MEMORANDUM

27 August 2024

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Re: CGO Open Pit Continuation SSD-42917792 - Response to RFIs

Introduction

Please find below responses to the requests for information in relation to the Cowal Gold Operations (CGO) Open Pit Continuation Project (SSD-42917792) (the Project) including:

- RFI #6 received from the Department of Planning, Housing and Infrastructure (DPHI) dated 18 July 2024 in relation to geotechnical and other issues (including noise and groundwater).
- RFI# 7 received from the Department of Climate Change, Energy, Environment and Water (DCCEEW) Water dated 10 July 2024 (received 1 August 2024) in relation to groundwater modelling and water licencing.
- Email correspondence from DPHI dated 23 July 2024 in relation to noise, water and water management.
- RFI #8 received from DPHI on 6 August 2024 in relation to groundwater.

Response to RFI #6 – Geotechnical

1. Provide a detailed response to the Dr Stephen Fityus (Douglas Partners) advice dated 28 May 2024. i.e. provide the additional information and clarifications requested

The Douglas Partners advice report (the report) was received by CGO on 28 May 2024. The report represents a desktop review of all geotechnical work carried out to support the original pre-feasibility study (PFS) which included:

- Geotechnical investigation for all open pit mining areas.
- The Integrated Waste Landform (IWL) tailings facility.
- The Lake Protection Bund (LPB) which separates Lake Cowal from all new open pit mining areas.

In addition to the PFS work were several supporting geotechnical documents that were prepared subsequent to the PFS, which were reviewed by Douglas Partners including:

- Geotechnical appendices from the OPC Feasibility Study (FS).
- An Independent Peer Review of the OPC FS study undertaken by Australian Mining Consultants (AMC).
- An operational Memo which was independent of the OPC work which was prepared to investigate a geotechnical event that occurred in E42H at a time approximating the conclusion of the FS.

The report provides an overview of many geotechnical elements of the work that has been undertaken to support the preparation of the Project's Environmental Impact Statement (EIS) and provides additional insight to the ongoing geotechnical work being prepared by CGO. Many of the recommendations made in the report are reflective of the CGO studies' observations, and form part of a detailed program of works that will be implemented by CGO to inform detailed design and construction of key Project elements.

A detailed response to the matters raised in the report is provided in **Attachment 1**.

2. LPB Height - what height (mAHD) is required to achieve (inclusive of any freeboard):
   a. 0.1% AEP initially, and then
   b. PMF for final landform

Simulated peak water levels in Lake Cowal, as outlined in the ATC Williams Report (ATCW 2024) were provided as Appendix L to the Submissions Report (EMM 2024), and are presented in **Table 1** below.

Table 1 - Simulated peak water levels in Lake Cowal

Event	Simulated peak water level (mAHD)
1% Annual Exceedance Probability (AEP) flood level	208.53
0.1% AEP flood level	209.27
Probable Maximum Flood (PMF) level	210.54

The recommendation for the Lake Protection Bund (LPB) height in the ATC Williams Surface Water Assessment (ATCW 2023) provided as Appendix G to the EIS, is to consider a 1% AEP flood Level with a 0.5m provision for freeboard.

CGO is proposing to go beyond the ATC recommendation and have designed the LPB to eventually accommodate the PMF flood level with a 0.3 m consideration for freeboard.

For the purposes of the Project, and based on the above, the proposed initial operational LBP design criteria and final mine closure landform LPB design parameters are detailed in **Table 2** and **Table 3** respectively.

Table 2 – Initial operational LPB design parameters

Aspect	Design criteria
0.1% AEP flood level	209.27 mAHD
Freeboard provision	350 mm
Total proposed height	209.64 mAHD

Table 3 – Final landform LPB design parameters

Aspect	Design criteria
Probable Maximum Flood (PMF) level	210.54 mAHD
Freeboard provision	350 mm
Total proposed height	210.90 mAHD

The above LPB design parameters provide contingency when compared to actual flood levels. Historical Peak flooding events at Lake Cowal are recorded below:

- **1954**: 207.85
- **2016**: 207.49
- **2022**: 207.69

It is important to note that the LPB will be built in stages and is subject to further design development as additional geotechnical information becomes available.

3. LPB Volume - what volume of material is required to construct both:
    a. 0.1% AEP initially, and then
    b. PMF for final landform

CGO proposes to construct the Lake Protection Bund (LPB) using suitable available material on-site that will come from the construction of up-catchment diversion system (UCDS), internal catchment diversion system (ICDS), mine water dams and open pit mine footprints.

The total volume for the initial operating LPB design is approximately 2 million (M) cubic metres of material. There is ample adequate material available on site to construct the LPB and we have a very favourable material balance that will enable the construction of the LPB in an emission's efficient manner. The LPB predominantly consists of rock and clay material with geotextiles used to maintain separation of the different layers in the design noting that the Haul Road is an optional as this is an operational consideration rather than structural.

The overall volumes required for the wet and dry build are approximately the same however the wet build is a little more complex with respect to material selection and construction sequencing, a breakdown of the wet build material volumes is detailed in **Table 4**.

Table 4 – LPB initial operational design material requirements

LPB Component	Volume (cubic metres)
Rock Groyne	355,616
Bund	489,941
Bund Riprap	63,671

LPB Component	Volume (cubic metres)
Internal LPB Sheeting	128,236
External Batter	66,687
Road Fill	626,796
Road Pavement	93,679
Surface Treatment	160,295
Total Volume	**1,984,921**
Trench[1]	200,169

1. The trench will be excavated and then the material compacted back into the trench to ensure the integrity of the LPB engineering structure.

The elevation of the initial operation LPB design to achieve the closure Probable Maximum Flood (PMF) design has not been finalised at this time, however the estimated additional material for this is approximately 0.5 M cubic metres will be sourced from the footprint of the mining areas.

- For the Northern LPB material will most likely be sourced from the GR pit footprint once the area is dewatered.
- For the Southern LPB material will be sourced from the E41 pit footprint.

The current strategy would see waste rock emplacement to the PMF level of 210.90mAHD constructed within 3 years of the LPB construction as this is practical for the material schedule, however not all areas of the LPB would be raised to a PMF level during operations due to interaction with operational infrastructure

Based on the level of contingency offered by the 0.1% AEP design (Refer to Question 2 response above), CGO seek to ensure the timing of any PMF level raise aligns to our final landform considerations (which are studied in further detail as we progress) and ensure that the timing of execution is consistent with an efficient materials handling strategy to minimise our emission levels.

4. LPB Footprint – what is the LPB width / length / area (overall footprint) and will this change when the height is increased to achieve the PMF design? If so, by how much?

The LPB was initially designed with a haul road in event perimeter circulation was required. Following further design refinement, the need for a perimeter haul road is optional in the design which enables haulage to be relocated closer to the pits. This provides CGO the opportunity to reduce the size of the road associated with the LPB and achieve a PMF level design within the existing assessed footprint. Key design aspects for the LPB for both the initial operational design and final mine closure design are detailed in **Table 5**.

Table 5 – Design aspects

Aspect	Initial operational design	Mine closure design
Width	Approximately 70 m in the deepest section of the lake. The width of the LPB will reduce as the depth of the lake decreases.	With the removal of the haul road component of the design, an LPB to a PMF level (210.90mAHD) will be achieved within the existing design footprint.
Length	Approximately 6.1 km	No change
Footprint	35 ha	35 ha

5. LPB source of material - where will the LPB material be sourced, for both operational and final landform design, e.g. will there be additional storage / stockpile areas required or rehandling of waste rock material from waste rock emplacement to construct the final LPB – PMF design?

Rock inventory has been getting stockpiled since early 2023, this rock stockpile has been sourced from waste stripping from the current E42 pit and is geochemically suitable for the Lake Protection Bund (LPB) construction. Clays will be sourced from inside the E46 and GR pit footprints, however if material quality is not suitable then options to source clays adjacent to the original LPB will be investigated. This decision will be subject to material testing once the water has been removed from the targeted areas.

Based on detailed site knowledge, CGO has confidence the material can be sourced from local areas inside the approved mining areas. Historically E42 clays have been successfully used extensively for the existing LPB and Tailings storage facilities at site. CGO can use clays sourced from the E42 Stage I cutback if necessary.

6. LPB timing - when will the LPB material be placed and how will it fit with the mine sequencing?

Material Sourcing

Rock material for the Lake Protection Bund (LPB) construction will be stockpiled ahead of the construction. This rock will be crushed as required to meet the construction specification so the rock will be available ahead of the LPB construction which, subject to approval, will commence in 2025.

Clay material is planned to be sourced from the footprint of the local pit areas adjacent to the LPB, these areas will become available once the sheet piles and dewatering have occurred. This makes sourcing material from these areas practical in the scheme of the construction schedule.

Alternate clay sources are available across site if material specification from these local sources is not suitable for the construction of the LPB.

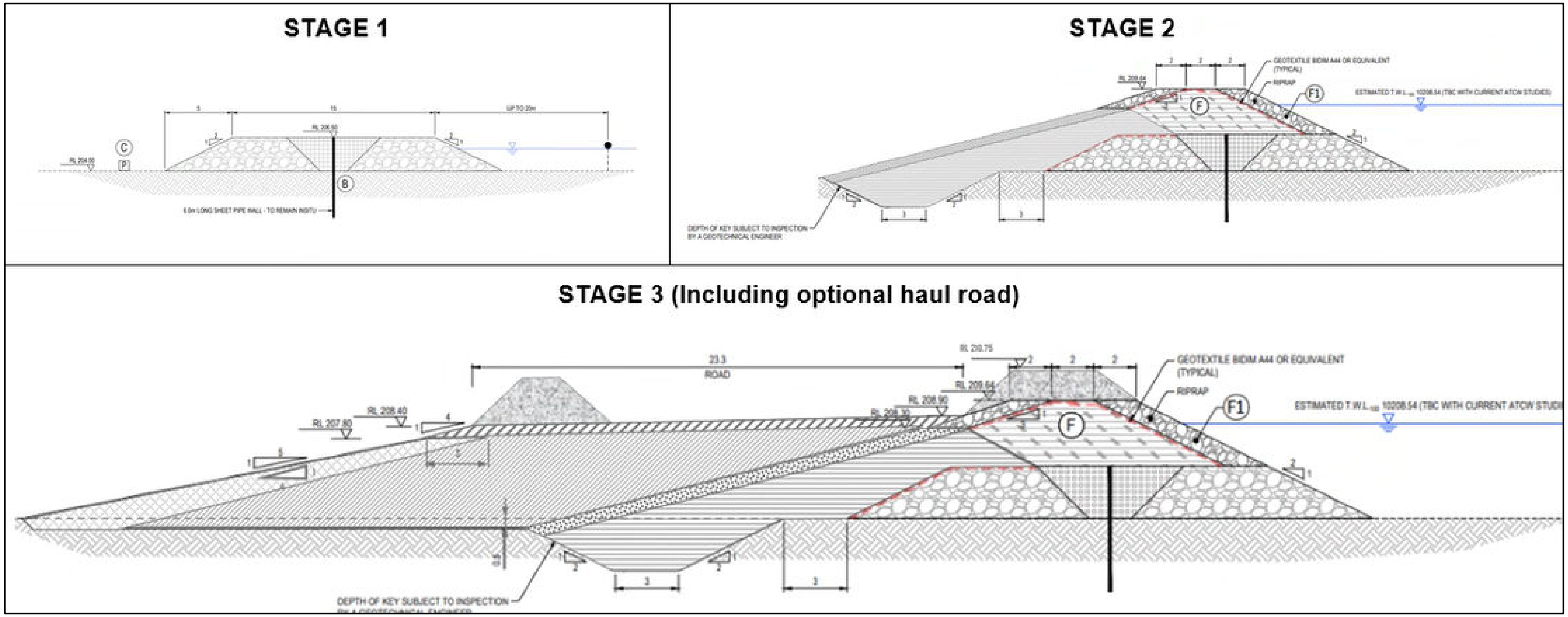
LPB Phased Construction:

The LPB will be built in four stages as summarised below and illustrated in **Figure 1**.

- **STAGE 1:** Construction of a rock groin up to an indicative height of ~ 206.5 mAHD, this will consist of a central finger of engineered rock so that sheet piles can be installed through the groin. The sheet piles are subject to the height of the Lake at time of execution, but currently estimated to be approximately ~6 m in length and will create hydraulic separation between the new mining area and the lake water. This stage is a function of the wet build method that has been proposed and will be subject to change pending the lake levels at the time of construction, changes during this stage will not impact the ultimate height of the LPB.
- **STAGE 2 – Engineered Bund**: The engineered bund will be built to 209.64 mAHD this will consist of excavating a key into the existing lakebed to create a lock for the lake protection then building the LPB to height using compacted clays to ensure a good seal with the surficial lake materials. The clay will be built up on the internal edge of the rock groin before the final profile of the LPB is raised to final design height. The sheet piles will be left in place and while they provide a barrier against the lake the clay core of the LPB will on its own will provide an impermeable barrier against rising lake waters.

  The engineered LPB structure will be rock armoured with rip rap to ensure the integrity of the engineered structure is maintained against erosion and surface operations.
- **STAGE 3 –** Optional haul road: A haul road may be constructed on the inside edge of the LPB subject to the operational requirements. This will be constructed by using run of mine oxide material with a rock cap to provide a suitable running surface for the road. This will be sheeted with appropriate geotextile and road base. Exposed bund surfaces will in time be sheeted with a soil rock matrix to promote rehabilitation of these surfaces.
- **STAGE 4** – PMF and Final Landform: On the back of the Douglas Partners Geotechnical review and the recommendation that the closure strategy should employ a height more closely aligned with the PMF (210.90mAHD). Design of this has yet to be finalised but will be included as a part of the final landform in the Rehabilitation Management Plan. CGO is proposing that the haul road be relocated adjacent to the pit voids and this footprint be used to elevate the LPB. Preliminary designs show that this could be achieved within the existing LPB design footprint. Northern access and southern interaction with lake foreshore will prevent PMF height being achieved for the whole LPB during operations however, schedule logistics suggest that PMF levels for a majority of the LPB could be achieved within 2 years of bund construction with the Northern and Southern areas raised during site closure.

Figure 1 – LPB construction stages



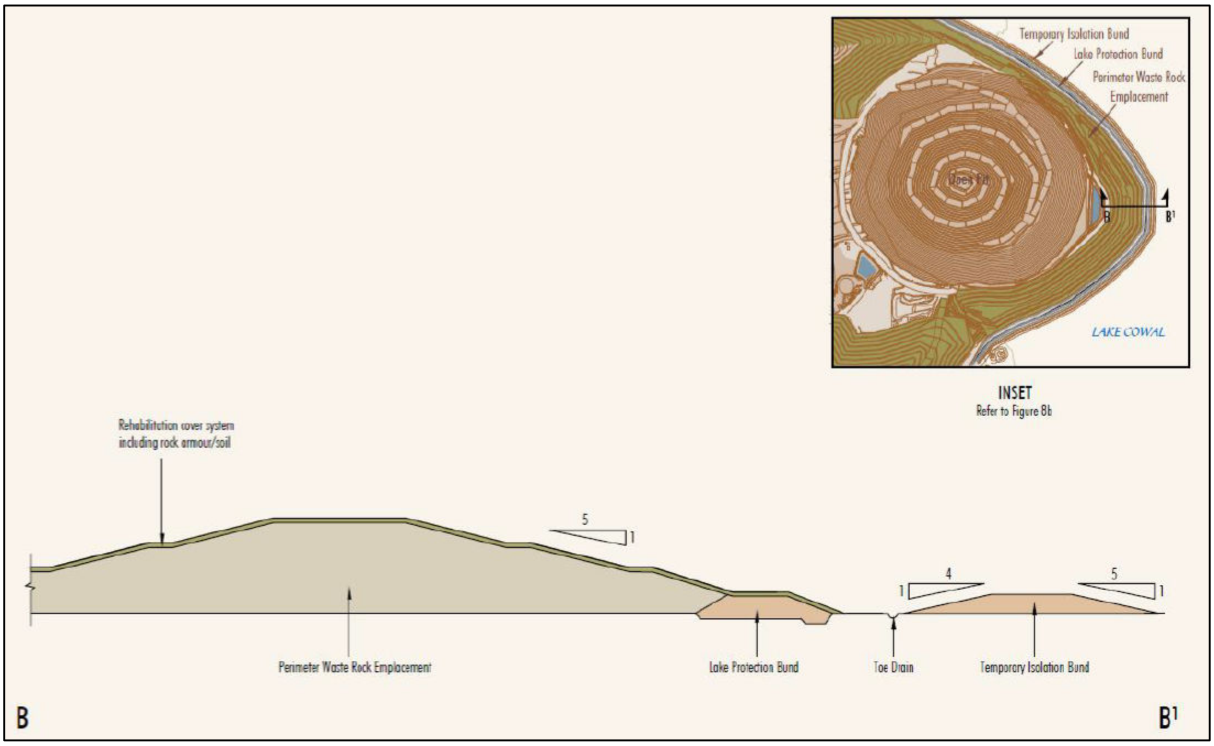
7. How does the proposed LPB design compare to the existing as built LPB, including the approved perimeter waste emplacement integrated into the LPB?

The original Lake Protection Bund (LPB) was constructed during a period when the lake was completely dry and so water did not occupy the footprint of the construction area, and therefore the approach to construction was reflective of the OPC dry build method. With the current water levels in the lake and a need to provide workforce and ore feed continuity, for OPC North, the OPC project has a need to build the LPB while lake waters are present within the construction zone and therefore have developed a wet build method (**Figure 1**).

1. The current lake isolation system consists of three elements designed to prevent the inflow of water from lake Cowal into the open pit area, the three elements of the lake isolation system (**Figure 2**) Temporary Isolation Bund (TIB) – At the time of construction the lake was dry enabling a TIB to be constructed using the construction fleet (dozers and scrapers). This bund was built using stripped material from within the footprint of the proposed LPB as well as near surface silty clay from within the contained mining area. As the name suggests it provided temporary isolation for the LPB construction area in the event of rising lake waters. Its construction was rudimentary lacking a key into the lakebed and was a rapid build and lacked engineering control on the compaction of the material. The bund no longer contributes to the function of retaining water.
2. Lake Protection Bund (LPB) this is the engineered bund designed for the purpose of keeping water out of the mining area. It was formed by excavating a key-way and then using silty clays sourced from within the contained mining area. A keyway, excavated during construction of the TIB was backfilled by scrapers in layers and then compacted to an engineered standard. The LPB was built to a height of 208.25mRL 9; this is 1.4m lower than the proposed LPB height and +2m from the eventual PMF height.
3. Perimeter Waste Rock Emplacement (PWRE): upon completion of the LPB the mining area was protected from elevated lake levels and mining could commence. Early stripping from the mining area was hauled to the PWRE and stockpiled, this was constructed in lifts approximating 5.0m in line with construction methods adopted for all site Waste Rock Emplacement (WRE) areas. The material was not compacted other than by the equipment during the construction phase. This component has been removed from the OPC LPB design due to several key drivers:

- With the processing plant now constructed and the waste rock emplacements extending above the height of the visual amenity bund, the need of this structure was deemed unnecessary.
- The chainage length of the new dam is over 6 km, the footprint of the PWRE is significant and if it was to be replicated, the width of this could add up to 150 metres to the width of the LPB. Removing it from the OPC Project resulted in a significantly footprint, reducing the biodiversity impact on the Project.

Figure 2: Cross Section of existing LPB at CGO



The new LPB employs two methods of construction, a wet build and dry build method, which will be determined by the location of the shore line at the time of construction. The profile of the two LPB's is the same but the construction method differs:

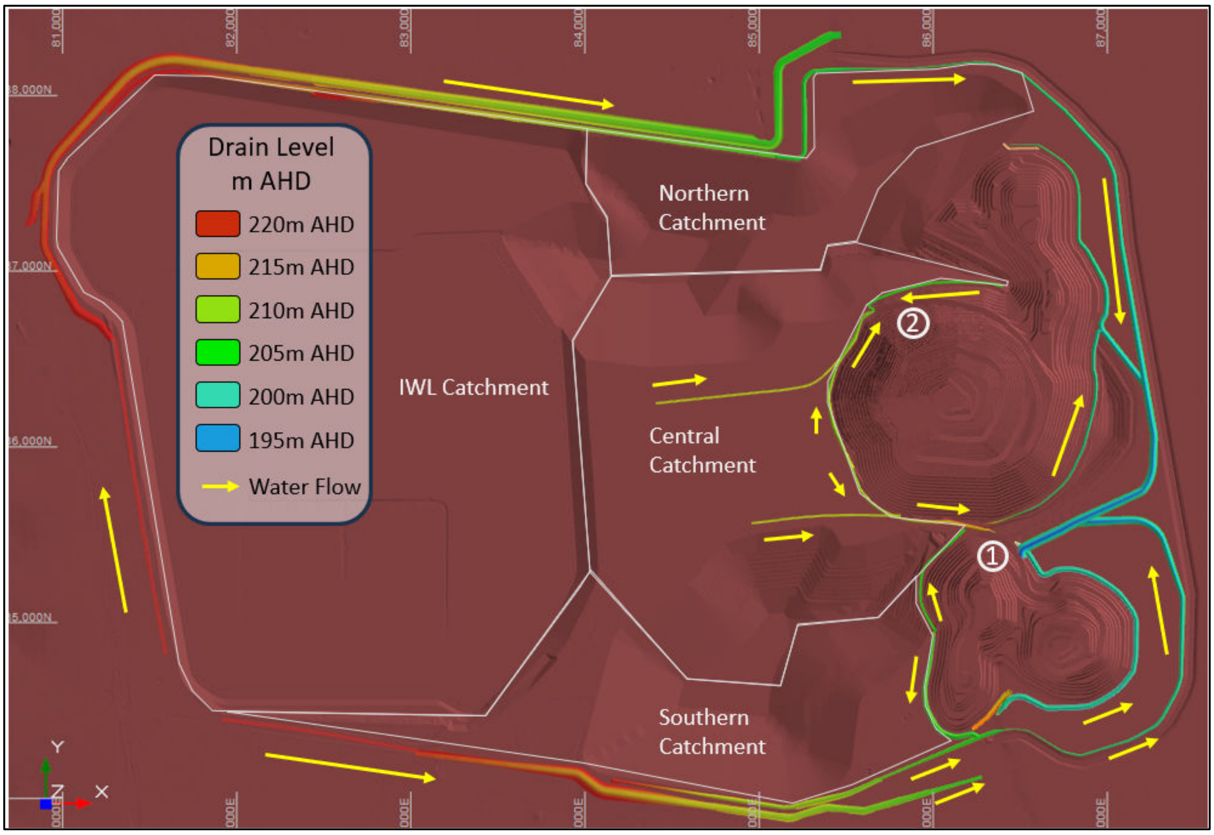
- Dry Build – this is built using similar construction method to the original LPB consisting of a compacted clay core with a rock shell to maintain integrity of the bund. This would involve excavating a key and then placing compacted silty clay sourced from the mining area until the final profile is achieved. Rip rap would be applied to this to prevent erosion.
- Wet Build – during construction all areas where the LPB alignment is impacted by water a wet build method will be adopted. The key sequence of the wet build is outlined above and illustrated in **Figure 1**.

8. Provide a figure showing final conceptual water catchments and drainage, including significant surface water management structures, such as 'drop structure', spillways and drainage channels, demonstrating minimising catchment reporting to the final void.

A conceptual closure strategy (strategy) has been prepared. A key element of the strategy is to manage surface water post mining. The strategy will be subject to change as pit closure landforms are yet to be finalised, however the fundamental drainage strategy will be inherent in further refinements of this landform strategy.

Major water management infrastructure including the Upper Catchment Drainage System (UCDS) and Internal Drainage Catchment System (ICDS) will be left in place post mining with minor updates to remove water storage elements. This is to maintain the separation of water between the CGO mining area and offsite water. Additional drainage structures to prevent water from draining over the crest of all voids are also proposed as a part of this strategy to ensure water is directed towards controlled pit drainage points. **Figure 4**, provides an overview of the proposed closure water strategy overlayed with the closure landform.

Figure 3: Post mining drainage system overlayed with landform



The strategy includes:

- Water naturally flows from west to the east towards Lake Cowal, offsite water flowing from the west will be diverted around the site by the UCDS as per the operational phase of the mine.
- There are four western catchment areas of note that work as a connected, holistic system:
  - **The IWL Catchment**: will be capped and vegetated at closure. A spillway will be maintained as a low point so extreme rain events direct water over a dedicated discharge point to the central catchment and E42 Pit.
  - **Northern Catchment:** Drainage of the north face of the Northern Waste Rock Emplacement will drain to the northern ICDS which diverts water around perimeter of the mining area to the east. *(Note: In addition to the ICDS, this area is supported by Dam 21)*
  - **Southern Catchment**: Like the northern system, the south face of the Southern Waste Rock Emplacement will drain to the southern ICDS and will divert water to the East. *(Note: In addition to the ICDS, this area is supported by Dam 24)*
  - **Central Catchment**: The Central Catchment will capture the remaining water to the west of the voids and direct the water to drainage systems along the western boundary of the pit voids, from here it will drain dedicated discharge points. *(Note: In addition to the ICDS, this area is supported by Dam 23 which receives overflows from 21 and 24 and will eventually travel down the E41 ramp system)*

- Drainage systems around the pit voids have been designed to eliminate water actively flowing over the pit faces, these systems will evolve from the drainage systems proposed during the active mining phase and at closure will be connected to flow into several dedicated discharge points.
  - Most of the drains will direct water into the ICDS which will divert water to the Eastern side of the site before diverting water back to the E41 ramp system where it will discharge into the void ①.
  - Water from the central catchment will be diverted to both the E42 ① ramp system and the E41 ② ramp system to be collected in the pit voids.

  Note: ① and ② refer to features on Figure 3 above.

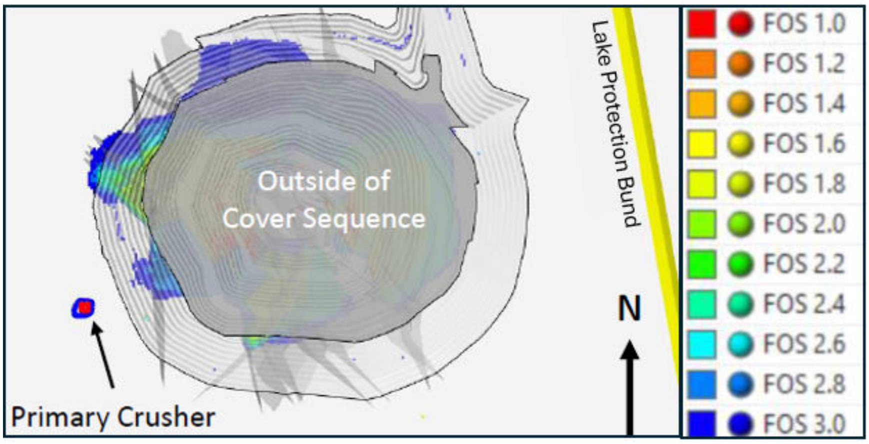
- During the mining phase, all in pit ramp systems that are built on oxide material have a rock treatment consisting of no less than 2.0 m of rock to form the road base. It is proposed that upon closure of these ramp systems they be reconfigured to form drainage channels to accept site water runoff and direct the water to the base of the pit without impacting the oxide zones within the surficial zone.

The final landform has been conceptualised to compliment other erosion and sediment control systems to ultimately deliver a strategy that provides long term integrity of the closure landform.

9. For a mining scenario with the greatest open pit extent, demonstrate (including in a final landform plan) that there would be sufficient footprint in the proposed disturbance area to not impact on the final landform LPB (including post mining), assuming a FOS of 1.5 on the eastern pit wall and include sensitivity analysis under different drainage conditions.

Numerical modelling of the E42 pit using SlopeX and FLAC^{3D} software was undertaken for wet (no dewatering bores) and dry scenarios. This work indicated that the eastern wall of the E42 pit is stable and exceeds a FoS of 3.0 contours for which are provided in **Figure 4**.

Figure 4: FoS contour Plot for E42 pit wet scenario



Management of erosional risk has been addressed in previous correspondence to DPHI. In considering these erosional risks as part of the modelling, it should be noted:

- The wet condition phreatic surface is not a saturation of the material but rather a drawdown based on no dewatering infrastructure being installed in the pit. The observation ignores the impact of external surficial water causing saturation of the oxide zone at a surface level and therefore surface water management is assumed in the modelling.

- With the new LPB the water source is now modelled at approximately 340m from the E42-I pit edge, the drawdown for the future state as modelled results in significantly more drawdown from the lake waters. This is significantly different to the current E42-H where the distance from pit crest to water edge is approximately 120m.
- CGO has experienced geotechnical events within the oxide zone however these have been localised with the mechanism associated with the 45° batter rather than an issue with the regional IRA of 22.5°.

To provide assurance that the eastern pit wall would not disrupt the proposed LPB, settlement modelling was also undertaken (**Figure 5**). Mining-induced damage to surface features is generally caused by horizontal strain and angular distortion (not failure). In all instances, settlement measures indicate that the pit void would result in <0.1mm (the lowest measure) cracks.

Figure 5: LPB damage on eastern side of E42 @FoS 1.6

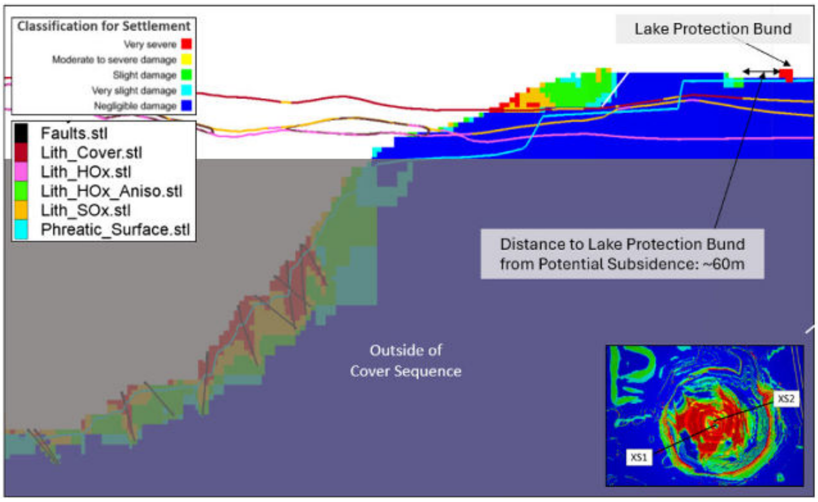


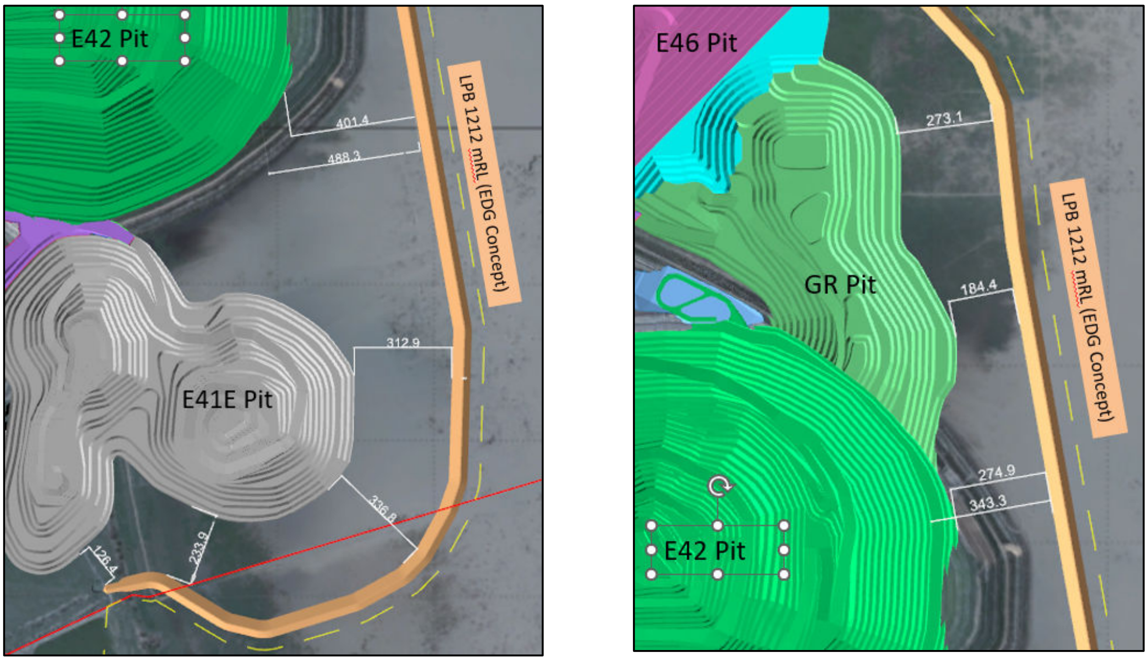
Figure 5 illustrates the subsidence that would be incurred when the model is loaded to meet a FoS1.6 scenario. The bund is not exposed to any subsidence of concern with remnant LPB contours 60.0m from the LPB generating the only area of notable subsidence (slight damage). Analysis supports the proposition that, from a geotechnical stand point, the current design of the oxide layers of the E42 pit does not present a current or future risk to the proposed LPB location.

10. What distance / buffer between open cut pit/s and the final LPB design to meet PMF height is available?

The crest to toe distance between the current pit crest and the toe of the LPB design is not constant and the buffer distance between each of the pits varies. The closest crest to LPB toe distance for each of the pits is (see **Figure 6**):

- E41 pit – 126.4m on the Southern extent of the LPB, the Eastern area is over 300m.
- E42 pit – 343.3 metres
- E46 pit – This pit is being backfilled and therefore no assessment was prepared,
- GR pit – 184.0m

Figure 6: Minimum distances between pit crest and LPB final landform (pit crest to LPB toe)



The LPB was originally positioned to meet the life of mine requirements of the open pit mining in the E42 area, and was designed with adequate area to allow all mining operations, and more importantly, to meet closure requirements. At the time of the design reference was made to a document prepared by the West Australian Department of Industry and Resource guideline – *Safety Bund Walls Around Abandoned Open Pit Mines, 1997*. This document was approved by the Mines Occupational Safety and Health Advisory Boards and remains a reference for estimating closure requirements in the absence of detailed geotechnical analysis.

Figure 7: WADIR - Guidelines for distance to safety bund wall for mine closure 1997

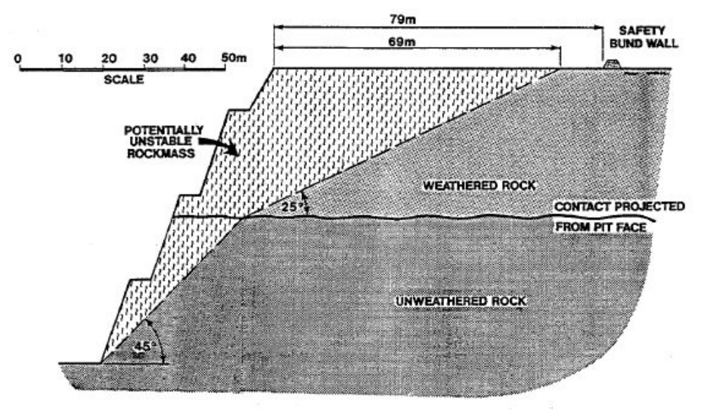


Figure 5
EXAMPLE OF SAFETY BUND WALL LOCATION

In all instances the location of the LPB exceeded this guideline and was subsequently validated with detailed modelling.

11. Provide further details of the proposed progressive erosion control measures to be implemented as part of pit construction?

Assuming the Project is approved, CGO will review and update the CGO Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan will detail the erosion and sediment control measures that will be implemented across the CGO site throughout the operation of the Project.

Consideration of erosion risk and management has, and will be, considered throughout all stages of the Project, from design, construction, operation and mine closure.

Erosion and sediment control risk and impacts were considered through the Project's design, with landform design considering landforms that will remain safe, stable and non-polluting throughout operations and following mine closure. Project design elements have been informed by robust modelling and local site data. A program of ongoing data collection will be undertaken throughout the life of the Project which will be used to inform management of erosion risk.

During operations, erosion and sediment control management will generally comprise a series of diversion drains, sediment control dams and the installation of temporary (i.e. silt fences and sediment traps) and permanent (i.e. ICDS and UCDS) erosion and sediment control management systems. All erosion and sediment control structures will be designed and constructed in accordance with the guideline *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004).

For the Waste Rock Emplacement (WRE) areas, drainage on the top surfaces of the WREs would be managed via a series of small shallow basins (depressions) and would include a rehabilitation cover system that absorbs rainfall and comprises woodland vegetation. The use of depressions would be aimed at maximising internal drainage without creating permanent ponding during normal and heavy rainfall events. A bund around the perimeter of the top surfaces of the waste rock emplacement would also be constructed to provide a contained catchment and minimise surface water runoff from the top surface down the batters.
In relation to pit walls, a program of work has been identified to support the ongoing design and implementation of erosion and sediment control structures including:

- a dewatering study to evaluate operational, transitional and closure plans for (active / passive) dewatering of the erodible pit walls.
- quantifying material erodibility using an industry recognised method of modelling.
- material assessment study to verify final pit wall chemical and physical properties and available materials for stabilising the erodible pit walls.
- revegetation studies to determine which plants may be most effective for long term dewatering within final pit walls – these could be pot and/or in-pit trials.
- hydraulic design studies to verify flow rates, velocities, and management controls for the final landform design.

This program of work will be documented within the Rehabilitation Strategy to be developed within 6 months following project approval being received.

Progressive rehabilitation of disturbed areas will be undertaken over the life of the Project as disturbed areas become available. Progressive rehabilitation will manage the risk of erosion to landforms as they are developed.

Erosion and sediment control structures will be monitored and managed throughout the operation to ensure they remain effective at managing erosion. Site inspections will be undertaken and will record the condition of the erosion and sediment control structures and any maintenance requirements necessary. The monitoring of erosion and sediment control structures will be complimented by the existing surface water monitoring program implemented across CGO. This monitoring program will continue and identify any impacts to water quality as a result of erosion.

Response to RFI #6 – Other issues

1. Groundwater drawdown – section 6.1 of the Revised Groundwater Impact Assessment provides an assessment of cumulative drawdown.

   a. Does this include groundwater extraction from private bores?

   b. If so, what would the maximum drawdown be and how would recovery time differ under the dry and fast recovery scenarios without landowner pumping (i.e. based on proposed mining plus the existing mine and Evolution owned borefields only)

   c. What is the final drawdown level once equilibrium is reached post mining?

a. No, this does not show impacts from private landowners. It just shows cumulative project impact (i.e. proposed project (pit expansion) plus existing and approved open pit and underground). The cumulative drawdown assessment incorporating landowner bore extraction (undertaken in accordance with the minimal impact considerations of the NSW Aquifer Interference Policy (AIP)) is presented in Section 6.4 of the Groundwater Impact Assessment (GIA).

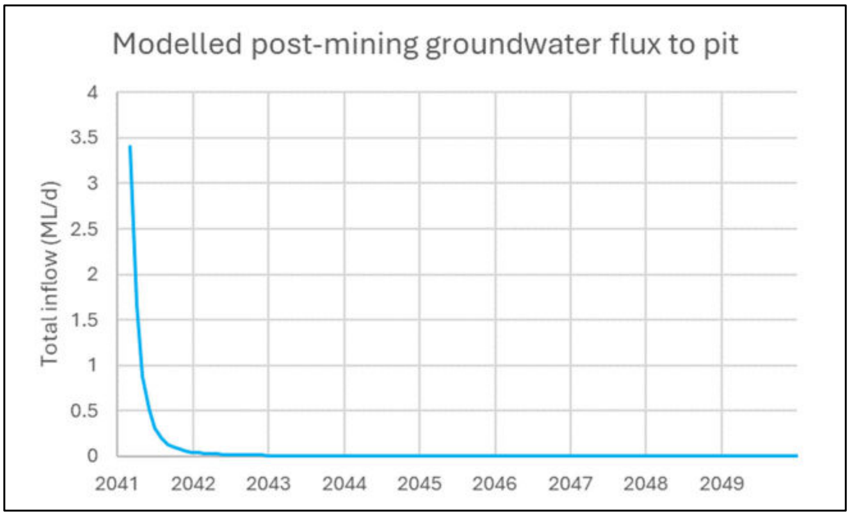
b. This is already presented in Section 6.1 of the GIA (as noted in the response above).

c. Refer to response below.

2. Mine inflows – section 6.2 of the Revised Groundwater Impact Assessment indicates groundwater inflows are expected to reduce to less than 0.01 ML/da by the start of 2043. Figure 6.6 does not extend beyond 2040, but inflows in 2040 appear to be around 3.6 ML/day. What is the reason for this steep reduction in inflows? Can you extend this graph out beyond the end of mining?

The data shown in Figure 8 depicts the modelled inflow to the pit post-closure, though without influence of pit lake evaporation or incident rainfall. The modelled inflow reduces as the in-pit water level returns towards pre-mining levels, due to lowering of the hydraulic gradient between the aquifer and the pit. This data was used towards the water balance modelling, where a function of flux against pit lake water level was used in predicting long-term in-pit water levels.

Figure 8: Modelled post mining groundwater flux to pit



Model hydrographs do not equilibrate by the end of the 100-year post-mining period. An additional long-term run of the base realisation model predicts equilibration to be reached between 10,000 and 100,000 years following the cessation of mining, owing to the very low hydraulic conductivity of some hydrostratigraphic units. The footprint of the 2 m modelled drawdown contour increases by up to 7 km in the Upper Cowra and Lachlan HSUs. For this reason, analysis in the Groundwater Impact Assessment is not considered to be feasible.

3. Noise – Evolution has committed to continuing to employ best available technology economically achievable (BATEA) and best practice noise management on site. It is not clear exactly what this involves. It is also not clear whether the predicted noise levels are the residual noise levels after the application of BATEA and best practice management. Please clarify and provide further consideration of options to reduce noise levels at impacted receivers, particularly at night.

Table 5.4 of the Noise and Vibration Impact Assessment (NVIA) provided as Appendix O to the EIS, lists BATEA as one of the mitigation measures considered and adopted in the modelling assessment as feasible and reasonable. Best Management Practice (BMP) is also listed as one of those measures in Table 5.4 of the NVIA. However, no specific BATEA and BMP measures have been adopted in the noise modelling.

BMP and BATEA are listed in the CGO Noise Management Plan (NMP) as mitigation measures that would be implemented to reduce noise emissions in the event that noise monitoring indicates an exceedance of the noise impact assessment criteria. Predicted operational noise levels presented in the NVIA (section 5.1.1) are not the residual noise levels after the application of specific BATEA or BMP other than the measures deemed to be both feasible and reasonable in Table 5.4 of the NVIA and hence adopted for the Project. For clarity, the reference to BATEA in the NVIA would be more appropriate in section 6.1 which summarises noise management measures (including BMP options) that Evolution would implement in accordance with the NMP.

In relation to consideration of options to reduce noise levels at impacted receivers (including for the night period), section 5.1.1iv of the NVIA provides an analysis of feasible and reasonable noise mitigation measures as defined in the Noise Policy for Industry (NPfI). Table 5.4 of the NVIA presents a summary of possible mitigation options considered for the Project and whether they are feasible and/or reasonable, as well as justification as to why each option was adopted or not.

Further discussion on the adopted mitigation measures for the Project is also provided after Table 5.4, including Evolution's proposed approach to implementing those and achievable noise limits recommended for the Project (section 5.1.1vi).

4. Noise – The noise modelling assumes noise enhancing meteorological conditions even though these are not a significant feature of the area. If the predicted noise levels are applied as limits, it would potentially allow higher noise limits under standard meteorological conditions. What are the predicted noise levels under standard meteorological conditions?

The NPfI provides two options for considering meteorological conditions for modelling noise and assessing potential impacts from a development. Option 1 is to adopt noise-enhancing conditions as listed in the NPfI (conservative approach). Option 2 is to determine the significance of noise-enhancing conditions, that is whether noise-enhancing conditions occur for a significant amount of time (30% or more). The latter (i.e. option 2) was adopted for the NVIA prepared to support the EIS.

The meteorological data analysis determined that noise-enhancing meteorological conditions did not occur for 30% or more between 2017 and 2022 (5 year period) and hence were not considered as 'significant' in accordance with the NPfI. The NPfI states:

"Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.

It also states:

"Where noise-enhancing meteorological conditions have been identified as not significant, predicted noise levels under standard meteorological conditions should be compared to the relevant project noise trigger level for impact assessment purposes".

However, instead, noise-enhancing meteorological conditions as listed in the NPfI (conservative option 1) was adopted for the purpose of the assessment and predictions for standard meteorological conditions as per the NPfI (i.e. wind speed up to 0.5 m/s) were not modelled and assessed.

It is agreed that noise predictions under noise-enhancing meteorological conditions as presented in the NVIA would result in higher predictions than under standard meteorological conditions, and potentially higher noise limits if predictions are applied as limits. The meteorological data analysis completed for the NVIA identified that although the occurrence of noise-enhancing meteorological conditions was below the 30% NPfI threshold (i.e. not considered as 'significant'), wind with speeds up to 3 m/s occurred for up to 16%, 28% and 22% of the time during the day, evening and night periods respectively. Moreover, temperature inversion conditions (i.e. stability class F or G) occurred for 19% of time on an annual basis and 22% in the Winter months.

The NPfI method to determine whether noise-enhancing meteorological conditions occur for at least 30% of the time excludes meteorological conditions where wind speed is above 3.0 m/s. This means that samples where wind speed was above 3.0 m/s would be excluded from the percentage of occurrence calculation. The meteorological data analysis completed for the NVIA identified that wind speed above 3.0 m/s occurred for 73%, 51% and 46% during the day, evening and night periods respectively between 2017 and 2022 (5 year period). Further, the meteorological data analysis completed for the NVIA identified that standard meteorological conditions as per the NPfI (i.e. wind speed up to 0.5 m/s) occurred 1%, 4% and 6% during the day, evening and night periods respectively during the same 5 year period. This shows that standard meteorological conditions are not representative of prevailing meteorological conditions occurring in the Project area. Given the preceding, noise predictions under noise-enhancing conditions as presented in the NVIA should be taken into account when establishing operational noise limits for the Project.

Finally, the approach to adopt noise-enhancing meteorological conditions for the modelling is consistent with previous noise assessments completed for CGO. Existing operational noise limits for the site are based on predictions under noise-enhancing meteorological conditions.

5. Evolution has indicated it has noise agreements with the owners of two properties. Please provide copies of these agreements to the Department.

Copies of noise agreements in place have been provided to DPHI separately.

6. Construction noise is proposed to be regulated under the Interim Construction Noise Guideline, and construction activities are proposed for around 2 years initially and again in year 5 for the UCDS. Predicted noise levels during this period are not insignificant at some residences. Please provide further consideration of options to reduce construction noise. It is worth noting also that the Department typically only allows a six-month period for construction for mining projects activities, after which operational noise limits apply for all activities.

Construction activities modelled for the Project include the construction of the Lake Protection Bund (LPB) and Upper Catchment Diversion System (UCDS). The LPB is proposed to be constructed in the initial stages of the project and is expected to occur in two stages. Construction of the UCDS is proposed to be completed in several stages. The LPB and UCDS are major features of the Project, and given its size, it is not possible for the LPB and UCDS to be constructed within a six-month construction period. The Project Secretary's environmental assessment requirements (SEARs) specifically reference the Interim Construction Noise Guideline (ICNG) for the assessment of noise from proposed construction activities where it is demonstrated to be relevant. Section 3.2.2 of the NVIA provides justification for assessing noise impacts from construction of the LPB and UCDS in accordance with the ICNG. The LPB and UCDS are considered necessary infrastructure to enable and/or support mining operations associated with the Project and will be temporary in nature, with activities generally progressing from one point to another (i.e. in stages). The location of the LPB and UCDS construction activities will also generally be closer to receivers than mining operations.

The ICNG criteria adopted in the NVIA for construction activities occurring outside the ICNG standard hours (i.e. during out-of-hours (OOH)) are the same as the project noise trigger levels (PNTLs) adopted in the NVIA for operational noise.

LPB and UCDS construction have been assumed to occur during approved existing mining operational hours, that is 24 hours seven days per week. However, it is expected that noise generating activities associated with LPB and UCDS construction (especially those generally associated with higher noise emissions) will generally occur during the day period between 6 am and 6 pm, Monday to Sunday. Construction activities may extend potentially up to 10 pm from time to time where necessary for construction to remain on schedule (e.g. due to extended period of adverse weather or other construction delays). Therefore, the majority of LPB and UCDS construction is expected to occur outside the night period. Predictions presented for OOH evening and night periods are provided as a worst-case scenario and actual construction noise is likely to be less for the majority of the time.

All construction plant and equipment were modelled as operating concurrently and at full power and hence noise predictions are considered conservative. Further, noise predictions presented in the NVIA have been combined with noise levels from the relevant operational scenario before comparison to ICNG noise management levels (NML). Hence, noise predictions shown in section 5.1.3 of the NVIA are not due to proposed construction activities alone.

Noise from the LPB construction during standard hours is predicted to satisfy the relevant ICNG NML at all assessment locations. Noise from the UCDS construction during standard hours is predicted to satisfy the relevant ICNG NML at most assessment locations with the exception of one residential property which is currently subject to acquisition upon request.

Noise from the LPB construction during OOH is predicted to cause exceedance of the NML, however most of the exceedances are associated with operations and not due to proposed construction activities. Noise from the UCDS construction during OOH is predicted to cause exceedance of the NML, however some of the exceedances are associated with operations and not due to proposed construction activities alone. Most affected residential properties either currently have a noise agreement with Evolution, are currently subject to mitigation upon request or are currently subject to acquisition upon request. Exceedances of 1 to 8 dB are predicted at other residential properties, however these are mostly during the evening and night OOH periods when construction activities will be limited.

There is limited opportunity to reduce these exceedances when they are contributed to by both construction and operations. Notwithstanding, noise management measures that will be implemented on the project are listed in section 6.2.2 of the NVIA in the form of work practices as well as plant and equipment related measures.

Response to RFI #7 – Water licencing

Recommendation 1.1

The Department of Planning, Housing and Infrastructure understand and consider the following when assessing this project:

- The proponent has been unable to demonstrate sufficient water entitlement can be obtained to account for the surface water take required to dewater during construction of the southern bun. This is a significant risk to the project.
- The proponent has provided a methodology to account for the water take required to dewater during construction of the northern bund over a period of 2 years which would cover 90% of modelled scenarios. If this does not occur, the proponent would be required to dewater over a longer timeframe to be within existing licensed entitlements. This option is viable but may have some risk in terms of timeframes.
- The Minister for Water has asked DCCEEW Water to consider two options to address the project's water licensing constraint. A preferred option is not expected to be ready for the Minister's consideration until the end of 2024.

CGO acknowledges the risks associated with construction of the northern section of the LPB and have identified opportunities to mitigate risk of water captured behind the bund required to be accounted for by Water Access Licenses (WALs). Timing for construction of the northern section of the LPB is currently anticipated for H1 2025 subject to approval and any post approval requirements being implemented.

Closure of the LPB Groyne, and requirement to commence pumping of water captured behind the LPB would not commence until water levels within Lake Cowal are below the Lake Cowal overflow to Nerang Cowal, which sits at 205.6 mAhD (noting water levels in Lake Cowal as at the end of July 2024 are at 204.92 mAhD). The rate of pumping will be determined by the volume of water captured and the volume of WALs in the absence of any options being in place by the Minister for Water to address the current Water Licensing constraints.

Construction of the southern section of the LPB is not anticipated to commence until Year 4 of the Project (currently anticipated to be 2028). Given the completion of the southern section of the LPB is not required until mining commences in E41 pit (currently anticipated to be in Year 7 of the Project or 2031), CGO considers there to be sufficient time for a resolution to the current water licensing constraints to be finalised, should these constraints persist at the time construction of the southern section of the LPB commences.

Recommendation 1.2

The Department of Planning, Housing and Infrastructure advise the proponent to ensure a Water Access Licence (WAL) with sufficient entitlement nominates the relevant work to account for the proposed water take for the saline borefields and pit dewatering.

Noted. CGO will ensure all WALs relating to water take from the saline borefield nominates the relevant work to account for the water take and pit dewatering as required.

MEMORANDUM

Response to RFI #7 – Groundwater

> Recommendation 2.1
>
> The Department of Planning, Housing and Infrastructure requests the proponent to:
>
> - Provide an explanation of the implications of the additional groundwater information detailed in EMM's memo dated 2 July 2024 on the mine's groundwater impacts and water licensing requirements.

The new information presented in the EMM memo dated 2 July 2024 does not require any changes to the assessment presented against the minimal impact considerations of the NSW Aquifer Interference Policy (AIP) in Section 6.4 of the GIA. As stated in the GIA, in accordance with the AIP minimal impact considerations, the maximum cumulative groundwater level drawdown for the Project was assessed from the year 2012, consistent with the commencement of the Lachlan alluvial water sharing plan (WSP). Cumulative variation in the watertable and/or pressure head decline criteria in the AIP are for 'post-WSP' variations only. EMM understands the reference to 'post-WSP' (in regard to minimal impact considerations) to mean that projects/activities should be assessed against environmental conditions at the time of a WSP first being enacted (or soon after), allowing for climate variation. It is an acknowledgement of activities prior to commencement of the WSP, which in this case include borefield pumping and some mining activity.

To determine the drawdown under the AIP requirements, the following elements were included in the 'AIP cumulative impact' scenario:

- the proposed project (pit expansion)
- existing and approved open pit and underground
- borefield and landholder groundwater pumping.

This scenario was then compared against the conditions experienced during 2012 to determine cumulative drawdown impacts in accordance with the AIP requirements, therefore no update to this assessment approach or results are required.

Similarly, water licensing requirements are not affected by the additional data presented, are these are determined by conservatively predicted groundwater inflows to the mine and borefield extraction requirements.

> Provide comment on the suitability of the use of the constant head boundary in the north.

The memorandum dated 2 July 2024 shows a breakdown of modelled fluxes and drawdowns associated with combinations of landowner and mine-related groundwater abstraction. These results show the majority of boundary effects arising associated with landowner pumping, rather than mine borefields. EMM considers these results to show the use of constant head boundary cells as suitable and not having implications on the mine's groundwater impacts and water licencing requirements.

> Recommendation 2.2
>
> The Department of Planning, Housing and Infrastructure require the proponent to complete the recommendations in Table 4.1 of EMM's memo dated 2 July 2024 with respect to the future groundwater analysis, modelling and reporting.

Noted. CGO will ensure commitments made regarding future groundwater analysis, modelling and reporting are implemented.

Response to RFI #8 – Groundwater

More than 2 m of drawdown (cumulative) is predicted at four privately owned bores and groundwater dependent ecosystems to the north of the mine. Please clarify whether a >2 m drawdown at these bores and GDEs is predicted to occur as a result of the existing project without the open cut extension.

Also, was a >2 m drawdown predicted at these bores and GDEs for the approved project?

In accordance with the Aquifer Interference Policy (AIP) minimal impact considerations, the maximum cumulative groundwater level drawdown for the Project was assessed from the year 2012, consistent with the commencement of the Lachlan alluvial water sharing plan (WSP). Cumulative variation in the water-table and/or pressure head decline criteria in the AIP are for 'post-WSP' variations only. EMM understands the reference to 'post-WSP' (in regard to minimal impact considerations) to mean that projects/activities should be assessed against environmental conditions at the time of a WSP first being enacted (or soon after), allowing for climate variation. It is an acknowledgement of activities prior to commencement of the WSP, which in this case include borefield pumping and some mining activity.

To determine the drawdown under the AIP requirements, the following elements were included in the 'AIP cumulative impact' scenario:

- the proposed project (pit expansion)
- existing and approved open pit and underground
- borefield and landholder groundwater pumping.

This scenario was then compared against the conditions experienced during 2012 to determine cumulative drawdown impacts in accordance with the AIP requirements. It was from these cumulative drawdown results presented in Section 6.4 of the GIA, that it was determined that the four bores (GW028040, GW702262, GW704641 and GW065263) and the GDEs to the north of the Project could potentially be impacted on.

A comparable scenario comparison, but without the proposed project (pit expansion), against the 2012 conditions was not undertaken as part of the groundwater impact assessment for this Project, as these aspects were already approved. Therefore, the requested clarifying drawdown results for the existing project without the open cut extension under comparable AIP minimal impact consideration requirements are not available.

The hydrogeological assessment and groundwater impact assessment written to support the Cowal Underground Development EIS Mine Site (Coffey, 2020) and the CGO Underground Development Project Modification 1 (EMM, 2022), respectively, both determined that these (now approved) projects would not impact on any landowner bores or high priority GDEs. However, it must be noted that these assessments were based on a mine site-scale model which did not extend as far as the borefields, nor to the south to the Billabong and Maslin centres of landholder extraction. The model used to support the current proposal has a more regional extent (approximately 97 km long and 65 km wide), enabling prediction of cumulative impacts incorporating borefield and landholder extractions.

MEMORANDUM

Response to email RFI date 23 July 2024

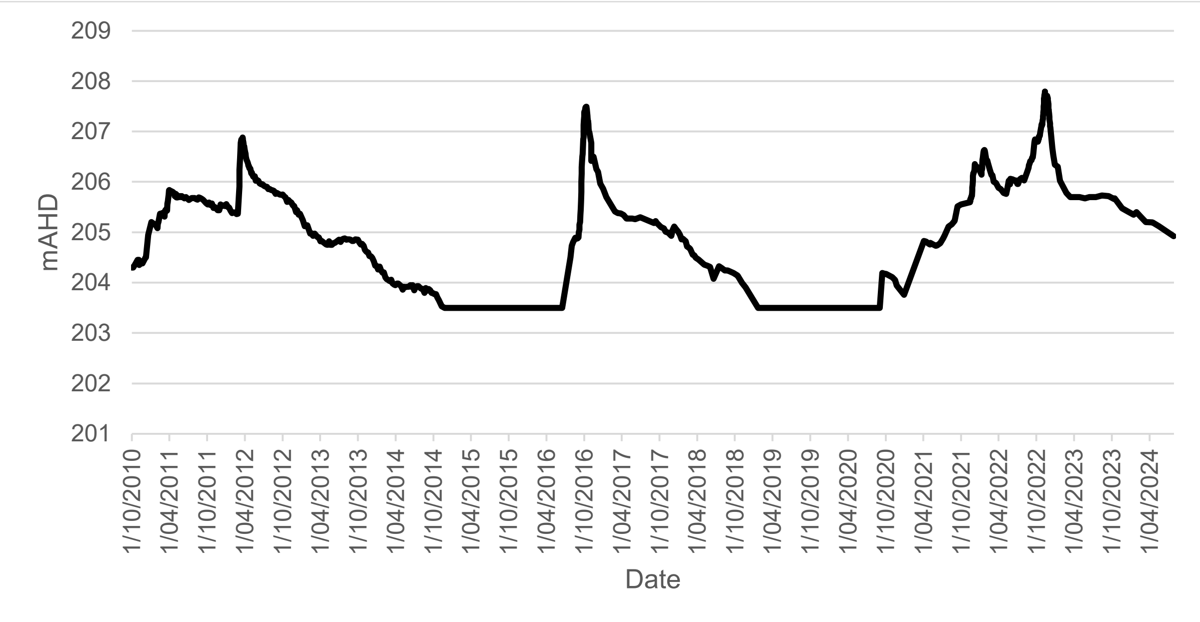
The noise report notes overpressure and ground vibration limits have complied since 2018. Why was this year selected? Were CGO non-compliant before this?

Historical blast data (measured overpressure and vibration) provided by Evolution was made available for analysis from 2018. No data analysis was undertaken to determine historical blast compliance prior to 2018.

How full (%) is Lake Cowal at the moment?

Measured water levels in Lake Cowal since 2010 are presented in **Figure 9**. The highest recorded water level in Lake Cowal was 207.8 mAHD recorded in November 2022. Water levels, as at the end of July 2024 were at 204.92 mAHD which represents about 98% of the highest recorded water level. PMF modelling indicates water levels may reach 210.54 mAHD. Current water levels represent about 97% of the PMF levels within the Lake.

Figure 9: Long-term measured water levels in Lake Cowal



Does Eastern Saline Borefield DA include a connecting pipeline?

Development consent (DA 2011/0064) for the Eastern Saline Borefield was originally granted on 20 December 2010 by Fobes Shire Council, and subsequently modified on 3 August 2020. DA 2011/0064 authorises the construction and operations of four bores and a series of connecting pipelines to connect the Eastern Saline Borefield bores to the existing water supply pipeline that connects the Bland Creek Paleochannel (BCP) Borefield to the mine. The BCP Borefield and water supply pipeline is currently authorised by DA 14/98. Approval to transfer water from the Eastern Saline Borefield to the mine was granted on 6 July 2011 under modification 10 to DA 14/98.

MEMORANDUM

What's the reason for not including the Eastern Saline Borefield in the project? Is there an opportunity to include it?

The decision to not include the infrastructure associated with the Eastern Saline Borefield as part of the Project was due to potential risks of being unable to surrender DA 2011/0064 due to the requirement to obtain landowner consent to authorise its surrender. Inability to obtain landowner consent to surrender DA 2011/0064 could potentially result in a non-compliance with any conditions of the Project that require the consent to be surrendered. The infrastructure is already approved and located within designated easements to ensure ongoing access and maintenance.

CGO acknowledges that it is common for new State significant development (SSD) consents to subsume the obligations of existing development consents. A condition requiring the surrender of DA 2011/0064, and for the infrastructure and associated operations of the Eastern Saline Borefield by SSD-42917792 could be accepted, noting the risk that landowner consent to surrender DA 2011/0064 may result in this being unable to be achieved.

Closing

I trust this information is sufficient for your purposes. If you require any further information or wish to discuss these issues in more detail, please contact me on 0499 091 666 or email Pierre.Miquel@evolutionmining.com.

Yours sincerely,

DocuSigned by:
Pierre Miquel
E4F471D1609F4F5...

Pierre Miquel
Evolution Mining
Project Director and Study Principal

8/27/2024

Attachment 1

Detailed response to Douglas Partners Report

MEMORANDUM

Review of Cowal Gold Operations Geotechnical Pre-Feasibility Study – Cowal Expansion Project: Mining One Report 6171v2_FINAL

Section	Issue summary	CGO response
3.1 General	The PFS for the Project appears to comprise four principal parts: • Expansion of the E42 pit from Stage H to Stage I; • Construction of a new in-wall ramp (IWR) to replace the current spiral ramp within the pit; • Excavation of three new satellite pits (E41, E46 and GRE46); and • Expansion and new construction of waste rock dumps. It would also appear that it should include an additional part to cover the modification of the levee/bund arrangements that separate the pits from Lake Cowal, however this appears to have been excluded from the report.	The Douglas review report noted the key aspects covered by the components considered by the PFS report. CGO note that the aspect of the IWR (In Wall Ramp), considered as part of the PFS, was determined not be a viable go forward option, and does not form a component of the Project or EIS for which approval is sought. Although the Lake Protection bund (LPB) was not included in the PFS geotechnical and design documents provided to Douglas Partners for review, this aspect of the Project is considered extensively in the overall PFS.
	The Pre-Feasibility Study (PFS) is generally a thorough and well written report, albeit limited by shortcomings and gaps in the base data. However, these are clearly acknowledged in the report and their potential risks/consequences are recognised. For the data that was available, the report presents a well-founded analysis, with clearly stated limitations.	Noted
	It is significant that only limited new factual data appears to have been acquired to support the PFS because "a field program could not be organised and completed in a	Since the completion of the PFS, CGO has completed additional geotechnical drilling, with outcomes presented in the feasibility study (FS) report (refer to *FS_Chapter 6_*

MEMORANDUM

<table>
<tr><th>Section</th><th>Issue summary</th><th>CGO response</th></tr>
<tr>
<td>3.2 Geological and Geotechnical Models</td>
<td>reasonable time frame.” It is noted that although a core drilling program for E41 was completed in May 2020, it “did not allow sufficient time for laboratory testing and completion of this aspect of geotechnical work” and that “Mining One was directed to use the E42 parameters for the slope stability assessments …. for the use of satellite pit stability”</td>
<td>Geotechnical & Hydrology). A copy of this report was provided and considered as part of the peer review process.

The additional information has been incorporated into the sites geological database which is used by CGO. The additional data collected validated all geotechnical logging data available until 2022 and was used to inform the FS.

Sources of Geotechnical Drill data is outlined in the following table. The 2022 data incorporated a Geotechnical drill program designed to address the information shortfalls identified in the PFS report as reviewed by Douglas.
<table>
<tr><th>Item</th><th>Name and Origin</th><th>Source year</th><th>Source & Project</th></tr>
<tr><td>1</td><td>2003 SRK
(Drilling logs)</td><td>2003</td><td rowspan="4">PFS and OP projects.
Included as part of dataset 8.</td></tr>
<tr><td>2</td><td>2010 AMC
(Drilling Logs)</td><td>2010</td></tr>
<tr><td>3</td><td>2012 AMC
(Drilling Logs)</td><td>2012</td></tr>
<tr><td>4</td><td>2014 CGO
(Drilling Logs)</td><td>2014</td></tr>
<tr><td>5</td><td>2016 Mining One
(Drilling Logs)</td><td>2016</td><td>PFS and OP projects.
Mining One Project 2213_G

Included as part of dataset 8.</td></tr>
<tr><td>6</td><td>2020 Mining One
(Drilling Logs)</td><td>2020</td><td>PFS/OP</td></tr>
<tr><td>8</td><td>2020 SRK
Database Validation Project</td><td>2020</td><td>Validated and compiled data set with most pre-2020 geotechnical logging.</td></tr>
<tr><td>7</td><td>2021 Mining One
(Drilling Logs)</td><td>2021</td><td rowspan="2">CGO – OPFS
Uploaded to CGO’s Data shed environment.

Limitations to data uploaded exist.</td></tr>
<tr><td>9</td><td>2022 – ongoing Mining One
(Drilling Logs[1])</td><td>2022</td></tr>
</table>
</td>
</tr>
</table>

Section	Issue summary	CGO response
	No new groundwater studies were undertaken to support the PFS either, so that conceptual groundwater models had to be adopted. Douglas are unaware what additional data was acquired for the E41 pit or if/how it was incorporated into the FS.	CGO engaged Valenza engineering in 2023 to develop an updated groundwater model to support the Project The model was completed in 2024 with outcomes being used by CGO to inform ongoing refinement of the geotechnical design aspects of the Project. The groundwater model will be regularly reviewed and calibrated as the Project progresses using data as it becomes available. This model will be used by CGO to inform the ongoing geotechnical design refinements and risk management actions throughout the Projects construction and operation.
	In general, the surficial units, which are relatively deep, are poorly characterised. As there is only limited rock mass data for the satellite pits from geotechnical drilling, and no soil or rock testing data, the general nature and character of the Transported and SoX units were taken to be consistent across the project areas. Defect data for the surficial layers in the E41 and E46 pits was limited to that which was measured from drill cores, which is described as being subject to drilling bias (which is not clearly elaborated).	The FS incorporated additional data review and validation not available as part of the PFS, including: • Validation of all logging data from 2003 – 2022, including isolation of data to remove bias. • Validation of lithological interpretations to generate a unified model with curated geological domains for geotechnical analyses. • Updated structural model, from 20 high-confidence faults to nearly 100 modelled. CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project. The purpose of the final void management plan will be to integrate planning and designing for closure early in the Project life. The final void management plan would be prepared within 6 months of approval being granted and developed in consultation

Section	Issue summary	CGO response
		with the Resources Regulator and DPHI. The final void management plan would include: • Collation of a knowledge base for the Project with detailed data such as: - Chemical and physical properties of the regolith strata in the oxide and transition zone of the pit walls - Pit wall mapping – use geological and geotechnical data to increase the mapping from oxide, transition and fresh rock - Hydro-geological aspects including operational dewatering data • Documentation of technical gaps and scoping for ongoing technical investigations • Development of a schedule for undertaking the additional technical scopes which will include the following key aspects: - A mining study to quantify final landform of the mining areas. changes to pit wall geometry over the life of mine including evaluating standard (linear berm, bench, batter designs) and / or geomorphic designs that may provide better long term surface water management and erosive controls. - Dewatering study to evaluate operational, transitional and closure plans for (active / passive) dewatering of the erodible pit walls. - Quantifying material erodibility using an industry recognised method of modelling. - Material assessment study to verify final pit wall chemical and physical properties and available materials for stabilising the erodible pit walls - Revegetation studies to determine which plants may be most effective for long term dewatering within final pit walls – these could be pot or in-pit trials

Section	Issue summary	CGO response
		- Hydraulic design studies to verify flow rates, velocities, and management controls for the final landform design. Progress of implementation of the final void management plan would be documented in the sites Annual Review and incorporated into the Forward Program prepared as part of the Project's rehabilitation management plan.
3.3 Hydrogeology	At the time of the PFS for Stage I and the satellite pits, the only detailed groundwater model was that previously prepared for Stage H. It is reported that it was not possible for the hydrological consultants to update the Stage H model for Stage I "due to time constraints" and the geotechnical consultants "elected not to attempt to change the groundwater model, due to constraints of time, software, and lack of hydrogeology expertise. There is a risk that manipulation of the groundwater model by geotechnical engineers may lead to unexpected results." Instead, "a phreatic surface was used for the PFS geotechnical study, instead of using the pore pressure block model." It is noted that "groundwater modelling is recommended for a future feasibility study, and should be similar in method and detail to the 2016 modelling, which has been demonstrated to provide a high degree of confidence." Similarly, no detailed groundwater models were available for the proposed E41 and E46 pits, and it was noted that "It is expected (and it will be required) that the surficial units are depressurised by horizontal drains, similar to E42." To facilitate the PFS, a series of different assumed groundwater scenarios were adopted so that the relative sensitivity could be evaluated	Since the FS study, CGO have engaged Valenza Engineering to develop a new updated hydrology model. This model has been used to validate the findings of the FS study to support the FS design, with no material changes being required in the updated designs. The groundwater model will be regularly reviewed and calibrated as the Project progresses using updated data as it becomes available. This model will be used by CGO to inform the ongoing geotechnical design refinements and risk management actions throughout the Projects construction and operation.

MEMORANDUM

Section	Issue summary	CGO response
3.4 Geotechnical Model Parameters	The PFS report notes limited available material characterisation data for the satellite pits as a limitation, and adopts data from E42 as a substitute. Of particular concern is the available strength characterisation for the surficial layers. It is noted that "it is believed that the previously adopted HoX material strength is disproportionally high for an oxidised and weathered rockmass." Douglas concur with this belief and generally agree with the approach used to justify revised values. The defect strength model adopted is reasonable but the fault strength properties seem high. On the basis of the limited existing data available, the parameters adopted for stability assessment of the proposed satellite pits are reasonable, except as noted above.	The information gaps identified in the Douglas review report were also identified by Mining One as part of the PFS and were further considered during the preparation of the FS report. The FS incorporated rockmass characterisation completed for each project area (i.e. E41, E42, GRE). This information was presented in Appendix C of the FS report and considered in Section 7 of the Douglas review report. CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project.
3.5 Design inputs and acceptance criteria	As is commonly the case for geotechnical design in mines, the Design Criteria adopted in the PFS are selected (and are appropriate) to achieve an acceptable risk to operations and worker wellbeing for the period of mining. Where geotechnical elements (tunnels, walls and embankments) are to be buried or removed during the post-mining site remediation, the appropriateness of design criteria need only be considered for the (usually short) operating life of the mine. Where elements such as highwalls and embankments (including dumps) are to remain as permanent features in the final landform, additional considerations are needed. Beyond the life of mining, the landform returns to potential uses that are likely to be similar to those for the site pre-mining, and the periods for which future performance needs to be considered become much longer. As such, consideration of the landforms shifts from mining to civil, and acceptance	CGO engaged industry specialists for the design of critical infrastructure. Appropriate factors of safety for this infrastructure is contained within the respective areas of the OPC PFS report that was not made available as part of the peer review. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.

Section	Issue summary	CGO response
	criteria typically adopted in civil geotechnical situations become more applicable. Design acceptance criteria for civil geotechnical designs are almost always different (and more conservative) than those used for mining geotechnical designs. There is little guidance available to define what the design acceptance criteria for final landforms should be, and it is appropriate that the mine operators work this out in consultation with the regulating and approval authorities, taking account of likely future site uses and what are considered to be acceptable levels of risk to future land users and the wider community as a whole. In general, Douglas do not believe that the criteria adopted in the PFS are appropriate for the proposed open pits as final landforms, in any general sense. However, without supplementary information in regard to likely future land use, meaningful further consideration is not possible for this review.	
3.6 Stability Analysis	The analysis of the IWR offset adopted an acceptance criterion FoS of 1.3, which whilst potentially unsuitable for assessment of long-term landform stability, is adequate for consideration of the interaction between the cutback and the IWR.	The IWR considered as part of the PFS was determined to not be a viable go forward option and does not form a component of the Project or EIS for which approval is sought.
3.6.1 Stage H Pit	Efforts are made to calibrate the model of displacements using InSAR data for the existing pit, however it is noted that “the modelling is optimised to assess stability in the fresh rock units, and is not expected to accurately reproduce behaviour in the cover sequence because the groundwater	CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this

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Section	Issue summary	CGO response
	conditions in those domains have not been provided for inclusion in the model." This indicates that the PFS contains substantial uncertainty in regard to both the short-term, but especially the long-term, behaviours of the pit shell, and it emphasises the need for more and better data/inputs to the feasibility study for the proposed Stage I cutback.	approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.
3.6.2 Stage I design	It is significant that FoS were not calculated for the cover sequence, in order to focus on the stability in the fresh rock. This is a serious short coming. It is noted that some FoS values for the cover units are indicated in Figure 7-49 and these all indicate marginal stability.	Although not included as part of the PFS, the FS study undertook a back analysis of the 2007 and 2008 failures in the cover sequence and SOX was completed with construction of a 3D numerical model using a calibrated octree mesh for transported materials. The back analysis supported the overall OPC design criteria presented in the PFS and are in line with mining industry practice. CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.

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Section	Issue summary	CGO response
3.8 Satellite pit stability	In undertaking the batter angle review, limitations arising from “a bias in structural data” were again recognised, although they were not elaborated. Although kinematic analyses were completed for the satellite pits, because of these “biases”, “the results of the analyses are reported and not readily adopted for this study”, and instead “for this study, the design parameters sourced from the Stage H FS were adopted. This decision is significant, and for its relative importance, a greater justification would be appropriate. In guiding the interpretation of the outcomes, it is noted that “the 2D Limit Equilibrium (LE) analysis provides a more rigorous analysis, which can be used to optimize the slope configuration” but “… for this stability assessment and level of study, the outcomes of the Slide3 assessments are adopted as an accurate description of the stability stage. This is because the shear surface developed in the program is more likely to represent that observed; especially in surficial material.	Additional information to support the OPC design was incorporated as part of the FS report which included: • Construction of a 3D numerical model using a calibrated octree mesh was completed for each satellite pit. • 5 groundwater scenarios were assessed with varying degrees of depressurisation. CGO are confident that the geotechnical model that underpins the OPC design provides adequate interpretation to support future mining activities. CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.
3.8.1 E46 Slope Analysis	As a result of the assumed phreatic conditions in the 3D assessments, it is found that the proposed design needs to be depressurised to a minimum of 50 m from the pit slope and 100m along the west wall. In the absence of a site specific hydrogeology model, however, the implications of this for slope stability cannot be fully appreciated. It is	Refer to comments in 3.8 above.

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Section	Issue summary	CGO response
	particularly important to appreciate whether any depressurisation that is carried out will be permanent or only for the life of mine. Douglas note that this could be a primary control on the long-term stability of the final pit shell. The uncertainty around the presence and role of relict structures in the surficial cover units extends to the 2D analyses, where it is suggested that even the Transported sediment units may host structures with the potential to act as slip surfaces. The assessment acknowledges that "the likelihood of these relic structures causing instability is not truly understood." In the summary and discussion that follows, it is suggested that batter angles need to be reduced, and further drilling to provide supplementary data is required. It is also suggested that "the results reflect observations of surficial slope performance at E42" although the specific context of that statement is unclear. Overall, the PFS assessment of the E46 pit is inadequate to support reliable assessment of its future geotechnical stability, and it needs to be supplemented by a specific groundwater model and additional geotechnical drilling to acquire suitable data for the assessment of geotechnical stability (as opposed to targeting data regarding the resource).	
3.8.2 E41 Slope Analysis	As was the case for the E46 pit, the PFS assessment of the E41 pit is inadequate to support reliable assessment of its future geotechnical stability, and it needs to be supplemented by additional geotechnical drilling and groundwater modelling.	Refer to comments in 3.8 above.

Section	Issue summary	CGO response
3.8.3 GRE46 Pit Slope Analysis	As for the E46 and E41 pits, the PFS assessment of the GRE46 pit is inadequate to support reliable assessment of its future geotechnical stability, and it needs to be supplemented by additional geotechnical drilling.	Refer to comments in 3.8 above.
3.9 Waste Dump Stability	The assessment of proposed new and extended waste rock dumps is based on a number of significant assumptions. One significant assumption is that saturated zones within the waste dump are not likely to exceed 1.5 m to 2 m deep at the base. Whilst coarse rock rubble will rill and segregate to create a disproportionate amount of coarse material at the base of the pile, in scenarios where Transported and SOX materials constitute more than 60% of the dumped spoil, it should be expected that a greater thickness of saturated spoil may exist at the base of the pile. The consideration of a basal drainage layer in some analyses is appropriate, and should be included in the design if the assumption of a minimal phreatic surface is to be valid. Another significant assumption is that the Transported silty clays and clayey silts are equivalent to Category 2 materials, according to the Simmons and McManus (2004) spoil categorisation framework. Although these are described as low to medium plasticity, they are likely to be marginal with considerable similarities to Category 1 material (mostly clay with predominantly matrix). SOX and HOX may or may not be as good as Category 2, depending on their particular characteristics. Ripped rock spoil may typically be equivalent to Category 3, however it is not appropriate to simply average materials of different category to get an 'average' category.	Waste dumps across site were assessed with a factor of safety exceeding 2.0. Erosion modelling was subsequently completed on these dumps and included in the FS. Waste dump slope angles are not dictated by the geotechnical stability but rather the limitations of erosion. The erosion modelling tested the 1:5 design angles of the dumps and supported this design criteria for all slope lengths on site. This is further supported by current site observations.

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Section	Issue summary	CGO response
3.10 Summary, Recommendations and Conclusions	Significant shortcomings are identified in the data available to support reliable design of the satellite pits. The summary of the PFS notes that "the proposed field programs, engagement of specialist consultants and laboratory testing for the satellite pits could not be completed for the PFS. (Douglas are unaware whether these were completed to inform the FS.) It further notes that: • Slope stability in all three satellite pits is very sensitive to groundwater assumptions; • Potential failures are isolated to the surficial material; • Depressurisation should be undertaken to achieve the required acceptance criteria; • The occurrence of relic structures may present problematic conditions; however, • Current design parameters appear to have managed stability associated with these structures. Numerous limitations are identified for the satellite pit designs, including bias in the drill data; lack of new/specific lab test data; lack of specific groundwater study data and low confidence in the existing structural data. Recommendations are provided for all aspects of the extension project based on the analyses performed throughout the report, along with identification of risks and opportunities. Recommendations for further work to support the Feasibility Study are also provided. These include (but are not limited to): • Development of an integrated lithological model, an integrated drilling data database; a unified testing	The OPC team note the shortcomings in data available to inform the PFS. Following the PFS, CGO implemented a program of works to inform the FS report and refine open pit designs. CGO propose to continue to collect, validate and incorporate data throughout the design and construction or the Project to ensure the open pits are designed and developed with appropriate consideration to risk and data gaps. To support this approach, CGO propose to develop a detailed final void management plan as part of the Rehabilitation Strategy for the Project. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.

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Section	Issue summary	CGO response
	database and locally specific rockmass characterisation models; • Development of integrated material parameter models for each area with reviews of material parameter derivation methods and current parameters; • Re-logging of existing holes and future drilling programs which allow some percentage of metres for geotechnical drilling, logging, and sampling, in particular, logging to include structure and defect data collection with some percentage of future drill holes logged for soil characteristics and nature; • For the relatively shallow satellite pits, more focussed scrutiny of the potential for instability of the HoX and the materials within immediate proximity to primary material; • Modelling to calibrate rockmass parameters by comparing modelled displacements with monitoring data; • Review of field mapping outcomes before data is entered or ranked for confidence, to ensure the quality and reliability of structural data; where possible, with comparisons against photogrammetry; • Detailed fault characterisation should be undertaken, to assess the nature of each fault, maintaining logic and consistency through consideration of their geological relationships.	

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Review of IWL North Expansion Feasibility Design: AECOM Report 60686720 16 January 2023

Section	Issue summary	CGO Response
Section 4 Review of IWL North Expansion Feasibility Design	The Integrated Waste Landform (IWL) is proposed as part of the CGO expansion project, although it was not considered as part of the Pre-Feasibility Study.	The IWL is part of the OPC project and was considered as part of the PFS and is contained in Chapter 7 – Tailings Disposal. CGO have developed a comprehensive design for the IWL that has been reviewed by subject matter experts: • Derrick McKenzie (Evolution Group Head of Tailings) • Neil Mattis – Aecom Technical Lead (Dams) & Subsidence Expert. CGO are committed to responsible tailings management aligned with global best practice for safety, the environment and communities during the life of the Project. CGO's tailings management approach is based on compliance with the sites Tailings Storage Facility Sustainability Performance Standard that is aligned with the Global Industry Standard on Tailings Management (GISTM) 49, and relevant guidelines to ensure structural stability and support risk mitigating actions. The IWL will be operated in accordance with a Tailings Operations Manual and employ monitoring and surveillance systems to monitor tailings storage facility performance over time. Where applicable, real-time monitoring is utilised, and satellite monitoring is also included for all facilities. This information is integrated into a management system that outlines triggers and response requirements by all sites for active facilities. Formal dam safety inspections are conducted at least annually by the Designer / Engineer of Record, and reports are issued to CGO for action of recommendations.
4.1 Material Characterisation	No additional, site-specific information was available for the design of the IWL North presented in this report, despite the stated scope of work suggesting that it would.	The IWL is part of the OPC project and was considered as part of the PFS and is contained in Chapter 7 – Tailings Disposal. The IWL is an expansion of the existing IWL. The IWL design is based on design principles adopted as part of the Project's MOD 14 and supported by a geotechnical

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Section	Issue summary	CGO Response
		report that incorporates historical drilling data, test pits and piezometer data. A 2022/2023 drilling program was undertaken to support the FS for the IWL. The IWL design has been peer reviewed which confirm the design is satisfactory. For the FS a geotechnical program was undertaken to validate many of the assumptions made in the IWL design. CGO believe the IWL design as presented provides sufficient information to validate the buildability of the structure, but it should be noted that the IWL expansion is not required until after 2030. A detailed program of works to further develop the design is proposed to be completed prior to this date. To support the program of works required to be implemented prior to the commencement of construction of the proposed IWL, CGO propose to prepare an IWL design and closure plan as part of the Project's overall Rehabilitation Strategy. The IWL design and closure plan will be developed in consultation with DPHI and the Resources Regulator and will include a detailed program of investigations required to inform the IWL construction designs, including quantifying material erodibility using flume measurement to provide measured data for erosion modelling using an industry recognised method of modelling. Progress of implementation of the works schedule outlined in the IWL design and closure plan would be documented in the sites Annual Review and incorporated into the Forward Program prepared as part of the Project's rehabilitation management plan.
	Douglas note that the IWL concept is described as storing "70 Mt of dry tailings" and it is unclear whether this implies a dry stacking process, and whether the tailings data presented was derived or dry stacked or wet deposited tailings.	The IWL will receive wet tailings as per the current operation. This approach is noted in Section 4.4 of the Douglas review report which states *"Cowal tailings storages is by sub-aerial deposition, where the tailings are deposited in thin layers on 'dry' beaches which slope gently from the TSF perimeter to a distant central decant point.*

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Section	Issue summary	CGO Response
4.3 Slope Stability Assessment	The design appears to satisfy the ANCOLD criteria at 10 years, but not in the long-term, if the same criteria are adopted. No comment is made as to why the embankments would not need to satisfy the same criteria in the long term.	The IWL design has been peer reviewed which confirms the design is satisfactory and is in line with ANCOLD.
	Excessive erosion of embankment soils could have a serious detrimental effect on its overall stability, and specific consideration should be included. Other approaches to limit erosion such as top-dressing and mulching/seeding should also be considered.	The IWL is constructed with primary rock which is tolerant of erosion, CGO can only assume this comment is made in reference to the clay liner in which clear guidance is provided on the design specification. CGO have a tailings management plan which provides operational guidance when the clay liner is not in specification. Erosion management will be covered in an IWL closure plan.
4.5 Drawings	Sandy paleochannel lenses could occur beneath the site, and that additional drilling is needed to better understand their potential occurrence. Douglas believe that this is an important requirement and that should sandy channels be identified in the additional site investigation, they should be fully excavated and backfilled with compacted clay fill.	An investigative geotechnical program was conducted to support the FS study and identified treatment for the creek areas as well as additional soils. This commentary aligned with the Douglas observations and made recommendations in areas of sandy channels to excavate and backfill with clay. In addition a zone of thin clay required that additional clay be placed to line the base of the new IWL. CGO are comfortable that these have been addressed in the work undertaken for the IWL design.
4.6 Basis for Design (Appendix B)	The BoD also gives brief consideration to erosion control and suggests that minor erosion (defined as up to 0.5m) is acceptable on the 2.5 m thick clay facing. Douglas note that the Google Earth images of the current E42 pit suggest that some of the site soils are prone to significant dispersion and erosion and that it would be appropriate to do more to	The IWL expansion is not required until after 2030. A detailed program of works to further develop the design is proposed to be completed prior to this date. To support the program of works required to be implemented prior to the commencement of construction of the proposed IWL, CGO propose to prepare an IWL design and closure plan as part of the Project's overall Rehabilitation Strategy. The IWL

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Section	Issue summary	CGO Response
	understand and mitigate erosion in the embankments at design stage.	design and closure plan will be developed in consultation with DPHI and the Resources Regulator and will include a detailed program of investigations required to inform the IWL construction designs, including quantifying material erodibility using flume measurement to provide measured data for erosion modelling using WEPP, GEOWEPP or SIBERIA. Progress of implementation of the works schedule outlined in the IWL design and closure plan would be documented in the sites Annual Review and incorporated into the Forward Program prepared as part of the Project's rehabilitation management plan. The clay liner once constructed will be managed in accordance with a sites Tailings Operations Manual and employ monitoring and surveillance systems to monitor tailings storage facility performance over time. Appropriate monitoring will be installed by CGO to monitor the effectiveness of the clay liner.

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Review of Detailed Design Report - Lake Protection Bund: SLR Report 630.30307-R04, v1.2 April 2023

Sections	Issue summary	CGO Response
5.0 Review of Detailed Design Report	From Table 2, this corresponds to the quoted crest heights for the very western ends of the north and south embankments, however for the central length if the LPB, where the predicted wave height is 0.5 m higher than elsewhere, the additional 0.5 m of freeboard does not seem to be included.	Table 2.0 presents the heights to the top of the Lake Protection Bund (LPB) and excludes an additional bund that is intended to serve as a breakwater as well as the vehicle bund this did not form a part of the engineering design but will be required to meet site road design protocols. This will be detailed on the detailed design drawings required to support construction of the LPB.
5.2 Consequence Category Assessment: Appendix C	In the context of environmental impact to Lake Cowal, different criteria should apply to the selection of design crest levels, and different justifications will need to be formulated to select appropriate AEPs for the design flood level and wave height. For a bund required for long-term protection of Lake Cowal in the final landform (a period much greater than the life of mine) the likelihood of wind and flood events of more extreme magnitude is higher.	CGO engaged independent specialists to support the design of the LPB. The designs have been developed consistent with guidance provided. AEP recommendations have been adopted in accordance with this advice. CGO take note, that prior to closure landform should be elevated to at least exceed the PMF (Probable Maximum Flood) levels to provide flood security post mining. The landform should provide sufficient contingency for freeboard and wave action. This structure will be designed to an adequate FoS and will be designed to meet erosion requirements.

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Review of AECOM Reviews of the LPB Detailed Design (17 March 2023 and 28 April 2023)

Sections	Issue summary	CGO Response
6.1 17 March 2023 Review of LPB Design Report V1.1	As a final comment to the AECOM reviews, whilst these seem sound and pertinent to the design and construction of the LPB, like the LPB design itself, they are almost exclusively focussed on the operational life of the LPB and do not seem to consider its performance in the post-mining landscape.	CGO will incorporate ahead of closure a strategy to elevate the LPB to meet PMF.

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Review of FS Chapter 6 Documents – Geotechnical and Hydrology (folder)

Sections	Issue summary	CGO Response
7.2 Appendix B-1 - OPFS - P4000 Modelled Faults and Dykes – Mining One: 2973_G_7309_v	Additional structural data is needed for reliable design in the satellite pits. As the work carried out already seems to have done a thorough job in compiling and integrating data from all existing boreholes and surface mapping approaches, this is likely to require targeted additional subsurface information. For the south-west wall of E42, the likelihood of deficient data due to insufficient exposure is noted. The same is not explicitly noted for the satellite pits.	Data from the drill hole collection was incorporated into the geological model for all mining areas. The drilling program provided adequate information to confirm the design criteria for the satellite pits. At the time of the study the pits were quite shallow and therefore predominantly formed in the oxide zone. Further drilling has been recommended for all areas to further advance the knowledge of these pits
7.3 Appendix B-2 - Stereo net summary_Final_2Aug22	The data presented generally appears adequate and appropriate, noting the acknowledgement that the addition of new additional drilling data has increased the number of recognised discontinuity sets compared with previous models.	Noted
7.4 Appendix C - OPC_FS_P4000_Memo_Geotechical Rockmass Characterisation and Understanding (2973_G_7314_Final 22 February 2024)	Overall, the approach adopted is systematic and logical and volume of data is significant for most of the geological domains considered in E42. The proposed groupings of domains are reasonable and made on a sound statistical basis. The absence of specific analysis for E46 should reduce the confidence of the model in this area.	Noted

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Sections	Issue summary	CGO Response
Appendix E OPC FS P4000 Summary Results of E42 Primary Rock Batter Scale Assessment	These are all reasonable conclusions, given the available data and the analyses that were carried out, but they are strictly only valid for the E42 cutback, from the information provided.	Kinematic Analysis, Swedge Analysis and Wedge Geometry has been prepared for all proposed mining areas to support the selected design criteria. This was deemed suitable for the FS level of study. The E42 analysis was able to be calibrated against observations which is absent from the satellite analysis.

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Review of Lake Protection Bund (folder) Documents

Sections	Issue summary	CGO Response
8.1.3 Geotechnical Design Parameters	It is proposed to adopt a drained friction angle of 35° for lacustrine clays, which is considerably higher than might typically be adopted for such soils. Although there is test data to support this value, Douglas do not believe it is reasonable to adopt a value for the soft to firm lacustrine clay that is 7° higher than the value adopted for the stiff to hard alluvial clay. Based on the information available, similar drained friction angles for both soils would be more appropriate.	The LPB has been designed using information that is supported by test data. During construction ongoing testing of materials will be a requirement of the construction execution and, if compliance is not met, alternative sources from across site will be obtained.
8.1.4 Material Suitability	It is advised that the materials anticipated to be excavated as part of the LPB foundation preparation would be generally considered suitable as a low permeability material provided the organic content matter does not exceed 2%. No advice is provided in regard to materials that will need to be imported (likely to be the entire volume of the LPB).	The current design is supported by test results and therefore based on the data available is a reasonable strategy. CGO also have the nearby current LPB as a point of reference to support this method of construction. Alternative material sources are available on site if testing during construction indicates otherwise.
8.1.5 Construction Recommendations	The context around this is poorly detailed, but Douglas consider that this would lead to poor outcomes in the base of the construction embankment, and that construction in the event of high lake water levels should be reconsidered to avoid the behaviours that are suggested.	Placement of the groin during construction is for the purpose of installing sheet piles which will isolate the mining area from the lake. The water retaining structure will be built behind the sheet piles and therefore be constructed on dry lakebed. CGO's preference is to construct when the lake is dry as this presents the most practical construction method and therefore concur with Douglas's observations. The wet option provides a technical solution in the event construction has to be undertaken in a lake with elevated water levels, but it must be noted that the method involves isolating the lake first using sheet piles. This enables removal of water from the

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Sections	Issue summary	CGO Response
		construction area enabling the LPB to be constructed from a dry quasi dry lakebed.
	A range of generic surface treatments are listed, but no specific recommendations are provided. The potential risks due to dispersive potential are again not explicitly recognised, and treatment of the soils to reduce their dispersive potential is not considered. Douglas consider that this is an oversight.	Allowance has been made for surface treatment. CGO are aware of the dispersive nature of the clay and have made allowance for treatment based on the material testing undertaken.
	Subsequent advice suggests "stabilising the surficial soils with gypsum treatment as per typical design specifications;" but falls short of nominating depths and zones of the embankment to be stabilised or gypsum dosage rates.	As is usual practice the detail design provides specification requiring that materials used for embankment must be tested for dispersivity and be at or exceed Class 4. The design specifies that all earthen fill shall be placed under level 1 geotechnical supervision.
8.1.6 Shortcomings	Limitations of report include Limited (and insufficient) consideration of the shallow sand lenses and what they might mean for the performance of the LPB.	The occurrence of the shallow sand lenses is extensive throughout the surfical materials at CGO. These have been noted near the existing LPB as well as intercepted throughout the various cutbacks on the E42 pit. To date there is limited evidence to suggest that there is connectivity. Furthermore attempts to determine the relationship between these shallow lenses and the lake so far have been inconclusive. This work is ongoing and any changes in the understanding of how these lenses interact with the lake will be incorporated into design updates.

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Sections	Issue summary	CGO Response
		The LPB is designed on the assumption that the observations and experience made on these lenses over the past 20 years of mining will be replicated in the new design.
	Limitations of report include limited consideration of the consequences of constructing the LPB under high lake water level conditions.	Sheet piles is a recognised construction method in the vicinity of bodies of water. CGO engaged industry specialists to provide oversight of this work. CGO understand there are some risks associated with this under high water conditions however the risks are largely business related and the impact from an environmental or safety perspective is considered to be low.
	Limitations of report includes no consideration of the materials (clay and rock) that will be imported to construct the bund.	The SLR interpretive report supports the design with laboratory test work. The design is founded on this information and CGO believe that subject to different findings during construction this is a reasonable position upon which to base the design. Notwithstanding this, CGO do have opportunity to source material from within the nearby pit cutbacks if required to meet material specification. This source of material will be considered if geotechnical oversight during construction determines the local material unsuitable for the construction of the LPB. This process of continuous geotechnical oversight is outlined in the SLR documentation and is usual practice for most dam constructions.
	Limitations of report include, Inadequate consideration of the potential dispersive nature of the locally available clay soils, and specific details of how to mitigate the risks due to erosion and dispersion.	As per note above.

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Sections	Issue summary	CGO Response
8.2 Slope Stability Analysis	This difference may be the result of a transcription error, but if the SILT lenses are present beneath the footprint of the proposed LPB they need to be specifically characterised and assessed for their potential to liquefy and destabilise the embankment. Even a localised and thin silt lens could be detrimental if it were to liquefy in the LPB foundation.	This was a transcript error referencing a 2003 geotechnical investigation. Work in the Geotechnical interpretive report reflects the data that was collected and tested during the OPC FS. Test results have provided the input assumptions used in the LPB design.
8.2.1 Geotechnical Model	Douglas notes that fill material for the new proposed LPB will be re-used from the existing LPB.	The Project does not propose to re-use material from the existing LPB. Material for the construction of the expanded LPB will be sourced on site.
	If the groundwater table was at the ground surface at the time of construction, it would never rise above 4 m below ground level in the long-term.	CGO are unclear on Douglas's interpretation of the groundwater assessment but the LPB was modelled as saturated (water at ground level) for the construction and then over the long term 4.0m below ground level to replicate the drying of the lake. Lake was tested with a maximum water level of 208.5 (1:100 AEP flood level).
	The values quoted in Table 4 appear to mostly meet (and exceed) the target design values comfortably, however Douglas recommend that the analyses be revised with more conservative values for the lacustrine clay shear strength, and for consistent groundwater assumptions.	During construction, material selection will be varied to achieve the design outcome. Most civil construction process employ material testing and validation and where necessary modifications will be made by project Engineers during construction.

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Review of Miscellaneous Documents

Sections	Issue summary	CGO Response
9.2.1 Review of Package 4000 - Geotechnical	They note that "the Western Shear Zone has not been included in the stability analysis, following instruction from CGO and they recommend that it be included in future analysis, as it may be "influential on pit slope stability. Douglas consider that geotechnical models that omit data are may be unreliable and strongly recommend that all known structures and available data be included in any geotechnical model.	The western shear was included in the model as two discrete surfaces rather than a zone. It is noted in Mining Ones report that this may be an over simplification of the feature and that future modelling should consider introducing it as a zone. Work has been progressing on further understanding this zone and based on that work this information will be updated accordingly. Ongoing investigations to inform pit designs will be incorporated into a final void management plan to be prepared in support of the Rehabilitation Strategy. The pit will be remodelled with any new data to determine if conditions have changed sufficiently to inform a change to the design. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.
	They note that "the OPC FS E42 Stage I pit design berm width ranges between 8.8 m to 9.9 m, which seems inconsistent with the FS Appendix E-1a document (PowerPoint slides) which appear to recommend that bench widths be increased to values of 10.5 m to 11.8 m from a previous value of ~10.2 m.	The FS reviewed historical blast practices as well as recent trials and demonstrated that edge loss of up to 50% reduction could be achieved and was subsequently adopted as a part of the FS design criteria. The FS study highlighted this as a risk that requires additional work to validate. 3D modelling tested the regional stability based on the adjusted parameters and stability generally remained stable.

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Sections	Issue summary	CGO Response
		While economic benefits were obvious in this design the real driver for the incorporation of this benefit was to maintain the E42I limits inside the existing LPB so that E42I could be commenced shortly after approval was granted. Blast trials and monitoring is currently underway to validate this assumption. Redesigns of the pit will be carried out subject to the findings of the blast trials. Ongoing investigations to inform pit designs will be incorporated into a final void management plan to be prepared in support of the Rehabilitation Strategy. A highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 is achieved on pit walls within the approved disturbance footprint and without compromising the LPB design. CGO will liaise with the Resources Regulator over the life of the Project and demonstrate, where supported by data, a lower FoS is sufficient for long term stability of pit walls within areas of concern.
	None of the documents provided to Douglas seem to describe this dewatering system in detail, so it is unclear whether this system is passive (involving initial dewatering ahead of mining, which results in self-sustaining groundwater levels thereafter) or active (involving continuous ongoing dewatering to keep groundwater levels at their design levels).	Dewatering replicates current operations and is largely a passive system incorporating horizontal bores. Modelling of groundwater was undertaken based on this assumption but lacked a robust groundwater model. Valenza Engineering delivered a new model in March 2024. This will be incorporated into all future modelling of the GGO geotechnical work. Inclusion of the dewatering method was included in the PFS study as well as in subsequent work.
	It also identifies that there is "a high probability of failure (PoF) / unacceptable factor of safety (FoS) for the E42 Stage I design in the south-	The risk associated with the E42I pit design and the Speyburn fault were identified by the OPC FS team and allowances were made to

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	west corner of the pit, where the pit intercepts the Speyburn fault (regardless of the depressurisation scenario). The scale of this instability is described as having the potential to sterilise around 40% of the targeted resource	introduce engineering controls in the form of Meshing and bolting of the zone to secure the wall. However the recommendation in the report was this strategy is not recommended and redesign of the pit is required. Current designs of the lower levels in the E42 pit have addressed this risk and eliminated most of the failure. A conservative highwall design for open pits has subsequently been provided to DPHI to demonstrate a minimum FoS of 1.5 can be achieved on pit walls within the approved disturbance footprint and without compromising the LPB design.
	Douglas note that it is recommended to "update the GW model as part of the EW work program" but instead recommend that this be done before any works begin. Further to this, Douglas strongly recommend that the outcomes of the updated groundwater models be incorporated into the design and analysis of all elements of the continuation project before the project commences, as uncertainty due to poor groundwater models is a recurring theme throughout the review.	All points regarding the shortfall of hydrology reflect the commentary of the OPC FS study after initial work on an updated model failed to deliver a reliable model. This is noted and accepted by CGO and has since been actioned. CGO have since delivery of the FS engaged Valenza Engineering to prepare a hydrological model. This work is now ongoing and continues to be funded into 2025. A new model was received in Early 2024 and will be used to assess new pit designs. The model is a whole of site model as per Douglas's recommendations.