, reused or recycled in an off-site landfill area. Ripping and recontouring of surface, where required. Application of topsoil and seeding with species of native provenance, including riparian species within the lower Shepherd Creek valley.
Premature closure	Revise materials rehabilitation inventory. Closure designs and provision revised and updated as required. Revise closure outcomes to final state and agree with relevant stakeholders.

FEATURE	PROGRAM SUMMARY
	Implementation of revised rehabilitation and closure works as appropriate. Monitoring and maintenance program revised and implemented.

9.3.4 Haul Roads and Other Disturbance

Table 15 summarises the Closure Work Program for the haul roads and other disturbance domain.

Table 15. Hauls roads and other disturbance domain closure work program.

FEATURE	PROGRAM SUMMARY
Domain features	Haul Roads Other disturbance areas – all areas of disturbance that are not categorised by any of the above landform domain categories. This domain will be categorised into 'high disturbance', 'moderate disturbance' and 'low disturbance' sub-domains in future iterations of the MCP, based on the amount of earthworks that will be required during final landscaping, to allow for more accurate closure cost estimation.
Estimated closure date	Year 11, with opportunities for progressive rehabilitation.
Post-mining land use	Rehabilitated land, some of which will be suitable for pastoral use
Relevant closure outcomes	Safety hazards have been appropriately managed. Key heritage values have been protected during closure implementation. All infrastructure not required to support post mining land use(s) has been removed and appropriately disposed. The final landform is geotechnically stable. Disturbed areas have been appropriately revegetated to support the post mining land use(s).
Specific closure assumptions	All roads will be rehabilitated unless ownership is transferred to a third party.
Landform design	Install cross bunds where appropriate. Where linear infrastructure is removed, reinstate drainage lines where appropriate. Design considers post-closure access requirements.
Closure and rehabilitation materials required	Topsoil and subsoil for use as growth medium. Seed mix.
Closure monitoring and maintenance	Revegetation monitoring. Surface water monitoring.
CLOSURE STRATEGY - KEY TASKS	
Progressive rehabilitation and closure activities	Implementation of progressive rehabilitation during operations.
Decommissioning and closure	Where road is removed, reinstate drainage lines where appropriate. Battering of slopes to moderate topography and blend with surrounding landform. topsoil. Ripping of heavily traffic-compacted areas, application of subsoil and at least 200mm of topsoil, and seeding with species of native provenance.
Premature closure	Revise closure outcomes to final state and agree with relevant stakeholders.

FEATURE	PROGRAM SUMMARY
	Revise materials rehabilitation inventory. Implementation of revised rehabilitation and closure works as appropriate. Monitoring and maintenance program revised and implemented.

9.4 Decommissioning

A Decommissioning Plan will be developed based on the Closure Work Programs presented in Section 9.2, for stakeholder approval where required and implementation.

After completion of ore processing, the decommissioning of equipment and facilities will take place before removing items not designated to remain post-closure. Equipment and facilities not retained will either be dismantled for re-use or resale or demolished for off-site disposal, depending on the economic conditions at the time of closure. Contaminated land assessments will be conducted after the removal of infrastructure or near infrastructure intended for transfer to a third party. If necessary, remediation activities will be carried out, and the monitoring and maintenance requirements within the MCP will be updated accordingly.

Groundwater production and monitoring bores not required for the post-closure monitoring program, or being handed over to a third party, will be decommissioned. Monitoring activities will commence within the required timeframes following completion of rehabilitation activities. Revision and update of the closure cost estimate will occur, to determine any financial constraints associated with altered designs or deficient materials.

9.5 Contaminated Sites Management

Regular review to assess contaminants associated with operational activities will be undertaken. Where required, preliminary or detailed site investigations will occur. Storage of hazardous substances will be undertaken in accordance with the requirements of the Hazardous Substances and New Organisms Act (1996) (HSNO). Potentially contaminating activities and land uses will be managed to reduce health and safety risks for on-site staff and communities, reduce deleterious effects to the environment, and ensure that appropriate closure of the site is achieved.

NMD source hazards will be managed with appropriate engineering controls to prevent and otherwise minimise NMD generation. These controls are being developed as part of landform designs (Mine Waste Management, 2025b).

The following recommendations are considered for the management of potential current and future contaminated sites based on the existing characterisation (Geocontam Risk Management Ltd, 2025):

- Further evaluation of the soil dataset should be undertaken to better inform a risk assessment of the disturbance of soils with elevated As (and potentially Cd) concentrations during operations for both the Rise and Shine and Shepherds Creek catchments; and
- Management plans will be developed to address operational risks associated with key mine sources that have the potential to adversely impact human health or ecological receptors, to include procedures around waste rock and processing residues (e.g., tailings), shallow soil management strategies, dust management, chemical storage, spill response, and development of a surface and groundwater monitoring plan.

Prior to closure as part of the decommissioning process, a contaminated site assessment will be undertaken. Based on this assessment, specific plans will be developed to remediate or manage contaminants, where required, to support the PMLU.

9.6 Rehabilitation Management

9.6.1 Rehabilitation Resources

Most vegetation (e.g., matagouri, tussock, brier, pasture) will be removed with the topsoil during construction clearing activities and either transferred directly to rehabilitation areas or stockpiled for future use. In some locations subsoil and other geological materials may also be suitable as a topsoil substitute, however investigations are required to confirm suitability.

Competent rock material will be stockpiled for use in vegetative rehabilitation and fauna habitat enhancement (placement of rocks and rock outcrops to provide for ecological and landscape benefits, such as refugia for invertebrates and lizards). As far as practical, soil will be separated from the larger rocks. As the schedule allows, rocks will be progressively transferred to their final location on rehabilitated areas.

As indicated above, some topsoil in the RAS valley floor contains elevated arsenic, particularly in the historic mining areas. These soils will be managed appropriately to avoid adverse effects associated with dust and stockpile management, including keeping these soils segregated for rehabilitation, in accordance with the relevant management plans.

At this stage of development, detailed assessment of growth media and rehabilitation materials inventories has not been completed. This will be undertaken as soon as practicable (Section C.4.5). Stockpiled rehabilitation resources will be documented in spatial software and referenced relevant management plans, including characterisation of materials, recording and auditing volumes of soil, root zone material (soils and brown rock) and weathered boulders.

9.6.2 Landform Surface Treatments

Rehabilitation of the mining areas will include final slopes in keeping with the surrounding topography. Depending on the final slope profile and aspect, ripping may be undertaken on bench surfaces to create a zone of fractured rock and faces scarified to allow overburden to be ‘keyed in’ and to minimise slip planes between the two materials. An element of benching may be required to meet drainage and future access requirements. Topsoil will then be spread on the slope and areas seeded with native or pasture species. In some locations, suitable material (e.g., matagouri) will be directly transferred to prepared slopes as a mulch and seed source. Weed management will be undertaken throughout the LOM where required to enhance rehabilitation success.

Post-closure water management infrastructure is likely to include sediment control structures such as ponds, check dams, and erosion control measures; passive water treatment systems such as constructed wetlands and drains; and diversion channels and drainage systems to prevent water contact with waste materials. Inspections and maintenance will include hydrological assessments to evaluate the stability of such features.

9.6.3 Engineered Landforms

The ELFs will be constructed to make components available for partial rehabilitation as early as possible in the schedule to allow progressive rehabilitation.

Overburden waste rock from the RAS deposit will be stored in the Shepherds Creek ELF and Western ELF. The location of the ELF is downstream of the TSF, positioned in the bottom of incised valleys where it will act as a buttress to the TSF, enhancing the stability of the dam over and above the NZ Dam Safety Guidelines (2024), while providing sufficient storage capacity to store all waste from the pit. The WELF is located in an ephemeral valley west of RAS.

Sequencing of the ELFs has been incorporated into the LOM schedule to enable high arsenic waste rock (TZ4) to be mined and then encapsulated and capped with low / non-arsenic waste rock (TZ3), to approximately 20 m thick. A base layer of TZ3 material approximately 3 m thick will also be in place.

The SRX ELF will store overburden from the SRX deposit and will contain TZ3 material.

The following landform design approaches are proposed:

- Post-closure, the ELFs are expected to have a relatively flat top surface with minor slope to direct any runoff generated to manage water. The slopes of the ELF landforms will be 3(H):1(V). The interim bench raises will be progressively flattened, and slope contouring will take place by the track dozer to form a natural landform blending in with the surrounding hills. Earthworks to achieve this will also incorporate permanent drainage and runoff collection channels as appropriate;
- Post-closure, clean water diversion drains around the TSF will be opened to allow runon from the surrounding catchment. The surface of the TSF will be relatively flat, with minor slopes and swales to direct any runoff generated into the north west of the TSF to a constructed wetland which is ultimately conveyed past the northern side of the Shepherds ELF via a diversion channel to the valley downstream of the Shepherds ELF;
- Post-closure, the ELFs will have surface water infrastructure to convey any runoff that is generated off the landforms; and
- Based on studies completed to date, it is expected a proposed store-and-release cover system will be required for the Shepherds Creek ELF. Further work is required to refine the understanding of cover systems requirements for the ELF and for other landforms (Section C.4.5). Encapsulation options are presented in Section C.4.4.4.

9.6.4 Visual Amenity

Landscape and visual effects of the operation are being assessed to define the physical, perceptual and associative values of the pre-mining, post-mining, and post-closure landscapes. Rehabilitation design aims to balance the overall disturbance effects across the landscape values, including ecological, historical and visual values. Potential visual effects for the Project are considered to be substantially reduced because of locating much of the disturbance within the confines of the Shepherds and RAS valleys, of which there is limited visibility from key vantage points in the Clutha / Mata-Au Valley. It is anticipated that visual amenity will continue to be a subject of ongoing stakeholder consultation throughout the project, informing ongoing refinement to final landform designs.

9.6.5 Seed Management

Rehabilitation strategies provide a framework for refining rehabilitation works, including plant schedules over time, and requires planting plans to be adapted to support successful rehabilitation. The

Rehabilitation Management Plan details strategies and guiding principles for rehabilitation management. As highlighted in Section 1.2, the Rehabilitation Management Plan is currently being drafted and will be included in the next revision of the MCP.

Nursery-sourced native plants will be restricted to propagules from ecological districts of local provenance to ensure populations are genetically appropriate to the site and with dryland phenology. Nurseries located in the Central Otago region will be used to reduce the risk of importing weeds, pests and other diseases into the region.

9.6.6 Planting Strategies

One aim of revegetation is to create 'islands' of planted vegetation which assist the natural regeneration of adjacent areas through shelter and seed dispersal. The most favourable sites (microsites) will be selected for planting to cover approximately 20% of benches across the site. Planting is to be determined by a planting specification, which is to be developed progressively as part of the staged rehabilitation plans.

A matrix of plant species, ecosystem features, underlying soils and root zones, and topography (including aspect and exposure) will be developed for specific rehabilitation outcomes and applied across the mined areas, creating a heterogenous landscape with a variety of microsites. The outcomes will include pasture areas suitable for grazing, native vegetation, ephemeral streams and potentially wetlands and seepage areas.

Where planting is undertaken, maintenance will be programmed and costed for at least the first two to three years after planting, after which plants are expected to be well established and self-sustaining. This will be confirmed by monitoring and adaptive management implemented. On an exposed site, maintenance work will initially involve replacing dead plants ('blanking') and cutting back / removing unwanted and competing species. Staging the planting of tube stock over several years is critical to its success. This will accommodate any unexpected or unfavourable seasonal events. It also enables any adjustments to be made regarding species composition, timing, and methods of planting that are obtained from monitoring previous planting.

Indicative plant species for propagation and planting in the rehabilitation planting will be found in the Rehabilitation Management Plan. It is expected that the plant species list will be refined as part of ongoing processes of measuring on-site plant performance, tailoring planting mixes to specific site characteristics.

9.6.7 Fauna Habitat

A variety of invertebrate and small vertebrate refugia will be included in rehabilitation areas using wood and rocks, and tors (rock formations) will be recreated to assist with the natural re-establishment of mosses and ferns. Specific habitats will also be created for notable invertebrates which provide habitat conditions that encourage the presence of target species. Grazed pastures and areas with highwalls remaining will have limited ecological value for invertebrates due to exposure, temperature fluctuations, skeletal soil and low plant cover. To address this, woody vegetation patches will be created at the base of highwalls and adjacent to bunds to enhance connectivity between mined areas otherwise acting as barriers to dispersal.

9.6.8 Reference Sites

Baseline study sites and reference sites, also referred to as control sites or analogues, are located within remnants of native vegetation representative of the local area. These sites should reflect the vegetation community that existed at the rehabilitated site prior to disturbance and occupy a similar topographical position within the landscape. They serve as benchmarks for what the rehabilitated area might achieve over time. However, suitable reference sites may not always be available, as the landforms undergoing rehabilitation are often significantly altered. In such cases, reference sites serve as a general guide. Data from reference sites also supports the planning of rehabilitation programs, including the selection of seed lists and their species composition. Reference sites for the BOGP need to be selected and will form part of the developing rehabilitation strategies within the Rehabilitation Management Plan.

9.7 Progressive Rehabilitation

Disturbance over the life of the mine, including buffers, is expected to be in the order of 550 ha. Of this, some 130 ha will remain unrehabilitated as open pits, while the remainder of the disturbed land will be rehabilitated. Progressive rehabilitation will be undertaken from the second year of operations, allowing for the trialling of rehabilitation methods and strategies to inform future rehabilitation approaches.

An ecological effects management strategy has been developed which includes rehabilitation for ecological and pastoral (grazing) outcomes on direct disturbed areas. A combination of broad scale and targeted habitat restoration and enhancement measures will be employed to deliver improved rehabilitation management outcomes. The strategy groups rehabilitation into two broad approaches in line with the dominant post-mining outcomes:

- Rehabilitation for pastoral (grazing) outcomes; and
- Rehabilitation for ecological outcomes.

This approach aims to ensure that at a broad level, biodiversity benefits in rehabilitated areas outweigh impacts in accordance with regional and national policy requirements. Adaptive management will be applied to individual areas, informed by specific monitoring and by trials established early in the mine life to enable improvement and refinement of rehabilitation techniques.

9.8 Premature Closure

Premature closure of the BOGP would likely result in modifications of the proposed mine closure strategies detailed in this MCP and its subsequent revisions, depending on the stage that the mine sequence is at such a point in time. In the event of unexpected or premature closure, revision and update of the closure risk assessment would occur to determine key areas for closure works and any change in residual risk from premature closure. Outcomes of the review will be used to prioritise closure actions.

In the event of unexpected closure, a revision and update of the MCP and development of a Decommissioning Plan will be required to address changed circumstances and gain approval from relevant key stakeholders where strategies may need to be amended.

These plans would require the following as a minimum:

- Stakeholder engagement to communicate the strategy to be implemented and address concerns of key stakeholders;

- A review of closure outcomes and completion criteria to determine any which may be difficult to achieve given premature closure. Communicate these with relevant key stakeholders to determine a way to resolve issues;
- Amendment to landform designs for TSFs, ELFs, mining voids and surface water control structures where the proposed design could no longer be met;
- Assessment of topsoil and other rehabilitation materials balances to determine any deficiencies in materials, and options to address this;
- Contaminated land assessment, and where required, remediation works, of all areas of the Project used to manufacture, store or utilise hazardous materials;
- Revision to the final void groundwater model where the proposed extent of mining did not occur to determine if the closure strategy requires amendment;
- A review and update to monitoring and maintenance requirements;
- Revision and update of the closure cost estimate to determine any financial constraints associated with altered designs or deficit of rehabilitation materials;
- Finalisation of rehabilitation or closure trials to determine if findings are adequate to implement; and
- Relevant undertakings to address all safety obligations required under the *Health and Safety at Work Act* 2015 (NZ) in relation to mine suspension or abandonment, including its associated Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016. Under Regulation 85 of the Mining Regulations, mine operators are required to notify WorkSafe New Zealand if a mining operation is to be suspended or abandoned permanently.

10 CLOSURE MONITORING AND MAINTENANCE

10.1 Closure Monitoring Program

The primary purpose of closure monitoring is to assess whether the agreed completion criteria have been met. A specific monitoring program will be finalised as the site approaches closure, therefore, this MCP outlines the principles and indicative framework that will be employed. A specific and appropriate program will be developed to enable adaptive management as well as assessment of performance against completion criteria and refined and finalised as the site approaches closure. It will include the components outlined in Sections 10.2 to 10.4.

Baseline monitoring is conducted in the exploration and development phase and as operations commence and informs the closure knowledge base and development of closure strategies. Following that, monitoring will be conducted in the following phases:

- Operational monitoring, which occurs throughout the life of the mine, in line with regulatory requirements. Results that are relevant to closure are incorporated in the environment knowledge base when it is reviewed;
- Pre-closure monitoring, which occurs as the site approaches closure to underpin assessment of post-closure performance;
- Closure monitoring, which is conducted during the period of active site closure; and
- Post-closure monitoring, which is conducted on a regular basis until either:
    - there is a demonstration that closure criteria have been met and that the site is able to be relinquished; or
    - parameters being monitored reach a steady state.

As a minimum, it is expected that the Monitoring Program will cover:

- Rehabilitation monitoring;
- Groundwater monitoring; and
- Surface water monitoring.

10.2 Rehabilitation Monitoring

The purpose of the rehabilitation monitoring is to provide useful feedback for the improvement of rehabilitation techniques via evaluating the successional development of the rehabilitation, and to help assess progress towards long term rehabilitation goals and completion criteria. The intention is that trends can be recognised early and optimised through early intervention with remedial activities where required.

A Rehabilitation Monitoring Program will form part of the rehabilitation documentation and conditions of consent. Whilst some management measures need to be in place at the outset, for others ongoing monitoring will be required to determine what action needs to be taken and when. This may be a matter of refining the rehabilitation method used or it may require significantly altering the method and timing. Comprehensive record keeping will be important and facilitate the accumulation of knowledge. The monitoring program design will consider the following factors:

- regulatory monitoring requirements;
- rehabilitation age;
- rehabilitation quality;
- rehabilitation area size;
- trial / experimental plots to provide direction on overall rehabilitation approaches;
- the level of complexity of the rehabilitation and therefore rehabilitation quality risk i.e., waste rock landforms are high risk; exploration rehabilitation is low risk;
- safe access for monitoring personnel; and
- efficient use of monitoring resources.

Associated rehabilitation management will be applicable to designated Rehabilitation Management Areas, and will consider:

- Extent of areas rehabilitated against proposed annual targets;
- Observations of finished landform stability, including small-scale slumping and rock falls that may affect revegetation success;
- Signs of animal pest damage to revegetation areas as a trigger for undertaking pest control;
- Incidence and persistence of invasive plant pests, particularly those required to be controlled under statutory documents (e.g. Regional Pest Management Strategy) or those deemed to present a risk of to the success of revegetation areas; and
- The success of seeding at providing vegetative cover to areas such as benches, batters and faces (strike rate and vigour).

Monitoring methodologies are likely to include such methods as:

- Permanent transects for quantitative data collection of erosion, growth medium, vegetation cover, species richness, vegetation structure, plant density, weed presence and general condition;
- Permanent photo-points to track visual progress towards rehabilitation outcomes; and
- Soil sampling and laboratory analysis to assess nutrient composition of soils used for rehabilitation.

Environmental monitoring will also be undertaken to meet conditions compatible with post-land use in disturbed areas. The monitoring will involve, but may not be limited to, vegetation condition assessments, survey data assessments, aerial imagery and visual inspection assessments, climate data monitoring, sediment and erosion assessments and historical data reviews. The baseline and operational monitoring phases will assist in refining these programs to be suitable for monitoring for the closure phases. Environmental Management Plan(s) will be developed for ongoing reference and associated with key closure completion criteria.

10.3 Groundwater Monitoring

The groundwater monitoring program during the closure and post-closure phases aims to ensure that water quality is protected, potential contaminants are identified and managed, and long-term environmental impacts are minimised. The program is designed to detect changes in groundwater conditions over time, assess the effectiveness of closure activities (e.g., waste encapsulation, seepage controls), and guide any necessary remediation efforts.

A network of groundwater monitoring wells will be established around critical areas, including:

- Downstream of ELFs – to monitor potential leachate migration from encapsulated waste rock;
- Downstream of the TSF – to monitor any seepage from the tailings impoundments;
- Near processing areas to monitor potential contamination from residual processing chemicals; and
- Background wells – to serve as reference points for baseline groundwater conditions.

Monitoring wells will be installed at multiple depths to capture both shallow and deep groundwater flow systems at appropriate strata. Groundwater samples will be collected and analysed for a suite of chemical parameters relevant to the site's potential Contaminants of Potential Concern (COPCs), and may include:

- Major ions including calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^{+}), potassium (K^{+}), chloride (Cl^{-}), and sulfate (SO_4^{2-});
- Metals and trace elements including As, Pb, Zn, Cu, Cr, Co, and Al;
- Nitrate, nitrite, and ammoniacal nitrogen from explosives residues;
- pH and Electrical Conductivity (EC) to assess overall groundwater chemistry and potential contamination; and
- Total Dissolved Solids (TDS) to monitor general salinity and changes in water quality.

Monitoring frequency will include a post-closure phase during which monitoring will occur at close intervals to provide a high-resolution dataset for assessing potential contaminant releases and groundwater dynamics, a post-closure phase during which the frequency will be reduced following establishment of stable parameters, and long-term monitoring to occur less frequently once groundwater trends demonstrate consistent water quality with no significant contaminant migration. The frequency of monitoring will be adapted based on results, with increased sampling in the event of contaminant exceedances or trends indicating potential risks to groundwater quality.

Site-specific groundwater quality trigger levels will be established based on baseline conditions and relevant environmental guidelines. These trigger levels will serve as early warning indicators for potential contamination, requiring further investigation or remedial action if exceeded. Contingency actions including exceedance investigations and mitigation measures will be in place. Comprehensive reports will be prepared annually, detailing groundwater monitoring results, comparison to baseline data and trigger levels, and any trends or exceedances identified.

10.4 Surface Water Monitoring

The surface water monitoring program during the closure and post-closure phases aims to ensure that water quality is maintained, potential contaminants are identified and managed, and long-term environmental impacts on downstream water bodies are minimised. Baseline surface water quality data will be used to establish site-specific trigger levels. Comparisons will be made against national and regional water quality guidelines (e.g., ANZECC).

A network of surface water monitoring sites will be established at key locations, and may include:

- Upstream reference sites to establish background water quality conditions unaffected by mining activities;
- Downstream of ELFs to monitor potential runoff and seepage from encapsulated waste rock;
- Downstream of the TSF to monitor potential seepage and tailings-related contaminants;
- Controlled mine discharge points from closure water management structures (e.g., sediment ponds, passive treatment systems);
- Key creeks, rivers, and wetlands that may receive mine-impacted water; and
- Outflow infrastructure from mine landforms, diversion channels, and sediment control structures.

Similar to the groundwater monitoring program, monitoring frequency will include a post-closure phase during which monitoring will occur at close intervals, a post-closure phase during which the frequency will be reduced following establishment of stable parameters, and long-term monitoring to occur less frequently. Inspection of water management infrastructure will occur as part of monitoring. Contingency actions including exceedance investigations and mitigation measures will be in place. Comprehensive reports will be prepared annually, detailing groundwater monitoring results, comparison to baseline data and trigger levels, and any trends or exceedances identified.

Surface water samples will be analysed for a range of physical, chemical, and biological parameters to assess potential contamination and ecosystem impacts. Core water quality indicators will be developed and may include Total Suspended Solids (TSS) to assess sediment loads and erosion impacts, biological indicators for macroinvertebrate diversity and periphyton biomass in key receiving waters, and nutrients, metals and trace elements.

10.5 Post Closure Maintenance

Maintenance will continue post-closure as required to ensure the site remains environmentally stable, meets regulatory compliance, and minimises long-term liabilities, until it is determined that the closure outcomes have been met, or relinquishment of the site is agreed.

11 CLOSURE COST ESTIMATION

The specific details of closure cost estimates are commercially sensitive information. This section outlines the general process of completing a closure cost estimate. For commercial reasons the actual estimate is not documented in this closure plan.

11.1 Closure Cost Estimation Principles

Closure cost estimates are determined based on the Bond Introduction Report and associated methods, prepared to support the resource consent (Lane Associates Ltd, 2025). The report provides a preliminary estimate of the quanta of annually assessed bonds for the Project throughout its life and describes the method by which they were calculated. This initial closure cost estimate was prepared based on the most recent information of mine plans and infrastructure at the time of preparation and is supported by several relevant assumptions. The cost estimate for the site will be revised annually to account for incremental mine development. In addition, integration of closure considerations into the LOM Plan will ensure that adequate provisions are maintained.

The cost estimates consider the closure implementation (decommissioning, closure, and rehabilitation of the operation's site disturbance) and post-closure (aftercare and monitoring) phases. In broad terms, these include the following components:

- Decommissioning and removal of infrastructure;
- Construction of final landforms;
- Rehabilitation of remaining disturbed areas of mine disturbance;
- Monitoring[1];
- Post-closure aftercare[2]; and
- A contingency factor.

11.2 Cost Estimation Methods and Assumptions

The following assumptions have been applied:

- Unit rates are based on late 2024 costs applicable to the types and scale of works required to rehabilitate the proposed mine site;
- For conservatism, rehabilitation costs are assumed to be incurred within one year so are not discounted;
- Administration costs are assumed over periods ranging from less than one year to several years as appropriate;

[1] Monitoring costs have been included for a 11-year aftercare period. If ongoing monitoring is required beyond the aftercare period, a portion of these costs will extend through the post-closure phase.

[2] Aftercare typically includes care and maintenance of newly vegetated areas and weed management. It may involve ongoing water treatment and environmental and geotechnical monitoring. Considered to be a 11-year period for the purposes of the current estimate.

- Removal of offices and staff buildings from the SFA and from the process plant area is cost neutral, i.e. return from the sale of buildings and materials meets the cost of their removal;
- More substantial structures such as crusher and mill foundations and bunded, concrete leach tank pads need to be broken up and at least some of the material disposed of either into the remnant open pit(s) or the underground;
- Provision of outfall structures and associated discharge channel(s) for any open pit as a safeguard against potential future overtopping;
- Construction of a discharge channel in natural ground to carry ponded rainfall from within the TSF impoundment around the northern abutment of the TSF embankment and main ELF, discharging downstream into Shepherds Creek;
- Backfilling a length of the underground access tunnel with waste rock to exclude future access;
- Removal of all roads and access tracks formed as part of the mining project;
- Rehabilitation across the whole site, comprising;
    - Ripping of heavily trafficked or compacted site areas.
    - Recovery, trucking, placement and compacting of a rock/soil layer on the ELFs to provide a low permeability capping, reducing the potential for oxidation of the underlying rock that may result in soluble metals release in runoff or leachate.
    - Covering of the deposited tailings in the tailings storage facilities (TSF) with a layer of rock.
    - A subsoil/topsoil layer across all areas of disturbance; and
    - Planting all rehabilitated areas with grasses.
- A three-year period of ongoing water quality and vegetation monitoring to confirm success of the rehabilitation works;
- A five-year period of aftercare is also assumed, comprising an annually reducing effort on planting maintenance and weed control; and
- The ongoing cost of management of the ecological area for a maximum total term of 30 years.

12 INFORMATION AND RECORDS MANAGEMENT

The management of baseline and closure data, as well as legal and other obligations and stakeholder consultation records is critical to the management of closure planning and implementation. Data management systems to support the management of operations and closure planning, and facilitate decision-making, are currently under development and will include an Information and Records Management System (IRMS) containing a Stakeholder Engagement Register, an Environmental Management System (EMS), and a Health and Safety Management System (HSMS), inclusive of Risk Management.

13 CLOSURE FUTURE WORK FOCUS AREAS

This section provides a summary of all current future work focus areas identified from the baseline and closure data analysis undertaken in the preparation of this MCP. Future work focus areas build on baseline studies using data collected during mine life to further develop the closure strategy and build a robust detailed closure plan. Progress updates will be provided for actions in the next MCP. The information in Table 16 informs and aligns with the Closure Risk Assessment (Section 7).

Table 16. Closure future work focus areas.

FACTOR	CLOSURE KNOWLEDGE GAP	ASSOCIATED CLOSURE ACTIONS
Cultural Values	Information on the extent and nature of subsurface archaeological remains within the Project Area. Most of the proposed works will be occurring on parts of the landscape that have previously been modified during the 19th century, with small risk of encountering unrecorded archaeological remains.	▪ There is the potential that ephemeral archaeological remains relating to Mana whenua lifeways may be present in adjacent areas. Consultation to be undertaken to ensure appropriate procedures are in place should any Māori archaeology be encountered.
	Consultation with tangata whenua and other stakeholders regarding cultural and heritage values has commenced as part of the ongoing CIA and will continue throughout the LOM to ensure their values and concerns are appropriately incorporated into closure planning.	▪ Develop Closure Stakeholder Engagement Strategy and integrate this as early as possible into planning stages. ▪ Further evaluation to understand the cultural and historical significance of the project area and specific sites, to inform appropriate management strategies.
	Heritage Management Plan that incorporates the Cultural Impact Statement, protocols for avoiding or mitigating impacts and preserving sites of high archaeological significance.	▪ Develop Heritage Management Plan.
Socio-economic Context	Expectation that local communities may be impacted by closure of the BOGP, particularly regarding cessation of opportunities for employment and business opportunities.	▪ Refine the current socio-economic baseline to inform impact assessment. ▪ Complete Social and Economic Impact Assessment. ▪ Develop and implement Social and Economic Impact Management Plan. ▪ Potential social and economic impacts to be considered as closure preparations commence including amenity, loss of employment and business opportunities.
Climate	Changing climate potentially resulting in increased temperatures, and extreme weather events. These changes may impact landform stability, vegetation success, and water management systems, potentially compromising rehabilitation efforts.	▪ Design landforms to mitigate erosion, manage hydrological changes, and ensure the resilience of post-mining ecosystems.
Soils	Assessments of the spatial distribution and behaviour of subsurface horizons with restricted permeability (e.g., fragipans) and their impact on water management and root growth and consequently soil and erosion management of the post-mining landscape.	▪ Permeability assessments.
	Development of detailed information on the erodibility and sediment generation potential of specific soil types (e.g., loess, colluvium, and alluvial deposits) under mining and post-mining conditions.	▪ Site-wide mineral waste inventory and erodibility characterisation. ▪ Landform erosion modelling and erosion risk assessment to define material-specific landform designs for mineral waste units.

FACTOR	CLOSURE KNOWLEDGE GAP	ASSOCIATED CLOSURE ACTIONS
	Soil management and inventory for rehabilitation purposes.	▪ Develop stockpile scheduling and management for rehabilitation purposes.
Flora and vegetation	Baseline and impact assessment underway at time of MCP finalisation. To be updated in next MCP.	▪ Complete flora baseline and impact assessment. ▪ Review and update closure objectives and completion criteria based on outcomes of the assessment. ▪ Incorporate baseline and impact assessment results into the Rehabilitation Management plan, and subsequent MCP.
Fauna and fauna habitat	Baseline and impact assessment underway at time of MCP finalisation. To be updated in next MCP.	▪ Complete fauna baseline and impact assessments. ▪ Review and update closure objectives and completion criteria based on outcomes of the assessment. ▪ Incorporate baseline and impact assessment results into Terrestrial Ecology Management Plan and Rehabilitation Management Plan, and subsequent MCP. ▪
	Long-term geochemical behaviour of the tailings and potential for AMD.	▪ Geochemical analyses of tailings behaviour.
	Long-term effectiveness of the proposed capping system in preventing infiltration and promoting vegetation establishment.	▪ Implement capping trials to evaluate the performance of the proposed capping system.
	Feasibility of establishing functional wetlands over the TSF and their capacity to support native species.	▪ Undertake ecological studies and pilot projects for wetland re-establishment focussing on hydrological and ecological functionality.
	Impacts of the TSF on downstream surface water quality.	▪ Establish a comprehensive water quality monitoring program to track surface and groundwater quality during and after closure.
	Understanding of seepage rates and their potential influence on local groundwater systems.	▪ Conduct seepage modelling to predict seepage behaviour and assess the need for additional containment measures.
	Final Shepherds Creek TSF closure design and associated studies.	▪ Complete final Shepherds Creek TSF closure design.
Waste rock inventory	Detailed understanding of waste material inventory.	▪ Site-wide waste balance that captures topsoil volumes, and assessment against the calculated rehabilitation construction and growth media requirements.

FACTOR	CLOSURE KNOWLEDGE GAP	ASSOCIATED CLOSURE ACTIONS
Mineral waste physical characteristics	Post-closure access assessment, incorporating stakeholder consultation.	▪ Stakeholder consultation regarding post-closure access requirements.
	Characterisation of erosion potential of mineral wastes for use in developing rehabilitated landform designs. Identification of competent low erodibility mineral waste which will be stockpiled for bund construction.	▪ Site-wide mineral waste inventory and erodibility characterisation. ▪ Landform erosion modelling and erosion risk assessment to define material-specific landform designs for mineral waste units. ▪ Develop Landform Design Management Plan.
	Opportunities to progressively construct abandonment bunds/structures during operations.	▪ Development of PUPEZ zones and safety bund/structure designs, to include considerations for site drainage and the requirement for maintenance of surface flows post-closure. ▪ Final closure geotechnical stability review of the PUPEZ, calculated from the final pit designs and interaction with ELFs and natural topography. ▪ Integrate closure considerations into the Life of Mine Plan.
Mineral waste geochemical characteristics	Post-closure drainage conditions need to be clearly defined to prevent long-term contaminant migration. Confirmation of the effectiveness of construction methodologies to optimise ELF and TSF development. Further analysis of the ELF detailed design to understand the benefits of a cover system including a store-and-release system.	▪ Complete detailed construction and rehabilitation designs for the ELFs and TSF which include foundation earthworks, water and material management, encapsulation and cover system designs (including material volumes), and engineering design specifications. ▪ Assessment of brown rock and TZ3 materials for their geotechnical benefits as a cover system material to limit oxygen/water ingress. ▪ Incorporate background ecological metal concentrations into future closure planning and completion criteria.
	Management of elevated As and Cd levels in soils to mitigate human and ecological risks.	▪ Develop Contaminated Sites Management Plan.
	Background ecological metal concentrations to inform rehabilitation criteria and progressive reclamation using appropriate soil covers and vegetation.	▪ Geochemical characterisation of ELF materials (pre-excavation and placement) for AMD/NMD risks and risks associated with nitrogenous compounds.
Hydrology	Limited data on the expected performance of realigned channels, in the context of the seasonal and ecological flow needs of downstream water bodies to sustain aquatic and riparian habitats.	▪ Detailed hydrological modelling to include post-closure 3D landform drainage, seasonal flow patterns, and performance of engineered structures.

FACTOR	CLOSURE KNOWLEDGE GAP	ASSOCIATED CLOSURE ACTIONS
	Understanding of long-term erosion rates and sediment generation from disturbed landforms.	▪ Landform evolution modelling to confirm understanding of erosion and sediment dynamics.
	Understanding of the Groundwater – Surface water interactions.	▪ Studies on interactions between surface water diversions, seepage management systems, and underlying hydrogeology, and consequences for management of any Groundwater Dependent Ecosystems (GDE).
	Determination of the capacity of rehabilitated and reengineered watercourses, such as diversion channels and realigned streams, to handle peak flood conditions.	▪ Detailed risk assessment of flood management post-closure informed by surface water modelling of the post-closure landform. ▪ Confirmation of surface water management features and closure design specification requirements.
Hydrogeology	Limited data exists on the hydraulic properties, thickness, and drawdown behaviour of the veneer aquifer. Quantitative modelling to predict the contributions of rainfall and the veneer aquifer to pit inflows. Understanding of the natural infiltration and flow patterns in ephemeral creek systems over the Bendigo Aquifer.	▪ Detailed 3D numerical model of hydrogeological characterisation to understand the role of hydrogeological features and interactions, and impacts of mining, to include a post-mining groundwater recovery phase. ▪ Develop quantitative modelling to predict the contributions of rainfall and the veneer aquifer to pit inflows, including seepage rates and variability over the mining and closure phases.
	Detailed modelling to predict the extent of impacts on wetlands and alluvial systems, particularly near the SRX deposit.	▪ Studies on impacts on wetlands and alluvial systems to predict how mine dewatering, reduced catchment areas, and hydrological disruptions affect surface water bodies.
	Pit lake behaviour and water balance post-closure.	▪ Detailed modelling of pit lake water quality evolution post-closure. ▪ Model of potential overflow of groundwater rebound in pit lake to creek after closure, and associated closure implications (e.g., sediment discharge).
	Predictions and monitoring to understand how mine dewatering, reduced catchment areas, and hydrological disruptions affect surface water bodies like Shepherds Creek and Bendigo Creek during operations and post-closure.	▪ Monitoring and modelling to confirm the long-term sustainability of borefield abstraction and its influence on nearby private bores and surface water features.
	Anticipated impacts of reduction in groundwater discharge to Shepherds Creek from the hard rock aquifer.	▪ Improved modelling to confirm the groundwater discharge range for Shepherds Creek.
Rehabilitation	Arid-adapted rehabilitation techniques appropriate to Central Otago climate.	▪ Investigations to confirm rehabilitation methodologies, landform designs, and materials management. ▪ Assess Vegetation Direct Transfer viability.

FACTOR	CLOSURE KNOWLEDGE GAP	ASSOCIATED CLOSURE ACTIONS
	Confirmation of methodologies and design, including confirming erosion management methods, planting strategies, landform treatments, and weed management strategies.	▪ Identify and undertake ongoing environmental monitoring of undisturbed analogue areas throughout operations. ▪ Riparian revegetation trials to confirm species composition and rehabilitation strategies for riparian margins and proposed wetlands. ▪ Trial rehabilitation sites to inform future rehabilitation, including planting programs. ▪ Develop and implement Weed Management Plan, Terrestrial Ecology Management Plan and Rehabilitation Management Plan.
	Modelling of seed bank retention vs. stockpiling height overtime to inform seed management for rehabilitation. Seed/ tubestock sourcing and management.	▪ Preparation of Rehabilitation Management Plan to include design specifications and a monitoring and maintenance program. ▪ Develop and implement seed procurement and storage processes.
	Detailed landform rehabilitation designs.	▪ Detailed landform rehabilitation designs. ▪ Confirm design controls for the UG portal. ▪ Confirm requirement for disposal of removed infrastructure. ▪ Confirm timing of construction camp decommissioning. ▪ Closure cost estimate (bond) assumptions require validation or refinement, including confirmation of inclusions of aftercare component.
Contaminated sites	Detailed understanding of soil contamination within the project area, particularly regarding As and Cd.	▪ Targeted soil and water monitoring to refine the understanding of contaminant pathways and inform the development of adaptive closure strategies. ▪ Investigation of required management of contaminated soils. ▪ Develop Contaminated Sites Management Plan and Environmental Management Plan. ▪ Complete Detailed Site Investigation (DSI) prior to closure. ▪ Complete Remediation Action Plan (RAP) prior to closure.

14 MINE CLOSURE PLAN REVIEW

As this is the first iteration of the BOGP MCP, this section will be expanded in the next iteration of the MCP to summarise approved documents and articulate the outcomes of review processes. A summary of feedback from regulatory agencies relating to the MCP with response to comments and how these have been considered in the MCP development will be included, along with a summary of the knowledge database and actions updates.

14.1 Next Closure Plan Review

It is proposed that this MCP will be reviewed every three years (triennially) to reflect updates in site knowledge, changes in the site's risk profile, amendments to the life-of-mine plan, and ongoing stakeholder engagement outcomes. However, an initial review will be undertaken at the end of year one to incorporate the outcomes of outstanding baseline studies and draft management plans currently in development. Following this, the MCP will revert to the triennial review cycle. With each successive update, the level of detail in the MCP is expected to increase, and the completion criteria will be progressively refined.

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APPENDIX A ABBREVIATIONS

ABBREVIATION	DEFINITION
ABA	Acid base accounting
AEE	Assessment of environmental effects
AMD	Acid and metalliferous drainage
AMSL	Above Mean Sea Level
AMDMP	Acid and metalliferous drainage management plan
ANC	Acid neutralisation capacity
ANFO	Ammonium Nitrate Fuel Oil (explosives)
ASLP	Australian Standard Leaching Procedure
BOGP	Bendigo Ophir Gold Project
CIL	Carbon in leach
CIT	Come-in-Time
CODC	Central Otago District Council
COPC	Contaminants of Potential Concern
CRS	Certified Reference Samples
DOC	Department of Conservation
DGV	Default guideline values
DI	Deionised
DSI	Detailed Site Investigation
ELF	Engineered Landform
EMS	Environmental Management System
EPA	Environmental Protection Authority
GAI	Geochemical Abundance Index
GDE	Groundwater Dependent Ecosystem
GDP	Gross Domestic Product
GISTM	Global Industry Standard on Tailings Management
HSNO	*Hazardous Substances and New Organisms Act 1996* (New Zealand)
ICOLD	International Committee of Large Dams
INAP	International Network for Acid Prevention
LINZ	Land Information New Zealand
LGO	Low-grade ore
LINZ	Land Information New Zealand
LOD	Limit of detection
LOM	Life of mine
LOR	Limit of reporting

ABBREVIATION	DEFINITION
LRT	Low reliability trigger
MEA	Mining and/or Exploration Agreement
MCM	Mine Closure Management
MCP	Mine closure plan
MEP	Minerals Exploration Permit
MEQ	Metal ecotoxicity quotient
MGL	Matakanui Gold Ltd
MIA	Minimum Impact Exploration Agreement
MIW	Mine Influenced Water
Mt	Million tonnes
MPA	Maximum potential acidity
MWM	Mine Waste Management Limited
NAF	Non-acid forming
NAPP	Net acid production potential
NMD	Neutral metalliferous drainage
NPR	Neutralisation potential ratio
NZPAM	New Zealand Petroleum and Minerals
OCP	Organochlorine pesticides
ORC	Otago Regional Council
PAF	Potentially acid forming
PCOC	Potential contaminants of concern
PEP	Minerals Prospecting Permit
PUPEZ	Potentially Unstable Pit Edge Zone
pXRF	Portable X-ray fluorescence
QA/QC	Quality assurance and quality control
RAP	Remediation Action Plan
RAS	Rise and Shine
ROM	Run of mine
RSSZ	Rise and Shine Shear Zone
SAG	Semi-autogenous grinding
SH8	State Highway 8
SML	Santana Minerals Ltd
SRX	Srex
SIA	Social Impact Assessment

ABBREVIATION	DEFINITION
SRE	Srex East
SPLP	Synthetic Precipitation Leaching Procedure
TARP	Trigger action response plan
TGF	Thompson Gorge Fault
TGR	Thompson Gorge Road
TSF	Tailings Storage Facility
TZ3	Lower Greenschist facies Textural Zone 3 rocks of the Otago Schist
TZ4	Upper Greenschist facies Textural Zone 4 rocks of the Otago Schist
UC	Uncertain
WRS	Waste Rock Stack
XRD	X-ray Diffraction

APPENDIX B LEGAL OBLIGATIONS REGISTER

APPENDIX C CLOSURE KNOWLEDGE BASE

C. CLOSURE KNOWLEDGE BASE

C.1. Cultural Values

C.1.1. Māori Cultural Heritage

Ngāi Tahu / Kāi Tahu are the principal iwi across the South Island, with Te Rūnanga o Ngāi Tahu representing the iwi interest. Kāi Tahu have an enduring relationship with the natural environment.

The Central Otago area was accessed by a network of ara tawhito (travel routes) that connected the coastal settlements with the inland lakes, Te Koroka (Dart River), and with Tai Poutini (West Coast). The Mata-au (Clutha River) was part of a mahinga kai trail that led inland and was used by Otago hapu including Kati Kuri, Ngai Ruahikihiki and Ngāti Tuahuriri. The river was used as a highway to the interior, for transport of pounamu and provided many resources to sustain travellers (Aukaha, 2018). There is no record of permanent Māori occupation within the Project Area, but evidence of habitation is suggestive of migratory patterns. Wahi tapu and wahi taonga sites are important as places that hold the memories and traditions of the tupuna who moved through and occupied the Central Otago area. These places did not function in isolation from one another but were part of a wider cultural setting and pattern of seasonal resource use (Aukaha, 2018).

Mahika kai (Mahinga kai) is one of the cornerstones of Kai Tahu cultural identify. Mahika kai translates to 'food workings' and refers to the places where food was gathered or produced. The term also embodies the traditions, customs and collection methods, and the gathering of natural resources for cultural use, including raranga (weaving) and rongoa (traditional medicines). The Clutha River was a significant indigenous fishery, providing tuna (eels), kanakana (lamprey) and kokopu in the area over which Te Wairere (Lake Dunstan) now lies.

Matakanui is the Māori name for the Dunstan Mountains. The mountain range is a significant physical and cultural marker, and the peak is known as Haehaeata. Matakanui is known to be used by Māori as a trail across the ranges. The area is recorded as a Mahika kai site along with the Mata-au (Clutha River) where Weka and Tikumu were gathered. The people came from Moeraki to Makarora in the spring and remained for the summer catching eels and drying them for the winter. When the Iwi returned home, they floated down the Lake and Mata-au (Clutha River to Lindis) on koradi rafts which they abandoned and made a short cut across the ranges, by what is now known as the Māori Pass (Thomson Pass in the Dunstan Range) (Aukaha, 2018).

C.1.2. Archaeological and Ethnographic Values

New Zealand Heritage Properties Ltd (NZHPT) conducted a baseline survey of archaeological sites within the Project Area to map the location and associated values of identified archaeological sites (Lawrence, Lewis, & Scrivener, 2019). This built upon earlier survey work of the Bendigo area commencing in the 1980's and was updated and expanded in a Heritage Assessment (Woods & Thorrold, 2025).

The Project Area has been surveyed for archaeological sites via pedestrian survey, LiDAR imagery, historical document review and previous archaeological investigations to establish detailed maps of archaeological sites. There are 28 recorded archaeological sites within the closure boundary, with a total of 60 sites within the broader survey area (Lawrence, Lewis, & Scrivener, 2019; Woods & Thorrold, 2025). The predominant archaeological features are associated with the intensive historic alluvial and hard rock mining in the survey area. Details of assessments of archaeological significance based on the criteria defined by NZHPT are provided in the survey report (Woods & Thorrold, 2025), and recorded sites are displayed in Figure C 1.

The Project Area has not been subject to a comprehensive ethnographic survey. A Cultural Impact Statement is underway at the time of MCP development, and outcomes will be incorporated into the next MCP.

C.1.3. Heritage Management

The management of archaeological sites potentially affected by future mining developments for the Project will conform with Heritage New Zealand Pouhere Taonga protocols and other legislative requirements such as the *Resource Management Act* and the *Crown Minerals Act*, which include provisions for Māori rights and interests. Accidental discovery protocols will be adhered to in the event of discovery of sites currently unknown, in alignment with the conditions of legal instruments detailed in Appendix B.

An impact assessment is underway which will outline requirements and commitments regarding activities impacting heritage sites during operations. A Heritage Management Plan has been developed by MGL (Bendigo-Ophir Gold Project 'An Archaeological Management Plan', 2025) which governs operational heritage management and reporting requirements, including accidental discovery protocols. This document will be reviewed and revised during the LOM and incorporate closure management as required. Every practical effort will be made to avoid damage to any archaeological site, whether known, or discovered during closure activities.

MGL is committed to engaging with local Māori Iwi and Hapū communities, ensuring they are informed and consulted about mining activities. Planning will continue to be informed by appropriate authorities and stakeholders, and the implementation of progressive and post-mining measures for rehabilitation detailed in this MCP will support heritage management throughout the LOM.

C.1.4. Implications for Closure Planning and Future Work Focus Areas

Closure implications associated with cultural values include ensuring the protection and recognition of Māori cultural heritage, archaeological sites, and broader heritage values. Kāi Tahu’s enduring relationship with the natural environment and the cultural significance of the Mata-au (Clutha River) and surrounding landscape highlight the importance of incorporating traditional knowledge into closure practices. This includes consideration of *mahika kai* values and wahi tapu or wahi taonga sites, which are integral to the cultural identity and historical practices of the iwi.

Key implications for closure planning include:

- Effective consultation with tangata whenua is critical to ensure their values, knowledge, and interests are incorporated into closure strategies. Early and ongoing engagement with Kāi Tahu and local hapū is essential to address cultural impacts and incorporate traditional ecological knowledge into rehabilitation efforts;
- Management of recorded archaeological sites requires careful planning to avoid or mitigate impacts during closure activities. Sub-surface remains beyond currently known site boundaries pose additional risks that will be managed through accidental discovery protocols and adherence to legal requirements; and

- Appropriate management of any salvaged materials at closure, in accordance with key stakeholders wishes and direction.

The closure future work focus area associated with cultural value impacts, as summarised in Section 13, Table 16 is:

- Comprehensive consultation with tangata whenua and other stakeholders regarding cultural and heritage values or concerns relevant to rehabilitation and closure will continue throughout the LOM.

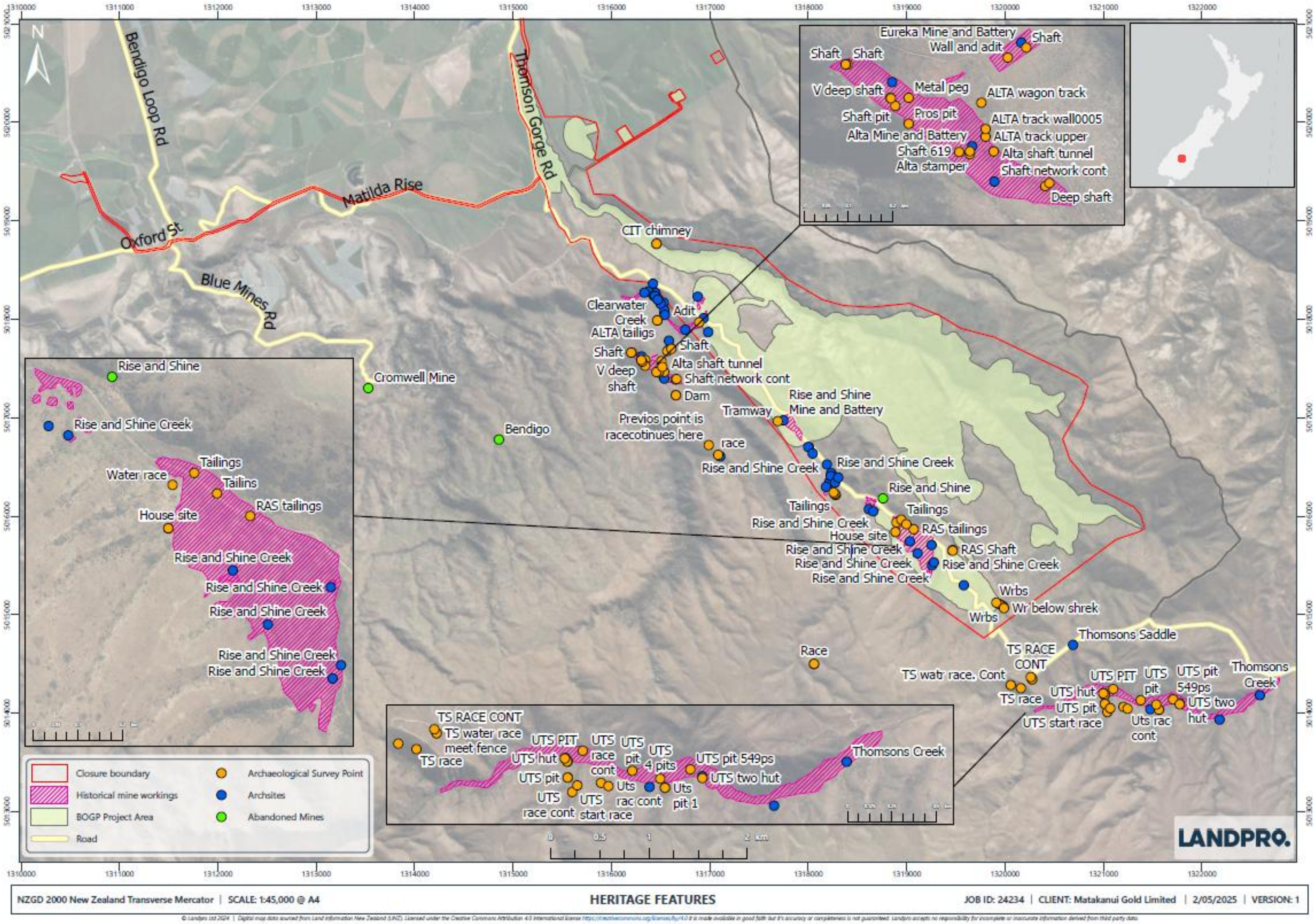


Figure C 1. Heritage features.

C.2. Socio-Economic Context

C.2.1. Nearby Towns and Communities

The BOGP is located within the jurisdictions of CODC and Otago Regional Council (ORC). The local community is defined as the Cromwell Basin and includes properties, towns, services and facilities. Five townships within the local community area, located within 35 km of the BOGP, have the potential to be impacted by construction, operations, and closure of the mine; namely Bendigo, Tarras, Cromwell, Clyde, and Alexandra.

Key services and facilities and information regarding the demographics of these towns are articulated in the SIA scoping report (GHD, 2024). The impact of closure upon the local community, as well as the broader regional community, will be assessed through the SIA and closure planning throughout the LOM.

The workforce employed at the BOGP is expected to be sourced primarily from the district community, including the District Council areas of the Central Otago District and Queenstown Lakes District. This area encompasses the larger towns of Queenstown and Wanaka. Some accommodation will be established for personnel on site during the construction phase and these facilities will be decommissioned prior to, or as part of closure. It is anticipated that there will be direct impacts such as employment, changes to amenity, access and connectivity as well as indirect impacts to the local economy and use of social infrastructure.

C.2.2. Major Industries

Major industries in Central Otago include agriculture, forestry and fishing, construction, tourism, and mining (Benje Patterson, 2024). Approximately 90% of Central Otago’s economic activity (GDP) and employment is concentrated in Vincent and Cromwell. The region is known for its diverse farming, particularly fruit and wine production, with viticulture representing a significant sector. Alongside viticulture, the region also supports horticultural activities, particularly with stone fruits and other crops suited to the climate. Mining, particularly gold mining, has historically played a vital role in Central Otago's development and economy. The region is also explored for other minerals, such as gravel and aggregates, which support construction and infrastructure development.

C.2.3. Implications for Closure Planning and Future Work Focus Areas

Closure implications associated with the socio-economic setting are centred on the expectation that local communities may be impacted by closure of the BOGP, particularly regarding cessation of opportunities for employment and business opportunities. The closure future work focus areas, as summarised in Section 13, Table 16 consist of:

- Potential social and economic impacts to be considered as closure preparations commence including amenity, loss of employment and business opportunities.

C.3. Environmental Context

C.3.1. Climate

The Central Otago region is the driest region in New Zealand, receiving less than 400 mm of annual rainfall. Climate information available from several nearby weather stations reports long-term average annual rainfall in the area between 390 mm and 550 mm with rainfall relatively evenly distributed throughout the hydrological year, albeit with lowest rainfall in July and August on average (Table C 1).

Rainfall is highest to the east of the Dunstan Ranges at Matakanui compared to the low-lying stations west of the range. The high seasonal variability of evapotranspiration is important to the relationship of rainfall to runoff. The Project Area has two weather stations, located in proximity to CIT and RAS deposits. Measurements at RAS have been occurring since November 2022.

Temperatures are on average lower than across New Zealand, with frosts and snowfalls occurring relatively frequently each autumn – winter – spring period. During summer hot dry conditions exceeding 30˚ are normal during summer and early autumn. Median summer air temperatures for the area are 16°C to 17°C and winter median temperatures are 5°C to 6°C.

Table C 1. Regional average rainfall near the BOGP area.

STATION	FROM	TO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Tarras	1951	1980	45	35	49	39	46	31	29	36	38	41	41	42	472
Bendigo 1	1951	1980	41	32	47	39	44	32	25	31	38	42	35	40	446
Bendigo 2	1981	2010	39	32	45	28	31	35	31	26	18	35	29	43	390
Matakanui	1951	2020	58	46	50	46	41	37	31	29	36	51	49	61	535
Cromwell	1981	2010	48	33	43	33	33	38	28	27	26	36	41	52	437

Source: http://cliflo.niwa.co.nz/

C.3.1.1. Implications for Closure Planning and Future Work Focus Areas

Climate change poses significant challenges for mine closure planning, requiring adaptive strategies to address altered precipitation patterns, increased temperatures, and extreme weather events. These changes may impact landform stability, vegetation success, and water management systems, potentially compromising rehabilitation efforts. When planning for closure, considerations will be made in designs to mitigate erosion, manage hydrological changes, and ensure the resilience of post-mining ecosystems.

The closure future work focus areas associated with climate impacts, as summarised in MCP Section 13, Table 16 are:

- Developing an understanding of climate modelling, vegetation resilience, and extreme weather impacts to ensure closure rehabilitation techniques are appropriate and that outcomes are expected to remain effective under future climatic conditions.

C.3.2. Land Systems and Topography

The Project Area sits on moderate topography in the north of the Otago Basin, an area characterised by alluvial fans and terraces formed by the rivers draining from the surrounding mountain ranges, particularly the Clutha and Taieri rivers. The mine site is located between incised valleys. The Otago Basin is bordered to the west by the Southern Alps. The Dunstan Mountains are part of the Otago Schist Belt, which stretches across much of the Otago region. The mountains have been shaped by glacial and fluvial forces, and are predominantly made up of schist, a type of metamorphic rock that was formed from ancient sedimentary rocks under intense heat and pressure. Schist is typically fine-grained, foliated, and often contains visible mineral veins (such as quartz or mica).

The topography of the area rises from the Bendigo terraces at 370 mRL to the top of the RAS future pit crest at approximately 770 mRL. The head of RAS Valley is at 970 mRL and serves as a watershed divide into the Matakanui catchment to the east.

C.3.3. Local and Regional Geology

C.3.3.1. Regional Geology

The Project Area is located within the Otago Schist belt comprising Permo-triassic metasedimentary and metavolcanic rocks metamorphosed to greenschist facies with peak metamorphism in the Cretaceous period (Figure C 2).

The Dunstan Mountains, located in the north and southeast of the Project Area, are an uplifted block of the Otago Schists tilted to the northwest with remnants of a Cretaceous peneplain well preserved on its northern slopes. The Manuka Basin to the southeast is infilled by Cenozoic sediments, and the fluvio-glacial Tarras terraces lay the northwestern margin of the Dunstan Range.

The Otago Schist is formed from sedimentary and minor intermediate volcanics and volcaniclastics of the Caples and torlesse tectono-stratigraphic terranes. Green schist facies rocks of the Otago Shist are sub-divided into four textural zones based on mineralogy and mineral textures.

The regional geology of the Central Otago goldfields surrounding the Project consists of chlorite and biotite schists. The Rise and Shine Shear Zone (RSSZ), a late metamorphic deformation zone (Cox, MacKenzie, Craw, & Norris, 2006), runs through the project area dipping at 20-30 degrees northeast. The RSSZ occurs only in the footwall Textural Zone 4 (TZ4) schist in close association with the Thomsons Gorge Fault (TGF), which cuts and truncates the RSSZ against the unmineralised TZ3 schist.

C.3.3.2. Local Geology

Three primary geological units are recognised at site:

- RSSZ – Rise and Shine Shear Zone;
- TZ3 – Lower Greenschist facies Textural Zone 3 rocks of the Otago Schist; and
- TZ4 – Upper Greenschist facies Textural Zone 4 rocks of the Otago Schist.

From NW to SE, the site transitions from the downslope Bendigo Terrace across the Lindis Formation and into the Cromwell-Tarras Valley. The Dunstan Mountain Range rises to the SE and is underlain by Torlesse TZ3 and TZ4 schist (psammite pelite greenschist with metachert and metaconglomerate marble).

The RSSZ is an approximately 50 m thick, late metamorphic low angle shear zone dipping 20 – 30 degrees northeast and crosscutting the metamorphic foliation at a low angle. From its outcrop in the RAS Valley, it has been traced for 1.7 km north-northeast beneath the unconforming TZ3 cover rocks with the bulk of the RAS mineralisation sitting beneath 150 m to 300 m of the benign cover rock.

The gently (25 degree) north-north-east plunging RAS deposit sits within a zone up to 400 m wide and can be up to 90 m in thickness (typically 30 m to 40 m). The RAS deposit is one of several zones of highly anomalous gold mineralisation truncated by the TGF (Figure C 3) (Cox, MacKenzie, Craw, & Norris, 2006). The TGF is a post metamorphic, post mineralisation cataclastic fault zone developed along the hanging wall of the RSSZ. It separates chlorite rich TZ3 schists in the hanging wall from biotite rich TZ4 schists in the shear zone and foot wall.

Within the 500 m wide zone of NNE trending mineralisation at RAS, a higher-grade core approximately 150 m to 200 m wide contains the majority of gold ore. The RAS deposit is primarily all fresh rock with subsurface oxidation variably extending from 5 m to 20 m depth.

The main mineralisation at RAS is associated with silica-siderite/ankerite alteration with minor arsenopyrite sulfides associated with the gold. In some areas a cataclastite (brecciated) network of anastomosing, post-metamorphic quartz, occurs with minor sulfide veins in a halo around the core mineralisation.

Gold occurs as free gold particles, typically up to 400 µm but with some coarser visible gold. A minor gold component occurs associated with the arsenopyrite grains, but typically not in solid solution, giving rise to the free milling and highly gravity recoverable components expressed by metallurgical testing.

The SRX deposit (SRX and SRE pits) is located in the upper part of Rise and Shine Creek 1.5 km upstream of the RAS deposit. SRE pit is offset by 200 m from SRX pit. Micaceous-carbonate breccia (MCBX) forms the thickest and most extensive zone of strongly deformed rock within the wider RSSZ at SRX implying it is the principal strand of the RSSZ in this location (Figure C 4, Figure C 5).

The CIT deposit is located 1.2 km NW of RAS. Mineralised rocks form a shoot, 700 m long and up to 150 m wide, that plunges 25° towards the NNE within the upper part of the RSSZ. The thickness of the shoot varies from 25 m in the centre and tapers off towards the fringes. The upper part of the mineralised shoot, immediately below the TGF, is hosted in a zone of MCBX typically less than 2-3 m thick, but locally up to 5-6 m thick (Figure C 6). Siliceous SBX breccia like that which dominates the upper part of the RAS deposit is largely absent at the CIT deposit.

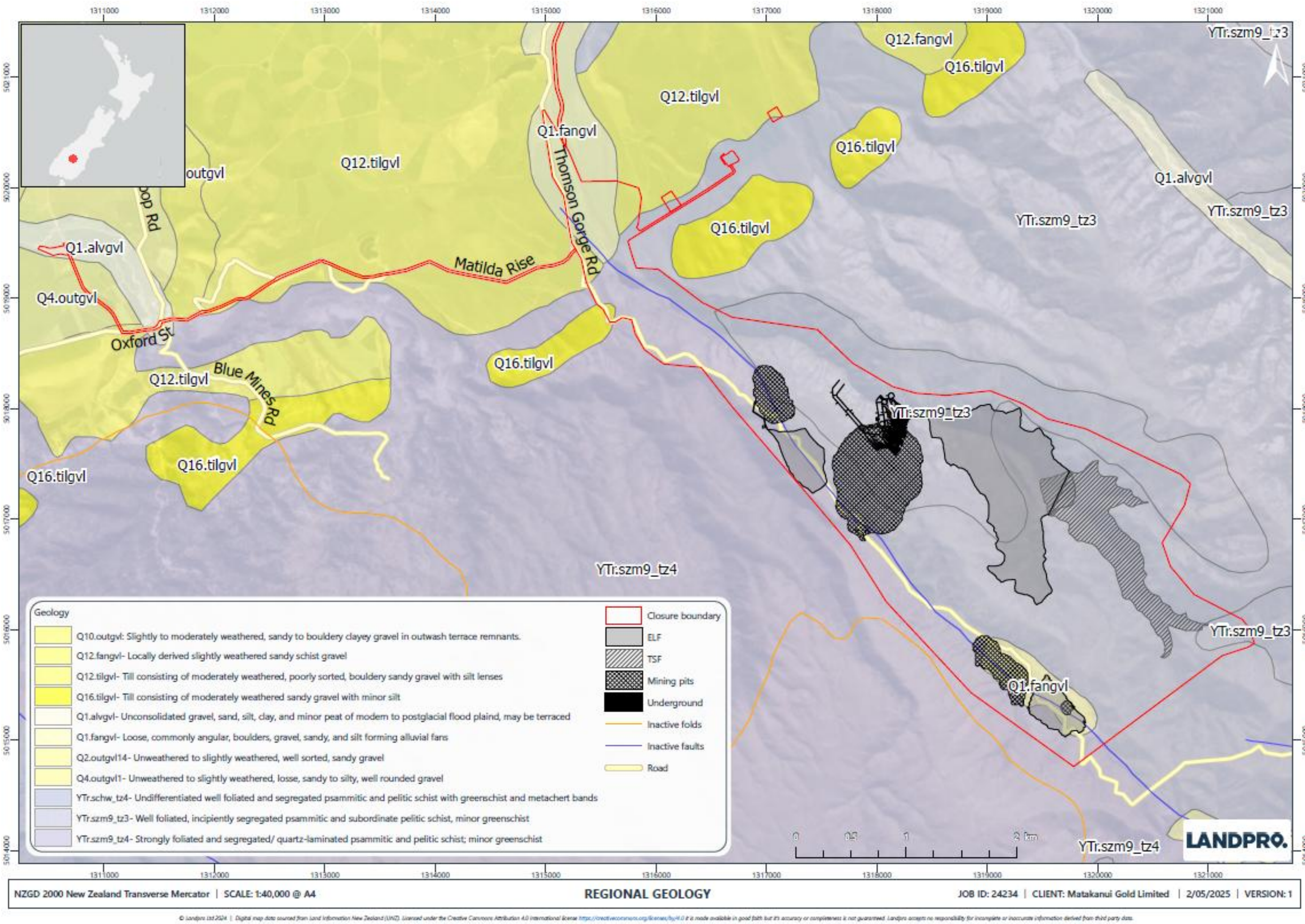


Figure C 2. Regional geology.

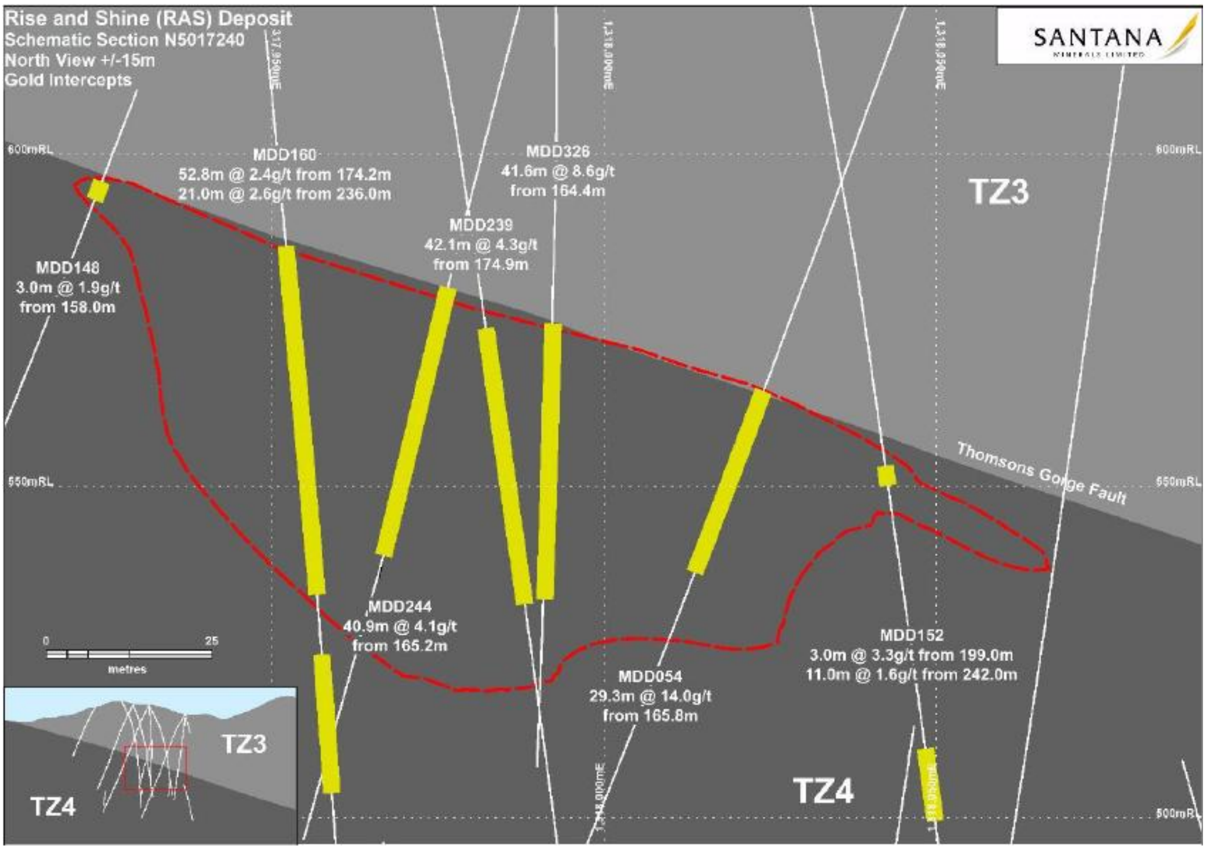


Figure C 3. Typical geological cross-section of the RAS deposit.

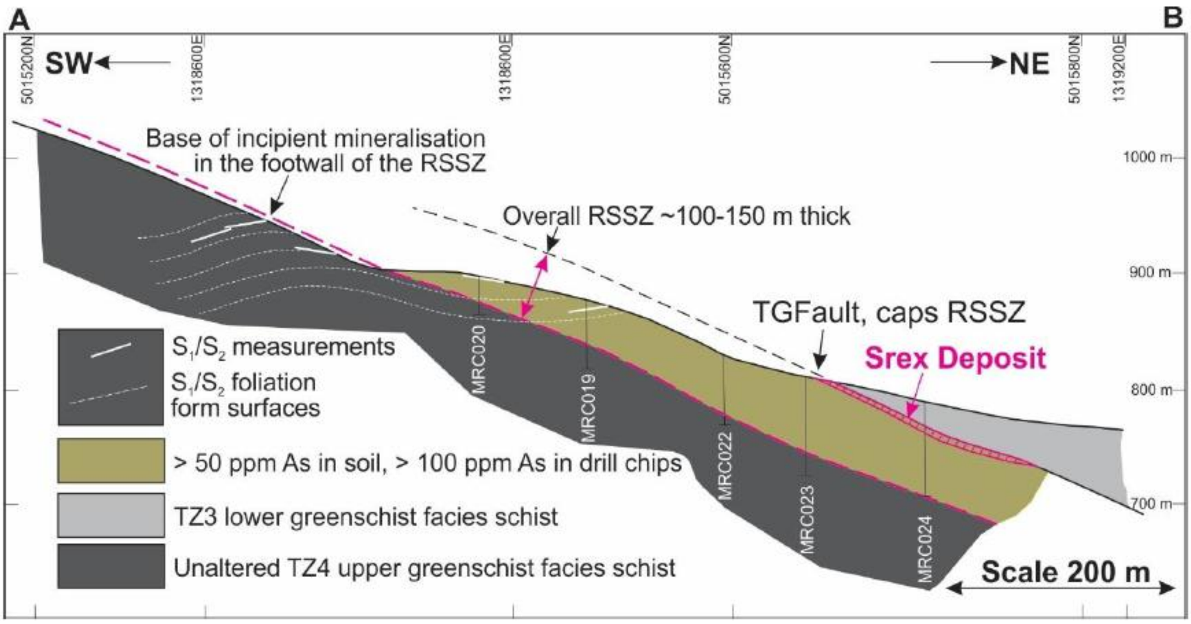


Figure C 4. Typical geological cross-section of the SRX deposit.

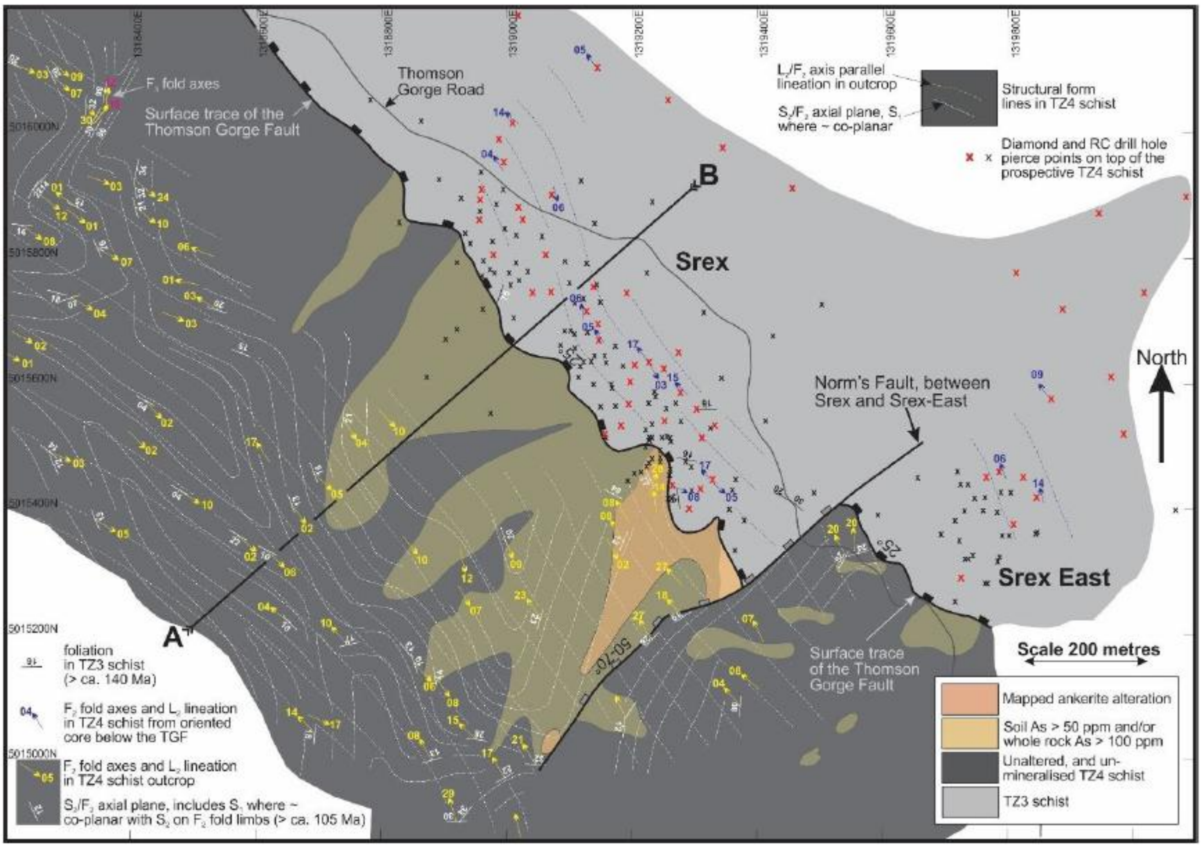


Figure C 5. Geological map of the SRX deposit.

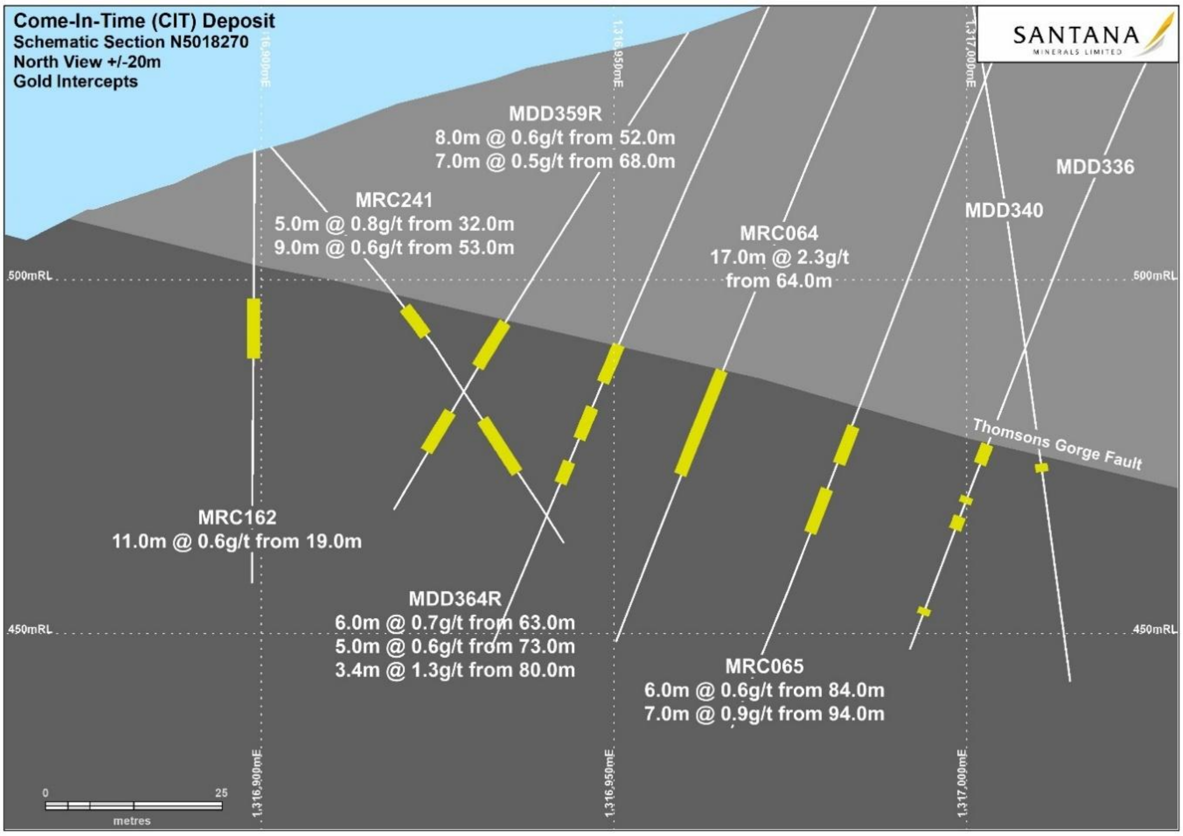


Figure C 6. Typical geological cross-section of the CIT deposit.

C.3.4. Soils

The soils of the BOGP and surrounding environment comprise of quaternary boulders, gravel sand, and silt clay from the Bendigo Terrace across the Lindis Formation, transitioning to moderately weathered, poorly sorted, bouldery sandy gravel with silt lenses within the Cromwell-Tarras Valley. The Dunstan Mountain Range consists of interspersed alluvial fans in the stream valleys that consist of loose, commonly angular boulders, gravel, sand, and silt forming alluvial fans that grade into scree (upslope) and valley alluvium longitudinally downstream.

Soils across the area generally consist of mature soils with well-developed topsoil and subsoil horizons containing quartz-rich material (Figure C 7). In accordance with the New Zealand Soil Classification system (Hewitt, 1992) and the Landcare Research national soils dataset (S-Map) the southern portion of the project area (higher elevations) is characterised as immature upland pallic soils (yellow-grey), bordering on semi-arid. Typically, these have moderate to high base status, low oxide levels, are pale in colour and are moisture deficient in summer but may have moisture surpluses in winter. Further down the valley (to the northwest), soils transition to immature semiarid and argillic semiarid soils. Acid brown soils are mapped in the valley/lowest elevations to the in the northernmost extent of the project area and into the grazing fields to surrounding the project area. In general, these soil types are weakly to very-weakly weathered and weakly leached. Subsurface horizons often have restricted permeability (fragipans) which may cause perched water tables and can limit root penetration.

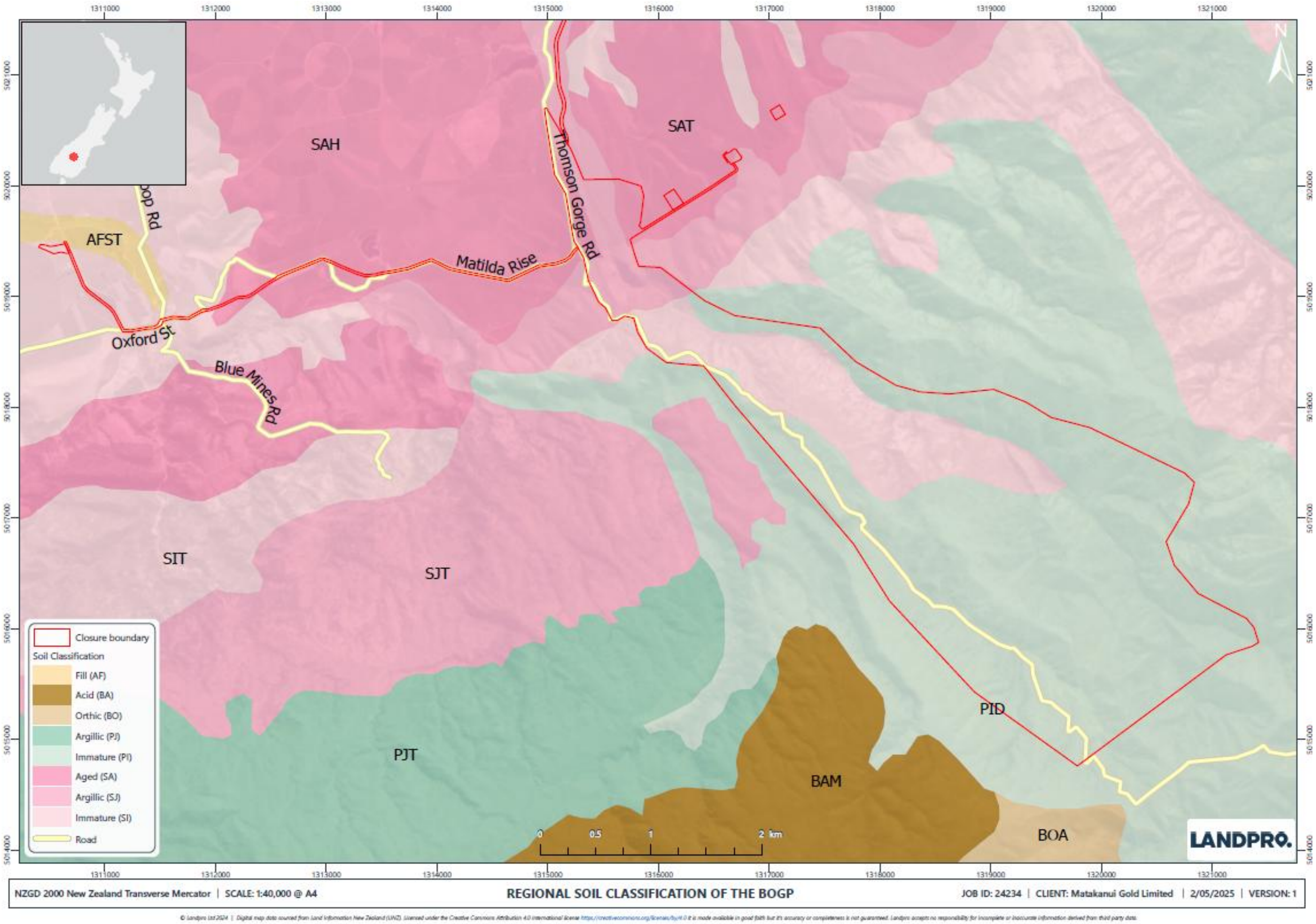


Figure C 7. Regional soil classification of the BOGP.

C.3.4.1. Implications for Closure Planning and Future Work Focus Areas

Central Otago, being the driest region in New Zealand, presents unique challenges for mine site rehabilitation compared to the wetter regions of the country. Rehabilitation practices will need to adapt to account for aridity, low organic matter, and potential soil compaction. New Zealand's mining operations are generally located in temperate climates with higher rainfall and fertile soils, where the focus has traditionally been on stabilising slopes and revegetation in wetter climates, not on the specific challenges of water management and soil crusting found in semi-arid areas. In arid regions, water infiltration and erosion control are critical, whereas water availability and runoff are less of a limiting factor for vegetation establishment in wetter regions.

The topsoil, loess, colluvium and alluvial deposits have the greatest potential for erosion and sediment generation where exposed. Loess soils require the most care as they can be highly erodible, however are generally found in isolated pockets onsite, reducing the scale of the risk for managing these materials. In some areas of the site, loess may be mixed in with weathered rock as colluvium on slopes. Topsoil, loess, colluvium and alluvial deposits will predominantly be encountered during the site establishment phase of works when surficial soils are being stripped and stockpiled.

Weathered schist will be stockpiled in selected areas of the Shepherds Creek ELF for use as rehabilitation capping material (along with topsoil). The generation of fines from schist rock is primarily from the mining process breaking the rock down through blasting, excavation, hauling, tipping and then trafficking of surfaces. Some shear zones within the schist may be clay altered and be finer. Generally tipped and un-trafficked schist rockfill will not generate sediment as surface water readily infiltrates the surface rather than forming a sheet flow on the surface. The truck running surfaces on the ELF, Haul Road and ROM Pad are the main areas with potential to generate sediment as the material breaks down and the surface becomes tight. Water can then concentrate on the surface under heavy rainfall.

The closure future work focus areas associated with climate and soils, as summarised in MCP Section 13, Table 16 are:

- Assessments of the spatial distribution and behaviour of subsurface horizons with restricted permeability (e.g., fragipans) and their impact on water management and root growth and consequently soil and erosion management of the post-mining landscape; and
- Development of detailed information on the erodibility and sediment generation potential of specific soil types (e.g., loess, colluvium, and alluvial deposits) under mining and post-mining conditions.

C.3.5. Flora and Vegetation

As outlined in MCP Section 1.2, baseline environmental studies related to flora and vegetation are still in progress. These studies will be used to establish site-specific baselines that will inform rehabilitation strategies and closure completion criteria. Any information currently provided is considered to be in progress, and will be updated in future versions of the MCP.

C.3.5.1. Vegetation Communities and Condition

The vegetation of the area comprises a mixture of indigenous and introduced species resulting from a history of low input pastoral management and is ecologically typical of similar hill terrain throughout Central Otago. The upper section of the Rise and Shine and Shepherds Creek catchments are of average to good ecological and conservation value, but value is reduced on the depleted soils of the lower sunny slopes.

The vegetation cover and ecology of the site varies considerably with altitude (Central Environmental Services Alexandra, 2021) as follows:

- The lower altitudes, near the CIT mine, exhibit drier environmental conditions with depleted sunny aspects and moderately dense, shrub-covered shaded aspects and gullies on Bendigo Station. Further north onto Ardgour Station, the sunny aspects are severely rabbit-affected with considerable bare ground, extensive scab-weed and heavily browsed grasses and herbs;
- The mid-altitudes, around RAS and SRX, exhibit mixed short tussock and over-sown/ top-dressed grassland (silver and fescue tussock, cocksfoot and clover) with sporadic scrub cover. North of the ridge and dipping down into Shepherds Creek/ Ardgour Station most riparian areas have good scrub cover, phasing into depleted pastoral scabweed on exposed sunny aspects; and
- The higher elevations (900 mRL to 1,000 mRL), exhibit more typical sub-alpine vegetation with hawkweed-infested tussock grassland and taramea herbfield interspersed with low-growing matagouri scrub interspersed with scented tree-daisy, occasional mingimingi, and kowhai.

Few of the indigenous grasses and herbs that comprise much of the vegetation in the locality are known to be rare or under any significant threat locally, regionally or nationally. Plant species present at the site that are referenced in the NZ Plant Conservation Network include:

- *Raoulia australis* and *R. parkii* are currently listed as “At Risk – Declining”. Both are widespread in the Central Otago hill country;
- *Anthosachne (syn Elymus) aprica* (blue wheatgrass) is still listed as uncommon but is known to be quite widespread locally;
- *Carmichaelia petriei* (Petrie’s broom) and *Pimelea aridula* (desert pimelea) are listed as “At Risk – Declining”. These plants are mainly present at the CIT and RAS and are largely sited away from areas of future disturbance; and
- A small stand of *Kunzea ericoides* (kanuka), listed as “Threatened – Nationally Vulnerable” was noted at RAS along with several individual kowhai (not threatened but rare in this locality).

Indigenous shrubs like *Melicytus alpina* (porcupine shrub), *Olearia odorata* (scented tree-daisy) and *Coprosma propinqua* (mingimingi) populations are at risk of decline in this region and therefore disturbance to remaining populations should be avoided.

C.3.5.2. Implications for Closure Planning and Future Work Focus Areas

The closure future work focus areas associated with flora and vegetation, as summarised in Section13, Table 16 are:

- Complete flora baseline and impact assessment;
- Complete Rehabilitation Management Plan;

- Review and update closure objectives and completion criteria based on outcomes of the assessment; and
- Incorporate baseline and impact assessment results into Terrestrial Ecology Management Plan and Rehabilitation Management Plan, and subsequent MCP.

C.3.6. Fauna

As outlined in MCP Section 1.2, baseline environmental studies related to fauna are still in progress. These studies will be used to establish site-specific baselines that will inform rehabilitation strategies and closure completion criteria. Any information currently provided is considered to be in progress, and will be updated in future versions of the MCP

C.3.6.1. Fauna Habitat

Freshwater Stream Habitat

Mapping has been conducted to characterise the sources of flow for RAS Creek and its tributaries, for Shepherd Creek and its tributaries, and mapped areas outside the BOGP footprint in Bendigo Creek and Clearwater Creek, and two un-named tributaries of the Lindis River (Water Ways Consulting, 2025).

The Shepherds Creek catchment includes a range of stream types. Most of the main stem of Shepherds Creek is a gentle gradient single channel stream 0.5-1.0 m wide flowing along a 10-100 m wide valley floor. The stream bed in the gentle reaches is composed predominately of a matrix of gravels, fine gravel, sand and mud with occasional small cobbles, dominated by run habitat with small gentle riffles and short pool sections. The banks are grassed unless shaded by riparian shrubs where they are often bare, eroding soil. The perennial streams in the Shepherds Creek catchment include a series of spring fed tributaries. Ephemeral reaches downstream of the water intake have been developed for pastoral grazing and the lower reaches are irrigated pasture.

RAS Creek tributaries drain the steep hillside rising on the ridge on the southern side of the catchment and these includes streams draining Mt Moka; a series of these are fed by springs which provide permanent flows on the north side of Mt Moka. The lower elevations represent riparian zones with pasture grasses and some historic alteration, as well as current grazing impacts. The valley floors are modified tussock grassland and scrubland with matagouri, coprosma and rosehip briar common in the riparian zone. The streambed is composed of fine grade materials, mud, sand and fine gravel and the channel has emergent macrophyte communities. Downstream of the pond the stream flows into a gorge where the gradient increases and the riparian zone is characterised by very dense woody scrub vegetation.

C.3.6.2. Threatened and Priority Fauna

Terrestrial Records

No threatened fish were recorded in the Bendigo and Shepherds Creek catchments. The presence of kōaro *(Galaxid brevipinnis)* in Bendigo Creek indicates there are periods when there has been sufficient flow in Bendigo Creek to provide a connecting flow downstream to the Clutha River / Mata Au. Kōaro is classified as a declining fish species with the qualifier of ‘partial decline’, as landlocked populations are considered stable (Water Ways Consulting, 2025). Kōaro in Bendigo Creek have their rearing habitat in Lake Dunstan or are from the upstream natural lakes and therefore, these are considered to be part of a stable landlocked population.

C.3.6.3. Introduced Fauna Species

A mammalian pest survey of the Project Area and surrounds recorded the presence of 10 mammalian pests including feral cats, feral deer (2 species), feral goats, feral pigs, hares, hedgehogs, mice, mustelids (2 species and a third outside the survey area), possums and rabbits (Habitat NZ Wildlife Management, 2024). Rats were detected outside the survey area in the surrounding landscape.

Two introduced species, brown trout and the snail *Physella acuta* have been detected in Bendigo Creek and Shepherds Creek respectively. The brown trout population has a very limited distribution due to the intermittent downstream reach and a waterfall preventing upstream passage. *Physella acuta* was detected in eDNA sampling, detected at a very low level in the lower perennial reaches of Shepherds Creek. This macroinvertebrate has no biosecurity threat status and can be found throughout New Zealand.

Evidence of stock hoof damage along the stream, as well as grazing, occurs throughout the Project Area along stream riparian edges, varying from low to heavily impacted. Heavily stock damaged areas are concentrated in the Shepherds Creek catchment, exhibiting both recent stock impacts and sites with evidence of previous damage that are showing some recovery as stock grazing varies over time, and low to moderate impacts in the Bendigo Creek catchment

C.3.6.4. Freshwater Ecology

Baseline freshwater ecological studies have been completed by e3Scientific Ltd (2023) and (Water Ways Consulting, 2025) including electric fishing, macroinvertebrate sampling, macrophyte assessment and water quality sampling across RAS, Bendigo, Clearwater and Shepherds Creeks. Bendigo, Shepherds and Rise & Shine Creeks appear to be dynamic surface water features, which are likely to fluctuate in flow due to their steep catchments and locality. Streams in the Project Area are considered ecologically integral freshwater resources and support the ecology of the area, including both terrestrial and aquatic flora and fauna.

Freshwater ecological values are associated with the overall stream habitat and the macroinvertebrates present. Based on the investigations:

- No threatened fish were recorded in the Bendigo and Shepherds Creek catchments;
- In lower Bendigo Creek two fish species have been detected: kōaro (*Galaxias brevipinnis*) and introduced brown trout *(Salmo trutta*) were identified, indicating fish are present within the Bendigo catchment but not within the RAS sub-catchment;
- The introduced mollusc, *Physella acuta*, was detected in the lower perennial reaches of Shepherds Creek;
- Macroinvertebrate samples varied in community health and diversity, with water quality classifications within each stream suggesting a wide range of water quality and habitat conditions based on localised influences such as flow, stock access, and substrate. A total of 28 aquatic macroinvertebrate taxa were identified to species level in eDNA sampling. All macroinvertebrate species detected are listed as ‘not threatened’; and
- Macrophyte species observed across all sites were common, with the invasive *Lagarosiphon major* present throughout the lower reaches of both Shepherds and Bendigo Creek catchments.

C.3.6.5. Implications for Closure Planning and Future Work Focus Areas

Field surveys conducted across different seasons ensure comprehensive and representative data acquisition which captures temporal changes in ecosystem dynamics, seasonal variability, and phenological changes.

The closure future work focus areas associated with fauna and fauna habitat, as summarised in Section MCP 13, Table 16 are:

- Undertake targeted field surveys across larger temporal scales to capture data across seasons; and
- Further biological surveys to include tissue samples and laboratory analysis of aquatic fauna to establish a baseline of COPCs prior to mining and processing activities.

C.4. Materials Characterisation

C.4.1. Waste Rock Inventory

An open pit mine production schedule for the RAS, CIT and SRX deposits has been produced using pit stages, current pit and ELF designs, and planned conceptual material movements for mine stages. Table C 2 shows a current summary of predicted mineral waste inventory for the BOGP. The material required to backfill mine pits to surface (CIT, SRE) has been accounted for, however detailed scheduling and waste rock inventory estimates will be refined as detailed pit designs are developed and incorporated into future updates to this MCP.

Estimates for CIT are preliminary. Low grade ore will be stockpiled on site at the CIT LGO stockpile, which will be dynamic during the mine life to manage ore grade though the process plant. The stockpile will be completely processed prior to closure.

Table C 2. Summary of predicted mineral waste inventory for the BOGP.

DEPOSIT	WASTE ROCK TZ3 (KT)	WASTE ROCK TZ4 (AND RSSZ) (KT)	SOIL (KT)	TOTAL WASTE ROCK (NO SOIL) (KT)
Rise and Shine	165,174	30,537	3,021	195,712
Srex	4,377	606	625	4,983
Come in Time	2,550	850	475	3,400

C.4.1.1. ELFs

Several potential waste storage areas have been assessed for the storage of forecast mineral waste rock from the RAS deposit, with options impacted by social constraints, foundational terrain limitations, and potential sterilisation of nearby satellite deposits excluded from consideration. The Shepherds Creek ELF has been selected as the most suitable option based on current waste material balance and alignment with landform design criteria. As part of this strategy, the Western ELF (WELF) will be the first landform constructed, using short-haul pre-strip material.. Waste rock from RAS pit is planned for deposition within this landform which will form a buttress of the TSF to enhance stability downstream of the dam (Figure 3), while providing sufficient storage capacity for forecast waste rock from RAS pit. A waste material balance has been completed for the ELF based on the construction landform design, with TZ3 capping material quantities assessed and accounted for. Table C 3 shows the required and designed capacities in bank cubic metres (bcm) and loose cubic metres (lcm) for the ELF.

Waste landform sequencing has been undertaken based on the assumption that background levels of As are elevated in the ore host rock (TZ4) and for precautionary reasons it is planned to be encapsulated and capped with low/non-arsenic waste rock (TZ3) to mimic its natural occurrence. A base layer and encapsulating layer of inert material is typically required, with a core of non-inert material. For this reason, the dump has a base layer of 3 m which would only consist of TZ3 material. A 20 m thick capping layer is proposed consisting only of the TZ3 material. The core will allow for all material types to be stored. Figure C 8 shows a cross-section of the ELF.

The Western ELF (WELF) will be the first ELF constructed, utilising short-haul pre-strip material. It will be sheeted with topsoil and established as a site for rehabilitation trials, with a particular focus on the establishment of annual herb species. The WLEF is anticipated to be completed within the first two years of operations, providing an estimated eight-year period for undisturbed monitoring and assessment of rehabilitation performance.

Table C 3. ELF design capacities.

LANDFORM	MATERIAL	DESCRIPTION	VOLUME REQUIRED (BCM)	VOLUME REQUIRED (LCM)
Shepherds Creek ELF	TZ3	Fresh and Transitional (excluding Soil), < 0.3 Au g/t	67,621	84,526
	TZ4	Fresh and Transitional (excluding Soil), < 0.3 Au g/t	5,555	6,944
	Mineralized Waste	>= 0.3 Au g/t	1,088	1,361
	Total Waste Rock	Total Material to be stored in waste rock dump	74,264	92,830
WELF	TZ3	Fresh and Transitional (excluding Soil), < 0.3 Au g/t	0.005	-

A total swell factor (lcm:bcm) of 25% after compaction (based on the majority of fresh rock) has been assumed.

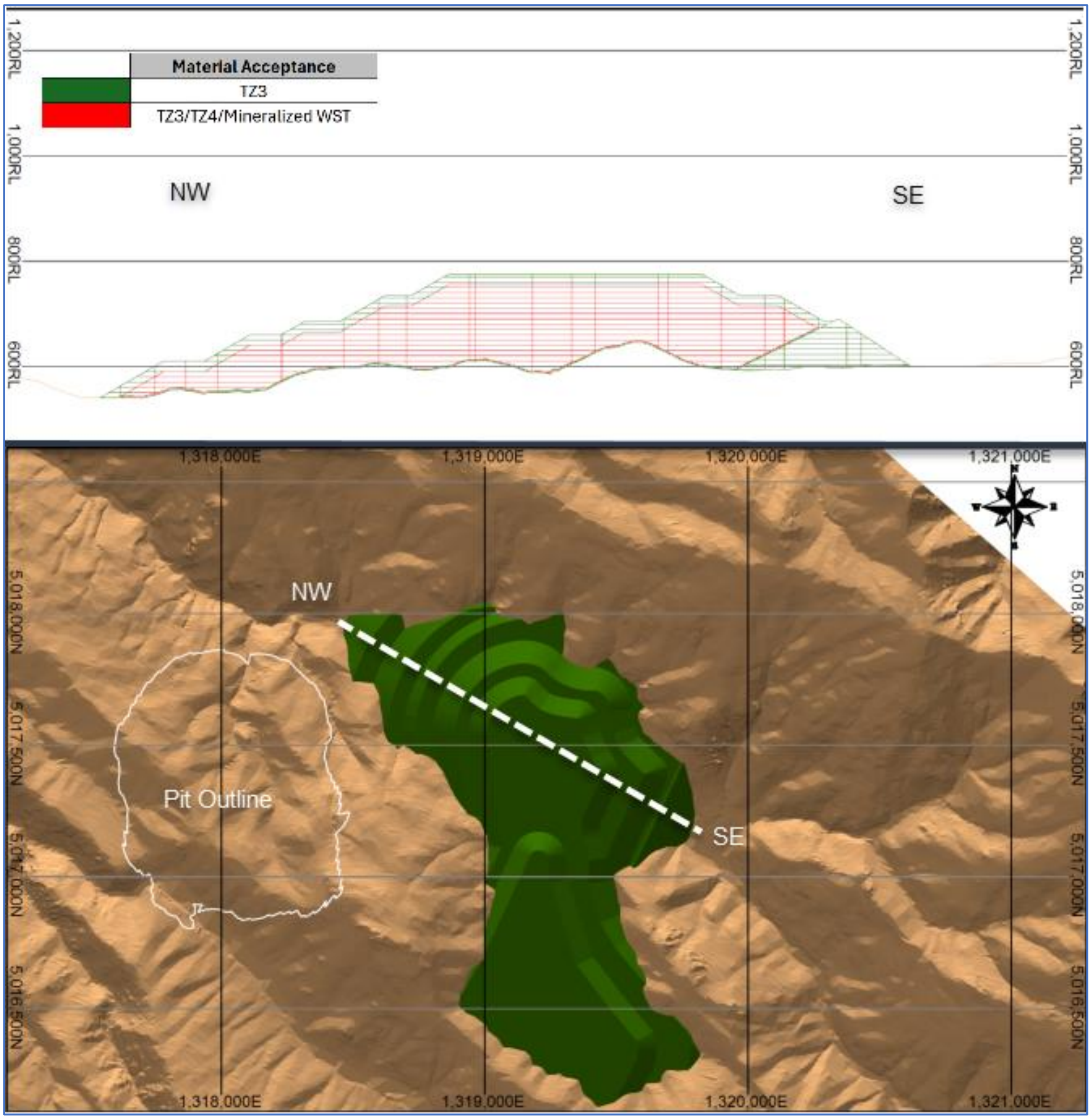


Figure C 8. Northwest-southeast cross-section of the Shepherds Creek ELF.

C.4.2. Tailings Storage Facility

All process tailings will be pumped to the Shepherds Creek TSF for final storage. Initial works during the start-up phase will include the construction of the TSF embankment, with the TSF increasing in size throughout the LOM. The TSF foundation is schist rock mass which is expected to form a low permeability foundation. A moderate thickness of soils in the valley floor and on some slopes will be stripped for embankment construction. Detailed investigation of the foundations is planned.

The proposed TSF downstream construction embankments will have a 1 V to 2 H downstream slope and 1 V to 1.5 H upstream slope with an 8 m final crest width. The proposed embankment is zoned, requiring compaction and conditioning of the upstream portion of the embankment to achieve performance requirements. Chimney drains are proposed for the initial starter embankment for the TSF until an effective tailings beach can be established against the embankment. Upstream cut off drains are proposed to full embankment height to intercept non impacted water. Pre-feasibility TSF design sections have been developed and will be advanced during early project development.

The crest of the embankment will be progressively raised using mined mineral waste material from the RAS pit over the LOM. The proposed final crest level allows for the TSF to be managed as a full containment facility (supernatant water managed onsite). This includes allowance to manage a normal operational decant pond and inflows from a 72-hour probable maximum precipitation event (748 mm depth), with 1 m freeboard for wave action. The uphill diversion channels are conservatively assumed not to function for this design condition.

A spillway will be cut into the natural ground around the northern abutment and discharge rainfall from within the covered impoundment into Shepherds Creek downstream of the silt pond. The silt pond is proposed to remain to provide protection to the creek from runoff prior to the planting becoming established.

The Shepherds Creek TSF will safely contain tailings when subjected to potential future extreme earthquakes. It is being designed to withstand a 1 in 10,000-year earthquake including aftershocks. This includes withstanding a potential rupture on the Alpine Fault or any of the other active faults in the region. The proposed closure design has the tailings contained behind the downstream rockfill embankment, that will also be buttressed during operations and prior to closure by a large volume of rockfill in the form of the Shepherds ELF.

On completion of mining, the new level of the upper reaches of the Shepherds Creek Valley will extend approximately 100 m above the existing valley floor in areas. The rehabilitation of the TSF will begin in the latter stages of the project. Tailings from the processing plant will be capped with overburden and topsoil to form a growth medium, which is expected to support native vegetation within the margins and the re-establishment of wetlands and surface water flows within the upper Shepherds Creek catchment.

The final landform is expected to support the re-establishment of wetlands and surface water flow within the upper Shepherds Creek catchment. The surface of the TSF will be shaped as necessary to avoid ponding of surface water and slope down to the north-west where the closure wetland, outlet, and auxiliary spillway will be located. The adjacent diversion channels will be broken and diverted across the TSF through a series of artificial high and low points creating wetlands. Two options for TSF closure are being maintained at present; a drain down, and a saturated option.

During the closure phase all seepage drains associated with the Shepherds ELF will continue to operate and be collected in the Shepherds ELF Seepage Collection Sump. Water collected within the sump will be pumped to the treatment plant.

C.4.2.1. Implications for Closure Planning and Future Work Focus Areas

The closure of the Shepherds Creek TSF will have significant implications for the long-term environmental and hydrological stability of the site. The progressive rehabilitation strategy, involving the capping of dried tailings with overburden and topsoil, will aim to establish a stable landform that supports native vegetation and grazing. Additionally, the proposed re-establishment of wetlands and surface water flow in the upper Shepherds Creek catchment presents an opportunity for ecological restoration.

The diversion channels, once decommissioned, will contribute to the hydrological integration of the TSF with the surrounding landscape. Re-establishment will depend on precise engineering and ecological design. The ability of the TSF to withstand extreme seismic events, including a 1-in-10,000-year earthquake, ensures containment integrity, but post-closure monitoring will be critical to confirm long-term stability.

Tailings will be elevated in As and S, being derived from RSSZ and TZ4 materials (Section C.4.4). $S0_4$, nitrogenous compounds, and trace metals are also likely to be elevated and require engineering controls to minimise the risks to the receiving environment.

Key challenges include potential seepage from the TSF base or embankment, the need for effective surface water management post-closure, and ensuring that any re-established wetlands and flow paths do not become conduits for contamination.

Following the granting of the resource consent for the construction and operation of the Shepherds TSF, a detailed Closure Manual will be prepared by MGL. This Closure Manual will be set out practical measures which will allow the facility to be built, operated and closed in accordance with the conditions of the consents and the established rehabilitation and closure outcomes.

The closure future work focus areas associated with material characterisation, as summarised in Section 13, Table 16 are:

- Foundation permeability: the permeability of the schist rock mass beneath the TSF and its potential for seepage;
- Tailings geochemistry: long-term geochemical behaviour of the tailings and potential for acid or metalliferous drainage (AMD);
- Capping effectiveness: long-term effectiveness of the proposed capping system in preventing infiltration and promoting vegetation establishment;
- Wetland re-establishment: feasibility of establishing functional wetlands over the TSF and their capacity to support native species;
- Surface water quality: impacts of the TSF on downstream surface water quality, particularly during extreme weather events;
- Seepage and groundwater impact: detailed understanding of seepage rates and their potential influence on local groundwater systems; and
- Final TSF closure design.

C.4.3. Mineral Waste Physical Characteristics

The key physical consideration of mineral waste that is applicable to closure landform design is the susceptibility to erosion, which is commonly termed ‘erodibility’. Erodibility data can inform runoff simulation and erosion modelling to define material-specific landform designs for mineral waste units. Low erodibility materials for example, with a higher percent of competent rock, are suitable for placement on the outer surface of ELFs to provide long-term erosion protection. High erodibility waste generally requires the application of conservative rehabilitation design parameters, selective placement within landforms, or capping with an appropriate thickness of a lower erodibility waste to prevent unacceptable erosion.

Early in the mine plan, the erosion potential of mineral waste at a site-wide level will be characterised, and modelling undertaken to provide guidance to both mine planning and closure planning regarding the placement of mineral waste in storage and construction, and to inform landform rehabilitation designs.

ELF rehabilitation design objectives are being developed and will be regularly reviewed throughout the LOM, with updates incorporated into iterative versions of the mine plan and closure plan. Preliminary designs have been developed for all ELFs and the TSF. In general design objectives aim to achieve landforms that are geotechnically safe based on a suitable factor of safety (FoS) (Section 8.3), and will also consider compatibility with the surrounding landscape and with the agreed post-mining land use; appropriate location, and rehabilitation methods that include appropriate surface treatments (Section C.4.5). Objectives will be updated on a regular basis to incorporate learnings from research and rehabilitation implementation trials.

C.4.3.1. Risk of Inadvertent Access to Pit Voids

The issue of public safety is mainly related to potential for members of the public to inadvertently access pit voids (or areas of potential instability surrounding pits) post closure. Failure of unstable sections of the pit walls would pose significant risks to people if they were to access these areas in vehicles or on foot. Designs for restricting public access need to be developed on a case-by-case basis after considering a range of factors such as:

- accessibility of the site (e.g., proximity to towns/major roads/areas of interest);
- nature of the surrounding landscape (e.g., pits abutting steep natural slopes, floodplains, water courses);
- the availability of suitable material to construct structures (e.g., material for abandonment bunds/ rock structures);
- pit geology and geometry (e.g., natural stability of the pit, pit backfill);
- the post closure land use (e.g., pastoral areas may require exclusion of cattle from pit voids); and
- the location of heritage sites (e.g., sites which may require access post closure).

Public access to the BOGP area is possible post-closure. There are several public roads near the Project Area and parts of the area are expected to return to pastoral activities post-closure. To mitigate the risk of inadvertent public access, the following conceptual measures are proposed:

- rehabilitation of tracks that are not required for monitoring and/or maintenance post-closure;
- rehabilitation of all access roads prior to relinquishment unless agreed with a third party that a road will remain;
- installation of physical barriers (e.g. earthen bunds) where appropriate to prevent access;
- installation of a locked gate on access roads for the duration of the post-closure monitoring and maintenance period; and
- a review of the potential visitors to access the site, and installation of additional control measures, including abandonment bunding around pits, where appropriate.

Open pits are designed to be stable during the life of the mining operations but may not be stable in the long term as materials weather and erode, leading to instability of sections of the pit walls post-closure. Safety bund designs will be progressed and form part of integrated mine planning during the LOM. The Potentially Unstable Pit Edge Zone (PUPEZ) will be identified for all pits based on the angle method described in *Guidelines for safety bund walls around abandoned open pit mines* (DoIR, 1997) or NZ equivalent. The rehabilitation toe of all ELF rehabilitation designs is required to be outside of the final PUPEZ to ensure the ELFs are fundamentally stable. Geotechnical evaluations will continue to be undertaken as pit designs are updated and this will trigger an updated PUPEZ to be developed. In the early stages of closure planning, safety bund locations will be conceptual due to the likelihood of changes to pit design, ELF rehabilitation footprints, buttressing requirements and pit closure strategies resulting in a change to the final PUPEZ. A detailed review of final PUPEZs will be undertaken prior to closure to ensure local geological features that may influence the PUPEZ, and any surface water management features designed for closure, are accounted for.

C.4.3.2. Implications for Closure Planning and Future Work Focus Areas

Backfilling of select pit voids will occur as part of the closure strategy; however significant voids are expected to remain after closure. No re-profiling of pit walls or rehabilitation of pit floors is proposed. Pits not backfilled to surface will not be actively rehabilitated and will have safety bunds installed outside the PUPEZ. Inadvertent access will be restricted at closure using physical barriers, built from competent low erodibility mineral waste which will be stockpiled for construction at closure or constructed during operations where possible. Strategies for managing safety risks will be developed as the site approaches closure and will consider the need for potential for ongoing public access resulting from a portion of the mining area being underlain by pastoral stations. Once developed, the location of proposed bunds will be revised and updated in each iteration of the MCP to reflect any changes to the mine plan, understanding of the closure landscape, cultural heritage sites and post-closure access requirements, and to address any updated flood modelling.

The closure future work focus areas associated with physical mineral waste, as summarised in Section 13, Table 16 are:

- Development of PUPEZ zones and safety bund designs, to include considerations for site drainage and the requirement for maintenance of surface flows post-closure;
- Post-closure access assessment, incorporating stakeholder consultation;
- Characterisation of erosion potential of mineral wastes for use in developing rehabilitated landform designs;
- Site-wide mineral waste inventory to identify competent low erodibility mineral waste which will be stockpiled for bund construction;
- Landform erosion modelling to define material-specific landform designs for mineral waste units;
- Opportunities to progressively construct abandonment bunds during operations; and
- Final closure geotechnical stability review of the PUPEZ, calculated from the final pit designs and interaction with ELFs and natural topography.

C.4.4. Mineral Waste Geochemical Characteristics

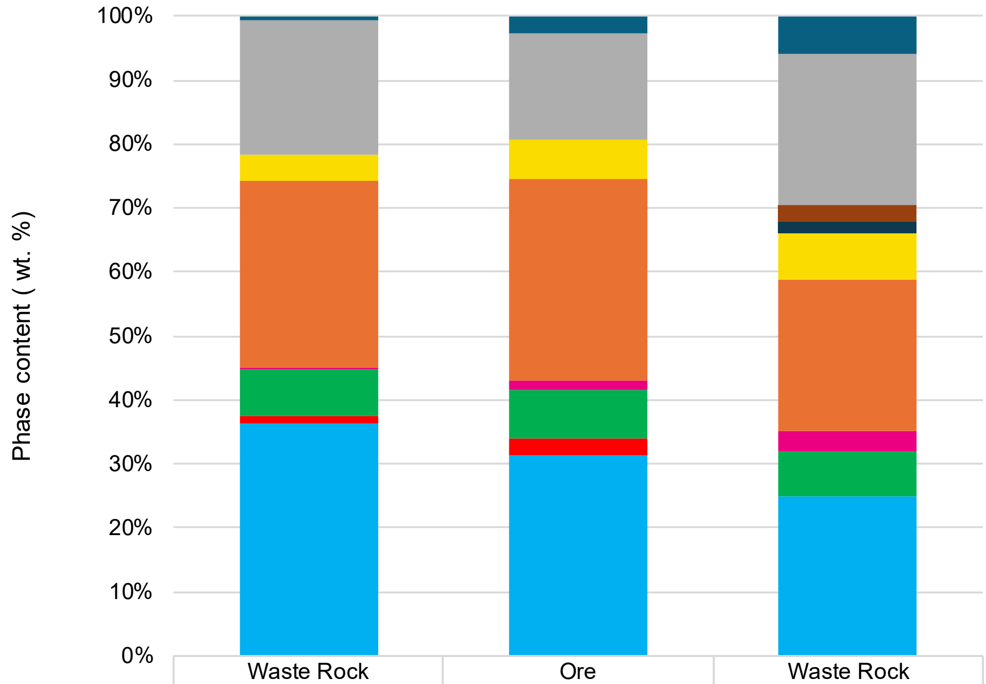
A comprehensive baseline geochemical assessment and characterisation of materials associated with the BOGP was undertaken to support project development (Mine Waste Management, 2025a) (Appendix C).

Table C 4 and Figure C 9 provide material quantities for ore and waste rock, categorised by geological units. The samples show a linear correlation between As and sulfur (S) and the main phases are plagioclase, quartz, and illite/ mica, which is characteristic of schist. Dolomite is the predominant carbonate phase. This mineralisation is dominated by elevated sulfate (SO_4) and As (e.g., the mineral arsenopyrite) with other trace metals also being potentially elevated at much lower concentrations (Figure C 10).

Key observations from the analysis were:

- Waste rock distribution:
    - The TZ3 geological unit represents 82% of the total waste rock, while TZ4 and RSSZ make up the remaining 18%.
- Arsenic (As) distribution:
    - TZ4 and RSSZ waste rock contains ~97.7% of the As within the waste rock, whilst TZ3 contains only 2.3%; and
    - For the total mined materials (ore and waste rock), 59.4% of the total As will be present in the ore, and the remaining 40.6% is expected in the waste rock.
- Sulfur (S) distribution:
    - Average S is higher in RSSZ and TZ4 waste rock compared to TZ3. TZ3 geological unit contains 62.8% of the S found in the waste rock, while TZ4 and RSSZ hold 37.2%;
    - For the total mined materials (ore and waste rock), 26.5% of the S is present in the ore, while 73.5% of the S is present in the waste rock; and
    - TZ3 has a S content of 0.088%, and although As concentration within is low, S concentration is significant due to the material quantities.

All materials, including ore and waste rock, and the three geological units, are classified as non-acid forming (NAF) with circum-neutral pH drainage expected from mine domains that contain the materials. However, neutral metalliferous drainage (NMD) is likely to occur, resulting in elevated levels of As, SO_4, trace metals, and nitrogenous compounds.



	Waste Rock RSSZ MG19250-131	Ore RSSZ MG19238-131	Waste Rock TZ4 MG19110
Amorphous	0.5	2.8	5.8
Illite/mica	21.2	16.5	23.7
Chlorite			2.8
Kaolinite			1.5
K-Feldspar	3.9	6.2	7.5
Plagioclase	29.4	31.6	23.6
Siderite	0.3	1.4	3.2
Dolomite	7.2	7.6	7.1
Arsenopyrite	1.2	2.7	
Quartz	36.3	31.2	24.8

Figure C 9. Graphical distribution of the XRD mineralogy.

Table C 4. Summary of estimated loads for As and S in ore and waste rock.

DEPOSIT	ORE (t)	WASTE ROCK TZ3 (t)	WASTE ROCK TZ4 (AND RSSZ) (t)	TOTAL WASTE ROCK (t)
Rise and Shine	12,100,000	128,516,046	21,079,234	149,595,280
Rise and Shine UG	6,500,000	0	1,600,000	1,600,000
SRX and SRE	1,200,000	0	4,200,000	4,200,000
Come in Time	700,000	1,950,000	1,950,000	3,900,000
Total	14,000,000	130,466,046	28,829,234	159,295,280
Waste Rock Distribution (%)		82	18	100
Arsenic				
As (mg/kg)	8065	13.5	2,618	484.9*
As (tonnes)	112,910	1,761	75,475	77,236
Waste Rock As Distribution (%)	-	2.3	97.7	100.0
Total As Distribution (%)	59.4	0.9	39.7	40.6

DEPOSIT	ORE (t)	WASTE ROCK TZ3 (t)	WASTE ROCK TZ4 (AND RSSZ) (t)	TOTAL WASTE ROCK (t)
Sulfur				
S (%)	0.472	0.088	0.236	0.115*
S (tonnes)	66,080	114,810	68,037	182,847
Waste Rock S Distribution (%)	-	62.8	37.2	100
Total S Distribution (%)	26.5	46.1	27.3	73.5

Calculated as a weighted average by dividing the total tonnes of As or S by the total tonnes of waste rock.

C.4.4.1. Geochemical Risk Assessment

The geoenvironmental hazards associated with the BOGP have been assessed through a sampling program which considered spatial distribution, geological units, and As and S distribution. Over 1,600 samples were analysed as part of the geoenvironmental hazard assessment for the BOGP, including acid-base accounting (ABA), compositional and mineralogical studies, and leachate testing (Mine Waste Management, 2025a). RSSZ and TZ4 are very similar geochemically. Mineralogical analysis identified arsenopyrite as the main sulfide mineral and dolomite as the main carbonate mineral, although siderite was also identified. The oxidation and dissolution of arsenopyrite can release As, SO_4, and Fe to solution. The dissolution of dolomite can release calcium, magnesium, and alkalinity, that will neutralise any acidity generation by sulfide mineral oxidation.

The results indicate that the TZ3, TZ4, and RSSZ rocks associated with the project will not generate acid rock drainage as a function of the high acid neutralisation capacity (ANC) associated with carbonate minerals (e.g., dolomite) and a low sulfide mineral content (e.g., arsenopyrite, pyrite) that can generate lesser acidity.

The geochemical source hazard assessment indicates that the most significant metalliferous source hazard for waste rock relates to the TZ4 and RSSZ materials, some of which will be waste rock, and some will be processed (to extract gold), producing tailings. The TZ4 and RSSZ lithologies contain ~97.7% of As and 40.9% of S yet represent only 18% of the waste rock that will be disturbed. Appropriate management of waste rock to reduce sulfide mineral oxidation and the release of As is essential to minimise any potential deleterious effects of mining. Tailings will also be elevated in arsenic and sulfur, being derived from RSSZ and TZ4. A Materials Management Plan is proposed to identify and characterise waste rock according to the sulfur and arsenic content so they can be managed in an appropriate manner. This plan will also address contaminants of potential concern (COPC) associated with trace metals.

Fibrous materials have not been identified in any baseline or historical materials characterisation at the BOGP.

C.4.4.2. COPC

The identification of COPC was conducted by assessment of elemental enrichment of different materials and by the assessment of laboratory leachate tests. Arsenic (As) was identified as the main COPC, with elevated concentrations across all geological units. Other COPC identified (Table C 5) include:

- TZ3 materials: As, antimony (Sb), and potentially cobalt (Co);
- TZ4 & RSSZ materials: aluminium (Al), As, chromium (Cr), S, Sb, and potentially lead (Pb);

- Soils: Al, As, Co, copper (Cu), and zinc (Zn); and
- Nitrogenous compounds (nitrate, nitrite, and ammoniacal nitrogen) are expected due to the use of ammonium-nitrate fuel oil (ANFO) explosives.

The identification of potentially elevated Zn and Pb is in alignment with mineralogical studies that identified the presence of sphalerite (Zn, Fe), S and galena (Pb, S) at the BOGP (Allibone, 2023). Table C 5 presents a summary of the findings regarding AMD classification and COPCs for the project.

Table C 5. Summary of AMD classification and COPCs for the Bendigo-Ophir Gold Project.

GEOLOGICAL UNIT	AMD CLASSIFICATION	TYPE OF MATERIAL	COPCS		
			GEOCHEMICAL COMPOSITION (BASED ON GAI)	LEACHATE TESTS	OTHER
TZ3	NAF	Waste Rock	As, Sb, *Co	-	N-Compounds, SO_4
TZ4 & RSSZ	NAF	Waste Rock/ Ore	As, S, Sb, **Pb	Al, As, Cr	N-Compounds, SO_4
Soils	-	Soils	As	Al, As, Co, Cu, Zn	-

**: Identified as enriched in approximately 10% or below of the analysed samples for elemental composition.*

***: Identified as enriched in less than 1% of the samples for elemental composition.*

C.4.4.3. Chemical Soil Characterisation

A soil study was conducted to determine metals concentrations in near surface soils, comprising the analysis of up to 1,589 samples described as loess, topsoil or outcrop, in the various prospect areas including CIT, RAS, SHR, SHE, and TSD. This study utilised portable X-ray fluorescence (pXRF) which provided concentrations for a range of analytes.

Preliminary analysis of the data has been undertaken with respect to those metals for which derived standards exist for contaminants in soil to protect human health in an outdoor worker, industrial land use setting (Ministry for the Environment, 2011), namely As, Cd, Cr, Hg, and Pb (Geocontam Risk Management Ltd, 2025). A summary of the soil data with comparison to these guidelines is provided in Table C 6.

The results of the preliminary investigation indicate that Cr, Hg, and Pb are predominantly not present in the shallow soils at concentrations that would be considered to pose a risk to human health in an industrial setting (i.e., in association with ingestion or inhalation). Based on a limited data set, exceedances of the SCS-Industrial guideline were reported for Cd in 15% of samples, with maximum reported concentrations substantially (4x to 10x) above the guideline. Additional characterisation of Cd may be warranted to better understand potential risks to human and environmental health. Arsenic (As) concentrations are above the SCS-Industrial guideline of 70 mg/kg in 7.7% of soils (Ministry for the Environment, 2011).

Table C 6. Summary of soil concentrations for As, Cd, Cr, Hg, and Pb.

DATA STATISTIC	TOPSOIL	LOESS	OUTCROP	ALL SAMPLES
Arsenic (SCS-Industrial < 70 mg/kg)				
No. Samples	215	1,268	106	1,589
Minimum	4	3	7	3
Maximum	1,271	1,738	3,399	3,399

DATA STATISTIC	TOPSOIL	LOESS	OUTCROP	ALL SAMPLES
Median	14	16	21	16
Mean	41	32	84	36
Exceedances of SCS-Industrial	21	89	12	122
Cadmium (SCS-Industrial < 1,300 mg/kg)				
No. Samples	1	16	2	19
Minimum	1	12	13	1
Maximum	5,346	15,015	21	15,015
Median	5,346	16	19	1,806
Mean	5,346	1,920	18	17
Exceedances of SCS-Industrial	1	3	0	4
Chromium (SCS-Industrial < 6,300 mg/kg as CrVI)				
No. Samples	173	511	47	731
Minimum	4	4	5	4
Maximum	66	81	189	189
Median	9	10	14	9
Mean	13	14	28	14
Exceedances of SCS-Industrial	0	0	0	0
Mercury (SCS-Industrial < 4,200 mg/kg)				
No. Samples	32	191	26	249
Minimum	4	3	4	3
Maximum	19	21	15	21
Median	14	6	5	6
Mean	14	8	6	9
Exceedances of SCS-Industrial	0	0	0	0
Lead (SCS-Industrial < 3,300 mg/kg)				
No. Samples	216	912	102	1,230
Minimum	7	5	11	5
Maximum	5,185	2,095	99	5,185
Median	19	22	25	22
Mean	43	26	26	29
Exceedances of SCS-Industrial	1	0	0	1

Five soil samples were analysed by static leachate testing using the synthetic precipitation leaching procedure (SPLP) method (Mine Waste Management, 2025a). The descriptive statistics for the leachate tests are shown in Table C 7, comparing samples to water quality screening criteria to identify if COPC are elevated.

Aluminium (Al) is greater than the Default Guideline Value (DGV), possibly due to colloidal Al. Arsenic (As), Cu, and Zn were higher than the DGV, which agrees with elevated baseline data for Rise and Shine Creek. Arsenic (As) is a main pathfinder element for gold mineralisation and therefore is expected to be naturally present in elevated concentrations within the Project Area due to natural outcropping mineralisation, however, elevated As concentrations may also be present due to the historic alluvial mining practices. The elevated As concentrations above the SCS-Industrial guideline suggests that a management plan will be required to address potential risks to human and environmental health and to derive appropriate ecological background metals concentrations for the Project Area to inform soil management for rehabilitation.

Table C 7. Results of the SPLP test on soil samples.

PARAMETER	MINIMUM CONC. (mg/L)	MAXIMUM CONC. (mg/L)	AVERAGE CONC. (mg/L)	ANZG (2018) 95% DGV (mg/L)	N OF SAMPLES EXCEEDING ANZG 95% DGV
Calcium	<1	1.4	1.10	-	0
Magnesium	<1	1.4	1.10	-	0
Sodium	1.5	2.5	1.86	-	0
Potassium	3.7	8.2	5.90	-	0
Aluminium	0.025	**1.1**	**0.46**	0.055	**4**
Antimony	<0.005	<0.005	<0.005	0.074	0
Arsenic	**0.02**	**0.33**	**0.12**	0.013	**5**
Barium	0.09	0.11	0.10	-	0
Beryllium	<0.001	<0.001	<0.001	-	0
Cadmium	<0.001	<0.001	<0.001	0.0002	5
Chromium	<0.001	<0.001	<0.001	0.001	0
Cobalt	0.002	**0.008**	0.004	0.004	**1**
Copper	**0.004**	**0.012**	**0.01**	0.0014	**5**
Lead	<0.001	<0.001	<0.001	0.0034	0
Manganese	0.1	0.36	0.26	1.9	0
Molybdenum	0.0025	0.0025	0.003	0.034	0
Nickel	0.003	0.007	0.004	0.011	0
Selenium	<0.01	<0.01	<0.01	0.011	0
Silicon	9.15	23.4	15.33	-	0
Silver*	<0.005	<0.005	<0.005	0.00005	0
Tin	<0.005	0.007	<0.005	-	0
Titanium	0.122	0.332	0.21	-	0
Zinc	**0.058**	**0.088**	**0.08**	0.008	**5**
Boron	<0.05	<0.05	<0.05	0.94	0
Iron	0.49	1.1	0.67	-	0

Red values denote exceedances of the water quality screening criteria.

** The LOR for Silver is greater than the DGV. Therefore, exceedances were not considered.*

C.4.4.4. ELF Seepage Modelling and Landform Design

A geochemical model was completed for the ELF to estimate water quality (seepage) over the operational and closure phases of the BOGP. Three models were constructed:

- ELF base case seepage water quality with no engineering controls; and
- ELF base case seepage water quality with engineering controls to reduce oxygen ingress and water ingress.

The base case conceptual geochemical model highlights significant risks associated with unmanaged ELF designs, including elevated contaminant loads and prolonged AMD generation. Higher sulfur content in TZ4 and RSSZ materials necessitates targeted management strategies, including encapsulation and selective placement within the ELF.

An assessment of the net percolation (NP) (or water ingress) rates into the ELFs was also completed to support the assessment of environmental effects and understand the risks associated with downstream water quality and treatment needs (Mine Waste Management, 2025c).

A key control to minimise the effects on seepage waters from ELFs is to prevent the advective ingress of oxygen, as the dominant process for oxygen flux is by the advective and convective flow of oxygen (temperature differences, barometric pressure differences) along coarser waste rock layers that can form within ELFs. A landform design philosophy for the ELFs has been developed that investigates design principles for reducing sulfide mineral oxidation and the risks associated with NMD. An 'Engineered Fill' approach is proposed to manage drainage risks through implementation of source control, progressive reclamation, and cover systems, reducing the likelihood of in-perpetuity management (Mine Waste Management, 2025b). Guidance has been developed for foundation earthworks, water and material management, and engineering design specifications. Cover systems which can minimise the amount of oxygen and water flux into an ELF as well as providing a stable revegetation medium are also being investigated. A variety of systems are available including soil/rock covers, low permeability compacted clays barrier layers, capillary beaks, geosynthetic clay layers, and membrane technology such as polythene.

While further work is required to confirm the detailed design, the following encapsulation options are currently recommended:

- Placement of higher sulfur waste rock (TZ4, RSSZ) towards the back of each lift in a zone of limited airflow. This prevents higher-risk material from being within the zone of higher oxygen movement (e.g., the advective cell) near the front batter slopes of an ELF. The size of these zones and the number of individual zones will be a function of the materials schedule and 20 m is proposed as the set-back; and
- Development of a perimeter bund of paddock dumped waste rock (TZ3 and or brown rock) at the start of each lift at the outer edge of the ELF. This can then be compacted as a toe barrier (~ 2 m high). Toe barriers have been proposed for other projects to limit oxygen ingress due to grainsize segregation.

C.4.4.5. Implications for Closure Planning and Future Work Focus Areas

At closure, primary mine domains that will influence water quality include the ELFs, TSF, pit voids, and underground workings. While acid rock drainage (ARD) is not expected, NMD risks necessitate controls to manage As, SO_4, trace metals, and nitrogen compounds. Drainage treatment and water quality monitoring post-closure will be required, especially around ELFs and TSFs. TZ4 and RSSZ require specific waste rock management strategies due to their high As and S content. Selective placement and encapsulation of high-S and high-As materials within ELFs are necessary to limit oxidation and leachate generation. Tailings, which also have elevated As and S, will be designed to minimise leachate risks, potentially requiring engineered covers or treatment systems. Current design criteria for the Shepherds Creek ELF are conceptual (Mine Waste Management, 2025b) and will be developed into detailed criteria. This work will include criteria and specifications for the SRX ELF and the TSF. The aim is to minimise perpetual water treatment requirements through proper waste placement and cover systems.

Performance monitoring for the ELFs will include leading and lagging performance monitoring programs to confirm design criteria are being achieved, including but not limited to:

- Monitoring of water quality and quantity at the discharge of the ELF underdrain (Shepherds Creek, SRE) to understand water quality effects and confirm net percolation rates;
- Monitoring of groundwater downgradient of ELF to confirm that basal seepage is not significant;
- Monitoring of oxygen flux into the ELF using oxygen probes and/or oxygen sensors to confirm the oxygen concentration and the depth of the oxidation is < 20 m (i.e., the design criteria); and
- Installation of lysimeters to validate net percolation rates are acceptable and meet design expectations.

The closure future work focus areas associated with geochemical mineral waste, as summarised in MCP Section 13, Table 16 are:

- Post-closure drainage conditions need to be clearly defined to prevent long-term contaminant migration;
- Detailed construction and rehabilitation designs for the ELFs and TSF which include foundation earthworks, water and material management, encapsulation and cover system designs (including material volumes), and engineering design specifications;
- Development of construction methodologies to optimise ELF and TSF development;
- Development of Materials Management Plan;
- Geochemical characterisation of ELF materials (pre-excavation and placement) for AMD/NMD risks and risks associated with nitrogenous compounds;
- Further analysis is recommended as part of the ELF detailed design to understand the benefits of the cover system including a store and release system to reduce NP. Brown rock and TZ3 materials need to be assessed for their geotechnical benefits as a cover system material to limit oxygen/water ingress;
- Elevated As and cadmium (Cd) levels in soils necessitate a management plan to mitigate human and ecological risks; and
- Background ecological metal concentrations will be established to inform rehabilitation criteria and progressive reclamation using appropriate soil covers and vegetation will be incorporated into closure planning.

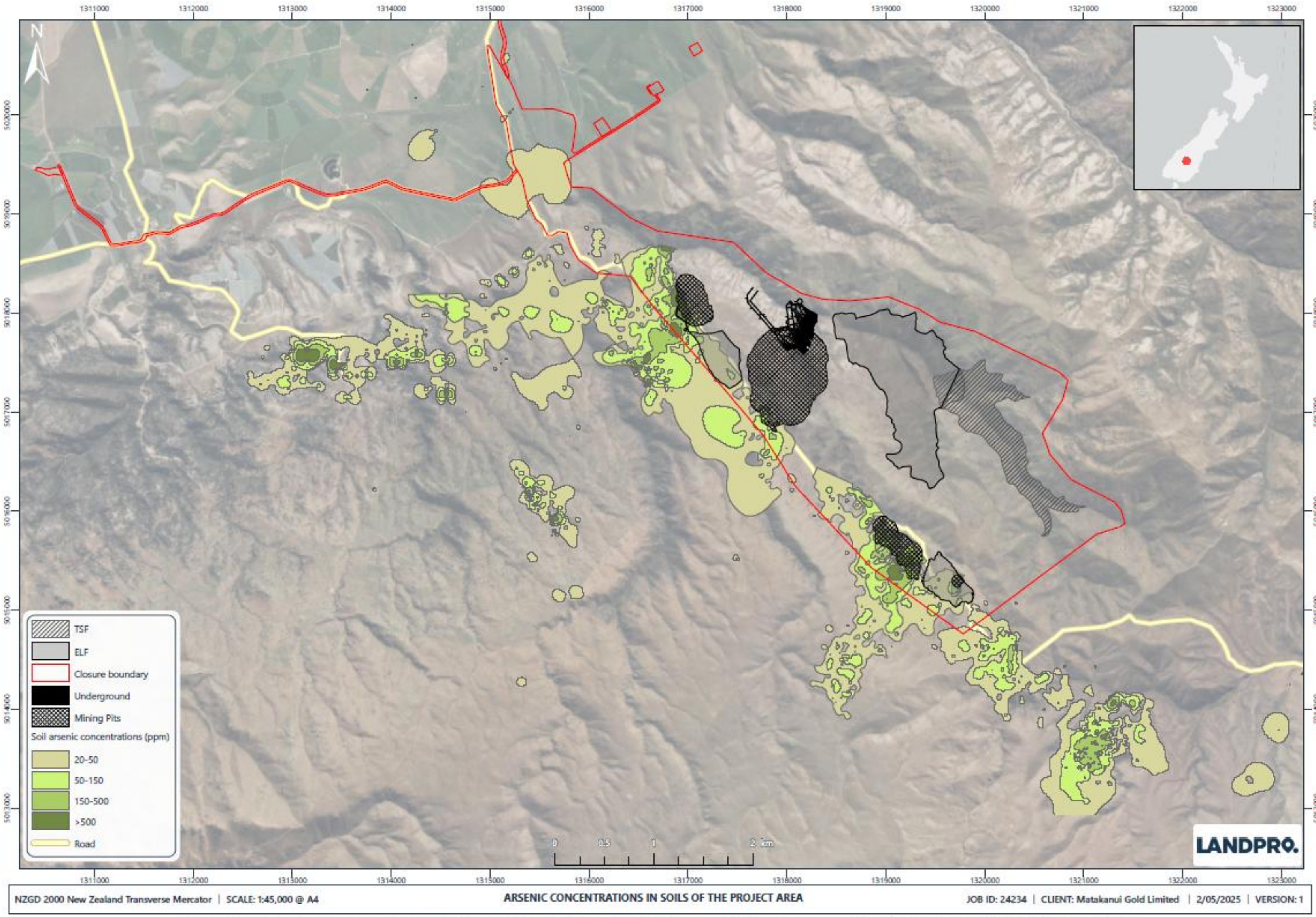


Figure C 10. Arsenic concentration in soils of the Project Area.

C.4.5. Growth Media and Cover System Designs

Existing soils and subsoils are planned to be used as the growth medium for rehabilitated areas. An enhanced water store-and-release or barrier type system is likely to be required to reduce net percolation on the ELFs and TSF; preliminary investigations have occurred which consider the site climatic setting into the context of expected performance for different types of cover systems (Mine Waste Management, 2025c). The GARD Guide (INAP, 2014) suggests that water store-and-release cover systems are targeted for climates with a PE:P of greater than 2, such as that of the BOGP site, and as such a cover system that includes some form of infiltration control (e.g., enhanced store and release, low permeability barrier, etc.) would improve performance (i.e., lower net percolation).

Based on currently available data, it is expected a proposed cover system consisting of a relatively thin water store-and-release cover system with moderately permeable material (moderately weathered coarse mine rock and topsoil with modest fines content and limited clay minerals) would achieve a post-closure net percolation for the covered ELF and TSF ranging between 30% and 50% of annual precipitation (Mine Waste Management, 2025c). Factors that are expected to influence performance of a cover system include the climate and texture of the proposed cover materials. Landform and vegetation aspects are not expected to significantly influence net percolation. Further work is required to develop the understanding of cover system requirements and is detailed below.

C.4.6. Rehabilitation Materials Inventory

Stripping and stockpiling of subsoils and topsoil across the mine footprint is planned. Materials will be stored in stockpiles which will be formed throughout the LOM and will be contoured on formation to reflect the underlying topography of the landform (Figure 3).

Soil volume estimates for the 2D footprint have been calculated and total topsoil volumes are expected to approximate 3,255,061 m^3, however these are required to be contextualised in the 3D landscape once landform designs are finalised. At this stage of development, detailed assessment of growth media and rehabilitation materials inventories has not been progressed. This will be undertaken as soon as practicable.

C.4.6.1. <u>Implications for Closure Planning and Future Work Focus Areas</u>

The closure future work focus areas associated with rehabilitation materials, as summarised in Section MCP 13, Table 16 are:

- Rehabilitation materials inventory for the 3D post-landscape, following finalisation of landform designs;
- Rehabilitation material (including growth media) characterisation assessments, including incorporation of material textural properties and site-specific particle size distribution data;
- Numerical models to progress assessment of cover system designs and enable the development of expected performance criteria; and
- Cover system field trials to improve confidence in post-closure cover system performance.

C.5. Water Resources

C.5.1. Water Quality

A site-wide water quality model has been developed, combining climate, hydrology, groundwater, and geochemistry data to forecast the effects of mining on surface water quality and quantity (Mine Waste Management, 2024a). Table C 8 shows the existing water quality sampling sites in the BOGP Project Area (Mine Waste Management, 2024a). Baseline water quality monitoring is ongoing and will be used to confirm project specific water quality criteria. Such criteria will form the basis for resource consent conditions for water quality compliance and help inform future refinement to the completion criteria.

Table C 8. Water quality sampling sites in the BOGP Project Area.

DOMAINS	SITE ID	DESCRIPTION
Shepherds Creek	SC01	Shepherds Creek at Bendigo Terrace. Downstream monitoring site.
	SC03	Shepherds Creek below Rise and Shine. Just upstream from Jeans Creek confluence.
	Jean Creek (JC01)	An intermittent tributary to Shepherds Creek.
Bendigo Creek	RSB	Rise and Shine Battery Site within the Rise and Shine Creek.
	RSA1	Rise and Shine Adit. Historic workings.
	RS01	Immediately downstream of the Rise and Shine workings.
	RS02	Rise and Shine Creek above Rise and Shine workings. Upstream baseline.
	RS03	Rise and Shine Creek below Come in Time.
	RS04	Rise and Shine Creek above Rise and Shine workings. Upstream baseline.
	CC01	Water quality monitoring site in Clearwater Creek.
	LBA	Lower Bendigo Adit – historical working.
Groundwater	MRC002	Groundwater from drillhole MRC002
	MDD015	Drillhole within the potential pit footprint.
	MDD302	Groundwater from drillhole in RAS Valley.
	Base (from water supply)	At the downstream base. Example of water supply.
	Base (exploration camp)	At the exploration camp. Example of water supply.

Water quality data (surface and groundwater) were assessed against:

- The 95% DGVs (ANZG, 2018)[3].
- Where appropriate, other guideline values including:
  - ANZECC Livestock Drinking Water guidelines (ANZECC, 2000);

[3] A draft update of the ANZG, 2018 guidelines is currently underway, and will be considered once finalised, as relevant.

- Guidelines from the National Policy Statement (NPS) for Freshwater Management (Ministry for the Environment, 2020);
- B.C. Ministry of Water, Land and Resource Stewardship (B.C. Ministry of Water, Land and Resource Stewardship, 2023); and
- A limit of 2.5 mg/L was applied to Sr (strontium) (Canadian Federal Environmental Quality Guidelines, 2020).

A metal ecotoxicity quotient (MEQ) identifies COPCs that may be elevated with respect to water quality guidelines, compliance limits, or trigger values (Weber & Olds, 2016). The MEQ value for a COPC is determined by dividing the measured maximum concentration by the DGV. MEQ values greater than 1 indicate parameters that exceed the relevant DGV. Conversely, MEQ values less than 1 are below the relevant DGV. If any contaminants are within 50% of the DGV (i.e., MEQ ≥0.5) they are considered potentially elevated and ongoing monitoring is recommended to confirm trends and /or potential hazards.

There are numerous historic mine workings throughout the project area (Section C.1.2), which have impacted baseline water quality. The majority of mine workings were pre-1900 activities and include stamping batteries and processing areas, underground mine adits, mullock piles, tailings mounds and sluicing areas. Several of the streams associated with the BOGP have been impacted by historical mining activities contributing to elevated metals such as As in waterways. Some streams are also elevated in metals such as Cu due to natural baseline conditions unaffected by mining (e.g., Shepherds Creek).

C.5.1.1. Bendigo Creek Catchment

Current understanding of baseline water quality is derived from data for the Bendigo Creek Catchment that comprises 106 samples from seven sampling sites (Mine Waste Management, 2024a). The results indicate that As, Cd, Cr, Cu and Zn concentrations were reported as exceeding the adopted DGV in at least one sample site (i.e., MEQ >1). Baseline data shows that CC01 (Clearwater Creek) and RS04 above the Rise and Shine historic workings were not elevated in As. Aluminium (Al) concentrations were recorded as potentially elevated at three sampling sites.

Table C 9. MEQ analysis and average concentrations for Bendigo Creek Catchment.

		RSA1 (n=25)		RS01 (n=26)		RS02 (n=26)		RS03 (n=25)		RS04 (n=14)		CC01 (n=16)		LBA (n=18)	
PARAMETERS	**ADOPTED DGV**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**	**MEQ (MAX VALUE)**	**AVE (mg/L)**
Ag	0.00005	10.0	0.0005	10.0	0.0005	10.0	0.0005	10.0	0.0005	-	-	10.0	0.0004	10.0	0.0004
Al	0.055	0.095	0.0029	0.473	0.0042	0.600	0.0082	0.509	0.0076	0.564	0.007	0.891	0.0123	0.12	0.003
As	0.013	10.0	0.0386	2.69	0.0193	0.546	0.0049	1.08	0.0085	0.146	0.001	0.085	0.0010	89.2	1.05
Cd	0.0002	1.00	0.0001	1.00	0.0001	1.00	0.0001	1.00	0.0001	1.00	0.000	1.00	0.0001	1.40	0.0001
Cr	0.001	1.00	0.0006	1.00	0.0005	1.00	0.0005	2.00	0.0006	1.00	0.000	2.00	0.0006	2.00	0.0004

PARAMETERS	ADOPTED DGV	RSA1 (n=25)		RS01 (n=26)		RS02 (n=26)		RS03 (n=25)		RS04 (n=14)		CC01 (n=16)		LBA (n=18)	
		MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)
Cu	0.0014	24.4	0.0018	1.07	0.0006	1.14	0.0006	0.529	0.0005	1.21	0.001	0.643	0.0004	0.357	0.0003
Fe	-	-	0.205	-	0.0614	-	0.0245	-	0.0375	-	0.068	-	0.0293	-	0.045
Sr	-	0.536	0.3807	0.206	0.358	0.158	0.266	0.076	0.136	0.162	0.315	0.021	0.042	0.209	0.468
Tl	0.00003	16.7	0.0002	16.7	0.0002	16.7	0.0002	16.7	0.0002	16.7	0.000	16.7	0.0002	16.7	0.0001
Hg	0.0006	0.833	0.0003	0.833	0.0003	0.833	0.0003	0.833	0.0003	0.833	0.000	0.833	0.0002	0.833	0.0002
Zn	0.008	9.00	0.0047	0.857	0.0018	1.63	0.0020	1.63	0.0023	0.550	0.001	0.388	0.0016	0.450	0.0014
Sulfate	1,000	0.018	4.52	0.015	5.13	0.007	2.72	0.0041	1.57	0.006	2.80	0.004	0.843	0.034	27.6
Ammoniacal nitrogen	0.24	0.542	0.0222	0.208	0.0098	0.417	0.0121	0.125	0.0092	0.458	0.013	0.125	0.0086	0.042	0.006
Nitrate-N	2.4	0.058	0.0153	0.054	0.017	0.096	0.0308	0.021	0.0088	0.004	0.003	0.012	0.0096	0.108	0.214

All units presented in mg/L unless otherwise specified.

A hyphen (-) indicates no data are available.

Red MEQ indicates that concentrations exceed the DGVs or similar guidelines.

Orange MEQ indicate MEQ between ≤ 1.0 and ≥ 0.5 (i.e., potentially elevated).

Blue MEQ indicates all data are influenced by the limit of reporting (LOR) being higher than the DGV and may not be elevated.

C.5.1.2. Shepherds Creek Catchment

Water quality data for Shepherds Creek Catchment comprised 52 samples from three sampling sites (Table C 10) (Mine Waste Management, 2024a). The results indicate that exceedances of adopted DGV's were recorded in at least one site for Cu and Zn. Potentially elevated levels of Cu, Zn and Sr were recorded in at least one sample site. Silver (Ag), Cd, Cr, Hg, and Tl have MEQ values of 1.00, 1.00, 0.833, and 16.7 respectively, due to a LOR > DGV for all Shepherd Creek Catchment sites.

Concentrations of nutrients (e.g., nitrate and ammoniacal nitrogen) were elevated in Shepherds Creek and may be attributed to the presence of livestock in the vicinity. Similarly, TKN[4] concentrations could also be a result of animal waste inputs or rock weathering processes within those watersheds (e3Scientific Ltd, 2023).

[4] *TKN = Total Kjeldahl Nitrogen*

Table C 10. MEQ analysis and average concentrations for Shepherds Creek Catchment.

PARAMETERS	ADOPTED DGV	SC01 (N=25)		SC03 (N=21)		JC01 (N=6)	
		MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)	MEQ (MAX VALUE)	AVE (mg/L)
Ag	0.00005	10.0	0.0005	10.0	0.0005	10.0	0.0005
Cd	0.0002	1.00	0.0002	1.00	0.0002	1.00	0.0002
Cr	0.001	1.00	0.001	1.00	0.001	1.00	0.001
Cu	0.0014	0.714	0.001	0.786	0.001	2.14	0.003
Fe	-	-	0.040	-	0.070	-	0.010
Sr	2.50	0.500	1.25	0.318	0.796	0.392	0.979
Tl	0.00003	16.7	0.0005	16.7	0.0005	16.7	0.0005
Zn	0.008	1.0	0.008	0.250	0.002	0.513	0.004
Sulfate	1,000	0.064	63.5	0.019	18.6	0.026	26.4
Ammoniacal nitrogen	0.24	0.167	0.040	0.167	0.040	0.042	0.010
Nitrate-N	2.4	0.129	0.310	0.133	0.320	0.063	0.150

All units presented in mg/L unless otherwise specified.

A hyphen (-) indicates no data are available.

Red MEQ indicates that concentrations exceed the DGVs or similar guidelines.

Orange MEQ indicate MEQ between ≤ 1.0 and ≥ 0.5 (i.e. potentially elevated).

Blue MEQ indicates all data are influenced by the limit of reporting (LOR) being higher than the DGV and may not be elevated.

C.5.1.3. Groundwater Quality

Groundwater quality data from samples collected from five sites across the Project Area between September 2022 and December 2024 were analysed. The MEQ analyses are presented in Table C 11 (Mine Waste Management, 2024a). The results indicate that As, Cu, Pb, Sr, Tl, and Zn were reported as exceeding the adopted DGV in at least one sample site. As, ammoniacal nitrogen, Cd, and Cu were each recorded as potentially elevated at one site respectively.

Table C 11. MEQ analysis and average concentrations for groundwater.

PARAMETERS	ADOPTED DGV	MDD015 (n=18)		MRC002 (n=1)		MDD302 (n=12)		Office Base (n=1)		Base (Exploration Camp) (n=1)	
		MEQ (max value)	AVE (mg/L)	MEQ (max value)	AVE (mg/L)	MEQ (max value)	AVE (mg/L)	MEQ (max value)	REPORTED VALUE (mg/L)	MEQ (max value)	REPORTED VALUE (mg/L)
Ag	0.00005	10.0	0.0002	10.0	0.0005	1.60	0.00008	10.0	0.0005	-	-
As	0.013	4.21	0.024	0.846	0.011	4.49	0.052	0.077	0.001	0.064	0.234
Cd	0.0002	1.00	0.0001	1.00	0.0002	0.100	0.00002	1.00	0.0002	0.500	0.00002
Cr	0.001	1.00	0.0005	1.00	0.001	0.200	0.0002	1.00	0.001	0.200	0.0003
Cu	0.0014	0.357	0.0003	1.43	0.002	0.521	0.0002	2.86	0.004	110	0.006
Fe	-	-	0.015	-	0.090	-	0.005	-	0.010	-	0.005
Hg	0.0006	0.833	0.0002	0.833	0.0005	0.133	0.00008	0.833	0.0005	0.133	0.0001
Pb	0.0034	0.147	0.0002	0.147	0.0005	0.015	0.00005	0.147	0.0005	5.29	0.0001
Sr	2.50	4.24	9.76	1.43	3.57	0.480	1.13	0.177	0.443	0.044	0.257
Tl	0.00003	110	0.0003	16.7	0.0005	0.333	0.00001	16.7	0.0005	0.333	0.00001
Zn	0.008	0.400	0.001	11.8	0.094	0.125	0.001	7.13	0.057	58.5	0.001
Sulfate	1,000	0.017	10.3	0.005	5.40	0.010	9.59	0.024	24.0	0.004	3.99
Ammoniacal nitrogen	0.24	0.833	0.109	-	-	0.208	0.050	-	-	0.021	0.030
Nitrate-N	2.4	0.004	0.005	-	-	0.004	0.0033	-	-	0.212	0.555

All units are presented in mg/L unless otherwise specified.

A hyphen (-) indicates no value is given.

Red MEQ indicates that concentrations exceed the DGVs or similar guidelines.

Orange MEQ indicate MEQ between ≤ 1.0 and ≥ 0.5 (i.e., potentially elevated).

Blue MEQ indicates all data are influenced by the limit of reporting (LOR) being higher than the DGV and may not be elevated.

C.5.2. Hydrology

The site is located astride a ridge dividing the Shepherds Creek and RAS Creek on the northeast side of Lake Dunstan in the Dunstan Mountains, with catchments open to the northwest onto the intervening fluvio-glacial sediments of the Cromwell-Tarras Valley.

The Project Area covers several catchments and sub-catchments (Figure C 16), including:

- Bendigo Creek Catchment (28.15 km^2) in the south and west, which includes the RAS sub-catchment;
- RAS Creek sub-catchment: This creek joins Clearwater Creek just Southeast of the CIT Battery and flows into Bendigo Creek;
- Clearwater Creek sub-catchment;
- Shepherds Creek in the northeast (12.36 km^2): This creek is a minor tributary of the Lindis River and flows intermittently towards the Lindis River; and
- Jean Creek sub-catchment: This creek is an intermittent tributary to Shepherds Creek.

Regionally, the Clutha River / Mata Au catchment makes up 67% (⅔) of the Otago region. There is a strong pluviographic (rainfall) gradient from extremely high runoffs in the Southern Alps headwaters to specific discharge only a sixth of the Alps in the Bendigo catchments. The gradient is the result of a drop-off in Alps spill-over precipitation plus the effect of rain shadowing by inland Otago ranges. The main water source in the catchment area is rainfall runoff and recharge, with an estimated average annual rainfall of 463 mm (Kōmanawa Solutions Ltd, 2024a). The primary receiving environments near the proposed deposits are Shepherds Creek and Clearwater Creek, both of which receive water from rainfall runoff and groundwater. Shepherds Creek is particularly important, as the RAS pit is located within its catchment. Flow measurements in Shepherds Creek range from 2.2 to 113 litres per second (L/s).

C.5.2.1. Surface Water Bodies

Both Shepherds Creek and Clearwater Creek flow to alluvial aquifers. Shepherds Creek flows to the Ardgour Alluvial Aquifer, and Clearwater Creek flows to Bendigo Creek, which then runs to the Bendigo Alluvial Aquifer. In both cases the creeks are connected to the aquifers through a drying front connection, where the creeks run dry in their lower reaches, and water is transmitted through alluvium under the creek bed. The creeks essentially become recharge for the alluvial aquifers down-gradient of the respective submergences. An irrigation water-take diverts surface water from Shepherds Creek to an irrigation reservoir, causing cessation of the creek's surficial flow. Mapped streams can be perennial or intermittent in the area and can go to ground seasonally or consistently across reaches as a function of valley alluvium depths, local groundwater, and upstream flow (e3Scientific Ltd, 2023). When streams do persist and flow onto the Bendigo Terrace, it is expected that they will experience transmission losses and go to ground, recharging local groundwater given the depth to terrace groundwater and coarse subsurface materials. It is inferred that the Bendigo Aquifer receives any net creek flow from Bendigo Creek after irrigation off-take and evapotranspiration (Kōmanawa Solutions Ltd, 2024a).

The creek courses only reach the Lindis River or Clutha River during heavy flooding associated with extended wet periods. There are several tributaries and springs in the wider environment which runoff to the respective creeks (Kōmanawa Solutions Ltd, 2024c). These springs most typically occur at the top of mass wasting features e.g., at the steep slope transitions at the top of slumps and landslides.

There is no mapped spring adjacent, up or down gradient from the proposed Project Area (Figure C 11).

The dominant receiving environments immediately adjacent to the proposed mining areas are Shepherds Creek and Clearwater Creek creeks (Kōmanawa Solutions Ltd, 2024c). These creeks are perennial and fed by rainfall runoff and groundwater discharges. Shepherds Creek is the primary receiving environment for the proposed mining area, with the Rise and Shine pit located in the Shepherds Creek catchment.

C.5.2.2. Changes to Hydrology from Mine Development

Management of surface water is a key aspect to mine design and planning. Infrastructure such as ELFs, stockpiles, and the ex-pit TSF will be constructed in the Shepherds Creek and Bendigo Creek catchments (Figure C 11). Surface water from the catchments will need to be managed, either diverting around the mining landforms into the creeks below the mine footprint or intercepted and used as to support operational water demand. Where water from the catchment is used, consideration of maintaining ecological flows downstream of the footprint will be made.

To manage surface water for the site the following supporting civil infrastructure is required:

- North Diversion Channel;
- TSF South Diversion Channel;
- Central Diversion Channel;
- South Diversion Channel;
- Shepherds Seepage Collection Sump;
- Shepherds Creek silt pond;
- RAS pit water sump and fill station;
- Shepherd Creek Realignment Channel (Process Plant and Infrastructure Area);
- Shepherd Creek Realignment Channel (Access Road); and
- Rise and Shine Creek Diversion (around RAS pit).

Wastewater treatment

- Closure mine impacted water treatment plant; and
- Closure mine impacted water passive treatment ponds.

Shepherds Creek Valley

During Project establishment, silt control measures will be undertaken such as localised clean water diversions, bypass culverts, sediment retention ponds, windrows, silt fences, and decanting earth bunds. An erosion and sediment control management framework will be implemented during operations to protect land surfaces from erosion and manage sediment deposition, reducing risks for closure liability.

Shepherds Creek will be substantially affected by the TSF and ELF infill and the Process Plant. The proposed setting in the Shepherd Creek Valley is designed to control watershed from the upper

Shepherds Creek catchment by detaining to the TSF, separation of clean water from catchments upslope of the TSF and ELF by the construction of clean water diversions channels, stabilisation and staging of cut/fill areas minimising disturbance and detaining sediment containing water within silt detention ponds downstream of disturbed areas.

Shepherds Creek Realignment

The Processing Plant and Infrastructure Area are located in the lower section of Shepherds Valley. The area requires an engineered cut fill platform. The cut is into the south slope of the valley and the fill platform extends across the valley floor to the north side. Shepherds Creek will be realigned to the north side of the valley in this area.

RAS Creek Realignment

Later in the mine life the RAS pit will intercept the RAS Creek. A diversion of the creek flow is established by constructing a detention bund with a culvert upstream of the pit to throttle flows before bypassing the pit while mining in a pipe then via an open channel cut into a 10 m bench formed in the final mining surface. In peak flood conditions water might escape the channel and enter the RAS pit.

Northern Diversion Channel

A freshwater diversion channel is planned to be constructed on the northern side of the TSF and Shepherds creek ELF (Figure C 12). The drainage channel along the TSF will be above final height of the TSF. The final height of the toe of the ELF on the northern side will be at drainage channel height – effectively making a valley between the ELF and the existing valley wall. At end of mine life the channel will be opened where it crosses natural creek lines to reinstate natural flows, and creek lines will drain to the TSF rehabilitated surface along the northern edge of the TSF to the TSF embankment. The TSF embankment will be engineered to deliver drainage water from the TSF into the valley below the ELF. The sediment pond section of Shepherds creek will be rehabilitated.

The ELF will require a large silt pond to be formed as an earth embankment dam. At the toe there will be the Seepage Collection Sump, a lined pond to manage the pump back of seepage as required to the TSF. A diversion drain will be constructed above the seepage pond and sediment pond to deliver clean water into Shepherds Creek. At the end of mine life this sediment pond will be removed, and the channel will be re-engineered to deliver fresh water close to the toe of the ELF.

SRX PIT

A freshwater diversion channel will be installed above SRX pit to Mount Moko Creek between SRE pit and the ELF. SRX pit is likely to be mined at the end of RAS Pit and Underground mining. SRX pit and SRE pit overburden rock will be stored in the SRX ELF. Clean water will be diverted around the pit and the ELF and mine-impacted water from the ELF will be diverted to SRX Pit. Water from SRX pit will either be gravity feed back to the Process Plant or pumped to the TSF during operations.

C.5.2.3. Operational Landform Flood Modelling

Hydrological and flood-related modelling by Kōmanawa Solutions Ltd (2025), has informed both operational and closure phase surface water management strategies. A 75-year synthetic rainfall record was developed using regional climate data to simulate representative design rainfall and runoff conditions. This modelling, along with monitored creek flow data, was used to estimate flood response and baseflow variability across key catchments, including Shepherds and Rise and Shine Creeks.

During operations, flood risk is managed through a combination of diversion drains, stormwater controls, and a silt retention pond with 64,000 m^3 total capacity. Modelling indicates that overflow from this system would occur only during infrequent high rainfall events, contributing no more than 3–10% of annual creek flow. Flood flows exceeding diversion or culvert capacity, such as those in Rise and Shine Creek, are intentionally directed into pit voids (e.g., RAS pit) for detention and sediment settlement prior to controlled release.

Post-closure, rehabilitated landforms, including waste rock dumps and backfilled pits, are expected to increase infiltration and delay runoff, resulting in a 37–47% increase in baseflows and improved flow buffering. The RAS pit lake and associated subsurface drainage paths further attenuate runoff, reducing peak flow velocities and supporting the reestablishment of stable, non-erosive downstream creek flow regimes. These modelled outcomes demonstrate that flood risk post-closure is expected to be minimal and manageable within the designed hydrological framework (Kōmanawa Solutions Ltd, 2025).

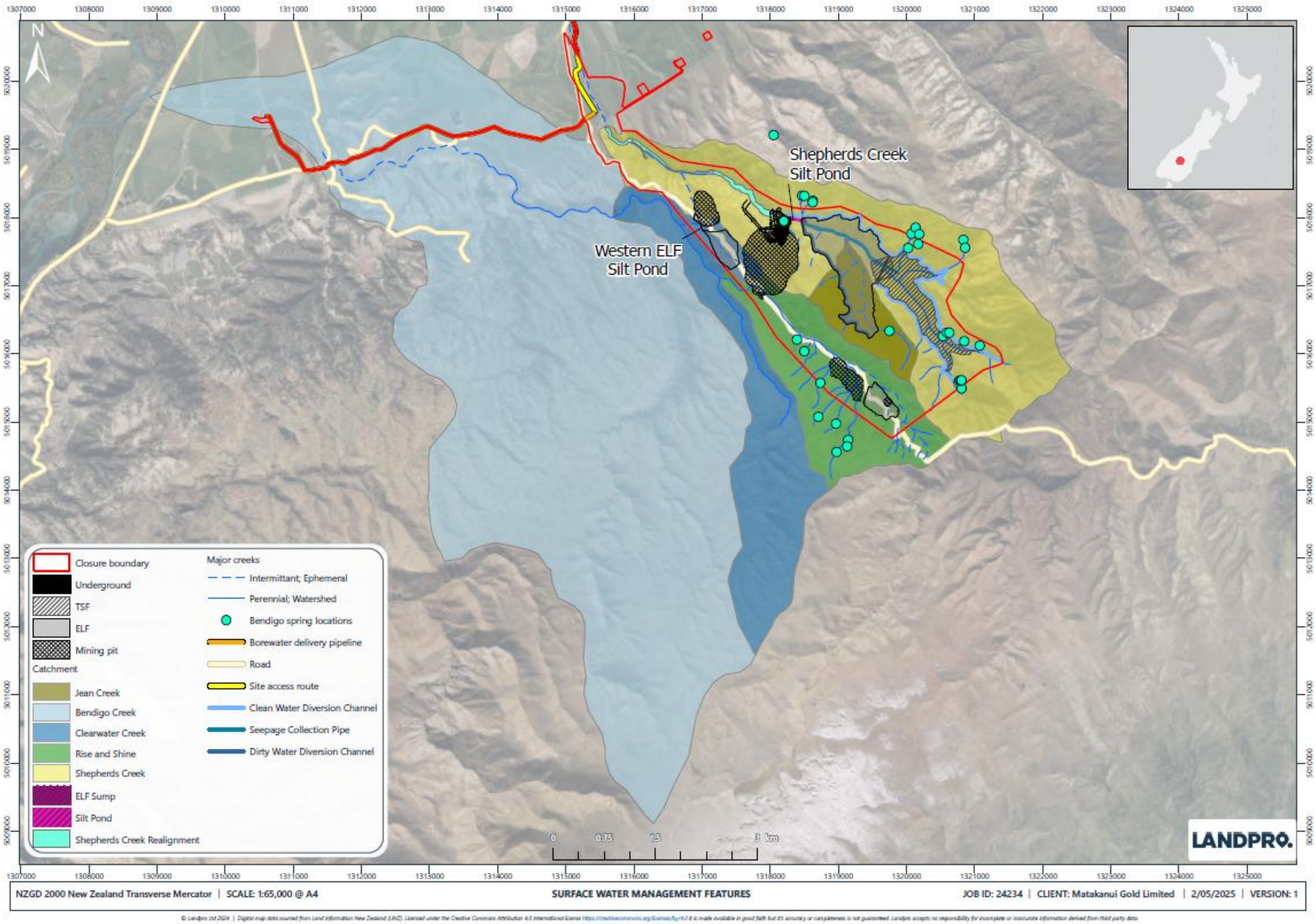


Figure C 11. Surface water management features.

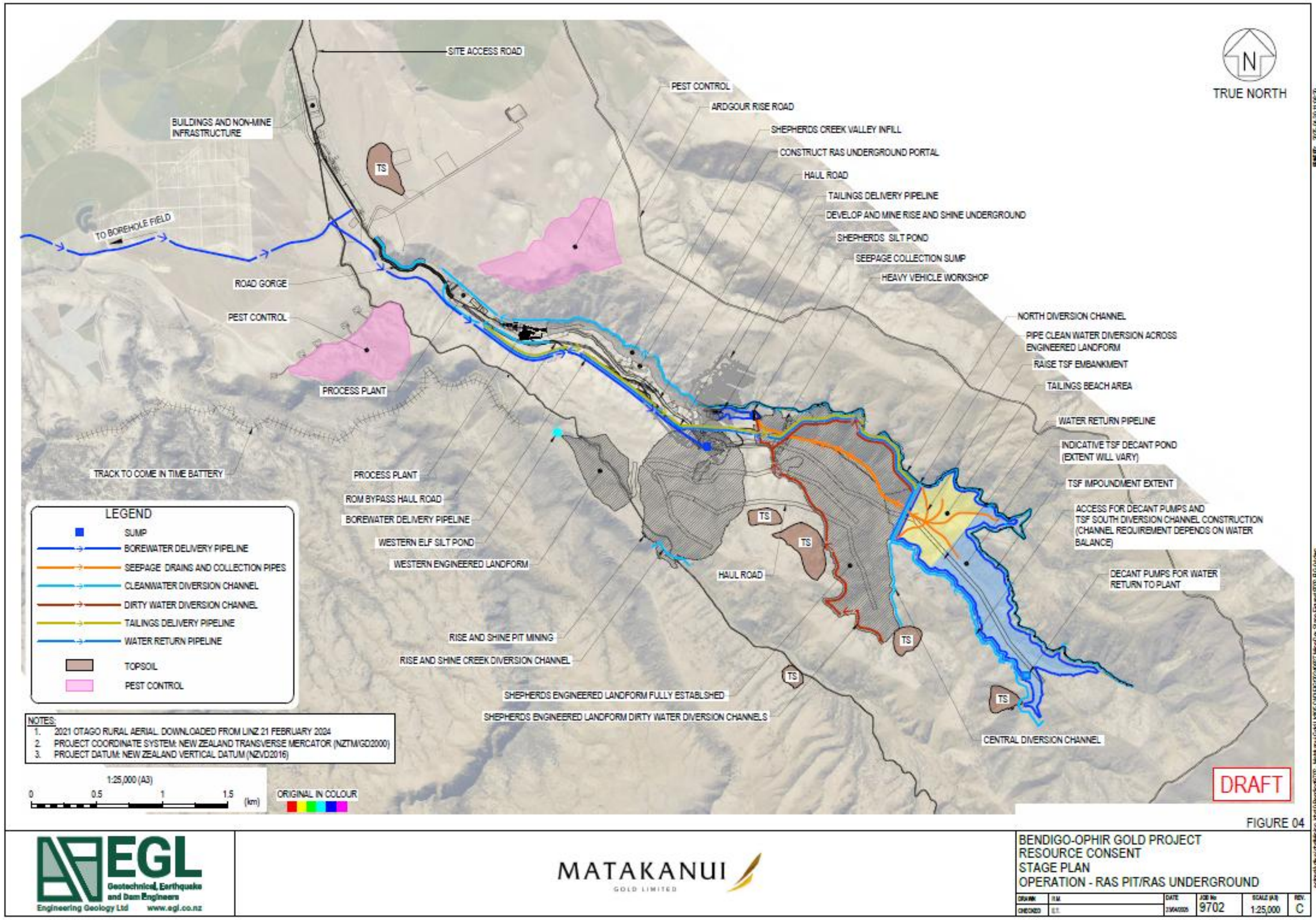


Figure C 12. Schematic of the Northern Diversion Channel (Engineering Geology Ltd, 2024)

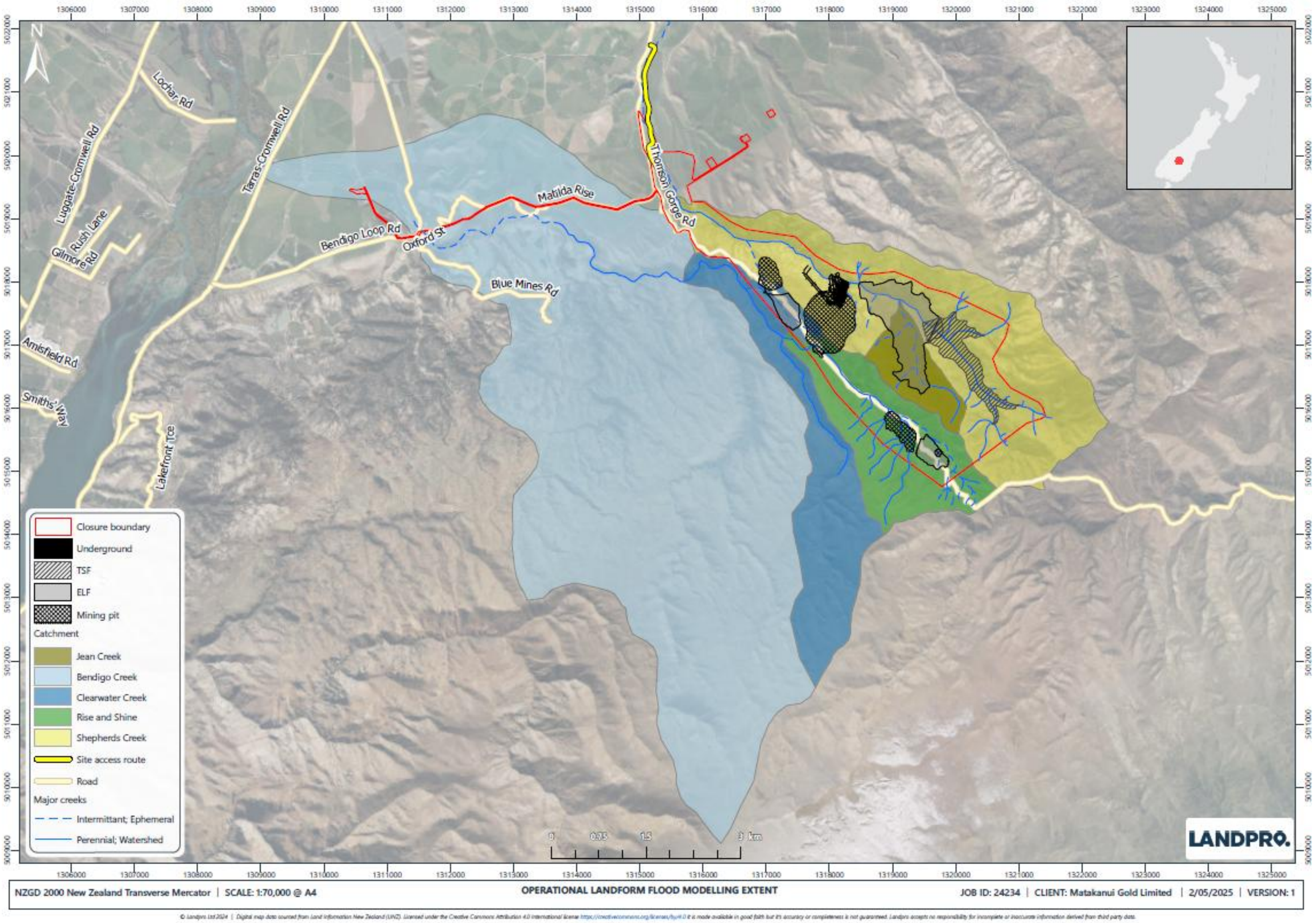


Figure C14 Operational landform flood modelling.

C.5.2.4. Implications for Closure Planning and Future Work Focus Areas

Where feasible, closure planning seeks to reinstate natural hydrological flows disrupted by mining infrastructure, however this is recognised as not always being possible. Infrastructure like the Northern Diversion Channel and the re-engineered Shepherds Creek alignment will be designed to replicate natural flow regimes in the context of the semi-arid climate and intermittent streamflow patterns in the area, including handling seasonal variations in water availability, maintaining ecological flows and mitigating the risk of sedimentation or erosion. Disturbances to the landscape, including cut/fill operations, channel realignments, and sediment ponds, increase the risk of sediment generation and downstream deposition. Long-term erosion and sediment control measures, such as revegetation, engineered channels, and sediment retention structures, will be incorporated into closure planning to manage runoff and protect receiving environments.

Mine infrastructure also alters the natural interaction between surface water and aquifers. Closure implementation activities will ensure that where surface water diversion structures are to remain in the post closure landscape, they are rehabilitated in such a manner that continues to support natural groundwater recharge.

The closure future work focus areas associated with hydrology, as summarised in MCP Section 13, Table 16 are:

- Hydrological modelling and flow reinstatement: development of the expected performance of realigned channels and 3D landform drainage in maintaining natural flow patterns and ecological functionality post-closure;
- Post-closure drainage conditions, surface water management features, and closure design specification requirements, including for the ELFs and TSF (in consultation with relevant stakeholders);
- Erosion and sediment dynamics: understanding of long-term erosion rates and sediment generation from disturbed landforms, including TSFs, ELFs, and diversion channels, during and after rehabilitation;
- Groundwater – surface water interactions: detailed studies on the interactions between surface water diversions, seepage management systems, and underlying aquifers are required, particularly in the Bendigo and Lindis Alluvial Aquifers;
- Ecological flow requirements: data on the seasonal and ecological flow needs of downstream water bodies to sustain aquatic and riparian habitats;
- Detailed risk assessment of flood management post-closure: further assessment of a range of rainfall events is required to better understand the capacity of rehabilitated and re-engineered watercourses such as diversion channels and realigned streams, to handle peak flood conditions; and
- As detailed by MWM in the BOGP Water Management-Treatment report (2025d), trials should be undertaken using BOGP site specific water to assess the viability of Passive Treatment Systems (PTS).

C.5.3. Hydrogeology

C.5.3.1. Regional Groundwater Conceptualisation

Groundwater in the Bendigo district has two overarching domains (Kōmanawa Solutions Ltd, 2024a; Kōmanawa Solutions Ltd, 2024b):

- Alluvium or outwash sediments, generally coarse sandy gravels; and
- Saturated consolidated rocks such as schist basement.

Alluvium and voluminous outwash gravel deposits are concentrated within the valley systems such as the Lindis Valley and Upper Clutha Valley. The alluvium and outwash gravel deposits have high permeability and porosity, allowing the conveyance of copious quantities of groundwater through the deposits. Three such deposits are of note in the Project Area. Groundwater under the mining footprint is found within fractured rock comprising Otago Schist (including textural zone 3 (TZ3), 4 (TZ4) and the Rise and Shine Shear Zone) with very low permeabilities compared to the alluvial aquifers found on the valley floors.

Post-glacial outwash associated with the Hāwea and Alberttown glacial advances (and the advances' collapse) has accumulated between the Clutha River / Mata Au and the terrace riser of the Bendigo Terrace. The higher elevation (340 m above mean sea level (AMSL)) Bendigo Terrace is correlated with the Lindis Glacial Advance and the upper surfaces are generally separated by 80 m vertical between the Bendigo and Hāwea - Alberttown outwash deposits. The Hāwea and Alberttown outwash gravel deposits host the Bendigo Aquifer with a roughly triangular outline delineated by Bendigo Loop Road and the Clutha River. The water table varies vertically across hundreds of metres of elevation in the Dunstan Range including within the Shepherds Creek and Bendigo Creek catchments (Figure C 13.)

The fractured schist rock groundwater systems have had the depth to water measured in 80 separate locations across the RAS, CIT, and SRX gold deposit zones. The depth to water exhibits depths up to 42 m directly beneath steep ridges and tends rise to near land surface at slope bottoms. Some flowing artesian pressures were also encountered, suggesting compartmentalisation or proximity to a groundwater seepage zone. Overall, the water table tends to follow the land surface across areas of sharply undulating terrain. Groundwater transmission rates in the schist basement are considered to be low, especially within the intact parts of the schist basement rocks. There are few signs of surface water being significantly lost to groundwater, nor making discrete gains from groundwater.

C.5.3.2. Site Hydrogeological Conceptualisation and Modelling

A comprehensive site-wide hydrogeological conceptualisation inclusive of all features has not yet been completed for the BOGP, however preliminary conceptualisation characterises the hydrogeological environment as consisting of a thin veneer aquifer which is poorly constrained, and a more extensive hard rock aquifer (Kōmanawa Solutions Ltd, 2024c) (Figure C 14). The hard rock aquifer is a confined aquifer with three zones of hydraulic conductivity. Hydraulic conductivity zones have been defined in accordance with the three geological zones - TZ3 Schist, RSSZ, and TZ4 Schist, and it is assumed that the hydraulic conductivity of each zone is homogeneous (the same across the entire zone), and isotropic (the same in all directions). These assumptions are a simplification of the true geological environment as conductivity in the hard rock aquifer is driven by fracture density and connectivity. Further detailed information on the veneer aquifer is required, however it is assumed that minimal drawdown propagation occurs within this aquifer due to the steep topography and the presumed limited thickness of the veneer aquifer. Flow divides in the alluvial and outwash groundwater systems are indistinct. There is a strong contrast between the alluvium and outwash such that the lateral and vertical barriers of alluvial groundwater systems at the schist rock contact. Lateral contacts are roughly coincidental with geological contacts.

Shepherds Creek makes a transition from a rock bed to an alluvial bed in the lower catchment. The transition from creek alluvium to Lindis River alluvium is gradational but infiltration increases with the increasing depth of alluvium. Figure C 15 presents the schematic hydrological creek profile of the Shepherds Creek catchment, including the course over the schist basement, creek alluvium and Lindis River alluvium. This hydrological profile envisages creek flow being contained within the creek bed while it travels over the schist basement. The creek is observed to be progressively lost into its bed where thicker creek alluvium has built up in its lower course and enters the Ardgour Alluvial Aquifer to the north-west of the BOGP (non-intersecting), which considered a deep alluvial aquifer though the depth to hydrogeological basement is not constrained (Kōmanawa Solutions Ltd, 2025). Surface flow is completely lost as a combined result of irrigation offtake during the irrigation season and infiltration into the creek alluvium throughout the year. As the alluvium enters the Ardgour Aquifer, the aquifer thickness increases dramatically and the depth to water increases significantly. No flow is present downstream of the transition from creek alluvium to Lindis Valley infill alluvial outwash.

The Bendigo Aquifer has a measured mean depth of 33 m, and a mean depth to the water table of 12 m. It is generally elevated in terms of its hydraulic conductivity and the water table is less volatile than the land surface across the aquifer, with the water table elevation ranging between 195 m AMSL to 201 m AMSL in the core of the aquifer (Kōmanawa Solutions Ltd, 2024d). The land surface follows the influence of the depositional processes that formed the aquifer atop the Miocene aged mudstone and Triassic aged schist basement. The gravelly deposits it consists of are composed of cobble, gravel, sand and silt sized grains, largely devoid of densely pack silt or clay that otherwise constrains alluvial hydraulic conductivity. The result is elevated transmission of groundwater throughout the Bendigo Aquifer and a low gradient to the water table. Groundwater from this aquifer exhibits incidental emergence from rock fracture as diffuse seepage, spring flow and base flow in surface water courses.

The main source of water in the catchment is rainfall runoff and rainfall recharge. While there is appreciable passage of water through the fractured schist rock basement due to their wide and pervasive distribution across Central Otago, much of the potential groundwater recharge of excess precipitation is refused at the soil/ regolith interface due to the generally low permeability of the fractured rock and feeds surface stream flow instead.

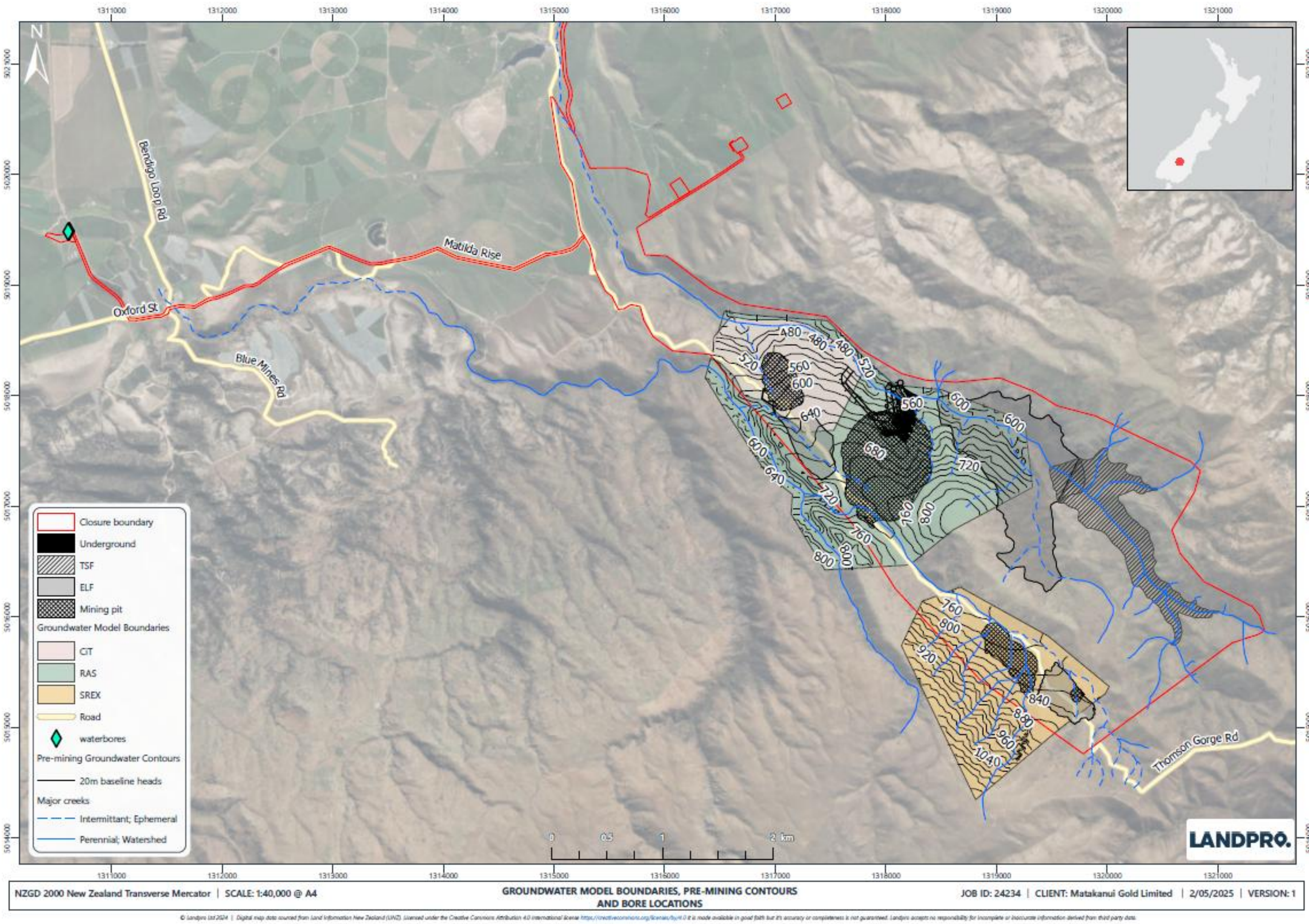


Figure C 13. Groundwater Model Boundaries, Pre-mining Contours and Bore Locations.

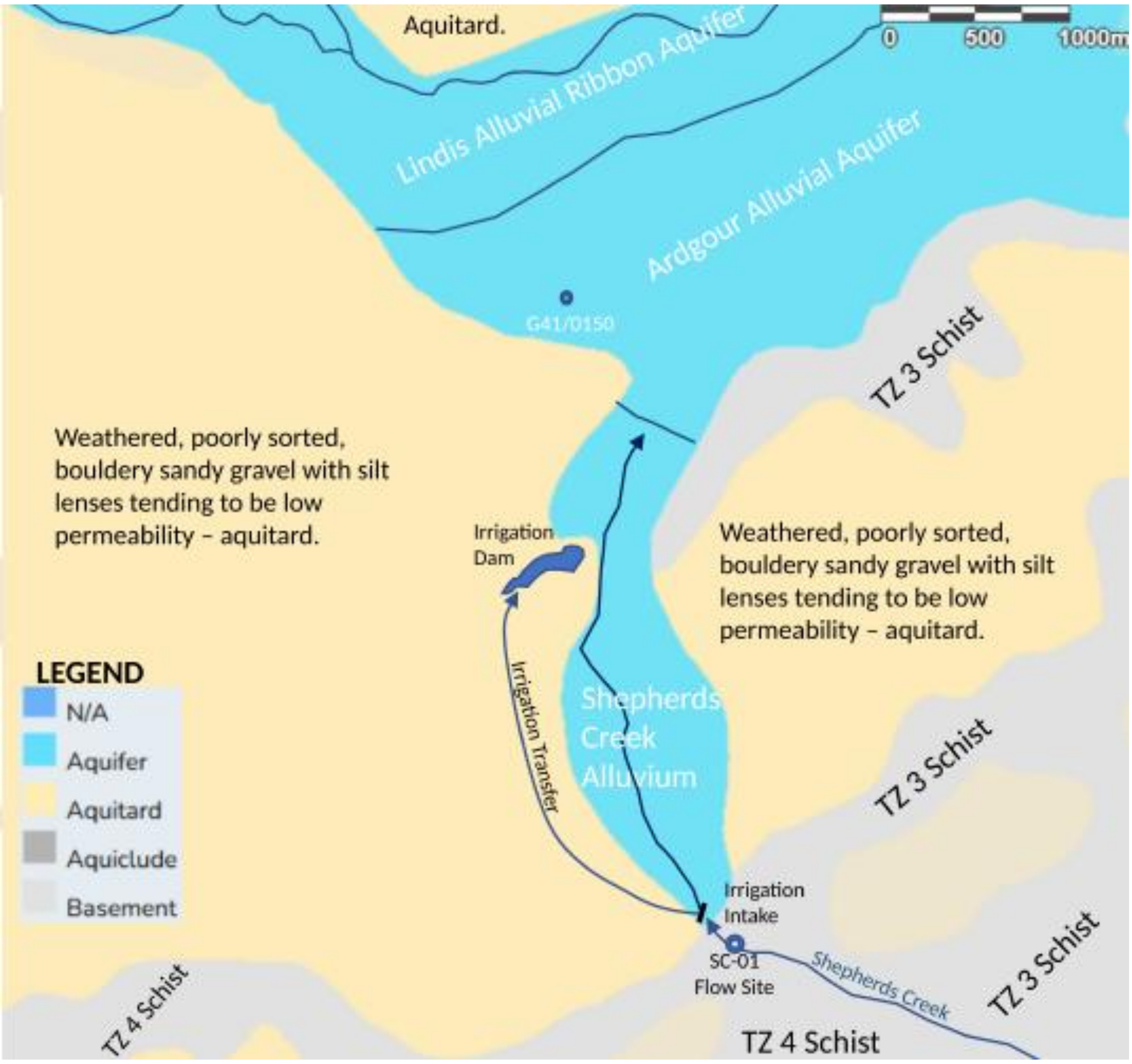


Figure C 14. Hydrogeological conceptualisation of the Ardgour Alluvial Aquifer and key hydraulic features of the BOGP (Kōmanawa Solutions Ltd, 2025).

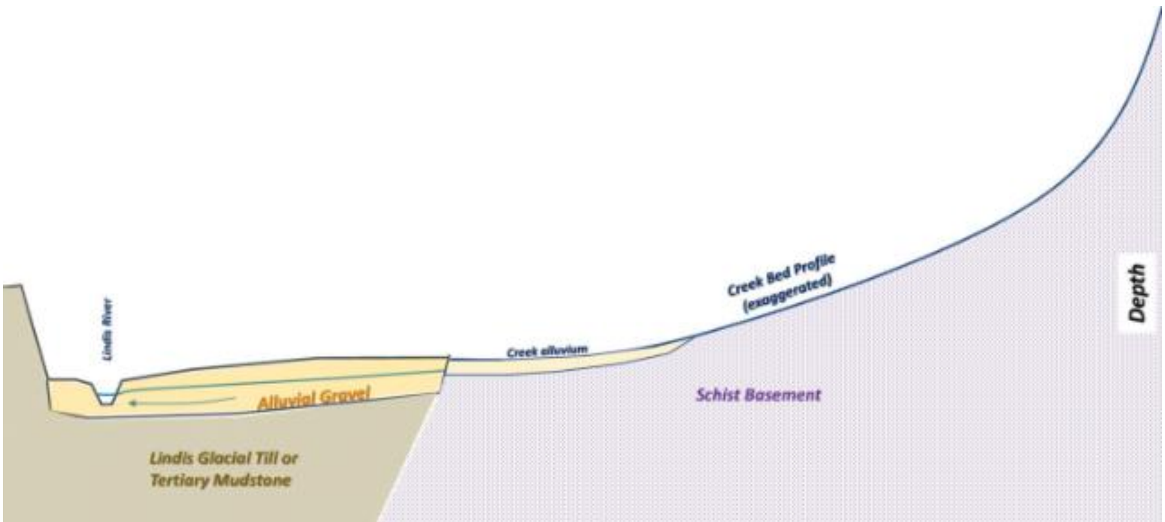


Figure C 15. Hydrogeological cross-section of the Shepherds Creek Catchment (west-east) (Kōmanawa Solutions Ltd, 2024b).

C.5.3.3. Groundwater Use

There has been substantial irrigation bore development of groundwater aquifers in the Hawea and Alberttown Advance gravel aquifers in the Bendigo – Tarras area. A single permanent ORC monitoring bore has been installed along the northern end of Bendigo Loop Road (Kōmanawa Solutions Ltd, 2024b). Bendigo Creek has been abstracted by Bendigo Station for many decades under mining privilege and recently obtained replacement consents to take creek water to store in a compartment of Lake Clearview. The stored water is used in pivot irrigators and overhead sprays in a cherry orchard, while any surplus is by-washed back into the Bendigo Creek further downstream.

The mining complex water supply will be obtained from a two-bore borefield in the Bendigo Aquifer located 7 km to the west of the mining footprint (Figure C 14). Mine water will also be used in a supplemental role in processing and dust suppression to offset the need to discharge or use clean water.

Groundwater assessments to establish the off-site effects of operating the bore field have included the effect on operating water levels of surrounding private bores (drawdown), the effect of reduction on the flow rates of surface water bodies surrounding the Matakanui Gold bore field (depletion), and the sustainability of long-term operation in the known context of the Bendigo Aquifer (sustainable groundwater volumetric caps). Pre-mining groundwater level contours are presented on Figure C 14.

The high permeability and strong connection of the Bendigo Aquifer to sources of recharge, such as Clutha River / Mata Au, Bendigo Creek and irrigation losses to ground, result in the drawdown effect of proposed pumping from the production bore being restricted to a narrow radius surrounding the proposed bore field. Accordingly, the projected drawdown effect on nearest neighbouring water bore was less than 0.85 m. The proposed groundwater taking from the bore field would increase the net depletion effect on the Clutha River / Mata Au but would fall within the bands of sustainable allocation for the Bendigo Aquifer or likely future limits for the Clutha River / Mata Au. There is also adequate natural water to be allocated to the proposed water take within allocation limits specified for the Bendigo Aquifer and the Clutha River / Mata Au in terms of projected surface water depletion (Kōmanawa Solutions Ltd, 2024d).

C.5.3.4. Pit Lake Water Balance and Water Quality Conceptual Model

Preliminary modelling for pit lake rebound in the RAS pit considers that evaporative losses would increase the water volume removed as the groundwater inflow increases the surface area of the pit lake (the pit being semi-conical), and the rising water level in the pit lake would suppress the rate of piezometric inflow due to the decrease in driving head difference (between the surrounding water table approximating the original water levels and the pit lake water level) (Kōmanawa Solutions Ltd, 2024e). It is likely that the phreatic seepage would be subject to significant evaporative losses in hot, dry seasons. Net loss or gain from the atmosphere and calculated groundwater inflow volumes. The groundwater and rainfall significantly exceed the net loss of pit lake water via the sum of precipitation and open water evaporation. Accordingly, the pit lake water balance envisages a steady rise in the pit water level while groundwater inflow declines in response. At some point the post-closure pit lake water surface intersects a pour-over notch in the modelled land surface, causing surface flow of pit lake water into the Shepherds Creek catchment. Further modelling work is being progressed to develop a site water balance and a hydrogeochemical model for the proposed RAS pit lake that will form at closure of the operation (i.e., once pit dewatering activities cease) and determine medium and long-term water quality. This modelling will not be available in time for inclusion in this MCP but will be incorporated into future revisions.

C.5.3.5. Changes To Hydrogeology from Mine Development

RAS pit

The proposed RAS mine comprises a surface mining pit and underground workings, each following the RSSZ and associated stockwork mineralised rock. Figure C 16 shows a profile of the ultimate surface of RAS pit and the degree of penetration below the ambient water table, which marks the height of saturation in the schist groundwater system (note that RAS pit design has been progressed since this schematic was developed). The groundwater system is predicted to respond to the steadily increasing penetration of the pit base below the previous zone of saturation by pushing groundwater into the pit and depressurising.

Predictions of water table elevations for the hard rock aquifer, both before and after mining, were modelled over the course of an 8-year mining period (Kōmanawa Solutions Ltd, 2024a). Initial; assumptions are that there would be a significant decline in the water table within the pit; however, the effects were limited to the immediate vicinity. Even after eight years of mining, at the final pit depth a distinct flow divide remained between the pit and Shepherds Creek. This indicates that the impacts on Shepherds Creek primarily involve a reduction in groundwater discharge to the creek, rather than a reversal of flow from the creek to the groundwater. Updated modelling is underway, but will not be ready for inclusion in this MCP. Future updates to the MCP will include details of the updated modelling.

Current model estimates of the RAS pit inflows are between 14 and 28 L/s. Actual inflows are expected to be highly variable and sporadic. The most significant component of the discharge is the surface water inflow from runoff and the veneer aquifer. This will likely be a relatively sporadic source of water, with significant variability in the discharge rate across the year. After about eight years of surface mining, the groundwater inflow into the pit base would be at the steepest groundwater gradient slope and likely the highest rate of groundwater seepage. A relatively dry pit floor would be maintained by pumping the pit sump, but the pumping is scheduled to cease at the conclusion of surface mining. A pit lake water balance model is described in Section C.5.3.4.

The excavation of the RAS pit and the UG portal will each induce the seepage of modest volumes of water from the surrounding fractured schist rock requiring it to be pumped away from the working faces. The relatively low fracture permeability of all parts of the schist rock mass constrains the rates of seepage and makes the discharge a relatively small part of the mining complex water balance. Groundwater seepage rates for corresponding UG workings are predicted to approach 24 L/s at peak, which would be pumped to the surface via the portal or evaporated into the mine air and taken away by ventilation.

Consequential to mining activities, surrounding water bodies may be affected in terms of intercepted groundwater flows in the creek catchments. Modelling suggests that during the operational phase, groundwater depletion is expected to reduce flow volumes in Shepherds Creek and Rise and Shine Creek, with modelled peak depletion rates of up to 3.5 L/s and 17 L/s respectively. This may temporarily lower surface water availability and reduce recharge to the valley-floor alluvial aquifers, which support downstream ecosystems and water users. Mitigation measures include construction of diversion channels to maintain baseflow connectivity, staged pit development to limit the duration of peak drawdown, decommissioning of existing irrigation takes, and implementation of a zero-discharge water management approach to minimise broader catchment impacts. The RAS pit would also extend across RAS Creek upstream of the Clearwater Creek confluence. Clean water diversions would be required to avoid significant loss of flow during the late operational phase of development. Modelling predicts almost no impacts to the constant head boundary representing the creek within the model domain (Kōmanawa Solutions Ltd, 2024c).

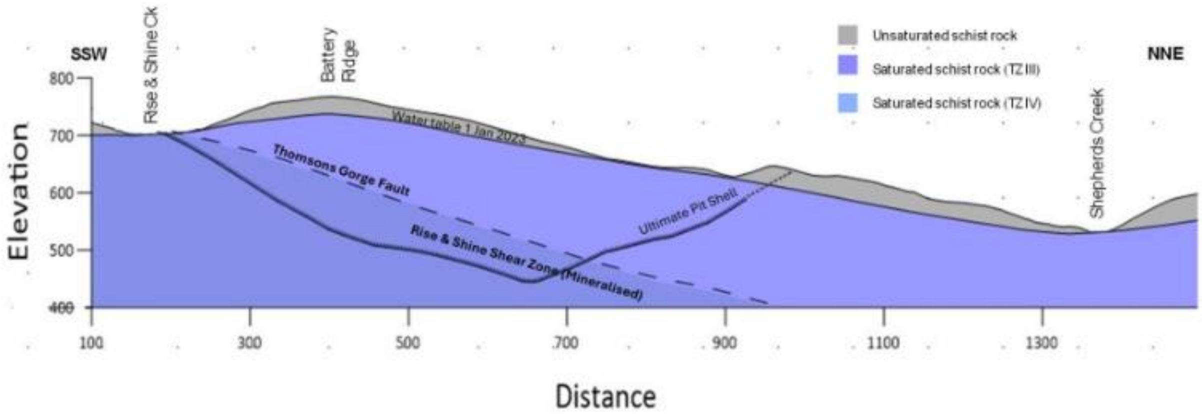


Figure C 16. Schematic hydrogeological profile of the RAS deposit (Kōmanawa Solutions Ltd, 2024e).

<u>SRX Deposit</u>

The mining impacts to the water table at SREX pit are predicted to be relatively constrained to the pit area, with the maximum draw-down of 40 m in the pit area (Kōmanawa Solutions Ltd, 2024c). However, there is an extension of draw-down to the south-east with a maximum draw-down of 10 m at the edge of the model domain where draw-down is only occurring in the hard rock system, however there is likely a more extensive alluvial/veneer system in the valley bottom which could propagate the draw-down further.

The modelled probability and cumulative density functions of the predicted changes to the discharges, and the relationship between pit flux and stream losses suggest that the pit is likely to fully deplete the RAS Creek and that the pit flux is likely to be on the order of 1.5 × the stream fluxes. More detailed modelling and additional data constraining both the hard rock and alluvial/ veneer systems is required.

There are several mapped wetlands and alluvial zones close to the SRX pit (Figure C 17). In addition, RAS Creek supplies water to a number of other wetlands downstream of the mining area. Whilst there is not currently sufficient data to support detailed modelling of the alluvial / SRX system, initial modelling suggests that the hard-rock aquifer is unlikely to prevent draw-down in the adjacent alluvial system and wetlands. RAS Creek is directly adjacent to the SRX pit, so there would likely be significant interaction between the creek and the pit. Detailed modelling is required to understand likely outcomes for the alluvial system and any nearby wetlands as a result of mining activities (Kōmanawa Solutions Ltd, 2024c).

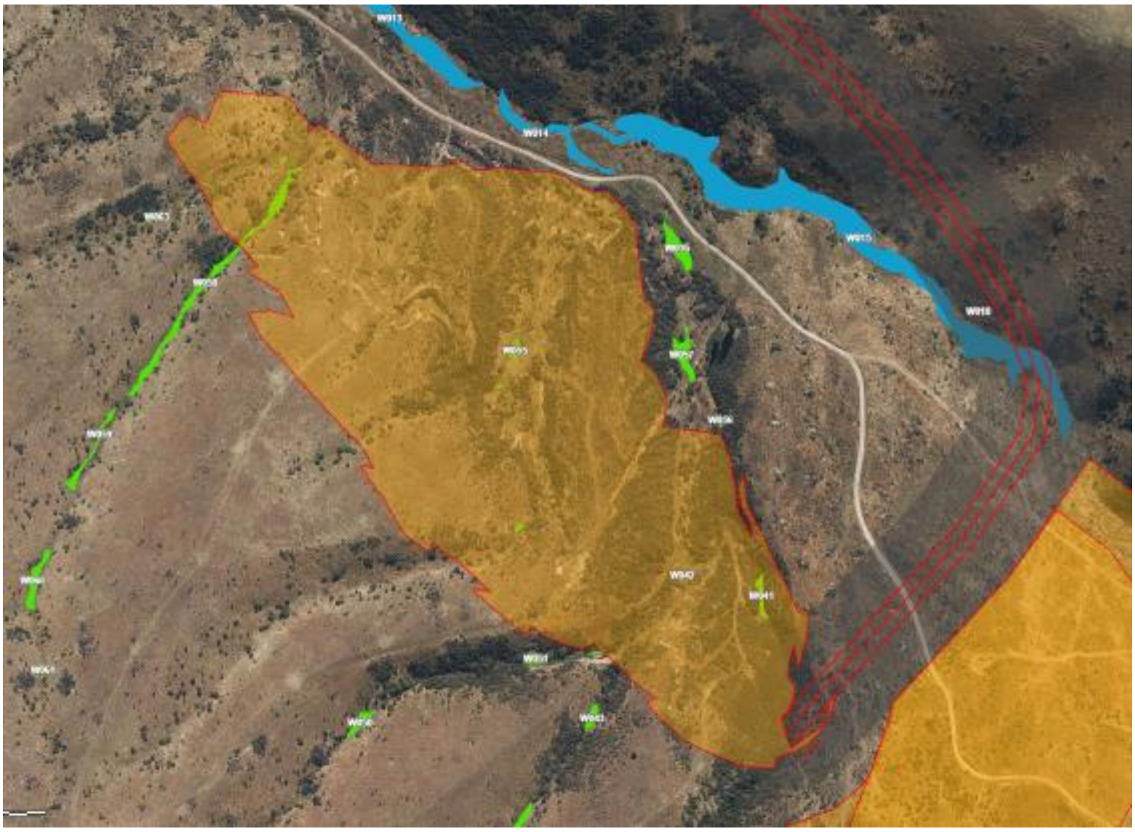


Figure C 17. SRX alluvial zone and mapped wetlands.

CIT Deposit

Similarly to SRX, the impacts to groundwater levels as a result of mining CIT pit are expected to be relatively constrained to the pit area, with a maximum draw-down of 50 m in the pit area (Figure C 18). An area of draw-down extends southeast towards the RAS pit, with a maximum drawdown of 25 m at the edge of the current model domain (Kōmanawa Solutions Ltd, 2024c). The induced draw-down of the pit is not sufficient to induce flow from the stream to the pit. As such, the changes in stream flow are associated with diverted recharge from the stream to the pit. Further detailed modelling is required to investigate the interaction between the RAS and CIT pit induced draw-down, and to determine the limits of the extent of the south-east draw-down of the Come in Time domain.

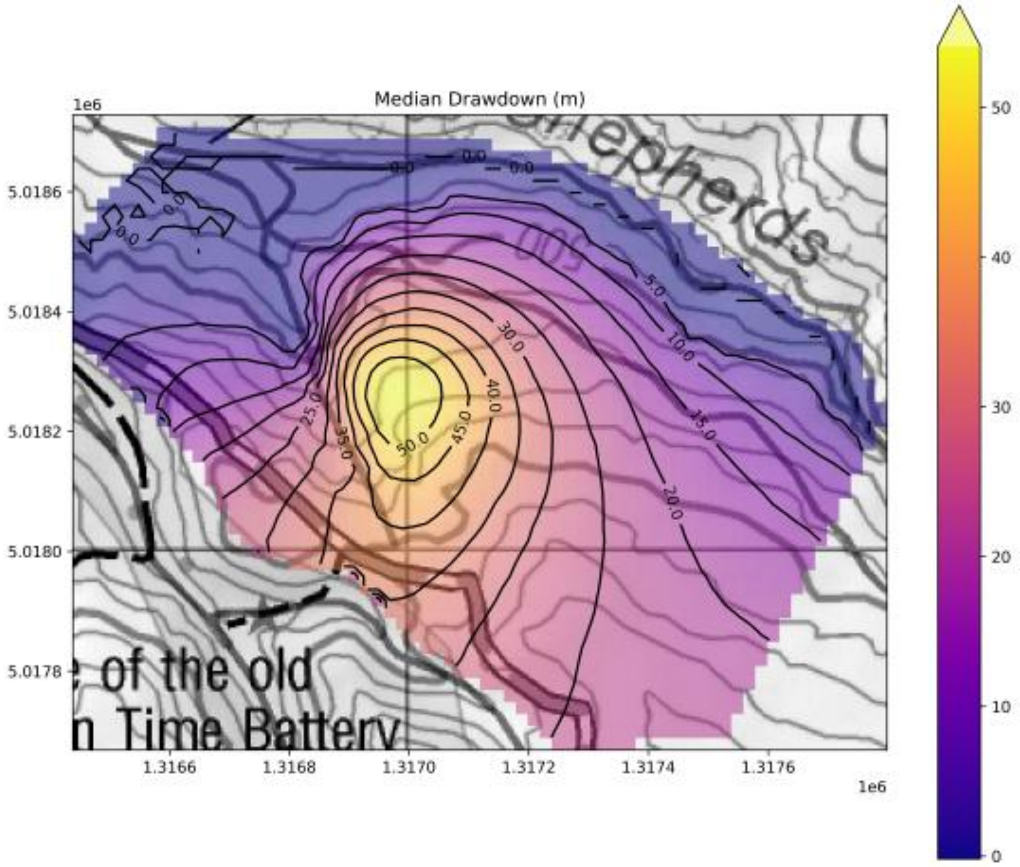


Figure C 18. Median predicted mining induced draw-down of CIT pit (Kōmanawa Solutions Ltd, 2024c).

Ephemeral Creeks

An *a. priori.* modelling assessment of the potential impacts of contaminants in Shepherds Creek on the Ardgour Alluvial Aquifer, to quantify the potential for mixing in the Ardgour Aquifer between the Shepherds Creek water and other sources of groundwater to estimate the potential effects of dilution on potential contaminants, and to provide an indicative assessment of the likely timescale for effects (Kōmanawa Solutions Ltd, 2025). There is minimal information available to constrain the model, so the outputs are considered conservatively. The influence of Shepherds Creek decreases down gradient, as is expected for a typical contaminant plume. Secondly, the model results suggest that the lower sections of the aquifer are more likely to be influenced by Shepards Creek than the upper sections, particularly as the contaminant plume moves down gradient, and that any contaminant plume is likely to be transported relatively quickly through the aquifer. This work suggests that the breakthrough of a contaminant plume should be expected within 10-20 years after the start of the activity and that the contaminant plume should largely be dissipated within 50 years after the cessation of the activity.

The creek beds of ephemeral or intermittent courses passing over the Bendigo Aquifer, including Bendigo Creek are perched. Due to small, dry catchments, riparian evapotranspiration and the tendency for the creeks to lose any surface flow by infiltration on reaching the outwash edge, the creeks are routinely dry aside from periods of flooding. Therefore, the ephemeral or intermittent creek flow would not be any more affected by infiltration in relation to bore water pumping than currently occurs pervasively and completely by gravitational gradients as the creeks cross onto the Bendigo Aquifer. The presence of an unsaturated zone detachment between the creek beds and Bendigo Aquifer means that bore pumping is not expected to exert any influence on creek flow or bed infiltration rate.

C.5.3.6. Implications for Closure Planning and Future Work Focus Areas

Closure activities will account for the hydrological changes induced by mining, particularly the drawdown of the water table in the RAS pit and the impact on nearby groundwater systems. Ongoing monitoring of water table recovery and seepage rates in the schist aquifer is essential to ensure stability and avoid unintended impacts on surrounding ecosystems. Rehabilitation efforts will focus on maintaining the natural hydrological gradients, particularly ensuring that seepage and flow pathways in Shepherds Creek and Bendigo Creek are not permanently disrupted.

Initial hydrogeological modelling suggests there will be impacts on wetlands and the adjacent alluvial systems near the SRX deposit due to mining activities. Rehabilitation plans will prioritise re-establishing groundwater and surface water connections to mitigate wetland desiccation and restore natural ecological functions.

The RAS pit lake water balance indicates potential variability in water quality and volumes due to contributions from runoff, veneer aquifer seepage, and the fractured schist aquifer. Given the extended timeframe, potentially several decades, for the pit to reach a stable equilibrium level, management strategies must address the long-term evolution of water quality. Importantly, any discharge from the RAS pit will occur via the underground workings and portal, providing a natural buffering mechanism that may assist in moderating water quality before re-entering the surface environment. Post-closure groundwater abstraction impacts will be minimised, particularly in relation to the Bendigo Aquifer and surrounding private bore users. Measures to monitor and manage long-term aquifer recovery and sustainability will be implemented to preserve regional water resources. The restoration of hydrological connections and drainage across rehabilitated landforms (e.g. ELFs, capped TSF, and pit lakes) is predicted to enhance baseflows and buffer storm runoff, which may benefit aquatic habitat. However, residual impacts include the release of solutes such as sulfate and total nitrogen, which could accumulate in valley-floor groundwater systems, potentially affecting downstream water quality and ecological values.

The closure future work focus areas associated with hydrogeology, as summarised in MCP Section 13, Table 16 are:

- Detailed 3D site-wide hydrogeological characterisation: a detailed 3D conceptual model is required to model the hydraulic properties and drawdown behaviour across the Project Area. Detailed studies are required to refine conceptual models and understand the role of hydrogeological features and interactions, and impacts of mining, to include a post-mining phase;
- Develop quantitative modelling establish a post-closure pit water balance including surface and subsurface flows and ensure accurate predictions of water management requirements during and after mining (including potential contamination risks). This is expected to require ongoing refinement during the operational phase as monitoring information becomes available to inform modelling inputs and assumptions;
- The inflow from the hard-rock aquifer to the pit(s) remains poorly constrained. Detailed hydrogeological modelling is needed to determine seepage rates and variability over the mining and closure phases;
- Further modelling to confirm the anticipated reduction in groundwater discharge to Shepherds Creek from the hard rock aquifer, evaluate seasonal variations, and account for local geological

controls. A significant component of Shepherds Creek discharge may be linked to rainfall runoff and veneer aquifer contributions. Hydrological models are required to separate the contributions from each source;

- Develop modelling to accurately predict the extent of impacts on wetlands and alluvial systems near the SRX deposit and devise appropriate restoration strategies;
- Further studies are needed to predict how mine dewatering, reduced catchment areas, and hydrological disruptions affect surface water bodies like Shepherds Creek and Bendigo Creek during operations and post-closure;
- Further monitoring and modelling to confirm the long-term sustainability of borefield abstraction and its influence on nearby private bores and surface water features; and
- As detailed by MWM in the BOGP Water Management-Treatment report (2025d), trials should be undertaken using BOGP site specific water to assess viability of Passive Treatment Systems (PTS)

C.6. Contaminated Sites

C.6.1. Conceptual Site Model

The Project Area is situated within the Otago Schist belt, a geologically complex region characterised by metasedimentary and metavolcanic rocks. Gold mineralisation is prevalent within the Otago Schists and is typically associated with silica-siderite/ankerite alteration zones, with minor arsenopyrite sulfides often linked to gold occurrences. Historical land use within the Project Area has been extensively mapped, with the broader mining lease area historically supporting several agricultural and pastoral activities and having a significant mining heritage (Section C.1.2; Section 5).

Notable remnants of historical mining activities are concentrated in the Thomson Gorge along Rise and Shine Creek. These include visible impacts such as sluicing debris, tailings migration along creek beds, adits, mullock piles, and remains of former battery sites. Environmental investigations around these areas have detected elevated concentrations of metals in shallow soils (As and cadmium (Cd)), surface water (As, Cd, Cr, Cu, and Zn), and groundwater (Al, As, Co, and Cu) (Geocontam Risk Management Ltd, 2025).

A Preliminary Site Investigation (PSI) has been conducted for the Project Area, which involved the development of a Conceptual Site Model (CSM). Sources of historic and potential future contamination are summarised in Table C 12; which outlines the possible contamination pathways (Geocontam Risk Management Ltd, 2025), and the potential current and future receptors relevant to the site are summarised in Table C 14.

Table C 12: Potential sources of contamination and COPC.

<table>
<tr><th>APEC</th><th>DESCRIPTION</th><th>COPC</th><th>STATUS</th><th>RISK</th></tr>
<tr><td colspan="5">HISTORIC/EXISTING FEATURES</td></tr>
<tr><td>CIT Historic Mining Area</td><td>Features include a 10-stamper battery, two adits, mullock, track, wall, and possible ore bin. (G41/251)</td><td rowspan="8">Sulfate (SO_4)
Metals: Al, As, Fe, Cd, Co, Cu, Hg, Mn, Ni, Pb, Tl and Zn</td><td rowspan="8">An extensive pXRF characterisation survey for metals concentrations in shallow soils has been undertaken across the historic mining areas. Elevated concentrations of As and possibly Cd have been identified within the soils.
Surface water monitoring at sites near the historic workings show evidence of AMD with elevated concentrations of metals including As Cd, Cu, Cr, Mn, and Zn in Bendigo Creek.
Based on limited data, groundwater exhibited potentially elevated concentrations of As, Co, Cu, and Amm-N.
Mercury (Hg) was used as part of historic gold recovery methods but has not been identified in the catchment at elevated concentrations from limited surface water sampling.</td><td rowspan="7">MODERATE</td></tr>
<tr><td>Eureka Historic Mining Area</td><td>Features include an underground mine adits, battery, and water race. (G41/252)</td></tr>
<tr><td>Alta Historic Mining Area</td><td>Mortar box battery, and adit linked by cutting to return wheel. (G41/253)</td></tr>
<tr><td>RAS Historic Mining Area</td><td>Features include underground mine adits, battery, sluicing face, dam, and spoil piles (G41/277)</td></tr>
<tr><td>Historic Sluicing Area</td><td>The historic sluicing area in the vicinity of the SHR deposit (G41/669) exhibits evidence of tailings fields.</td></tr>
<tr><td>Historic Mine</td><td>Historic mine with turbine (G41/604) and battery (G41/605)</td></tr>
<tr><td>Historic Tailings Fields</td><td>Gold mining tailing fields along Thomsons Creek (G41/636) from Thomson Gorge Road. Tailings piles (G41/670)</td></tr>
<tr><td>Historic Water Races</td><td>Water races (G41/673 and G41/677) transported surface water to the sluicing areas. Portions of the water races transect several historic mining areas.</td><td>INSIGNIFICANT</td></tr>
<tr><td>Historic Dam</td><td>A constructed dam is present in the SHR deposit area to capture water from the water race. Construction involved the creation of a dam wall and creation of a basin behind it.</td><td>None identified</td><td>This feature is unlikely to be a source of contamination as it was used to capture rainwater. Healthy vegetation was observed in the dam during the site visit.</td><td>INSIGNIFICANT</td></tr>
<tr><td>Pastoral Land Use</td><td>The land has been used for pastoral purposes since the 1860s</td><td>Nitrogen compounds: NO_3, Amm-N</td><td>Nitrogen compounds were elevated in Shepherds Creek potentially associated with faecal matter from livestock associated with pastoral land use.</td><td>MODERATE</td></tr>
<tr><td>Woolsheds</td><td>Two historic woolsheds (circa 1860s) are present within the Run238N area but are located at some distance from proposed operations (Lindis Valley and Ardgour Rd south of Tarras). Sheep dipping practices were likely undertaken proximal to the woolsheds. Sheep dipping using As was required by law from the 1840s and there are numerous</td><td>Metals: As
OCP, DDT, lindane, dieldrin and aldrin</td><td>Historic woolshed locations are not accurately known, and potential impacts are likely limited to localised hotspots. Woolshed areas are located outside the project disturbance area.</td><td>INSIGNIFICANT
(Offsite - Not a source that will impact this project)</td></tr>
</table>

APEC	DESCRIPTION	COPC	STATUS	RISK
	historic sites within New Zealand that exhibit elevated As hotspots resulting from these practices. Use of OCPs at sheep dips was introduced in the early 1900's.		Elevated As concentrations are naturally present in soils in the project area in association with the natural lithologies suggesting potential ecologic receptors may have a tolerance to elevated As concentrations.	
		FUTURE PROPOSED INFRASTRUCTURE		
Open Pits (RAS, CIT, SHR, SRE)	Open pit mining will be developed through blasting and excavation. Exposure of fresh rock faces may result in the oxidation of arsenopyrite and release of metals.	Nitrogen compounds: NO_3, Amm-N SO_4 Metals: Metals: Al, As, Fe, Cd, Co, Cu, Hg, Mn, Ni, Pb, Tl, and Zn Petroleum hydrocarbons: total recoverable hydrocarbons (TRH), monocyclic aromatic hydrocarbons (MAH including benzene, toluene, ethylbenzene, and xylenes (BTEX)), polycyclic aromatic hydrocarbons (PAH)	Open pit mining will progressively develop in line with the conditions of the Resource Consent to ensure future risks to the environment are minimised.	HIGH
Underground Mine (RAS)	Underground mining will require blasting to develop stopes within the schist basement and dewatering to support the exposure of the gold-bearing reef. Exposure of fresh rock faces may result in the oxidation of arsenopyrite and result in the release of metals to the environment.		Underground mining will progressively develop following open pit mining of the RAS in line with the conditions of the Resource Consent to ensure future risks to the environment are minimised.	HIGH
ROM Pad	The ROM pad receives the excavated or mined material prior to it being sent to the processing plant. This material may contain blast residue and residual explosives. Depending on retention time at the ROM, the oxidation of sulfide minerals may occur. During normal operations, the residence time of materials at the ROM pad is usually relatively short which limits the potential for oxidation of sulfide minerals, leaching and contaminant migration to the environment.	Nitrogen compounds: NO_3, Amm-N SO_4 Metals: Al, As, Fe, Cd, Co, Cu, Mn, Ni, Pb, Tl and Zn	This storage area is not currently constructed. Design of the ROM pad will be undertaken in accordance with the conditions of the Resource Consent to ensure future risks to the environment are minimised. Appropriate management plans will be prepared to define on-going obligations for the operation and maintenance of this attribute.	MODERATE
Processing Plant	Processing is estimated to be a conventional single stage crush, single stage grind via a SAG mill, gravity gold recovery, with a follow up cyanide leach to carbon recovery	Cyanide (CN) SO_4 Metals: As, Cu	This facility is not currently constructed. Design of the facility will be undertaken in accordance with the conditions of the Resource Consent to	MODERATE

APEC	DESCRIPTION	COPC	STATUS	RISK
	then electro-winning and final smelting to produce ore on site. Material and chemical spills that may occur during operations but are generally small-scale pose limited risks to the environment if appropriately managed at the time of occurrence.		ensure future risks to the environment are minimised. Appropriate management plans will be prepared to define on-going obligations for the operation and maintenance of this attribute.	
Engineered Landform (ELF)	The ELF receives the non-ore bearing overburden and interburden from the mining operations. Due to limitations in mining methods and economic decisions on cut-off grades for mineralisation, TZ4 and RSSZ geologic units which contain sulfide minerals (including arsenopyrite) will inevitably be disposed of within the WRD. Oxidation of sulfide minerals can result in the generation of acidity and leaching of metals to the environment. Blast residues may also adhere to waste rock.	Nitrogen compounds: NO_3, Amm-N SO_4 Metals: Al, As, Fe, Cd, Co, Cu, Hg, Mn, Ni, Pb, Tl and Zn	These material storage areas are not currently constructed. Design of these area will be undertaken in accordance with the conditions of the Resource Consent to ensure future risks to the environment are minimised. Appropriate management plans will be prepared to define on-going obligations for the operation and maintenance of these attributes to reduce long-term environmental risk.	HIGH
Tailings Storage Facility (TSF)	The TSF will receive the post-processed tailings. This fine-grained (sand, silt, and clay-type) waste material contains the presence of inorganic chemical residues from reagents used in the metallurgical extraction process and residual metals, minerals and sulfides not extracted from via processing. As a result, the mine tailings disposed to the TSF can represent a significant potential source of contamination both during operations and post-closure. Design attributes of the TSF will aim to mitigate these risks.	CN Nitrogen compounds: NO_3, Amm-N SO_4 Metals: Al, As, Fe, Cd, Co, Cu, Hg, Mn, Ni, Pb, Tl and Zn		HIGH
Topsoil Stockpiles	Several topsoil stockpiles will be present to support future rehabilitation of the site. Some topsoil will be elevated in As and possibly Cd. Windborne particulates, and runoff from As/Cd-rich stockpiles may distribute contaminants to other portions of the project area.	Metals: Al, As, Fe, Cd, Co, Cu, Hg, Mn, Ni, Pb, Tl and Zn	Stockpiles are not currently present. Stockpile management will be undertaken in accordance with the conditions of the Resource Consent to ensure future risks to the environment are minimised.	LOW
Vehicle Washdown and Refuelling Facilities	Vehicle washing and refuelling facilities will be appropriately constructed to prevent release of hydrocarbons to the environment. A triple interceptor trap will be installed at the washdown bay to filter out hydrocarbons facilitating recycling of water.	TRH, BTEX, PAH	These facilities are not currently constructed. Design of these facilities will be undertaken in accordance with the conditions of the Resource Consent to ensure future risks to the environment are minimised. Appropriate management plans will be prepared to define on-going obligations for the operation and maintenance of this attribute.	MODERATE
Explosives Magazine and Emulsion Factory	Chemicals used to produce explosives and manufactured ANFO will be stored within a designated area on the site. This area will be designed to regulatory requirements and produced material will be stored within an enclosed area.	Ammonium nitrate, TRH (diesel)		MODERATE

APEC	DESCRIPTION	COPC	STATUS	RISK
	Over time, minor spillage of product through transport loading may occur.			
Open Pit and Underground mining fleet workshops	Maintenance of mine vehicles will be undertaken in designated and appropriately designed workshop areas to minimise risk of spills to the environment. Chemicals will be stored onsite in designated areas in accordance with the requirements defined in the HNSO.	Solvents, TRH, BTEX, PAH, metals, oils, and grease		MODERATE

Table C 13: Potential migration pathways.

MIGRATION PATHWAYS	EXPOSURE MECHANISMS
Transport of contaminants by mechanical disturbance.	Direct contact with contaminated media (soils).
Windborne contaminant transport.	Inhalation of contaminated media.
Volatilisation to air.	Vapour inhalation.
Leaching of contaminants through the soil profile to groundwater.	Ingestion of or direct contact with abstracted groundwater.
Transport of contaminants via surface water within the Bendigo and Shepherds Creek catchments .	Ingestion of or direct contact with contaminated surface water.
Uptake/bioaccumulation of contaminants by terrestrial biota.	Ingestion.
Precipitation of contaminants into sediments.	Ingestion.
Uptake/bioaccumulation by aquatic macrophytes.	Ingestion.

Table C 14: Potential current and future receptors.

POTENTIAL RECEPTORS	DESCRIPTION
Site workers/site visitors	Site workers will reside offsite and work a 12-hour shift across a 4-panel roster which is less than the default exposure period for the derivation of default contaminant guidelines for industrial land use. Exposure to potential contamination risks can be mitigated through site management plans, training, and personal protective equipment (PPE).
Pastoral land users	Pastoral land users will have limited exposure to operational areas of the site where risks are highest.
Groundwater users	Abstraction of groundwater by pastoral land users is possible but it is unlikely to be used for potable water purposes.
Surface water users	Surface water in the project area does not have a beneficial use.
Pastoral livestock	Pastoral livestock (e.g. cows, sheep) are present on the land. These livestock have access to a wide grazing area and may access perennial streams for drinking water.
Terrestrial fauna	A range of mammals, avifauna, lizards, and terrestrial invertebrates are present in the project area. Some of these faunae are protected under the Wildlife Act and designated as being Nationally Threatened, At Risk, or Not Assessed – Potentially Threatened.
Aquatic fauna	Macroinvertebrates, macrophytes and freshwater fish are present in the catchments surrounding the site (no fish found onsite). Only one At-Risk freshwater species has been identified.
Native flora	A mix of indigenous and introduced species are present in the project area resulting from a history of pastoral management. Few of the indigenous species are rare or under any significant threat. Several Threatened or At-Risk flora species have been identified onsite.

C.6.1.1. Potentially Complete Exposure Pathways

Potentially complete exposure pathways have been identified within the Project Area, primarily associated with elevated concentrations of As and other metals in near-surface soils and sediments due to historic mining and gold-processing activities in the Thompson's Creek Valley. Current pathways include:

- Inhalation of dust by site workers, visitors, pastoral workers, terrestrial fauna, and livestock due to mechanical disturbances or windborne transport of contaminated soils;

- Bioaccumulation of metals by terrestrial and aquatic biota, with subsequent ingestion by native fauna and livestock;
- Transport of impacted soil and leachable contaminants via surface water flow in the Bendigo Creek Catchment, potentially resulting in bioaccumulation in aquatic biota and ingestion by fauna and livestock; and
- Limited potential for leaching of contaminants into groundwater, with the possibility of exposure through abstraction for irrigation or livestock use.

Currently, nearby less-impacted catchments such as Jean Creek and Shepherds Creek provide alternative sources of fresh water and vegetation for terrestrial fauna and livestock, reducing immediate risks. However, future development of these catchments may decrease clean water availability, though it is expected to also mitigate some historic impacts in Bendigo Creek through soil disturbance and removal.

Future development activities could introduce additional pathways relevant to closure, including:

- AMD and nitrate release: oxidation of arsenopyrite and residual ANFO may degrade groundwater quality, particularly upon rebound of the water table post-dewatering. Migration of contaminants from site features such as the open pit, ELF, TSF, and ROM pad could impact both surface water and groundwater, leading to biota uptake or ingestion by fauna and livestock; and
- Hazardous material migration: potential migration of spilled COPC, including hydrocarbons and other hazardous materials, into soil and water resources, resulting in degradation of environmental quality and risks to biota through uptake of contaminated media.

C.6.2. Implications for Closure Planning and Future Work Focus Areas

The presence of As and Cd in shallow soils, particularly in historic mining zones, at concentrations exceeding industrial land-use human health protection criteria, presents a significant challenge for closure planning. Potentially complete exposure pathways may emerge during soil disturbances associated with future mining activities, highlighting the need for targeted risk assessments and mitigation strategies.

Unmanaged future mining operations in the Project Area could exacerbate contaminant release into the environment, with adverse consequences for terrestrial and aquatic ecosystems. Key facilities, including the open pit, underground workings, ELF, TSFs, ROM pad, topsoil stockpiles, vehicle washdown and refuelling areas, explosives magazine, emulsion factory, and workshops, will require robust design and management plans to mitigate these risks (Geocontam Risk Management Ltd, 2025).

Uncertainties remain regarding the extent of contaminant dispersion in subsurface environments and long-term ecological impacts.

The closure future work focus areas associated with contaminated sites, as summarised in MCP Section 13, Table 16 are:

- Further investigations, including targeted soil and water monitoring, are required to refine the understanding of contaminant pathways and inform the development of adaptive closure strategies. These will include a Detailed Site Investigation (DSI) and a Remediation Action Plan (RAP) as the site approaches closure; and

- Some soils represent a source hazard that will require management if they are disturbed. Investigation of required management of contaminated soils is required, to include:
  - Confirmation that a cut-off threshold of ~20 ppm As is suitable as a threshold to define As-rich soils that require management;
  - Derivation of appropriate ecological background metals concentrations for the Project Area to inform soil management for rehabilitation;
  - Confirmation of a suitable location for reuse of the soils for rehabilitation purposes within the RAS Valley (keeping the materials within their geochemical origin);
  - Management of dust that may be elevated in COPC such as; and
  - Management of drainage/seepage from any As-rich soil stockpile area.

APPENDIX D GEOENVIRONMENTAL HAZARDS REPORT (ACID AND METALLIFEROUS RISK ASSESSMENT)

APPENDIX E CONCEPTUAL FINAL LANDFORM DESIGNS

APPENDIX F CLOSURE RISK REGISTER

MINE CLOSURE
MANAGEMENT

GREENROAD GROUP