

Optimisation Study Identifies Multiple Improvements to Enhance Project Economics

Highlights

- **Multiple areas of improvement compared to the Bankable Feasibility Study identified in latest study. This Optimisation Study focused on two key areas:**
 - Examining the potential to mine higher grade ore or more tonnes earlier in the schedule to enable an increase in margins in the first two years of production; and
 - Optimising Project cashflow through staging and deferring non-essential capital costs.
- **An accelerated mining rate based on information received from leading global contractor miners has significantly improved production during the first two years of operations (~21,000 tonnes of zinc metal) and four years of operations (~36,000 tonnes of zinc metal).**
 - Increased revenue generation during the first four years of production should allow for increased leverage whilst accelerating repayments.
- **Improving the plant ramp-up by delaying the processing facility construction (9 months) so that ore stockpiles can be built up prior to production commencing improves early cashflow. This would also delay initial drawdown on any potential debt facility.**
 - This scenario requires "alternative funding" for mine development, with numerous parties showing strong interest to participate.
- **Initial capital cost reductions in the plan of ~US\$4m have been identified.**

Superior Lake Resources Limited (ASX: SUP) ("Superior Lake" or the "Company") is pleased to provide an update regarding the Optimisation Study ("**Optimisation Study**" or "**Study**") on the Company's Superior Lake Zinc Project ("**Project**") in Ontario, Canada.

Following completion of the BFS (ASX Announcement 28 August 2019), which delivered robust financial returns (pre-tax NPV₈ of A\$224M), driven by exceptionally low operating costs (C1 US\$0.35/lb) and low upfront capital expenditure (US\$87M), the Company commenced work on options to further improve economics. The objective of the Study was to improve the economic returns but more importantly to further increase the Project's debt carrying capacity.

The key areas of focus for the Study were:

- 1) Examining the potential to mine higher grade ore and / or more tonnes earlier in the Project's life. (In the BFS, during the first two years of production, the average grade mined is less than the reserve grade of 13.9% Zn).
- 2) Assessing the benefits of using a mining contractor that could achieve higher mining rates based on a more experienced team, procedures and systems.
- 3) Identifying capital costs that could potentially be deferred until later in the Project's life.



- 4) Staging the Project by looking at options whereby a mining contractor or similar would undertake the mine development work for equity or enter into a project financing agreement to cover these costs.

Mining Schedules

With the support of the BFS mining consultant, the Company investigated options for mining higher grade ore or increased tonnes in years one and two, aimed at improving the Project's debt carrying capacity. Due to the geometry of the ore body, with the higher grade and wider ore zones at the bottom of the Pick deposit, the work primarily focused on increasing the mined tonnes, rather than grades.

After analysing several options, two mining schedules were produced, the basis of which are outlined below, with the BFS basis included for comparison.

BFS schedule basis

- BFS used a single jumbo until month 16 when multiple headings were completed, after which two jumbos were employed.
- Decline rate from portal to top of Pick Upper and between Pick Upper and Pick Middle maintained at 210m/month.
- Production ramped up as stopes were developed and ready for extraction.

Option 1 Schedule Basis

- Decline Rate from Portal to top of Pick Upper changed to 260m/month to enable earlier access to the first ore.
- Decline Rate from Pick Upper to Pick Middle A changed to 300m/month to optimize the production shortfall between Pick Upper and Pick Middle A.
- An additional jumbo is added from start of the schedule to month 22 to optimize the production shortfall between Pick Upper and Pick Middle A and then to maintain sufficient stope production levels.
- An additional 295m of bypass waste development has been added in Pick Lower B to enable bottom-up stoping ore to be brought forward and optimise final years in the schedule.
- Maximum total monthly tonne-kilometres (TKM) is no more than 420,000 to maintain the maximum truck number to 4.
- In months 16 to 22, production is capped at 20 kt / month and in months 28 to 46, production is capped at 30 kt / month.

Option 2 Schedule Basis

- Decline Rate from Portal to top of Pick Upper changes to 260m/month to enable earlier access to the first ore.
- Decline Rate from Pick Upper to Pick Middle A changes to 300m/month to optimize the production shortfall between Pick Upper and Pick Middle A.
- An additional jumbo is added from start of the schedule to month 22 to optimise the production shortfall between Pick Upper and Pick Middle A and then to maintain sufficient stope production levels.
- An additional 295m of bypass waste development has been added in Pick Lower B to enable bottom-up stoping ore to be brought forward and optimise final years in the schedule.
- Maximum total monthly TKM is no more than 420,000 to keep the maximum truck number to 4.
- Months 16 to 22, uncapped production, and months 28 to 46, production capped at 30 kt / month.



The mining schedules for the BFS and two Optimisation cases are shown below in Images 1, 2 and 3, with Table 1 quantifying the variances. Note the BFS schedule tonnes peak in month 25 and then drop off as mid-Pick is being developed with the Optimisation Study attempting to close this out.

The accelerated mining rates were successful in bringing tonnes forward in the mining schedule. In Option 1, with production capped in Year 1, approximately 18,000 tonnes of additional metal was mined in the first two years with a smoother production profile and a smaller dip in month 25.

In Option 2, unconstrained in Year 1, approximately 21,000 tonnes of additional metal was mined in the first two years, but with a peak and trough in the period similar to the BFS schedule. This could be further managed on the RoM pad to develop a smoother production schedule.

In both cases the life-of-mine was reduced by one year (but with the same life-of mine metal production) and a flatter mining profile.

Image 1: Bankable Feasibility Study Mining Schedule

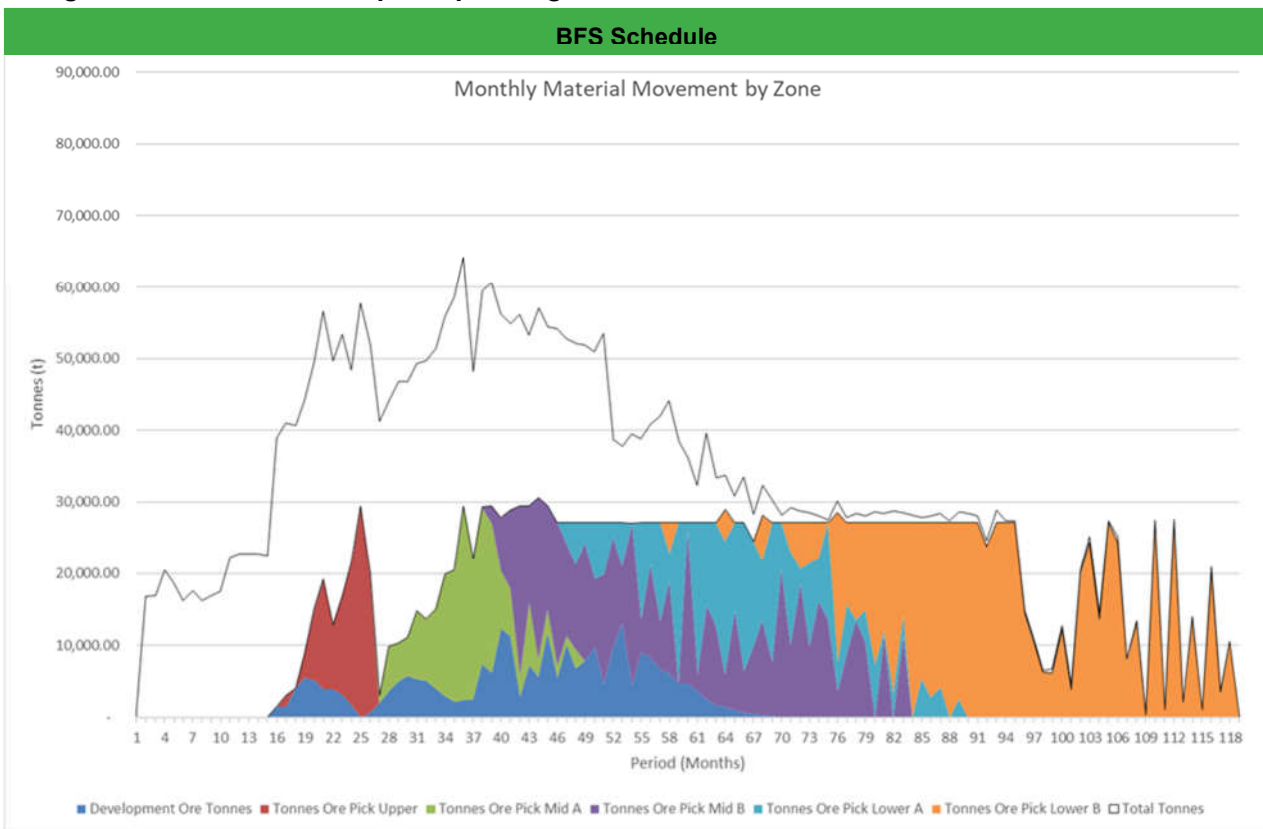




Image 2: Optimisation Study – Option 1 Mining Schedule

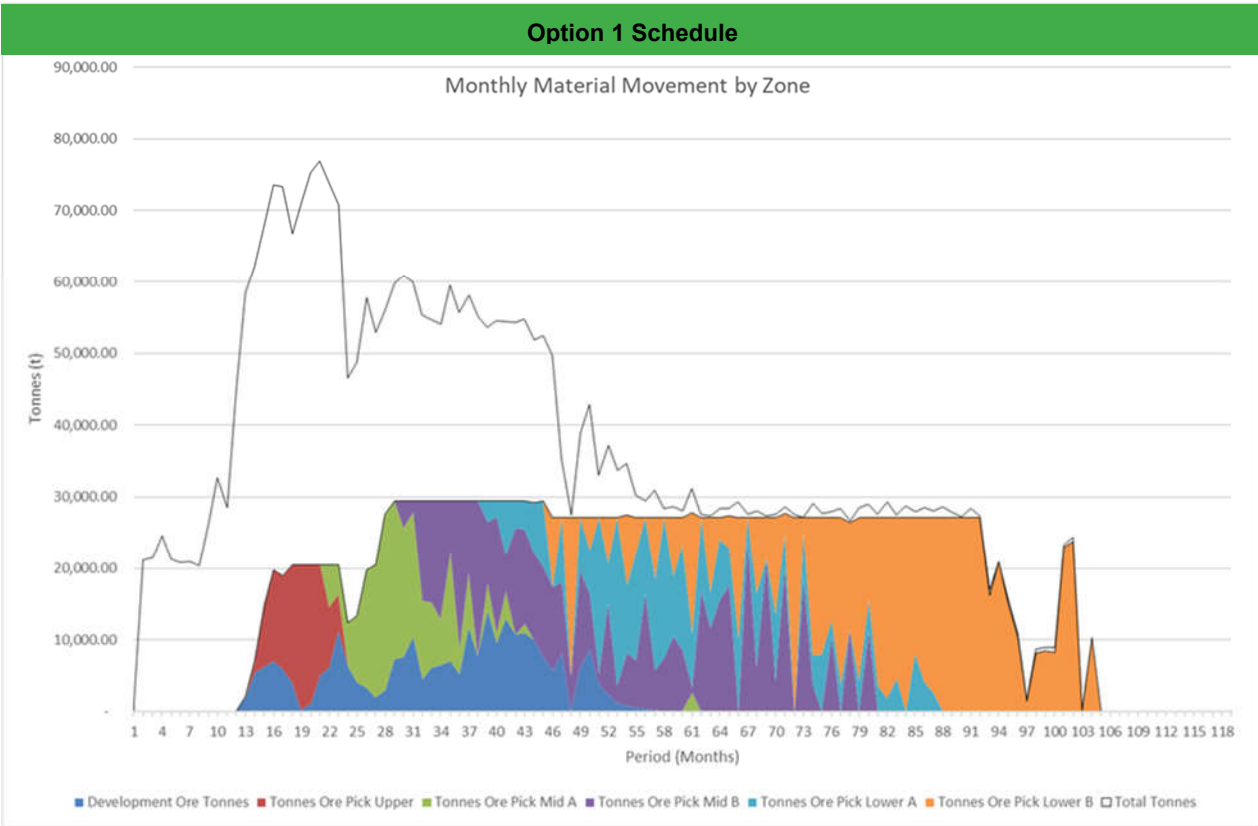


Image 3: Optimisation Study – Option 2 Mining Schedule

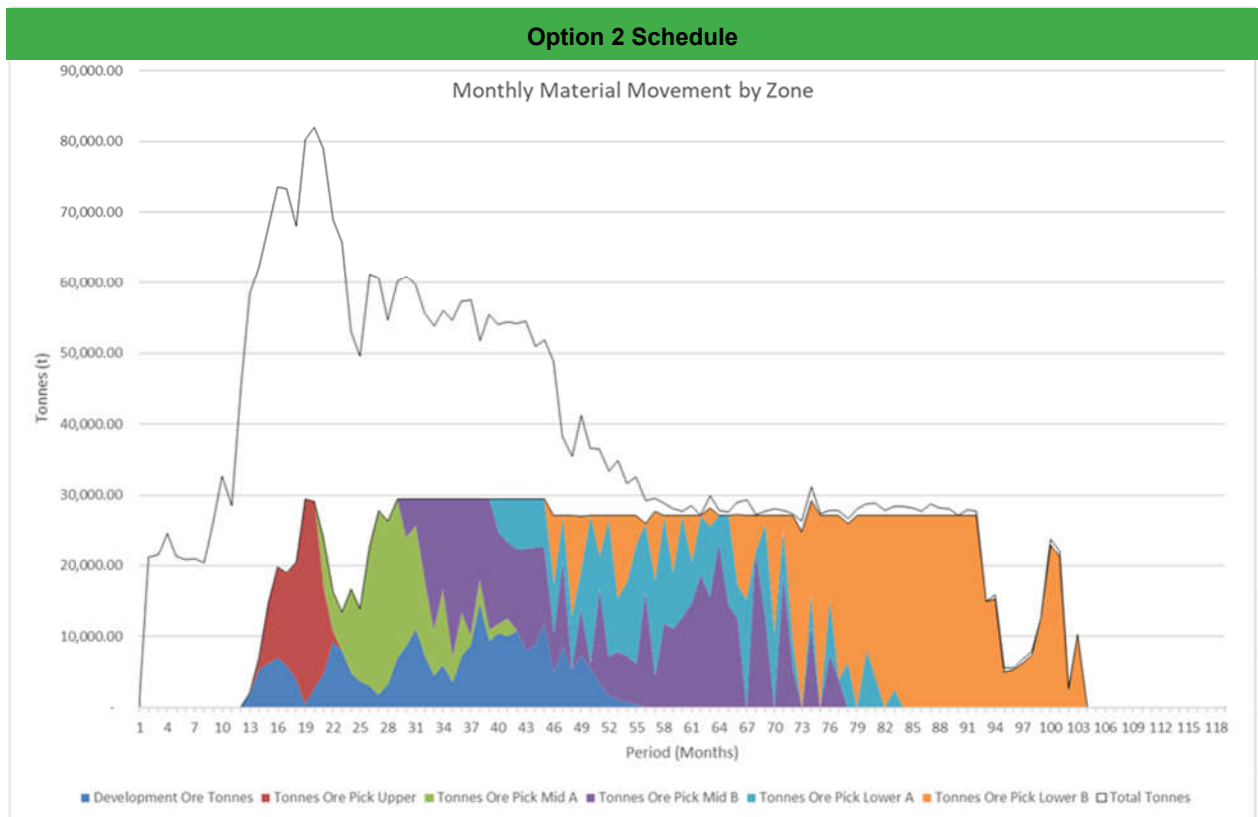




Table 1: Updated Project Capital Cost Estimate

	Total	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9
BFS Schedule										
Ore tonnes (t)	2,202,631	51,584	178,335	312,511	329,400	328,500	328,500	327,910	192,928	152,693
Zn Grade (%)	13.7	10.0	9.6	10.4	13.1	16.4	14.1	13.7	15.9	18.7
Zn Metal (t)	290,076	4,997	16,389	31,265	41,451	51,693	44,450	43,002	29,420	27,410
Optimisation Study – Option 1										
Ore tonnes (t)	2,202,632	144,544	282,068	328,500	325,837	326,450	325,380	325,500	141,352	
Zn Grade (%)	13.7	9.6	9.7	12.8	15.2	16.3	15.3	14.5	13.1	
Zn Metal (t)	290,344	13,332	26,399	40,342	47,722	51,123	47,785	45,865	17,776	
Variance (t)	268	8,335	10,010	9,078	6,271	-570	3,335	2,863	-11,644	
Optimisation Study – Option 2										
Ore tonnes (t)	2,202,632	165,699	284,957	328,500	324,813	326,629	324,166	328,500	119,369	
Zn Grade (%)	13.7	9.2	10.2	12.6	15.5	15.8	15.5	14.6	13.6	
Zn Metal (t)	290,453	14,686	28,009	39,897	48,441	49,626	48,160	46,095	15,538	
Variance (t)	377	9,689	11,620	8,632	6,989	-2,066	3,710	3,094	-13,882	

Contract Mining

The optimised schedules were provided to a selection of Australian mining contractors to produce a revised mining cost estimate for the Project. The contractor estimate considered the accelerated mining rate, the additional jumbo early in the schedule, additional bypass as well as the required manning to support the contractor scenario.

The results indicate an increase in mining costs for the contractor of approximately 25%. Operating costs increased from C\$74/tonne ore to C\$86/tonne with the most significant cost increases seen in sustaining capital. The key driver in most of the cost increases related to labour, specifically labour rates with the contractor using a higher skilled / experienced labour force which entails higher remuneration.

It is important to note that in the BFS, an owner operator model was used with an acknowledgement that new systems, training and procedures will need to be implemented at the start of the Project which would limit mining rates. A conservative mining rate of 210m/month was therefore assumed. A mining contractor with a well-established capability in place is expected to enable a higher mining rate to be achieved in the initial stages.

Project Staging

A detailed assessment was undertaken to determine if delinking the mine development from the remainder of the Project execution could improve economics. This scenario involved stockpiling ore for a period at the beginning of the schedule, with plant construction then delayed so that when the plant commences operations the concentrate production ramp-up is not constrained by the mine development and ramp-up.

The analysis indicated that the plant construction can be delayed by up to nine months, with the plant throughput ramping up to the design value of 300,000 tonnes per year at the end of the first year of production rather than at the end of the second year as per the BFS schedule. This scenario however requires an alternate funding approach for mine development. A number of discussions were held with various Canadian parties that had shown interest in the project, including mining contractors, equipment suppliers and a business consortium. A Canadian mining contractor has signed a confidentiality agreement and is accessing the Project data room. Initial feedback is encouraging and the Company continues to work with the mining contractor to define an optimal case for both parties to consider.



Project Capital Costs

The Company undertook a review of the plant capital costs, specifically contracting methodologies and associated indirect costs. Savings of approximately US\$4M were identified as part this review resulting in a revised upfront capital cost of US\$82.9M, excluding Owner's costs and pre-production expenditure.

Table 2: Updated Project Capital Cost Estimate

Cost Centre	BFS Capex US\$M	Updated Capex (US\$M)
Site General	0.8	0.8
Process Plant	43.5	45.9
Infrastructure	7.5	7.5
Mine Development	13.2	13.2
sub-total Direct Capital Costs	65.1	67.4
EPCM / Management	5.4	5.4
Construction Indirects	7.7	1.9
sub-total Indirect Capital Costs	13.1	7.3
Contingency	8.6	8.2
Total	\$86.7M	\$82.9M



About the Company

Superior Lake Resources Limited

Superior Lake Resources Limited is focused on the redevelopment of the Superior Lake Zinc Project in North Western Ontario, Canada. The Project is a high-grade zinc deposit with a JORC resource of 2.35 Mt at 17.7% Zn, 0.9% Cu, 0.38 g/t Au and 34 g/t Ag (ASX announcement 7th March 2019) and a Probable Ore Reserve of 1.96Mt at 13.9% Zn, 0.6%Cu, 0.2g/t Au and 26.2g/t Ag (ASX announcement 28th August 2019).

Superior Lake Mineral Resource at 3% Zn cut-off grade					
Classification	Tonnage Mt	Zn%	Cu%	Au g/t	Ag g/t
Indicated	2.07	18.0	0.9	0.38	34
Inferred	0.28	16.2	1.0	0.31	37
Total	2.35	17.7	0.9	0.38	34
Superior Lake Ore Reserve at 5.2% Zn cut-off grade					
Classification	Tonnage Mt	Zn%	Cu%	Au g/t	Ag g/t
Probable	1.96	13.9	0.6	0.2	26.2
Total	1.96	13.9	0.6	0.2	26.2

To learn more about the Company, please visit www.superiorlake.com.au, or contact:

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Reference to previous ASX announcements

In relation to the results of the Bankable Feasibility Study announced on 28th August 2019, the Company confirms that all material assumptions underpinning the production target and forecast financial information included in that announcement continue to apply and have not materially changed.