
19 August 2024

Simberi Sulphides Expansion Flowsheet Selected *Progress Ahead of Schedule*

Highlights

- Saleable Concentrate Flowsheet selected for Simberi Sulphides Expansion
 - Allows remaining testwork program to focus on optimisation of the saleable concentrate flowsheet design
- Early flowsheet selection (previously scheduled for November 2024) driven by:
 - Metallurgical testwork to date showing ~5% higher overall gold recovery than previous testwork due to the addition of cleaner scavenger flotation and improved flotation / regrind conditions
 - Favourable concentrate market conditions suggestive of the ability to negotiate higher gold payable and lower refining charges than previously modelled
- Sorowar ore samples tested were significantly less competent than results from previous testwork programs:
 - Previous samples tested were from outside the current pit design and had higher competency values that were unrepresentative of the ore
 - A single Sizer can be used for crushing rather than a separate jaw crusher and feeder-breaker specified in previous studies
 - Crushing and grinding ore properties are relatively consistent across all orebodies allowing greater mine schedule flexibility, opening up pit backfill opportunities to minimise waste dump sizes and haulage costs
- Commitments made for early commencement of Feasibility Study:
 - Class 4 Design and Cost Estimate commissioned with the Pitch Black Group
 - Requests for Proposals to be issued in September 2024 for Class 3 Design and Cost Estimate
 - Mine scheduling by AMC consultants in progress to take advantage of sequencing flexibility and pit backfilling
- Commitment made to Pre-Expansion Growth Capital items to accelerate development progress:
 - Two Volvo A60H trucks (~40% higher capacity than current fleet) now in service for trials
 - Early purchase of a MMD Sizer suitable for the Sulphides Expansion crushing duty will provide significant improvements in crushing and grinding of current oxide / transitional ores (delivery due in January 2025)
 - Reverse Osmosis Water Treatment Plant for improved plant reliability and gold stripping efficiency
 - Stage 1 Camp Upgrade and Stage 2 plant steelwork / tank refurbishment

St Barbara Limited (“**St Barbara**” or the “**Company**”) (ASX: SBM) is pleased to announce that results of the current testwork program have allowed the early selection of the Saleable Concentrate Flowsheet option for the Simberi Sulphides Expansion, three months ahead of schedule. The testwork program has also confirmed that the Sorowar ore has significantly lower competency than previous test results, reducing the average life of mine (LOM) ore competency by 20% thereby reducing the crushing and grinding energy requirements.

Managing Director and CEO Andrew Strelein said “We are excited by the improvements in the recoveries-to-concentrate and overall recovery being achieved in the flotation testwork we have completed to date. The results have allowed us to take an early decision in favour of the Saleable Concentrate Flowsheet, three months earlier than anticipated.”

“The confirmation of our expectations of the consistency and competency of the Sorowar ore’s crushing and grinding characteristics with those of Simberi’s other ore zones is a breakthrough. The simplification of the ROM pad and crushing circuit was just the first ‘value-unlock’ that we anticipate from this important clarification of the Sorowar ore properties. The testwork program is revealing enormous potential for flexibility in the sequencing of the open pits, pit backfill strategies to reduce waste dump construction and potential savings in waste haulage costs as well as dramatically simplifying mine closure and reclamation planning.”

“The demonstrated benefit of the flotation circuit design optimisation and the value we have unlocked from confirming Sorowar’s ore properties have already delivered a return on our investment in FY24’s comprehensive metallurgical drilling and testwork campaign.”

The Company is well funded to complete the next phases of work and beyond, including the investment in Pre-Expansion Growth Capital. This sets us up to deliver the clearest possible scope of work for the final investment decision anticipated in Q2 December FY26.

Current oxide production at Simberi is expected to operate at around breakeven cashflow for FY25, inclusive of funding a significant Sustaining Capital investment. Accordingly, the FY25 investment in Pre-Expansion Growth Capital is being funded from the Company’s balance sheet. Operating cashflow and AISC are anticipated to improve in FY26 and FY27 with lower Sustaining Capital investment and further improvements in mine fleet and process plant performance. These will be some of the benefits of the investments being made in FY25.

Metallurgical Testwork Update

Comminution Property Testwork

The current comminution testwork results for Sorowar ore has revealed significantly lower (~40%) competency (DWi and Axb) than historical results, indicating lower coarse particle breakage (SAG milling) energy requirements. The DWi value of 2.7kWh/m³ for the current LOM ore blend is ~20% lower than that used in previous studies and the LOM Axb value of 86 classifies the ore as “extremely soft” with respect to competency.

Bond Ball Mill Work index (BWi) values are consistent with previous test results indicating that the fine grinding (ball mill) requirements will be similar. The average BWi value for the LOM blend is 16.4 kWh/t, indicating that the ore is hard in the finer size fractions. The abrasion index values are low (<0.1) suggesting relatively low wear rates can be expected.

Improvement in Sorowar ore crushing and grinding performance was anticipated in the modelling underpinning the 10 Year Plus Outlook for Simberi¹. The results of the full comminution properties testwork for each ore zone will be incorporated into updated LOM projections in conjunction with the new Class 4 design with updated mine scheduling.

Recovery Testwork

Recovery testwork completed to date has been conducted on one flowsheet development composite and three master composites representing the major orebodies. Key outcomes from this testwork are:

- **Saleable Concentrate Flowsheet:** – overall gold recovery for this flowsheet has improved by approximately 5% over historical testwork due to the addition of cleaner scavenger flotation and improved flotation / regrind conditions. Overall recovery for the four composites tested to date averages 90.2%. Gold recovery to the final concentrate averaged 84.4% with a gold grade of 22.1 g/t and mass recovery of 9.9%. The remaining 6% (approximate) is from gold dore recovered from leaching of the float tails. The average head grade for the four tests was 2.6 g/t gold, in line with the anticipated LOM average head grade of 2.5 g/t gold.
- **Concentrate Ultra Fine Grind (UFG) / Cyanidation Flowsheet:** – rougher/scavenger concentrates were ground to 8 µm and leached for 72 hours. Overall gold recovery for the four composites (including flotation tailings leach) were well below what would be competitive with the Saleable Concentrate Flowsheet outcomes. Diagnostic leach results for the UFG concentrate leach residue showed that 91% of the gold not leached was locked in carbonates (9%) and arsenopyrite / pyrite (82%) and unlikely to be economically extracted with cyanidation.

¹ Refer to ASX announcement dated 10 May 2024 titled “10 Year Plus Outlook for Simberi”

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The recovery of the Saleable Concentrate Flowsheet has improved over previous studies and offers a significant advantage over the UFG leach flowsheet. Testwork will now focus on optimising the saleable concentrate flowsheet and understanding the impact of the variability samples on the process design.

Selected Flowsheet

The current design contemplated for the Saleable Concentrate Flowsheet is shown in Figure 1 below.

With comminution testwork now complete, preliminary comminution modelling of the LOM ore blend has confirmed the crushing and grinding circuit configuration and major equipment sizing. Crushing will be via a new MMD 625 Series Sizer. This has recently been purchased. The existing 2.6 MW SAG mill is being retained and will be coupled with a new 5 MW ball mill. The ball mill size is based on a preliminary grind size selection of 106 µm as it showed an improved recovery, grade and concentrate mass pull over the previously selected grind size of 150 µm. Further grind size versus recovery testwork is planned and an economic assessment of the final optimum grind size will be made when testwork is complete.

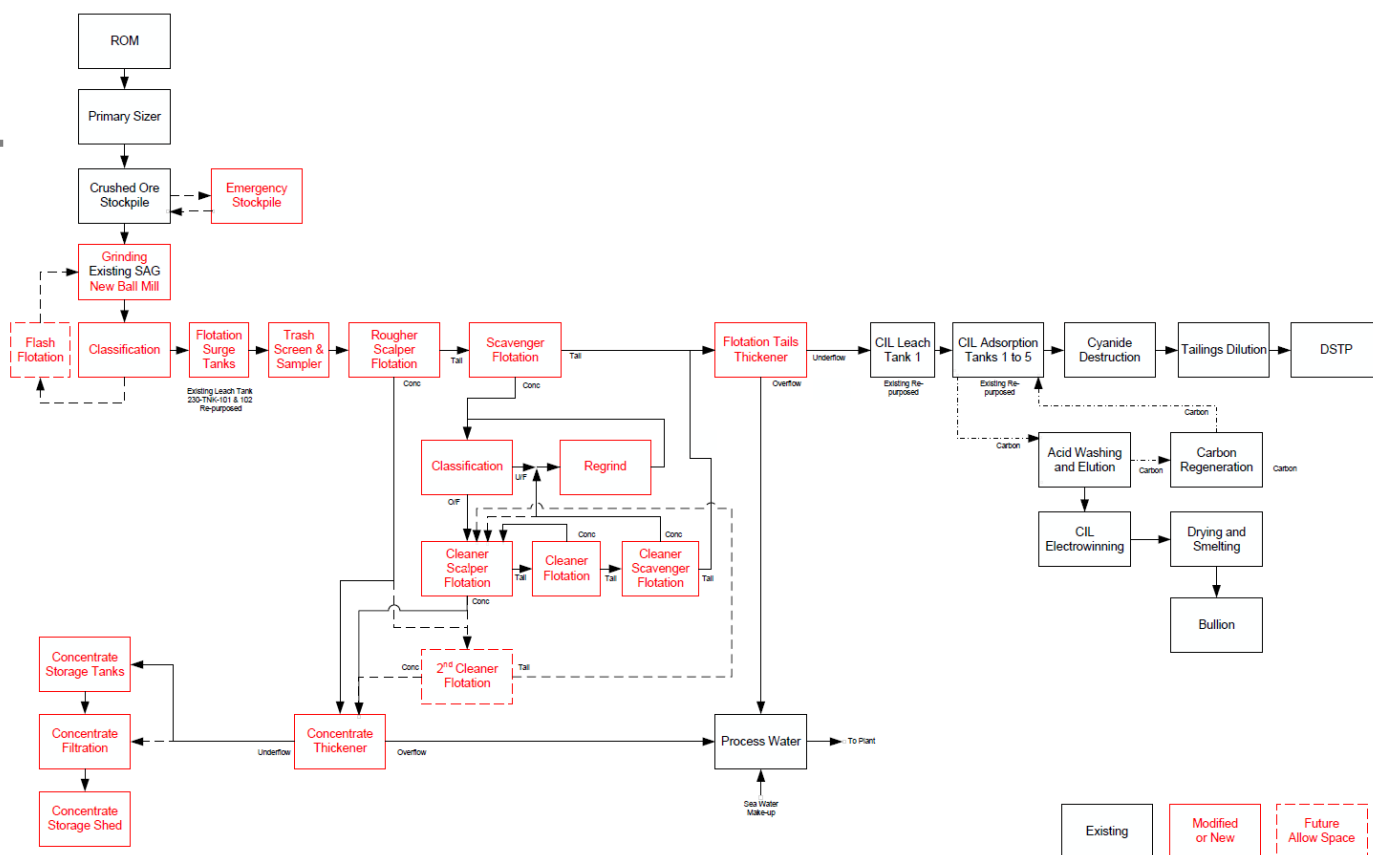
The circuit design that includes retention of the existing SAG mill will minimise downtime related to tie-in of the new circuit. The current Carbon-in-Leach plant has parallel, rather than sequential, SAG and ball milling circuits allowing the SAG mill to continue operating while the new ball mill is installed. The circuit design will also be configured to allow rapid changeover between oxide / transitional ore processing (direct leach) and sulphide ores (flotation and leach).

Cyclone overflow from the new ball mill circuit will be pumped to a new flotation circuit. Flotation circuit configuration and equipment selection will reflect the testwork objectives of:

1. Maximising flotation gold recovery as the tailings leach recoveries are relatively low (<50%); and
2. Producing a concentrate with a gold grade suitable for sale.

Flotation tails streams will be combined and leached in the existing leach/ Carbon-in-Leach circuit. Testwork to date suggests that the leach stage will add approximately 6% to the overall recovery, which justifies its continuing operation for the treatment of the flotation tails. The gold recovered in the leach circuit is much lower than for the current operation and therefore the existing gold recovery circuit will not require upgrading.

Figure 1. Saleable Concentrate Flowsheet – Block Flow Diagram



Pre-Expansion Growth Capital Investment

As previously outlined in the 10 Year Plus Outlook for Simberi², St Barbara has committed to funding some of the Sulphide Expansion activities ahead of the formal investment decision. These investments support the improved performance/reliability of the current operations and/or removes the complexity and improves the timing of the future construction timeline (e.g. camp upgrades and process plant structural refurbishment).

Current pre-expansion activities in progress are described below.

Volvo A60H trucks

Two low hour Volvo A60H trucks were purchased for trialing to confirm performance and cost parameters following the Mine Fleet Selection trade-off study that was conducted late last year. These trucks were identified in the study as being one of the preferred options as they provide a combination of higher capacity than the current small articulated trucks (CAT 740 / 745, Terex TA400 and Rokbak RA40s), whilst maintaining a narrower width and better manoeuvrability than larger rigid body alternatives such as the CAT 777, which is well suited to narrower cutbacks on the smaller pits. These trucks are now in service and are contributing to the current mining operations.

Figure 2. One of the two Volvo A60H 55-tonne dump trucks that have been purchased for trialing at Simberi prior to making the final decision on the choice of truck for Sulphide mining operations.



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² Refer to ASX announcement dated 10 May 2024 titled "10 Year Plus Outlook for Simberi"

New MMD Sizer

A semi-mobile Sizer unit has been ordered from MMD to replace the current feeder-breaker that feeds the Aerial Rope Conveyor (RopeCon). The Sizer will be utilised over the next few years, in a skid-mounted configuration, to provide greater crushing capacity and improved product size on the more competent ore that is being exposed in the deeper parts of the Sorowar orebody. This will improve the RopeCon availability and present a finer feed size to the milling circuit.

The Sizer has been selected to meet the Sulphides Expansion duty specification and will be relocated to its permanent installation at the process plant when the RopeCon is decommissioned. The RopeCon will be replaced by a shorter dedicated haul road to a new run-of-mine (ROM) pad at the Process Plant as part of the Sulphides Expansion.

For FY25 the mine plan has been adjusted to deliver a softer blend to the existing feeder-breaker before commissioning the new Sizer in Q3 March FY25. This will minimise the impact of harder ores on the availability of the RopeCon until the Sizer is commissioned. The RopeCon belt is also being replaced in September 2024, which will also provide additional service life and reliability for the remaining years of oxide processing.

Reverse Osmosis (RO) Plant

An RO plant is being installed at the Process Plant to improve water quality in the gland water system and the elution circuit. Improved gland water will substantially improve slurry pump reliability and hence overall plant availability. Improved water quality will also increase the efficiency of gold stripping in the elution circuit. The RO plant will benefit both the current oxide and future sulphide ore processing.

Process Plant Structural Refurbishment

The program of structural refurbishment continues ahead of the Sulphides Expansion with repair and replacement of steel structures that have degraded from corrosion due to the wet operating environment and proximity to the ocean. This refurbishment will remove these small complex tasks from the Sulphides Expansion scope, for greater certainty on execution, but will also improve reliability of the Process Plant in the lead up to the Sulphides Expansion.

Camp Upgrade

Three phases of funding have been allocated to upgrade the Simberi camp over FY25, FY26 and FY27 ahead of the Sulphide Expansion and full LOM requirements. Phase one consists of updating the electrical supply, replacing the existing dry mess facility, adding an extra 77 rooms, an office consolidation to centralise staff and to free up footprint and new water treatment and sewage treatment plants. Phase two involves the construction of another 224 beds. The third phase involves demolishing rooms at the end of their useful life and replacing them with new rooms suitable for the 10 year plus LOM. Current estimate is that room requirements will peak at around 700 during concurrent oxide operations and Sulphides Expansion construction and then drop back to around 450.

Sulphide Expansion – Next Steps

Table 1 below highlights the main Simberi Expansion work in progress for the remainder of FY25:

- **Resource definition drilling/exploration and sterilisation drilling:** This 9,000m program will continue through to mid-Q4 June FY25 targeting the new Sorowar – Pigiput trend discovery, the extension of the Samat deposit and exploration/sterilisation at Pigibo North.
- **Metallurgical testwork and Flowsheet finalisation:** Completion of the testwork program will continue through to the beginning of Q3 March FY25. This includes optimisation work to finalise the process design criteria.
- **Process Plant Layout and Design (Class 4) Study:** With the crushing and grinding circuit sizing now complete and the flowsheet selected, a new study has commenced to update the previous design. The study aims to interrogate the previous design to identify further improvements in the layout and other key areas such as concentrate handling/shipping and power plant options. The revised layout and design will support an updated capital cost estimate to a Class 4 level (equivalent to Pre-Feasibility Study level design and cost accuracy).
- **Feasibility Study Update (Class 3):** At the completion of the testwork program, the process design criteria will be completed and the Feasibility Study Update will commence. St Barbara will commence the tendering process for the Feasibility Study work in September 2024 with a target completion of the study by the end of FY25.

Table 1. FY25 Indicative Simberi Expansion Project Schedule

Simberi Expansion	Status	Q1 Sep FY25	Q2 Dec FY25	Q3 Mar FY25	Q4 Jun FY25
Resource definition drilling / exploration and sterilisation drilling	In progress	→			
Metallurgical testwork / Flowsheet finalisation	In progress	→			
Process Plant Layout and Design (Class 4) Study	Commenced	→			
Feasibility Study update	Not started		→		

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