

MINUTE 40 – GEOTECHNICAL RESPONSE

1. Minute 40 includes a series of questions from Commissioner Johnson on geotechnical aspects of the Bendigo-Ophir Gold Project (**BOGP**) arising from the hearing.
2. The following expert witnesses have prepared this response on behalf of Matakanui Gold Limited (**MGL**):
 - (a) Eric Torvelainen.
 - (b) Dr Trevor Matuschka.
 - (c) Peter O'Bryan.
3. It is noted that reference to the draft proposed closure conditions were not specifically addressed in the Joint Witness Statement (**JWS**) nor at the hearing, although there were many references to closure and post closure stability across the multiple topics addressed during the hearing.
4. Questions raised (in bold) in Minute 40 are summarised below followed by specific responses.

CLOSURE CONDITIONS - QUESTIONS

Has Mr. Johnson collectively interpreted the position being put forward to define closure by the Applicant and their experts, and, if he has not, can you please reframe this for his understanding.

Mr. Johnson's interpretation of these collective discussions is set out below:

The aim of closure is for all engineered slopes (both cut and fill) to be:

- **Safe for access:**
 - *If people or stock access these slopes post closure they will not be exposed to any risk of harm greater than they would be exposed to today accessing the existing landforms and surrounding hill slopes.*
 - *If safe access cannot be provided, then the slope must be isolated such that access can only be gained by the deliberate bypass of isolation barriers.*
- **Enduring slope performance:**
 - *Following rainfall, ground disturbance, and seismic shaking, the slope surface will not be subject to greater levels of slope movement, degradation, erosion and scour than exiting slopes (of an equivalent profile) within the site and surround hillslopes.*

- ***If a slope could be subject to greater levels of slope movement, degradation, erosion and scour than the current natural landform then:***
 - ***The crest of the slope does not regress into adjacent land (affect a larger area), and,***
 - ***Any debris arising is retained on or at the base of the slope (and does not disrupt adjacent land use).***
 - ***New and remaining water courses that originate and or pass through the site can be maintained with a low risk of disruption to flow or blockage.***
 - ***Works will not change the capacity of land beyond a defined site boundary to be used for continued existing land use activity.***
5. We agree with Mr Johnson's interpretation of the geotechnical aim for closure.

Given the above, can the Applicant's experts provide:

- **Information on how they would demonstrate slope performance for closure by observation and data collection, including use of control sites and calibration against key stability elements (e.g. measured groundwater levels).**
 - **Commentary on the period of monitoring required to confirm closure conditions have been met. Noting the one year, as was suggested in the JWS, represents only a limited period for exposure to a range of climatic conditions.**
6. For the ELF's and the TSF active closure criteria include demonstrating deformations are below a minimal threshold, hydrogeology conditions are stable, seepage collection drains are functioning with flows in line with design expectations, there is no visual evidence of cracking, vegetation is established and self-sustaining, and rill erosion and surface raveling is minimal and within acceptable limits. Slope performance can be assessed by visual assessment, deformation monitoring (ground survey of deformation markers, drone-based LiDAR, and satellite based deformation monitoring such as InSAR or GNSS), piezometers, and drain flow measurements.
7. We note that the downstream shoulder of the TSF embankment will be buttressed by the Shepherds ELF and the upstream shoulder is buttressed by tailings so performance will focus on the ELF and the slopes above the TSF impoundment. The ELF slopes will be progressively rehabilitated during operation and there will be a record of deformations of the finished slopes before active closure. The expectation is that deformations will reduce with time. The TSF impoundment slopes will be monitored during operation, and it is most likely that any potential for significant deformation will be identified in this period. Monitoring will continue into active closure.
8. The period and scope of monitoring required to provide confidence that slopes are stable will depend on the observations during operation and in closure. It is recommended that monitoring in the active closure phase of both the ELF and TSF slopes continue for a minimum of 5 years

to provide a robust baseline for decision making. The type, frequency, and duration of monitoring could be reduced depending on the observations. It is recommended that visual inspections of the TSF and ELF continue in the passive closure phase, but at a reduced frequency compared to the active phase.

9. The following closure criteria are suggested for the ELF, TSF and slopes above the TSF and will be included as part of the Mine Closure Plan Condition C116 in *D.03 - Schedule One - Common Conditions for CODC and ORC Consents* that is to be provided to the Panel on 28 August 2026:

Slope Displacement	Annual deformation rates (horizontal and vertical) are below 5 mm/year and show a flat, non-increasing trend over a period of 3 years.
Piezometers	Piezometer readings are stable, allowing for any seasonal cycles, and do not show elevated pore pressures or sustained upward trends.
Drain Flows	Drains are functioning and seepage flows are stable and in-line with design expectations.
Visual Observations	No evidence of new or widening cracks, scarps, or bulging.
Vegetation	Is established, and self-sustaining.
Erosion	The potential adverse effects of rill erosion and ravelling shall be managed by the establishment of a long-term monitoring and maintenance program.

10. For open pits a suggested initial position for definition of slope conditions for closure is set out below (which will also be included as part of the Mine Closure Plan Condition C116 in *D.03 - Schedule One - Common Conditions for CODC and ORC Consents* that is to be provided to the Panel on 28 August 2026:

Slope displacement No measurable movement exceeding survey uncertainty over a defined period (5 years from cessation of open pit mining)

Comment: Behaviour of geological/ structural units (TZ3, TZ4, TGF & RSSZ) where forming or exposed in pit walls are yet to be identified.

During operation slope displacement monitoring will use some combination of EDM prism monitoring and LiDAR scanning methods to provide comprehensive slope coverage. Other techniques could be used to augment coverage in specific critical areas, e.g., radar, tiltmeters & extensometers.

For monitoring in the longer-term high resolution LiDAR scanning is suggested. The method provides DTM files showing slope topography. Overlaying successive measured surfaces enables identification and quantification of displacements & deformation. This surveying system can be applied for all slopes.

InSAR would be suitable for intermittent survey of subsidence over the underground mining footprint. The effectiveness of assessment of horizontal displacement using this method is dependent on satellite transit alignments.

Crest regression	No progressive retreat beyond predicted long-term limits Comment: These limits are currently limited to those defined using empirical guidelines. The assumed limits of crest retreat will be refined when pit wall exposures are available to assess likely potentials. The characteristics of the immediate & general ground conditions surrounding the open pits are considered in this assessment.
Groundwater	Stable groundwater regime with no adverse pore pressure trends Comment: Groundwater monitoring system within pit walls will be established during operation. The installed instrumentation can continue to provide data during & following closure.
Erosion	Rates below agreed landform evolution thresholds
Rockfall/ slump	No significant rockfall events affect the hazard exclusion zone Localised instability in pit walls does not compromise/ exacerbate potential for crest retreat.

Can the Applicant and their experts:

- (a) **Extract the relevant information from the various design reports and provide a comprehensive summary table setting out the slope stability design guidance for the project as a whole, across a range of design cases, including but not limited to:**
 - (i) **Pit wall stability**
 - (ii) **Elf stability**
 - (iii) **Road cut and fill**
 - (iv) **Building foundations and associated slopes**
 - (v) **Tailing Storage Facility**
 - (vi) **Silt Dam**
 - (vii) **Shepard Creek and Rise and Shine Creek Stream diversion works (including bench stability for the RAS creek through the RAS Pit)**
 - (viii) **Disturbance of existing slope features.**
- (b) **Provide the basis for selecting these guidance design criteria referencing appropriate standards and best practice were applicable.**
- (c) **Provide comment on how these design parameters may give confidence that when adopted there is a high probability these designs will achieve closure criteria.**

(d) Set out how the above will be addressed through the proposed draft conditions.

11. Table 1 consolidates the principal geotechnical design criteria adopted across the BOGP, the basis for their selection, the reasons they are expected to achieve the proposed closure outcomes and the consent conditions through which those outcomes will be implemented and verified. Table 2 maps the principal geotechnical closure outcomes sought for the BOGP to the proposed consent conditions, identifying how each outcome will be achieved, monitored and verified throughout operations, active closure and passive closure.
12. The consent condition references in Tables 1 and 2 below are for the conditions submitted to the Panel on 22 June 2026 following the expert conferencing and concurrent expert witness hearings. We understand the consent conditions are currently being workshopped with the relevant regulators and iwi, and as a result, the condition references in the tables below may be different to the final consent condition numbering that will be provided to the Panel on 28 August 2026.

Table 1: Summary of Slope Stability Design Guidance for the Project

Feature	Design Criteria	Basis for Criteria Selection	Confidence in Achieving Closure Outcomes	Relevant Conditions, or required process under other legislation
Open Pit Slopes	Risk-based, multi-scale slope design. Static FoS generally within the accepted open pit mining guidance range of 1.3-1.5 for high consequence slopes. Seismic FoS ≥ 1.1 . Ongoing monitoring, groundwater management, scaling of pit walls and adaptive design refinement throughout operations and closure.	Based on Guidelines for Open Pit Slope Design (Read & Stacey, 2009) and accepted international mining industry practice. Design integrates geological, structural geological, hydrogeological and rock mass models within a risk-based geotechnical framework and is refined through ongoing investigation, monitoring and back-analysis.	High confidence due to staged development, ongoing monitoring, groundwater control, adaptive management and progressive refinement of the geotechnical model using observed site conditions. Residual risks at closure will be managed through exclusion zones and public safety controls.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): • Condition NEW 11 (Open Pit Ground Control Management Plan), • Condition NEW 12 (Geotechnical Stability Outside the Project Site), • Condition NEW 13 (Open Pit Geotechnical Stability Assessment), • Condition NEW 14 & 15 (Exclusion Zones and Public Safety). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): • Condition C116 (Mine Closure Plan)

Feature	Design Criteria	Basis for Criteria Selection	Confidence in Achieving Closure Outcomes	Relevant Conditions, or required process under other legislation
Engineered Landforms (ELFs)	Interim FoS ≥ 1.3 . Closure FoS ≥ 1.5 . Post-earthquake FoS ≥ 1.2 where relevant. Final outer slopes $\leq 1V:3H$. Progressive rehabilitation, drainage control, deformation monitoring and erosion management.	Based on accepted geotechnical engineering practice for engineered mine landforms, ICMM Integrated Mine Closure Good Practice Guide, and experience from comparable mine rehabilitation projects. Design criteria are intended to achieve long-term stability, erosion resistance, successful rehabilitation and resilience to seismic loading.	High confidence due to conservative slope geometries, progressive rehabilitation, deformation and erosion monitoring, adaptive management and closure verification processes.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): • Conditions 48-55 (ELF Management Plan and Design Requirements). • Condition NEW 20 (Cover System Trials). • Conditions 56-66 (Specific ELF Requirements), D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): • C116 (Mine Closure Plan).
Tailings	High PIC dam. NZDSG-aligned design. Long-term and closure FoS ≥ 1.5 . Post-earthquake FoS ≥ 1.2 . Designed for OBE and SEE seismic events. Seepage collection and buttressing by Shepherds ELF.	Based on the New Zealand Dam Safety Guidelines (NZDSG), GISTM principles and accepted international tailings engineering practice. Closure requirements have been incorporated from the initial design stage and will be refined throughout operations.	Very high confidence due to recognised industry design standards, conservative stability criteria, seepage collection systems, downstream buttressing by the Shepherds ELF, monitoring and independent review processes.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): • Conditions 24-35 (TSF Design and Closure Requirements and Tailings Management Plan), • NEW 19 (Tailings Settlement Assessment), •

Feature	Design Criteria	Basis for Criteria Selection	Confidence in Achieving Closure Outcomes	Relevant Conditions, or required process under other legislation
Shepherds Silt Pond / Large Dams	PIC classification. Static FoS ≥ 1.5 . Designed for applicable earthquake loading criteria and Building Act dam safety requirements.	Based on the Building Act framework, Building (Dam Safety) Regulations and New Zealand Dam Safety Guidelines, using criteria appropriate to the structure classification and consequence profile.	High confidence through application of established dam engineering standards together with inspection, maintenance and operational management requirements.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): • Conditions 24-26 (Dam Classification and Closure). • Conditions 40-46 (Shepherds Silt Pond and Pond and Reservoir Management Plan).
Road Cuts, Fill Slopes and Access Tracks	Observation-based geotechnical design. Fill slopes generally assessed using FoS ≥ 1.5 . Rehabilitation and re-profiling where required before closure.	Based on recognised geotechnical engineering practice and observational design methods suited to variable ground conditions.	Confidence achieved through inspection, monitoring, adaptive management and closure review to ensure safe and enduring performance.	D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): • Conditions C38 and C40 (Landscape and Ecological Rehabilitation Management Plan) regarding maximum SRX ELF slopes for future public access Principal Hazard Management Systems.
Building Foundations and Associated Slopes	Site-specific geotechnical investigation. Engineered foundations designed under Building Act requirements. Typical static FoS ≥ 1.5 .	Based on established geotechnical engineering practice and statutory Building Act and building consent requirements.	High confidence through detailed investigation, engineering design, regulatory review and	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026):

Feature	Design Criteria	Basis for Criteria Selection	Confidence in Achieving Closure Outcomes	Relevant Conditions, or required process under other legislation
	Landslide hazard assessment where applicable.		management of identified geohazards.	NEW 9 (Landslide Monitoring and Management Plan). Building Consent Process under Building Act 2004.
Stream Diversions (Shepherds Creek and Rise & Shine Creek)	Diversion channels designed using observational and performance-based approach. Cut and fill slopes monitored and adjusted where necessary. Erosion and scour management incorporated into design.	Based on established fluvial, hydraulic and geotechnical engineering practice informed by site-specific topography, hydraulic requirements and erosion management objectives.	Confidence achieved through operational monitoring, performance review and adaptive management to establish stable and self-sustaining channel forms.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition 22 (Stream Diversions). - Condition 31 (TSF Diversion Channel). - Condition NEW 21A (Shepherds ELF Diversion Channel), - Condition C69 (CIT Backfill diversion channels). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - C116 (Mine Closure Plan).
Underground Mining / Subsidence Areas	Numerical modelling, in-situ stress measurements, subsidence assessment and monitoring. Trigger levels	Based on accepted mining geotechnical engineering practice, including numerical modelling, in-situ stress	Confidence supported by staged mining, calibration of models using field observations and ongoing	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026):

Feature	Design Criteria	Basis for Criteria Selection	Confidence in Achieving Closure Outcomes	Relevant Conditions, or required process under other legislation
	and mitigation measures established prior to underground extraction.	assessment and monitoring-based validation.	monitoring throughout operation and closure.	- Condition NEW 16 (Subsidence Assessment Management Plan). - Condition NEW 17 (Underground Ground Control Management Plan).

Table 2: Relationship Between Geotechnical Closure Outcomes and Proposed Consent Conditions

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
Public safety around open pit voids	Establish exclusion zones, physical barriers, signage and restricted access around retained pit voids.	Geotechnical assessment of residual hazards; Public Safety Management Plan; periodic inspections.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition NEW 14 & 15 (Exclusion Zones and Public Safety). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - Condition C116 (Mine Closure Plan)
Long-term stability of open pit slopes	Risk-based slope design, groundwater management, progressive wall scaling, monitoring	Deformation monitoring, LiDAR surveys, groundwater monitoring, visual inspections and closure assessments.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026):

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
	and adaptive refinement throughout mining.		- Condition NEW 11 (Open Pit Ground Control Management Plan). - Condition NEW 12 (Geotechnical Stability Outside the Project Site). - Condition NEW 13 (Open Pit Geotechnical Stability Assessment). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - Condition C116 (Mine Closure Plan).
No adverse effects beyond the project boundary from slope instability	Design criteria require stability of land outside the project area and assessment of potential failure mechanisms.	Stability reassessment, geotechnical reporting and monitoring.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition NEW 12 (Geotechnical Stability Outside the Project Site). - Condition NEW 13 (Open Pit Geotechnical Stability Assessment).
Long-term stability of Engineered Landforms (ELFs)	Engineered design using defined FoS criteria, drainage controls, erosion controls and progressive rehabilitation.	Construction monitoring, deformation monitoring, inspections and closure reviews.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): Conditions 48-55 (ELF Management Plan and Design Requirements).

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
			- Condition NEW 20 (ELF Cover System Trials). - Conditions 56-66 (Specific ELF Requirements). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - C116 (Mine Closure Plan).
Successful rehabilitation of ELFs	Progressive rehabilitation and design of final landforms to support long-term vegetation establishment and erosion resistance.	Vegetation monitoring, erosion monitoring and closure verification.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Conditions 48-50 & 55 (ELF Management Plan). - Condition NEW 20 (ELF Cover System Trials). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - Conditions C38 to C40 (Landscape and Ecological Rehabilitation Management Plan). - C116 (Mine Closure Plan).
Long-term safe storage of tailings	TSF designed, operated and closed in accordance with recognised dam safety and tailings management standards.	Geotechnical monitoring, piezometers, inspections, seepage monitoring and closure certification.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026):

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
			- Conditions 24-35 (TSF Design and Closure Requirements and Tailings Management Plan). - NEW 19 (Tailings Settlement Assessment).
Control of seepage from TSF and ELFs	Underdrains, seepage collection systems, seepage sumps and contingency seepage recovery measures.	Seepage flow monitoring, water quality monitoring and inspections.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Conditions 28-30 (TSF Seepage Controls), - Conditions 36-39 (Shepherds Seepage Collection Sump). - Condition NEW X (Contingency Seepage Management).
Long-term stability of TSF embankment	Conservative design criteria, seismic design requirements and buttressing by Shepherds ELF.	Deformation monitoring, piezometers, inspections and periodic engineering review.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): Conditions 24-35 (TSF Design and Closure Requirements and Tailings Management Plan).
Safe and stable dams and ponds	Design, construction and operation in accordance with dam safety requirements and classification-specific standards.	Dam inspections, maintenance, monitoring and regulatory oversight.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Conditions 24-26 (Dam Classification and Closure), - Conditions 40-46 (Shepherds Silt Pond and Pond and Reservoir Management Plan).

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
Stable stream diversion channels	Performance-based channel design with erosion protection and adaptive management.	Operational inspections, performance monitoring and closure review.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition 22 (Stream Diversions). - Condition 31 (TSF Diversion Channel). - Condition NEW 21A (Shepherds ELF Diversion Channel), - Condition C69 (CIT Backfill diversion channels). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - C116 (Mine Closure Plan).
Management of subsidence from underground mining	Numerical modelling, stress assessments and adaptive mine design.	Subsidence monitoring and comparison of observed behaviour with model predictions.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition NEW 16 (Subsidence Assessment Management Plan). - Condition NEW 17 (Underground Ground Control Management Plan).
Safe access for ongoing closure management activities	Review and remediation of access roads, tracks and associated cut/fill slopes where required.	Closure inspections and geotechnical review.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026):

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
			- Condition NEW 14 & 15 (Exclusion Zones and Public Safety). - Condition 44 (Shepherds Silt Pond). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - Conditions C38 and C40 (Landscape and Ecological Rehabilitation Management Plan) regarding maximum SRX ELF slopes for future public access.
Continuous improvement and adaptive management	Ongoing review, monitoring, reassessment and updating of management plans and designs as new information becomes available.	Annual reporting, management plan reviews and independent review processes.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition NEW 11 (Open Pit Ground Control Management Plan). - Condition NEW 17 (Underground Ground Control Management Plan). - Condition 33 (Tailings Management Plan). - Conditions 49-50 (Engineered Landform Management Plan). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026):

Closure Outcome	How Outcome is Achieved	Verification / Monitoring	Relevant Conditions
			- Condition C12 (Annual Monitoring and Compliance Report).
Demonstration that closure objectives have been achieved	Closure performance criteria established for pit slopes, ELF, TSF, dams and diversion channels.	Long-term monitoring of deformation, groundwater, erosion, vegetation and seepage trends prior to transition from active to passive closure.	D.04 - Schedule Two - General Conditions for Otago Regional Council Consents (22 June 2026): - Condition NEW 14 & 15 (Exclusion Zones and Public Safety). - Condition 35 ((TSF Post-Closure Monitoring). - Condition 55 (ELF Closure Review). D.03 - Schedule One - Common Conditions for CODC and ORC Consents (22 June 2026): - C116 (Mine Closure Plan).

Seismic Performance

13. The design criteria adopted for the open pits, ELF's, TSF and dam structures include consideration of the seismic hazard applicable to the site. While significant seismic events may result in localised rockfall, slumping, surface cracking or minor deformation, these effects are not expected to result in large-scale instability or off-site effects. For open pits, any material generated by such events is expected to remain within the pit footprint and associated exclusion zones. For the ELF's, TSF and dam structures, the adopted design criteria are intended to ensure that any seismic deformation remains within acceptable limits and does not compromise the long-term closure objectives. Monitoring and adaptive management processes will provide confirmation of performance during operations and closure.
14. Further information on the Open Pit design guidance is provided below.

Open Pit

15. Slope design is undertaken using a risk-based, multi-scale approach that integrates geological understanding, groundwater conditions, and operational constraints to achieve tolerable risk levels for personnel, equipment, and infrastructure across all project phases. Throughout the life of the mining operation, wall designs will be iteratively refined through a closed-loop process of characterisation, analysis, monitoring, and back-analysis.
16. The process for investigation, assessment and slope design of the BOGP pits was based on current industry standards which fundamentally follow the recommendations provided in:

Guidelines for open pit slope design

Read & Stacey (editors), 2009

CSIRO PUBLISHING, Australia

ISBN 9780415874410

17. The process involves assessment of four (4) component models (Geology, Structural Geology, Hydrogeology, and Rock Mass models) into a geotechnical model. Assessments are performed at batter, inter-ramp and overall slope scales, using techniques appropriate to scale. The obtained results inform design through an iterative process with mine designers, considering mining constraints and current industry practice regulatory requirements, balanced using reasonable conservatism to derive practical and achievable wall profile designs for each geotechnical domain. Assessment of the RAS open pit followed the industry standard risk-based approach outlined in the Guideline (Figure 1.4, reproduced below). Referenced Design Acceptance Criteria (DAC) are those provided in the Guideline (Table 9.9, reproduced below)
18. From "*Guidelines for open pit slope design Read & Stacey (editors), 2009*".

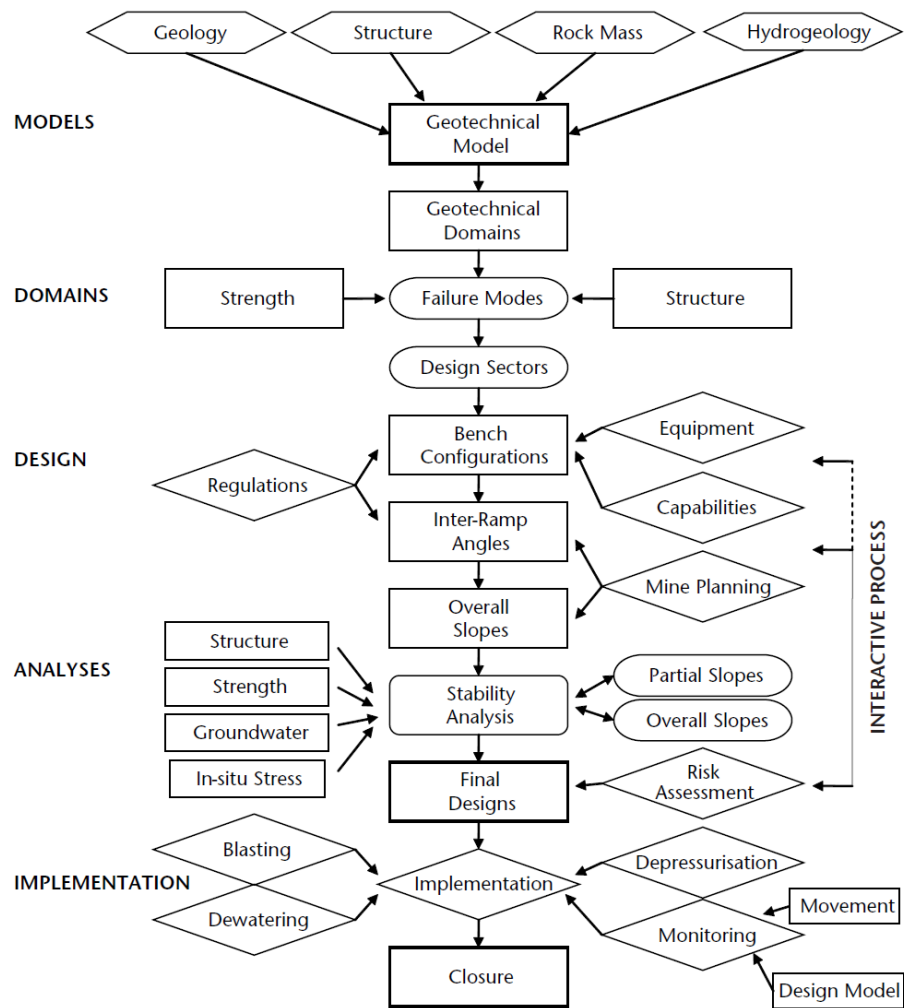


Figure 1.4 Slope design process

Table 9.9: Typical FoS and PoF acceptance criteria values

Slope scale	Consequences of failure ^b	Acceptance criteria ^a		
		FoS (min) (static)	FoS (min) (dynamic)	PoF (max) P[FoS ≤ 1]
Bench	Low–high	1.1	NA	25–50%
Inter-ramp	Low	1.15–1.2	1.0	25%
	Medium	1.2	1.0	20%
	High	1.2–1.3	1.1	10%
Overall	Low	1.2–1.3	1.0	15–20%
	Medium	1.3	1.05	5–10%
	High	1.3–1.5	1.1	≤5%

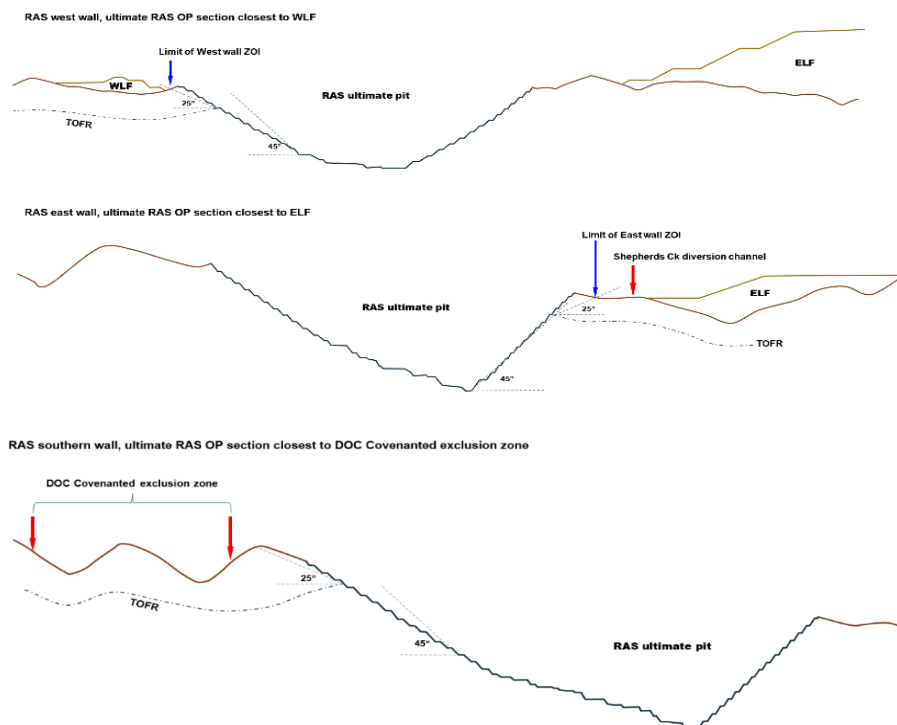
a: Needs to meet all acceptance criteria

b: Semi-quantitatively evaluated (see Figure 13.9)

19. In the JWS regarding FOS adopted for operation and closure there was alternative factors of safety discussed.
20. Read & Stacey Table 9.9 lists a range from 1.3 to 1.5 for FOS of *high failure consequence* slopes under static loading and ³ 1.1 for seismic loading.

21. The claim that FOS should be ≥ 2.0 for static loading is outside the range proposed by the Guideline and no other specification or guideline was cited.
22. The FOS obtained for the RAS NE slope under dry static and dry seismic (0.13g seismic coefficient) were 2.05 and 1.66, respectively, and for a partially saturated slope the FOS were 1.42 and 1.21 respectively for static and seismic conditions.
23. Groundwater in partially saturated analyses was defined by a phreatic surface expected to be achievable using active depressurisation to augment drawdown (from dewatering and unloading effects).
24. At the current (pre-feasibility) stage of assessment, use of DAC of ³ 1.3 to 1.5 is reasonable, considering the remoteness of the open pit from Project boundaries, the nature of the features which could theoretically be encroached on by crest retreat and that public access to the open pit will be physically denied.
25. Additionally, the FOS obtained by 2D analysis alone is not a holistic assessment of slope stability and the analysis technique has well known limitations.
26. All components of the geotechnical model must be considered, including variations in lithology, major structures, pervasive fabric and fracture network(s), groundwater variations and hydrogeological assessment of the extents and rate of drawdown must be acknowledged.
27. Three-dimensional numerical analysis of open pit stability is part of the assessment and will be undertaken as part of detailed design which is regularly updated as part of the development of the pit.
28. As further data are gathered and the understanding of the RAS rock mass increases, so too will the ability to apply realistic probabilistic analysis methods to slope assessment and design.

29. Needs for FOS ³ 2.0 are typically applied in mining where the slope/ excavation in question is located close to critical infrastructure or a public facility or thoroughfare or will not be subject to continuous monitoring. In the RAS case:
- ⇒ The nearest proposed mine facilities are the WLF and ELF (Western and Eastern waste rock Landforms) and the Shepherds Creek diversion channel aligned between the western toe of the ELF and the RAS pit eastern crest as illustrated below. All planned facilities lie outside the generically defined zone of influence (ZOI) associated with theoretically possible long-term degradation of slope conditions.
 - ⇒ Post-mining, slopes will be monitored intermittently until closure conditions are satisfied.



Does the Applicant or their experts have experience from other sites on how the iterative nature of works is managed to better support operational compliance and closure?

Aguablanca Ni/Cu Mine, Extremadura, Spain

30. This is an example in Europe that met with European standards in a populated / rural setting.
31. Recovery from development of major failure in the southern sector of a quasi-conical open pit, using various approaches to wall development, including trim basting, pre-split blasting, wall reinforcement and support measures, wellpoint dewatering, depressurisation drilling and development of underground drainage galleries.
32. Close monitoring and an adaptive management system enabled successful implementation of design adjustments and amendments to mining sequences. The open pit was completed and underground mining was established.

33. Monitoring included two (2) automated electro-optical distance measurement (EDM) prism monitoring systems, vibrating wire piezometers (VWP), two (2) slope radar systems, borehole extensometers, load cells on artificial reinforcement, and five (5) GNSS stations. All output reported directly to the Mine Office in real time. Areas monitored included the open pit and environs including road access, a stream diversion, freshwater dam stability, waste rock landforms and TSF.
34. The Site was monitored during operation and for three (3) years following cessation of UG operations (based on commercial decision), until the property changed hands.

The Applicant's experience

35. Staff of the Applicant have decades of experience managing sites during operations and closure to achieve compliance.
36. Sites within New Zealand include Ohai, Nightcaps, Macraes, Globe Progress, Rotowaro and Maramarua and overseas include Lihir, Ok Tedi, Hidden Valley, Ekati, Goonyella Riverside and Daunia.
37. These sites included a range of slope conditions that were managed using the methods described in this response and are a useful starting point for managing and implementing safe slope stability.
38. Under the HSAW Act, the Applicant has identified Ground and Strata as a Principle Hazard and is developing an action plan to manage this hazard from a worker health perspective that ultimately translates to achieving these proposed consent conditions and mine closure.

Can the Applicant and their experts review the proposed draft geotechnical consent conditions and propose amended or new draft conditions that would:

- **Better reflect the iterative nature of the project**
 - **Provide for the staging of different design elements across the project**
 - **Ensure all conditions are outcome focused**
 - **Support the closure documentation**
 - **Provide continuity of knowledge and expertise both within the project and consenting organisations over the multi-year duration of the project (for both operations and closure).**
39. We have summarised the geotechnical related conditions in Table 3 and provided recommended updates to address the items above. We have provided discussion below on the open pits to support the summary of conditions.

Open Pits

40. Assessment of geotechnical conditions for the BOGP open pits, with emphasis on the Rise & Shine pit, was founded on the expectation of evolution of an ongoing program of geological, structural, hydrogeological and geotechnical data collection and assessment. This program would form the basis of iterative design refinement via confirmation or amendment of recommended slope parameters.

41. This iterative/ adaptive management is dynamic and is the standard approach to present day open pit gold mining, with the process continuing throughout mining, to ensure the conditions required for both operational safety and pit closure are met.
42. For example, if stability at closure needs a $FOS \geq N$, that FOS must be applied from the onset of development of final walls. While a lesser FOS may be acceptable where comprehensive slope monitoring is applied, it is impossible to increase the FOS once the slope is developed.
43. The staged approach to open pit mining provides opportunity to review and revise (if necessary) slope design parameters and to identify and trial means of managing exposure of particularly weak units, specifically the core (gouge zone) of the Thomson Gorge Fault and the anticipated fractured zones in the hanging wall and footwall of the TGF as well as within the Rise & Shine Shear Zone generally.
44. The initial steps taken in this iterative process include drilling of additional geotechnical investigation boreholes, preliminary open pit 3D modelling (sensitivity only to this stage in the absence of an in-situ stress regime for the Site) and empirical/preliminary subsidence assessment.
45. Next steps include in-situ stress measurement, further structural interpretation, re-run of open pit numerical modelling and extension of modelling to include underground extraction and backfilling and closer examination of potential for surface subsidence.
46. Models are to be calibrated against actual behaviour where practicable and monitoring data are to be used to validate model output. Modelling parameters must be updated where field evidence is obtained or assumptions change.
47. One key finding of this work is the importance of the barrier pillar between the toe of the open pit and the uppermost stoping panel and the role this pillar plays in controlling subsidence impact on the open pit highwall.

Table 3 - Geotechnical Conditions Review Table

This table compiles draft conditions relating to slope stability, pit wall design, ELF design and performance, TSF design/monitoring/closure, silt dam performance, road cuts and fills, stream diversion stability, geotechnical monitoring and reporting, closure performance and verification, and adaptive management/design updates.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
All structures – Landslide risk			
NEW 9	Landslide risk	Prior to commencement of construction of any open pit, underground mine, ELF, TSF, large dam, or processing plant (hereafter referred to in this condition as “infrastructure”), the Consent Holder must: a) Engage a suitably qualified and experienced geotechnical engineer to investigate and identify active or potentially active landslides within in and around the proposed site of any infrastructure and assess the landslide risk to that infrastructure; b) Develop and implement a Landslide Monitoring and Management Plan (“LMMP”) the objective of which is to ensure that landslides are monitored and managed in a way that protects people and the environment throughout mine operations, active closure, and passive closure of the BOGP; c) Specifically for the Shepherds TSF, include the LMMP within the Dam Safety Management System required for compliance with the New Zealand Society on Large Dams Dam Safety Guidelines 2024.	Peter O’Bryan & Associates recommendation: It is inferred that unloading generated by open pit mining would reduce potential to activate any landslide coinciding with the planned mining sites. Should findings of the landslide investigation/ review that indicate or suggest potential interference with open pit wall stability, such potential would be examined and incorporated into re-assessment of predicted stability conditions and safety within the proposed open pits.
Open Pits			

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
NEW 11	Open pit Ground Control Management Plan	Prior to the excavation of each open pit, the Consent Holder must provide to the Otago Regional Council for certification a Ground Control Management Plan (“GCMP”) prepared by suitably qualified and experienced geotechnical engineer. The objective of the GCMP is to provide for the systematic management of geotechnical risks associated with open pit mining, through monitoring, identification, modelling, assessment, and mitigation of hazards, to prevent ground related injuries and damage to infrastructure, and to ensure continuity of mining. The GCMP must, at a minimum, address all of the matters listed in the example table of contents shown in Attachment X of this consent, and also include all of the recommendations for pre-mining and during-mining monitoring and modelling (that are relevant to open pit mining) set out in Application Report B.28 Geotechnical Assessment Open Pit & Underground Mining Rise & Shine Deposit, by Peter O’Bryan & Associates, dated June 2025. The Consent Holder may elect to provide one combined GCMP for all four open pits, or it may provide a separate GCMP for each individual pit	Peter O’Bryan & Associates recommendation: Development of GCMP documentation is a simple, albeit time-consuming, process. The objective of the GCMP is to provide a systematic framework for identifying, assessing, monitoring and managing geotechnical hazards associated with open pit mining to protect personnel, the public, infrastructure, the environment and mining operations throughout the life of the mine and during closure. Information related to detailed mining designs and methods and operational protocols is essential, hence compilation of these management plans is not yet feasible. The GCMP shall be reviewed: • at intervals not exceeding 12 months; • following any significant geotechnical incident; • following any major design change; • where monitoring indicates that original design assumptions may no longer be valid. The GCMP must state design acceptance criteria: • acceptable Factors of Safety • deformation criteria

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
			• groundwater trigger levels • blast damage criteria • monitoring trigger values.
NEW 12	Geotechnical Stability outside Project Site	Where project works may alter geotechnical stability, a minimum Factor of Safety of 1.5 must be maintained under static loading for all ground outside the project site as shown on Plan 2 of Common Conditions which apply to all of the resource consents within the jurisdiction of the Central Otago District Council and Otago Regional Council.	Peter O'Bryan & Associates recommendation: Planned open pits lie within the central area of the Project Site, remote from site boundaries, and do not encroach on property outside the boundary. The southern sector of the Rise and Shine open pit lies near the boundary Results show that disturbance adjacent to the NZ Department of Conservation (DOC) exclusion zone is negligible/ minimal, even for lower bound material strength under inferred worst case loading conditions. No disturbance encroaches into the exclusion zone and the FOS for this south-western sector of the pit (the only sector adjacent to the DOC zone) is > 1.5.
NEW 13	Open Pit and Geotechnical Stability	Prior to the excavation of each open pit, the Consent Holder must provide to the Otago Regional Council for certification a geotechnical stability assessment prepared by a suitably qualified and experienced geotechnical or mining engineer. This assessment must: a) Model potential failure surfaces and assess Factor of Safety for areas outside the project site as shown on Plan 2 of Common Conditions which apply to all of the common conditions which apply to all of the resource	Peter O'Bryan & Associates recommendation: Fundamental geotechnical assessment of planned open pit mining is reported in Document B.28. Re-assessments are planned to be performed as further data and/ or more reliable data are obtained from ongoing geological, structural, hydrogeological and geotechnical (rock mass characterisation) investigations.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		consents within the jurisdiction of the Central Otago District Council and Otago Regional Council; and b) Identify any mitigation measures or monitoring required to maintain compliance with Condition NEW 12.	Assessments should include sensitivity analyses, uncertainty assessment, groundwater sensitivity, confirmation of design assumptions, identification of critical failure mechanisms, monitoring recommendations and update frequency. Design revalidation is required annually or following significant changes in geology and structural geology, groundwater, change in mining sequence or pit geometry. A system of reporting, recording and monitoring geotechnical hazards (geohazards) must be established and maintained. A suitably qualified and experienced independent geotechnical engineer should inspect the open pits at intervals appropriate to the assessed level of geotechnical risk and not exceeding three months. This process will be ongoing through the operational life of the mine. During closure periodic inspections including rockfall assessment groundwater monitoring and erosion monitoring should be performed at least annually.
NEW 14	Exclusion Zone and Public Safety Management Plan	No less than 12 months prior to the cessation of mining operations, the Consent Holder must: a) Provide to Otago Regional Council for certification a geotechnical assessment, prepared by a suitably qualified and experienced geotechnical engineer which assesses residual stability risks and safety considerations for the purpose of designating an	Peter O'Bryan & Associates recommendation: Physical barriers will be constructed to deny pedestrian and vehicular access to those pits which remain as voids. Access roads will be made unusable and impassable. Approaches to pit wall access and haulage ramps will be blocked by bunds and/ or ditches.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		appropriate exclusion zone, within which it is necessary to prevent public access, around each of the RAS and SRX pits; and b) An Exclusion Zone and Public Safety Management Plan, prepared by a suitably qualified and experienced person or persons which must include at a minimum: I. The location and dimensions of the exclusion zone around each of RAS and SRX pits; II. The type and specification of physical barriers and signage that will be implemented; III. Long-term (in perpetuity) maintenance requirements for the barriers and signage; and IV. The legal and practical mechanisms that will secure the ongoing maintenance requirements of the barrier and signage are met. Advice Note: <i>The Consent Holder may elect to include this assessment within or alongside the Mine Closure Plan that must be submitted to Otago Regional Council in accordance with Condition C48 Common Conditions which apply to all of the resource consents within the jurisdiction of the Central Otago District Council and Otago Regional Council.</i>	Signage warning of the Excavation Hazard will be spaced such that at least one sign will be in view from every approach to the pits. Positions and alignment of barriers have been identified using generic guidelines; however, appropriate barrier configurations can be finalised only after assessment during mining of exposed wall stability conditions and likely susceptibility to long term degradation. The types of barriers constructed must account for the habits and capacities of likely intruders, notably human pedestrian traffic, livestock, native species; feral animals (mammals introduced to NZ are typically competent climbers, including feral goats; deer; pigs; dogs; cats; rabbits; and hares, none of which would be effectively excluded by an earthen or rock bund). Signage will not deter all human intruders. Hazards include injury in breaching a barrier, trip and fall injury or fatality, rockfall impact injury or fatality, and drowning in a pit lake. Entrapment within a pit is also a significant hazard. Potential zones of instability (ZOI) for each pit and wall sector will be identified during mining and physical barriers to pit approaches will be constructed more than 10 m outside the local ZOI. The type(s) of physical barrier to be used will be selected once each ZOI has been identified.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
			The extent of an exclusion zone must be reviewed if monitoring indicates that residual instability differs materially from that assumed in closure assessment. The maintenance obligation for exclusion zone barriers and signage should be explicitly limited to the end of the passive closure period. Legal and practical mechanisms by which those obligations will be secured are more appropriately addressed through the Mine Closure Plan.
NEW 15	Exclusion Zone and Public Safety Management Plan	Prior to first allowing public access to the site, the Consent Holder must implement the implement the Exclusion Zone and Public Safety Management Plan, including by constructing the barriers, installing signage, and securing any necessary legal mechanisms to ensure the ongoing requirements of the plan are met.	Peter O'Bryan & Associates recommendation: As recommended, access to the site is definitely not to include access to open pits.
Rise and Shine Underground Mine			
NEW 16	Subsidence Assessment Report	Prior to the commencement of any underground mining activities, the Consent Holder must engage a suitably qualified geotechnical or mining engineer to prepare and submit to Otago Regional Council for certification a Subsidence Assessment Report. The report must, at a minimum: a) Identify and evaluate the potential for ground subsidence resulting from the proposed mining operations, including predicted magnitude, extent, and timing of subsidence effects;	Peter O'Bryan & Associates recommendation: Further geological, structural, strength and rock stress data will be obtained through ongoing investigation and added to the existing database. These data and as planned open pit and underground excavation geometries and sequences will form input for three-dimensional modelling to assess potential for surface subsidence in response to underground mining. It is anticipated that modelling will be performed using the program FLAC3D.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		b) Assess potential impacts on surface infrastructure, surface water features and land stability within the area of influence; c) Include a monitoring and management plan specifying: I. Baseline ground level measurements prior to mining; II. Ongoing monitoring methods and frequency during mining and post-closure of the underground mine; III. Trigger levels for subsidence and corresponding mitigation actions; and IV. Be certified by a suitably qualified and experienced geotechnical or mining engineer and certified as meeting <i>[insert appropriate industry standards]</i>.	FLAC3D (Fast Lagrangian Analysis of Continua in 3D) is a three-dimensional finite difference numerical modelling program developed for solving complex geomechanical problems involving soil, rock and engineered structures. It employs an explicit Lagrangian solution scheme and is particularly well suited to problems involving non-linear material behaviour, excavation sequencing, large deformations, coupled hydro-mechanical processes and progressive failure. Results from modelling, as well as identifying subsidence potential, will be used to inform methods and configurations of appropriate monitoring systems and suitable frequencies of data collection during and following underground mining. If necessary, potential mitigation processes will be examined. Planning of investigations and proposed modelling will be performed by suitably qualified and experienced geotechnical and mining engineers.
NEW 17	UG Ground Control Management Plan	Prior to the commencement of underground mining, the Consent Holder must provide to the Otago Regional Council for certification a Ground Control Management Plan (“GCMP”) prepared by suitably qualified and experienced geotechnical engineer. The objective of the GCMP is to provide for the systematic management of geotechnical risks associated with open pit mining, through monitoring, identification, modelling, assessment, and mitigation of hazards, to prevent ground	Peter O’Bryan & Associates recommendation: Development of an underground GCMP required information on detailed mining designs, methods, sequences and operational protocols. A preliminary UG GCMP will be developed when planning is sufficiently advanced.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		related injuries and damage to infrastructure, and to ensure continuity of mining. The GCMP must, at a minimum, address all of the matters listed in the example table of contents shown in Attachment X of this consent, and also include all of the recommendations for pre-mining and during-mining monitoring and modelling (that are relevant to underground mining) set out in Application Report B.28 <i>Geotechnical Assessment Open Pit & Underground Mining Rise & Shine Deposit</i>, by Peter O'Bryan & Associates, dated June 2025.	
NEW 17a		Once the open pit mine is established, prior to the commencement of underground mining, Investigation and analysis including in-situ stress management and numerical modelling of the mining sequences, must be undertaken to inform the potential for surface subsidence in the area overlying planned underground mining.	Peter O'Bryan & Associates recommendation: Information specific to the rock stress regime at BOGP / RAS is a fundamental requirement for the numerical modelling outlined for NEW 16.
Dams / Tailings Storage Facility / Shepherds Silt Pond			
24	Dam structures	All dams forming ponds and reservoirs must be identified and recorded on a register and location plan. The register and location plan must be kept on file and be provided to the Otago Regional Council on request and at any time that the register is updated. The register must include: a) A unique identification; b) Location coordinates; c) Normal operating volume; d) Maximum stored volume;	No change required.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		e) Dam height; f) Spillway design criteria; and g) Large Dam status, and Potential Impact Classification (“PIC”) (where required).	
25	Large dams	All artificial barriers (dams and associated structures) for the BOGP that are designed and constructed to hold back water to form a pond or reservoir and used for the storage, control or diversion of water must be assessed to determine whether they meet the definition of a Large Dam under the Building Act 2004. <i>Advice Note: A Large Dam is defined as a dam that has a height greater than or equal to 4 m and forms a reservoir that holds greater than or equal to 20,000 m3 of water or other fluid.</i> <i>Advice Note: All dams forming part of the BOGP must comply with all relevant sections of the Building Act, and Large Dams must comply with the relevant requirements of the NZ SOLD New Zealand Dam Safety Guidelines (NZDSG) 2024 and Building (Dam Safety) Regulations 2022. On that basis, the requirements of the aforementioned guidelines and regulations, which are administered in another jurisdiction, are not repeated in the conditions of these consents.</i>	Dams should be designed, constructed, operated, and maintained in accordance with the recommendations of the New Zealand Dam Safety Guidelines. 1. Change “requirements” to “recommendations” 2. Delete reference to 2024 issue of NZDSG as the guidelines will be updated in the future? The NZDSG does not have requirements, it provides recommendations. Requirements are set by the govt via Building Act. Recommend that the advice note is updated to: <i>Advice Note: All dams forming part of the BOGP must comply with all relevant sections of the Building Act 2004 and Building (Dam Safety) Regulations 2022, and Large Dams must comply with the relevant recommendations of the New Zealand Dam Safety Guidelines (NZDSG). On that basis, the recommendation of the aforementioned guidelines and regulations, which are administered in another jurisdiction, are not repeated in the conditions of these consents.</i>
26	Large dams	Closure of each individual Large Dam must be integrated into the overall Mine Closure Plan and LERMP to ensure alignment of environmental, social, and land use outcomes.	No change required.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
27	TSF	The TSF must be constructed, operated and maintained in accordance with the following design specifications: a) A design crest height of up to 690 mRL; and b) A minimum freeboard level sufficient to impound the surface water run-off arising from the Probable Maximum Precipitation ("PMP") event without overtopping, plus a 1 metre freeboard. Following significant rainfall or any other event that reduces freeboard, the pond level within the TSF must be drawn down as soon as practicable to restore minimum freeboard in accordance with the approved design (Building Consent).	1. Can we avoid referencing specific RL as this is likely to change and would require a change to Resource Consent condition. Can we amend to allow some flexibility. Or can we change to a higher elevation (e.g. RL700) to allow for some expansion without requiring a change to Resource Consent condition. 2. b) Need to allow for normal operating pond water volume. Suggest re-wording as "A minimum freeboard level sufficient to store the normal operating pond water volume plus impound the surface water runoff etc..."
28	TSF	The Consent Holder must install during construction of the TSF a primary seepage collection system for the TSF, which must be in general accordance with the 'Subsurface Drain Layout Plan' shown in Attachment Y, and include the following, at a minimum: a) Tailings underdrains; b) Embankment chimney drain; c) Upstream cutoff drain; d) Low permeability core; and e) Pipes to convey collected seepage to the Shepherds ELF seepage collection sump.	No change necessary.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
29	TSF	The Consent Holder must ensure that the primary seepage collection system is in place prior to the first discharge of tailings to the Shepherds TSF.	No change necessary.
30	TSF	Placeholder for determining triggers and actions MWSF seepage bypassing the primary seepage collection systems reaches an unacceptable.	MGL support the inclusion of a MWSF seepage triggers and response condition as recommended by ORC. This will be further discussed and refined in conditions workshopping.
31	TSF / Diversion Channels	The Consent Holder must construct a diversion channel around the hills surrounding the northern margins of the TSF impoundment area to intercept and divert run-on water to Shepherds Creek. The diversion channel must be sized to allow passage of a 1 in 10-year Annual Return Interval (“ARI”) 24 to 72-hour duration flood event during the operational life of the TSF.	No change necessary.
Tailings Management Plan			
32	TSF	The Consent Holder must implement the Tailings Management Plan (“TMP”), certified in accordance with Common Condition C14 (or as amended in accordance with relevant conditions), and which forms part of the consents. The objective of the Tailings Management Plan is to ensure the protection of people, the environment, and the integrity of the Shepherds TSF. The Consent Holder must implement the TMP.	No change necessary
33	TSF	To achieve the objective in Condition 32 the TMP must include: a) An overview of the regulatory context and industry guidelines;	No change necessary.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		b) Roles and responsibilities; c) Design, construction, operation, closure and post closure management procedures; d) Emergency response and risk management approaches; e) The process for change management; and f) Record keeping, reviewing and auditing requirements.	
Decommissioning and Rehabilitation of the Shepherds Tailings Storage Facility			
34	TSF	Decommissioning and rehabilitation of the TSF must be integrated into the overall Mine Closure Plan to achieve the following objectives: a) Developing an acceptable and functional landform which integrates within the landscape; b) Providing acceptable, stable, post-closure landforms; c) Ensuring the secure storage of the tailings in a manner which minimises the risk of release of potential contaminants into the environment in the longer term; d) Describing the legal and practical mechanisms by which ongoing monitoring and maintenance requires will be ensured through the active and passive closure phases; and e) Reduce monitoring and maintenance procedures when environmental risks are assessed to be negligible.	No change necessary.

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
NEW 19	TSF	Prior to the cessation of active mining and final discharge of tailings or other mine impacted water into the TSF, the Consent Holder must engage a suitably qualified and experienced mining or geotechnical engineer to determine the duration of the tailings settlement period, and to assess any consolidation of tailings that may occur, to inform the final capping requirements.	Proposed wording change to condition: “Prior to final closure of the TSF the Consent Holder must engage a suitably qualified and experienced engineer to determine the tailings settlement profile and period to confirm the final capping requirements.”
35	TSF	Once the TSF has been capped in accordance with Conditions X, the ongoing monitoring of and maintenance of the TSF must include: a) Seepage collection; b) Surface erosion and vegetation management; c) Water quality monitoring in downstream receptors; and d) Review of the structural integrity of the TSF, tailings capping, and outlet channel.	Comments 1. Could specifically refer to visual inspections, and deformation & piezometer monitoring associated with TSF and landslides above impoundment 2. This scope seems more appropriate for active closure phase Condition recommendations: 1. Add active closure to first sentence Add new sentence at end. “Following the active closure phase the monitoring and maintenance requirements will be reduced to a minimum level consistent with the long-term land use”. Proposed update: “Once the TSF has been capped in accordance with Conditions X, the ongoing monitoring of and maintenance of the TSF in the active closure phase must include: a) Seepage collection system;

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
			b) Capped tailings surface (for erosion and vegetation management); c) Water quality in downstream receptors; d) Structural integrity of the TSF, tailings capping, and outlet channel; e) Ground stability above the capped TSF impoundment. Following the active closure phase the monitoring and maintenance requirements will be reduced to a minimum level consistent with the long-term land use”
Shepherds Seepage Collection Sump			
36	Shepherds Seepage Collection Sump	Prior to commissioning the TSF and the construction of the Shepherds ELF, the Shepherds Seepage Collection Sump must be formed at the toe of the Shepherds Engineered Landform (“ Shepherds ELF ”) to manage seepage water reporting from the TSF and the Shepherds ELF underdrainage system.	No change necessary
37	Shepherds Seepage Collection Sump	The Shepherds Seepage Collection Sump must be internally lined with geomembrane and drains be installed below the lining. Water from the liner underdrain must be returned to the seepage collection sump.	No change necessary
38	Shepherds Seepage Collection Sump	Pipe outlets reporting to the seepage collection sump from both the TSF and Shepherds ELF underdrainage systems must be designed to prevent oxygen advection into the Shepherds ELF.	No change necessary
39	Shepherds Seepage	The seepage reporting to Shepherds Seepage Collection Sump must be conveyed for use at the processing plant	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
	Collection Sump	during mine operations and the Water Treatment Plant during mine closure.	
NEW X	Shepherds Seepage Collection Sump	Placeholder for condition re seepage recovery wells needing to be installed.	Proposed condition wording: “If monitoring detects seepage downstream of the Shepherds Seepage Collection Sump measures to intercept and manage seepage shall be implemented. These could include seepage recovery wells, seepage interception drains, seepage cutoffs and grout curtains.”
Shepherds Creek Silt Pond			
40	Shepherds Silt Pond	The design of the Shepherds Creek Silt Pond (“ Shepherds Silt Pond ”) must provide sediment retention control for run off from Shepherds ELF in accordance with the sediment retention sizing requirements in the certified Erosion and Sediment Control Plan.	No change necessary
41	Shepherds Silt Pond	Shepherds Creek Silt Pond must be constructed, operated and maintained in accordance with the following design specifications: a) 5,500 m ³ of dead storage for sediment retention; b) 30,000 m ³ of water storage for back up process water; and c) A maximum volume at crest full of 112,000 m ³ including the volumes of a) and b) above.	No change necessary
42	Shepherds Silt Pond	The Shepherds Creek Silt Pond auxiliary spillway must be designed to pass inflow design flood associated with a 1 in 1,000-year ARI flood event.	No change necessary
43	Shepherds Silt Pond	All captured sediment volumes within the Shepherds Silt Pond must be monitored and recorded. All sediment	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		removed from the Shepherds Silt Pond must be placed into the bulk fill zone of any of the four engineered landforms within the Project Site	
44	Shepherds Silt Pond	The Consent Holder must ensure that safe and reliable access is maintained to the Shepherds Silt Pond to undertake all necessary inspections, maintenance, sediment removal and water management systems activities.	No change necessary
Pond and Reservoir Management Plan			
45	Pond and Reservoir Management Plan	The Consent Holder must implement the Pond and Reservoir Management Plan (“PRMP”) certified in accordance with Common Condition C14 (or as amended in accordance with relevant conditions), and which forms part of the consents. The objective of the PRMP is to ensure the protection of people, the environment, and the integrity of the ponds and reservoirs that form part of the BOGP. The Consent Holder must implement the PRMP.	No change necessary
46	Pond and Reservoir Management Plan	To achieve the objective of the PRMP set out in Condition 45 the plan must include: a) An overview of the regulatory context and industry guidelines; b) Roles and responsibilities; c) Design, construction, operation, closure and post closure management procedures;	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		d) Emergency response and risk management approaches; e) Continuous improvement measures; f) The process for change management; and g) Record keeping, reviewing and auditing requirements.	
Engineered Landforms			
47	ELFs	Engineered Landforms (“ ELFs ”) must be located in general accordance with the footprints shown on Plan 1 – Project Overview Plan in Attachment 1 to the Common Conditions in Schedule One .	No change necessary
Engineered Landforms Management Plan			
48	ELFs	The Consent Holder must implement the Engineered Landform Management Plan (“ELFMP”) certified in accordance with Common Condition C14 (or as amended in accordance with relevant conditions), and which forms part of the consents. The objective of the ELFMP is to set out the framework to ensure that Engineered Landforms (“ELFs”) are designed, constructed, and closed in a manner that is safe, stable, and environmentally responsible.	No change necessary
49	ELFs	The key objectives of the ELFMP are to: a) Define roles and responsibilities for MGL personnel to ensure effective implementation; b) Define criteria used to classify waste material used in ELF construction;	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		c) Define various construction elements of ELF design; d) Define ELF design criteria and design documentation; e) Define ELF construction sequencing; f) Provide details on required ELF construction and performance monitoring; g) Define ELF reporting requirements; h) Provide a high-level risk assessment of environmental aspects associated with ELF construction; and i) Establish a change management process for ELFMP updates and recertification.	
50	ELFs	Implementation of the ELFMP is intended to result in the following outcomes: a) Identification and management of key risks associated with ELF construction and mine-impacted water that could impact water quality objectives during operation and closure; b) Development of a materials classification and management process to ensure correct placement of materials during ELF construction; c) Implementation of engineering design standards to minimise long-term geochemical risks and support closure water quality goals;	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		d) Implementation of engineering design standards to ensure long-term geotechnical stability; e) Establishment of performance monitoring to validate ELF design and construction effectiveness; and f) Facilitation of a successful transition to closure, including meeting BOGP ecological rehabilitation and water quality compliance objectives for completed ELF's.	
51	ELFs	All individual ELFs must be subject to a specific detailed design documented within Detailed Design Report, Construction Drawings, Specifications, and Construction Monitoring and Inspection schedule. The detailed design and documentation for each individual ELF must be reviewed and approved by a Chartered Professional Engineer experienced in geotechnical and civil engineering.	No change necessary
52	ELFs	The Consent Holder must keep construction monitoring and as-built records on file and provide them to Otago Regional Council on request.	No change necessary
NEW 20		Within 12-18 months of commencing bulk earthworks on the BOGP the Consent Holder must initiate ELF cover system field trials for the purpose of validating the net percolation rate of 20% that was assumed in the application. The trial must be undertaken in the following way: a) A field trial methodology will be provided to the Otago Regional Council within 3-6 months of the project being approved;	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		b) An annual monitoring report, prepared by a SQEP will be provided; c) Following completion of trials the Consent Holder must: I. Report on trial results and confirm net percolation rates; II. Ensure sufficient materials are available to construct the proposed cover system; and III. Provide recommendations. Advice Note: <i>Trials will run for 3-5 years to confirm seasonal variances with an annual report being prepared for the Otago Regional Council. At the completion of the trials a final report will be provided to the Otago Regional Council.</i>	
53	ELFs	The Consent Holder must summarise all work completed on each individual ELF for the past year in the Annual Monitoring and Compliance Report required by Condition C12 in the Common Conditions in Schedule One. This must include: a) A description of the completed works; b) The actual material volume and tonnage stored in each ELF; c) The balance of material volume and tonnage required and available for earthworks rehabilitation of the site; and d) Review of construction versus design for each individual ELF by a Chartered Professional Engineer,	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		noting any non-compliance items and recommendations.	
54	ELFs	The Consent Holder must summarise the proposed work on each individual ELF for the year ahead in the Annual Work Programme required by Condition C11 in the Common Conditions in Schedule One. This must include: a) A description of the proposed works; b) The estimated material volume and tonnage in each ELF at the end of the year; and c) The estimated balance of material volume and tonnage required and available for earthworks rehabilitation of the project site at year end.	No change necessary
55	ELFs	On closure of an individual ELF (completion of all design and rehabilitation earthworks), the Consent Holder must ensure the final construction is reviewed against the detailed design by a Chartered Professional Engineer experienced in geotechnical and civil engineering. Any remedial measures are to be recommended. A copy of the completion report must be submitted to the Otago Regional Council.	No change necessary
Shepherds Engineered Landform			
56	ELFs	The Shepherds ELF must not exceed a height of 775 masl.	No change necessary
57	ELFs	The Consent Holder must install subsurface drainage beneath the downstream toe of Shepherds ELF to collect seepage water and discharge it to the Shepherds Seepage Collection Sump.	No change necessary
58	ELFs	The toe of Shepherds ELF shall be detailed to limit oxygen ingress into the core of the ELF, in general accordance with	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		<i>Figure 9, BOGP Engineered Landform Technical Report, Engineering Geology Limited, 25 September 2025.</i>	
NEW 21	ELFs	The Consent Holder must construct and rehabilitate the Shepherds ELF to ensure that oxygen ingress into the ELF is less than 5% at approximately 20 horizontal metres into the ELF with a clear diffusion profile and no advective oxygen ingress, where: a) The diffusion profile is measured by oxygen probes installed up to depths of 50 horizontal metres into the ELF; b) Advective oxygen ingress is prevented (i.e. no significant oxygen concentration spikes); c) Oxygen profiles are reviewed by a suitably experienced and qualified person (“SQEP”) to confirm that the design objective has been achieved (i.e. no advective oxygen ingress); d) If oxygen depth is greater than approximately 20 horizontal metres, then adaptive management processes need to be implemented to understand the effects and any risks for water quality objectives; and e) A management process will be developed within 12 months of earthworks commencing to achieve the ELF design objectives and that this should include performance monitoring and adaptive management responses.	Recommend rewording d) to, Rather than “If oxygen depth” should it be “If oxygen ingress is greater than 5% at approximately 20 horizontal metres,....”
59	ELFs	Surface water run-off from the Shepherds ELF must be collected and diverted to the Shepherds Creek Silt Pond	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
NEW 21a	ELFs	The Consent Holder must construct a diversion channel around the hills surrounding the northern margins of the ELF to intercept and divert run-on water to Shepherds Creek. The diversion channel must be sized to allow passage of a 1 in 20-year Annual Return Interval event, for all storm durations for the operational life of the ELF and 1 in 100-year ARI event for closure.	No change necessary
Western Engineered Landform			
60	ELFs	The Western ELF must not exceed a height of 725 masl or capacity of 5.2 million cubic metres.	No change necessary
61	ELFs	The Consent Holder must install subsurface drainage beneath the downstream toe of the Western ELF and divert and discharge seepage water collected from the Western ELF for use within the processing plant during mine operations and the water treatment plant (or passive treatment system) during mine closure.	No change necessary
62	ELFs	Surface water run-off from the Western ELF must be collected and diverted to the Western ELF Silt Pond.	No change necessary
NEW 23	ELFs	The Consent Holder must construct and rehabilitate the Western ELF to ensure that oxygen ingress into the ELF is less than 5 % at approximately 20 horizontal metres into the ELF with a clear diffusion profile and no advective oxygen ingress, where: a) The diffusion profile is measured by oxygen probes installed up to depths of 50 horizontal metres into the ELF; b) Advective oxygen ingress is prevented (i.e. no significant oxygen concentration spikes);	Recommend rewording d) to, Rather than “If oxygen depth” should it be “If oxygen ingress is greater than 5% at approximately 20 horizontal metres,....”

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		c) Oxygen profiles are reviewed by a suitably experienced and qualified person (“SQEP”) to confirm that the design objective has been achieved (i.e. no advective oxygen ingress); d) If oxygen depth is greater than approximately 20 horizontal metres, then adaptive management processes need to be implemented to understand the effects and any risks for water quality objectives; and e) A management process will be developed within 12 months of earthworks commencing to achieve the ELF design objectives and that this should include performance monitoring and adaptive management responses.	
Srex Engineered Landform			
63	ELFs	The SRX ELF must not exceed a height of 887.5 masl or capacity of 5.2 million cubic metres.	No change necessary
64	ELFs	Surface water run-on from upslope of the SRX ELF must be intercepted and diverted around the SRX ELF and discharged into the Rise and Shine Creek.	No change necessary
65	ELFs	The Consent Holder must ensure that seepage water from the SRX ELF is collected and discharged to the SRX Open Pit void.	No change necessary
66	ELFs	The Consent Holder must ensure that surface water run-off from the SRX ELF is collected and discharged to the SRX Open Pit void or an appropriately sized sediment retention pond in accordance with a Site-Specific Erosion & Sediment Control Plan as required by Condition 2.	No change necessary
NEW 23A	ELFs	The Consent Holder must construct and rehabilitate the SRX ELF to ensure that oxygen ingress into the ELF is less than 5% at approximately 20 horizontal metres into the ELF	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		with a clear diffusion profile and no advective oxygen ingress, where: a) The diffusion profile is measured by oxygen probes installed up to depths of 50 horizontal metres into the ELF; b) Advective oxygen ingress is prevented (i.e. no significant oxygen concentration spikes); c) Oxygen profiles are reviewed by a suitably experienced and qualified person (“SQEP”) to confirm that the design objective has been achieved (i.e. no advective oxygen ingress); d) If oxygen depth is greater than ~20 horizontal metres, then adaptive management processes need to be implemented to understand the effects and any risks for water quality objectives; and e) A management process will be developed within 12 months of earthworks commencing to achieve the ELF design objectives and that this should include performance monitoring and adaptive management responses.	
Come-in-Time Backfill			
67	CIT backfill	Upon the completion of mining the Come-in-Time (“CIT”) Open Pit, the Consent Holder must backfill the pit void to establish a free draining surface that allows the rehabilitation of slopes similar to the pre-mining landform.	No change necessary
68	CIT backfill	Seepage water and surface water run-off collected from the CIT Backfill must be diverted for use within the processing	No change necessary

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Condition No.	Topic	Current Draft Wording	Comments/changes needed
		plant during mining operations and the water treatment plant (or passive treatment system) during mine closure.	
69	CIT Backfill	Upslope diversion bunds or clean water diversion channels must be constructed during operation to prevent surface water run-on to the CIT Backfill.	No change necessary