Chaketma Scoping Study Confirms Long-Life, Low-Cost Rock Phosphate Project with Outstanding Economics

Cautionary Statement

The Scoping Study referred to in this announcement is based on further technical work following a scoping study released in 2012. This study remains at the level of a Scoping Study based on preliminary technical and economic study of the viability of developing the Chaketma Phosphate Project by constructing an open pit mine and processing facility to produce phosphate concentrate for export. The Scoping Study outcomes, production target and forecast financial information referred to in this release are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore Reserves.

The Scoping Study has been completed to a level of accuracy of +/-35% in line with a scoping level study accuracy. While each of the modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production target itself will be realised. Further exploration and evaluation work and appropriate studies are required before PhosCo will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

The Company has reasonable grounds for disclosing a Production Target, given that in the first eighteen years of production, being 37% of the published Resources, all mill feed is scheduled from the Measured (88%) and Indicated Resource (12%) categories. The remaining twenty-eight years of the Life-of-Mine (LOM) Production Target is material scheduled from Indicated Resource (92%) and Inferred Resource (8%) categories. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the Production Target itself will be realised. Notably, the Inferred Mineral Resources included in the Scoping Study are not a determining factor in the project viability. As set out in Section 2, the Inferred Mineral Resources are at the end of the mine plan (from year 18 onwards) and the key project economics are not sensitive to excluding the inferred material.

The Mineral Resources underpinning the production target in the Scoping Study have been prepared by competent persons in accordance with the requirements of the JORC Code (2012). For full details of the Mineral Resources estimate, please refer to PhosCo ASX releases dated 15 March 2022 and the earlier ASX release for the Gassaa Kebira Resource dated 17 November 2022.

PhosCo confirms that it is not aware of any new information or data that materially affects the information included in that release. All material assumptions and technical parameters underpinning the estimates in that ASX release continue to apply and have not materially changed.

Forward-looking Statements

This report contains forward-looking statements which are identified by words such as 'may', 'could', 'believes', 'estimates', 'targets', 'expects', or 'intends' and other similar words that involve risks and uncertainties. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions regarding future events and actions that, as at the date of this report, are considered reasonable. Such forward-looking statements are not a guarantee of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, the Directors and the management. The Directors cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this report will actually occur and investors are cautioned not to place undue reliance on these forward-looking statements.

The Directors have no intention to update or revise forward looking statements, or to publish prospective financial information in the future, regardless of whether new information, future events or any other factors affect the information contained in this report, except where required by law or the ASX listing rules.

PhosCo has concluded that it has a reasonable basis for providing these forward-looking statements and the forecast financial information included in this release.

To achieve the range of Chaketma Phosphate Project outcomes indicated in the 2022 Scoping Study, funding in the order of an estimated US$190 million will likely be required by the Company.

Based on the current market conditions and the results of feasibility studies to date there are reasonable grounds to believe the Project can be financed via a combination of debt and equity. Debt may be secured from several sources including development banks, international banks, resource credit funds, and in conjunction with product sales of offtake agreements. It is also possible the Company may pursue alternative funding options, including undertaking a corporate transaction, seeking a joint venture partner or partial asset sale. If it does, this could materially reduce PhosCo's proportionate ownership of the project. There is, however, no certainty that PhosCo will be able to source funding as and when required. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

PhosCo has engaged with debt adviser HCF Consulting and a number of potential financiers on the Chaketma Phosphate Project and these financial institutions have expressed an interest in being involved in the funding of the project.

This ASX release has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions, including sufficient progression of all JORC modifying factors, on which the production target and forecast financial information are based have been included in this ASX release.

PhosCo

ASX PHO

Chaketma Scoping Study Confirms Long-Life, Low-Cost Rock Phosphate Project with Outstanding Economics

PhosCo Ltd (ASX:PHO) is pleased to announce the results of a Scoping Study for the development of a potential large-scale, world-class mining operation at its Chaketma Phosphate Project in Tunisia, strategically located in close proximity to key export markets/end users.

FINANCIAL HIGHLIGHTS

- Strong financial returns, with **after-tax NPV_{10} of US$657M.**
- **After-tax IRR of 54% and payback of 1.5 years from commercial production.**
- Total revenue US$10.1B @ US$150/t FOB North Africa phosphate concentrate *(vs current World Bank price of US$300/t)*.
- Average annual net cashflow (first 10 years production) US$93.4M.
- **Development capital US$170M.**

KEY PARAMETERS

- Low risk open-pit mining and processing to deliver 1.5Mtpa of high-quality concentrate at **greater than 30% P_2O_5 and less than 1% MgO.**
- Construction of a facility to process feed tonnages from 2.7Mtpa to 3.5Mpta.
- **Production target of 128Mt @ 19.9% P_2O_5, from overall 46 year mine life.**
- First 18 years of production from KEL Resource with strip ratio of 3.6:1, scheduled from Measured (88%) and Indicated (12%) KEL Resource.

SIGNIFICANT UPSIDE POTENTIAL

- Large resource could support higher production rate above 1.5Mtpa to match market demand.
- Nearby deposits identified for lower mining costs, including SAB prospect.
- Mining optimisation for greater utilisation of strip mining.
- **Potential to direct ship material in higher grade layer B early in project life.**
- Simplified processing via single stage flotation and/or washing.
- Economies of scale, such as extension of a rail connection to site for lower cost logistics yet to be considered.

NEXT STEPS

- Upon receiving the Chaketma Mining Concession, PhosCo intends to study the optimisation opportunities above and to proceed to a Bankable Feasibility Study.
- Progress discussions with the Tunisian Government and development and commercial banks.

The Scoping Study was prepared based on technical work conducted by a group of leading independent consultants including SRK Consulting (UK) Ltd, Jacobs Engineering Group, Arethuse Geology Sarl and COREM.

PhosCo Executive Director, Taz Aldaoud commented:

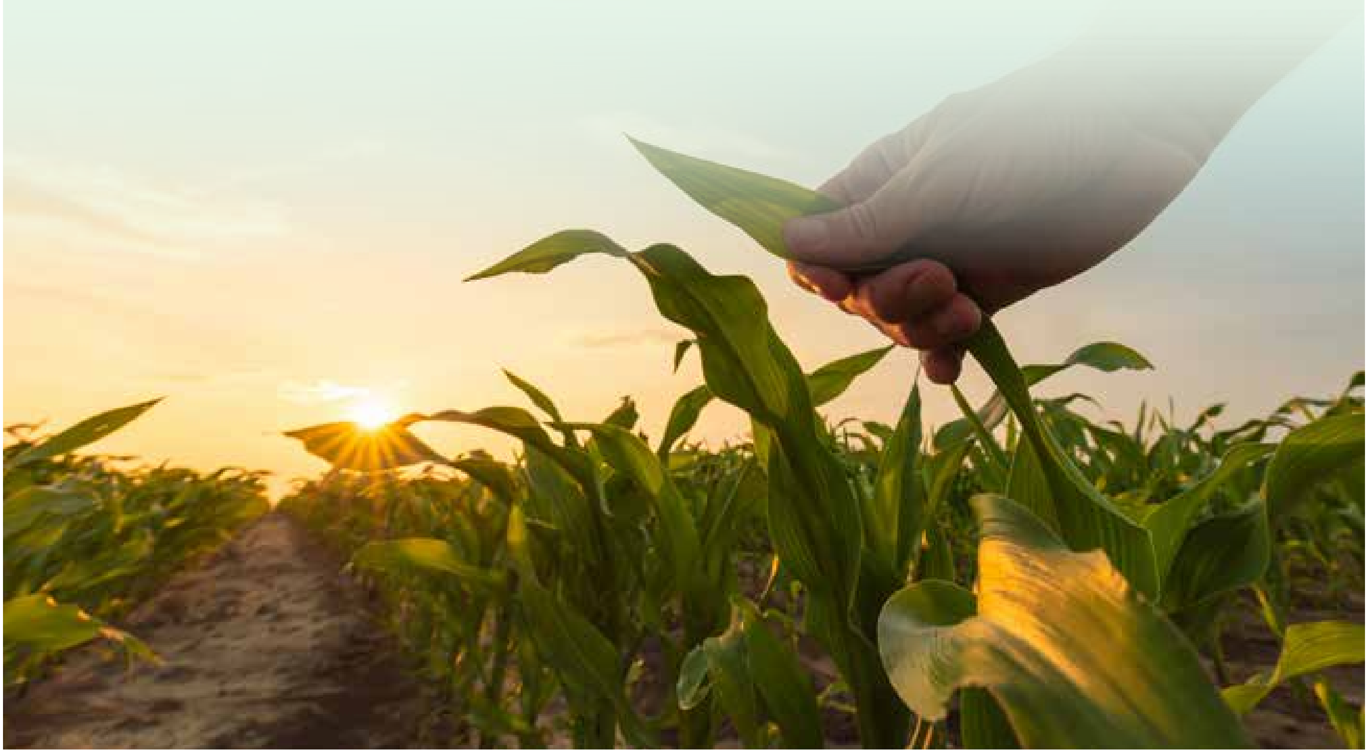
"The Chaketma Phosphate project's Scoping Study results are breathtaking. The robust project economics confirm the potential to generate excellent financial returns over a long mine life of 46 years. The capital expenditure of US$170M will be paid back in just 1.5 years. PhosCo has used a conservative long-term rock phosphate price of US$150/t to calculate a post-tax NPV of US$657M. By way of comparison, the World Bank has most recently reported a rock phosphate price of US$300/t.

These results confirm that the Chaketma Phosphate project truly is world-class, but the work has not stopped there, with our technical team identifying several opportunities to optimise the project parameters even further. The Company will update the market as results come to hand.

The development of Chaketma will provide major benefits to Tunisia and its people. The Project is also being advanced at a critically important time, given the growing concerns globally around food security.

With the Scoping Study now complete, the Company looks forward to commencing a BFS and progressing discussions with both the Tunisian Government and development and commercial banks.

On behalf of the Board, I'd like to thank our entire team and all of our leading consultants for their tremendous effort in producing this Scoping Study."



The key assumptions underpinning the Scoping Study (Table 1) and the key financial results from the study (Tables 2 and 3) are summarised below:

Assumption	Units	Value
Exchange Rate Applied	USD/TND	0.33
Exchange Rate Applied	USD/AUD	0.70
Exchange Rate Applied	USD/EUR	0.98
Phosphate Price	US$/t	150.00
Tunisian Tax Rate, Year 1-5	%	0
Tunisian Tax Rate, From Year 6	%	25
Royalty	%	1
Discount Rate – Real	%	10

Table 1 Key Project Inputs - Financial

Project Physicals			
		Initial 10 Years	Life of Mine
Ore Mined	Mt	27.7	127.6
Grade	%	20.3	19.9
Waste Mined	Mt	95.0	730.6
Strip Ratio – Waste/Ore	t/t	3.4	5.7
Concentrate Produced	Mt	15.0	67.6
Concentrate Grade	%	30.0	30.0
Recovery	%	80.0	80.0

Table 2 Project Outputs – Production

Project Metrics – Financial			
Capital Costs		**Initial 10 Years**	**Life of Mine**
Development Capital	US$M	169.5	169.5
Operating Costs (100% Payable Basis)			
Cash Costs	US$M	1,010	5,215
Contingency	US$M	101	521
Royalty	US$M	23	101
Sales and Marketing	US$M	56	253
TOTAL OPERATING COSTS	**US$M**	**1,190**	**6,091**
.	**US$/t Conc**	**79**	**90**
Project Revenue	US$M	2,250	10,138
Project Cashflow: Pre-Tax	US$M	900	3,887
NPV_{10} : Pre-Tax	US$M	469	787
EBITDA	US$M	1,060	4,047
IRR: Pre-Tax	%		55%
Tax Paid	US$M	115	861
Project Cashflow: After-Tax	US$M	785	3,026
NPV_{10} : After-Tax	US$M	418	657
IRR: After-Tax	%		54%
Capital Payback Period	Years		1.5

Table 3 Project Metrics – Financial

The results from the Scoping Study provide the Company with a high level of confidence that Chaketma has potential to be a tier-1 phosphate project and that there are no red flags, justifying advancing the project to a bankable feasibility study.

PhosCo is pleased to present the Executive Summary of the Chaketma Phosphate Project Scoping Study in the following booklet.

This announcement is authorised for release to the market by the Board of Directors of PhosCo Ltd.

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Follow @PhoscoLtd on Twitter

Competent Person's Statement

The information in this announcement that relates to historic data and Exploration Targets, Exploration Results or Mineral Resources is based on information compiled by Donald Thomson, who is a Member of The Australasian Institute of Mining and Metallurgy and an employee of PhosCo Limited. Mr Thomson has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he is undertaking, to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Thomson consents to the inclusion in the announcement of the matters based on his information in the form and context in which it appears.

The historic data referenced in this report comes from a number of sources (see below). The company cannot vouch for its accuracy and includes to explain the target selection process. Further exploration might not be able to reproduce these results, but no further evaluation is possible until the permits are granted.

PhosCo

Chaketma Phosphate Project

Scoping Study

December 2022

Contents

1. Executive Summary

1.1 Introduction

PhosCo Ltd (**PhosCo** or **the Company**) has completed a Scoping Study for the development of the Chaketma Phosphate Project in Tunisia. The Scoping Study consolidates the extensive environmental, geological, mining and metallurgical works that have been completed over several years and assessed the current status of the project.

Chaketma Phosphates SA (CPSA) is a public limited company under Tunisian law which is 50.99% owned by PhosCo via its 100% owned subsidiary Celamin Ltd. CPSA was created in May 2014, with the purpose of exploration, development and operation of the Chaketma Phosphate Project and has 100% ownership of the Chaketma Phosphate Exploration Permit.

The Scoping Study has been prepared based on a significant proportion of information overseen by Tunisian Mining Services, particularly the 2016/2017 engineering study and associated project work (a period when PhosCo was not in control of the project). The review indicates that most of the work is reliable having been carried out by reputable consultants. However, the opportunity does exist to materially improve the project.

1.2 Project Location

The Chaketma project covers approximately 56 km^2 and is located SW of Tunis, the capital of Tunisia. It is accessed by a sealed highway from Tunis followed by local sealed roads to the project area.

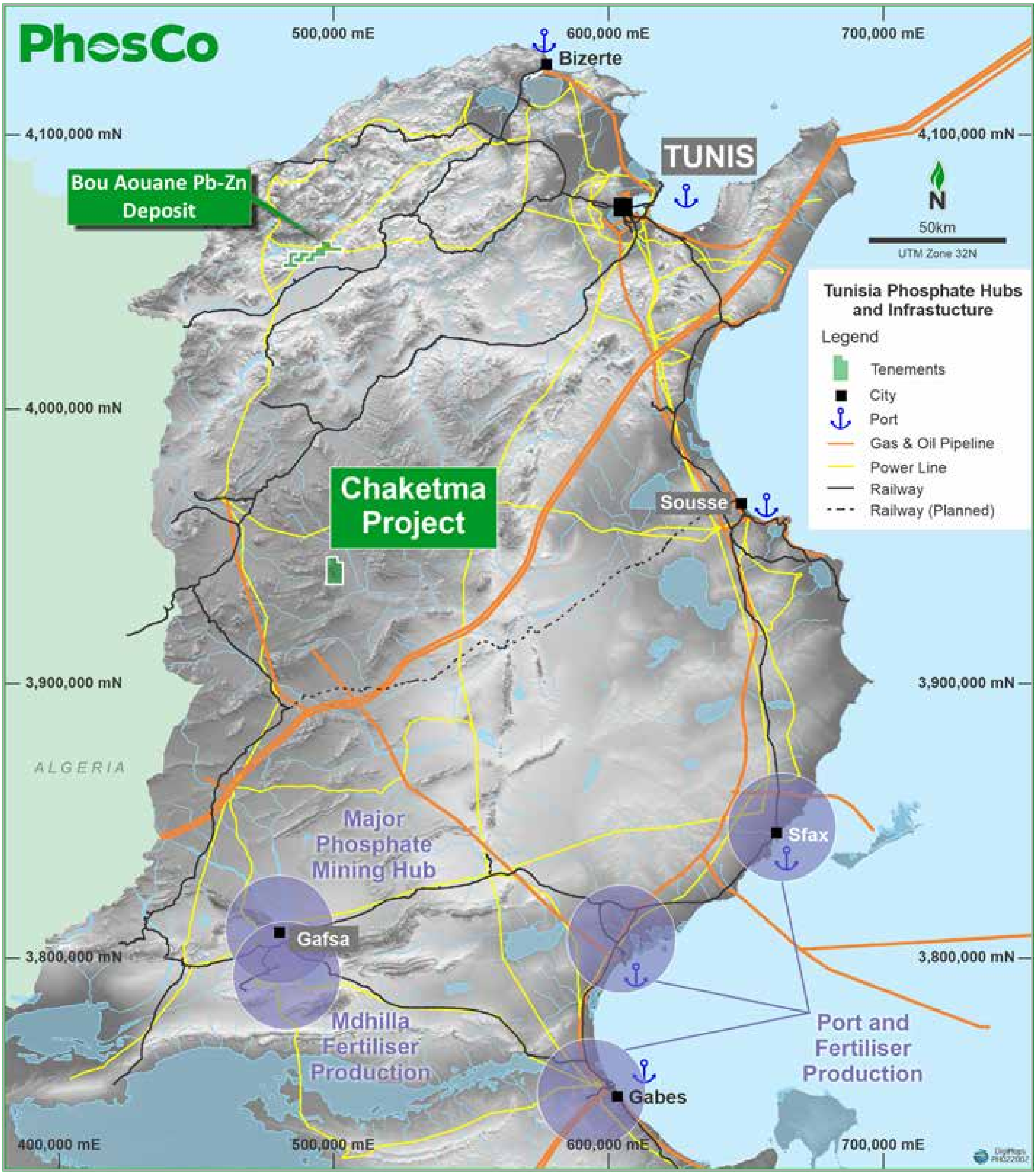

Figure 1.1 Chaketma General Location

1.3 Tenure

The Chaketma Exploration Permit was granted in February 2010 (JORT No 33 22/02/2016) and is held 100% by CPSA. In late 2017, ahead of the expiration of the permit in February 2018, CPSA applied to convert the Chaketma Exploration Permit to a mining concession. As of the date of the Scoping Study, the Chaketma mining concession had not been granted and the application remained under consideration by the Tunisian regulatory authorities. The Chaketma Exploration Permit remains valid and in good standing whilst the application is being considered by the Tunisian regulatory authorities. If the application for the mining concession is formally rejected by the Minister of Mines the exploration permit will lapse.

Under Tunisian regulations PhosCo will be able to apply for an ancillary permit for mine infrastructure, including infrastructure outside of the mining tenement area.

1.4 Project Basis

The Scoping Study comprises the following project concepts:

- Establishing a sustainable and profitable phosphate mining operation, employing local people and adding value to not only the Company but to the local community and Tunisia as a whole.
- Utilising conventional open pit mining operations.
- Phosphate ore mining and processing at a rate to deliver 1.5Mtpa of high-quality concentrate at greater than 30% P_2O_5 and less than 1% MgO.
- Supplying 2.7 to 3.3 Mtpa Run of Mine phosphate ore to a conventional crushing/rod mill/flotation process facility, with a design capacity of 3.5Mtpa.
- A mining operation that incorporates an integrated co-disposal of mined waste rock and dewatered tailings as backfill into the mining excavation footprint to minimise overall site disturbance.
- Upgrading infrastructure to provide power and gas supplies to the site.
- Sourcing water for the project that does not negatively impact on resources currently utilised by the community and initiatives to minimise water consumption.
- Constructing non-processing infrastructure including mining operations, processing facility, administration buildings and mining infrastructure.
- Transporting phosphate concentrate from site to port.
- Port facility for shipping of concentrate product.
- Developing a rehabilitation plan for mined and disturbed areas focused on delivering usable land for agriculture or in accordance with EIA approvals at completion of the various project stages.

The study has not considered the ultimate development of fully integrated fertiliser production in Tunisia to produce high quality products including phosphonic acid, Mono Ammonium Phosphate (MAP) and/or Diammonium Phosphate (DAP).

1.5 Key Project Metrics

The key project metrics as applied to the evaluation of the Scoping Study are summarised in the following tables. The degree of accuracy of the Scoping Study outputs is estimated within a range of +/-35%.

The project economic metrics confirm that the Chaketma Project has the potential to deliver outstanding financial outcomes including an estimated project post tax NPV of US$657M, a post-tax IRR of 54% and a rapid post tax capital payback of 1.5 years.

Operating costs of US$79/t for the first 10 years reflect the low strip ratio open pit, high grade phosphate mineralisation, and the low operating cost environment in Tunisia.

Assumption	Units	Value
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Exchange Rate Applied	USD/EUR	0.98
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NPV_{10} : After-Tax	US$M	418	657
IRR: After-Tax	%		54%
Capital Payback Period	Years		1.5

Table 1.3 Project Metrics – Financial

Concentrate Sale Price				
Breakeven for IRR =	**0%**	**$90.87/t**		
Breakeven for NPV @	**10%**	**$93.20/t**		
Factor	**Price**	**Cashflow**	**NPV**	**IRR**
70%	$105/t	$743 M	$138 M	21.5%
75%	$113/t	$1,123 M	$224 M	27.6%
80%	$120/t	$1,504 M	$311 M	33.3%
85%	$128/t	$1,884 M	$397 M	38.7%
90%	$135/t	$2,265 M	$484 M	44.0%
95%	$143/t	$2,645 M	$570 M	49.1%
100%	**$150/t**	**$3,026 M**	**$657 M**	**54.0%**
105%	$158/t	$3,406 M	$743 M	58.9%
110%	$165/t	$3,786 M	$830 M	63.6%
115%	$173/t	$4,167 M	$916 M	68.2%
120%	$180/t	$4,547 M	$1,003 M	72.7%
125%	$188/t	$4,928 M	$1,089 M	77.2%
133%	$200/t	$5,562 M	$1,233 M	84.4%
167%	$250/t	$8,098 M	$1,810 M	111.5%
200%	$300/t	$10,634 M	$2,386 M	136.4%

Table 1.4 Chaketma Sensitivity – Concentrate Sale Price

Two key drivers for project economics are considered to be:

- The sale price that will be obtained for the concentrate, likely to be determined by market forces and as such outside of project control;
- The feed grade to the process plant that will be determined by site operations.

High level range analysis of the impact of each of those variables, in isolation, is shown in following two tables.

The project economics are not sensitive to the capital cost to develop the project.

Mined Ore Grade				
Breakeven for IRR =	**0%**	**10.8%**		
Breakeven for NPV @	**10%**	**11.2%**		
Factor	**Grade**	**Cashflow**	**NPV**	**IRR**
70%	13.90%	$1,048 M	$207 M	26.4%
75%	14.89%	$1,377 M	$282 M	31.4%
80%	15.89%	$1,707 M	$357 M	36.2%
85%	16.88%	$2,037 M	$432 M	40.9%
90%	17.87%	$2,366 M	$507 M	45.4%
95%	18.87%	$2,696 M	$582 M	49.8%
100%	**19.86%**	**$3,026 M**	**$657 M**	**54.0%**
105%	20.85%	$3,355 M	$732 M	58.2%
110%	21.84%	$3,685 M	$807 M	62.4%
115%	22.84%	$4,015 M	$882 M	66.4%
120%	23.83%	$4,344 M	$956 M	70.3%
125%	24.82%	$4,674 M	$1,031 M	74.2%

Table 1.5 Chaketma Sensitivity – Mined Ore Grade

1.6 Key Opportunities

A number of areas of work have potential to add value to the project:

a) Increase the targeted concentrate production rate from the nominal 1.5 Mtpa, to match market demand/offtake agreements and in line with logical incremental increase in primary process plant equipment and capital constraints.

b) Incorporation of the low strip, but yet to be defined to a publishable resource standard, SAB prospect into the early mine schedule.

c) Early mining of higher grade layer B proportion of the ore body with the potential to direct ship.

d) Alternative process plant scenarios utilsing single stage flotation and/or washable process opportunities.

e) Alternative processing reagents based on developments in the industry since 2016/17.

f) Extension of a rail connection to site to streamline concentrate handling offsite and delivery of consumables to site.

g) Consideration of the use of wastewater from the facilities at Kasserine or Sbeitla instead of, or in addition to the borefield options.

1.7 Environmental, Social and Governance

PhosCo is committed to developing the Chaketma project to international ESG standards. The Scoping Study has confirmed the development of the project is technically and commercially feasible with no red flags identified. During 2022 additional work has been initiated with respect to community engagement with the assistance of ASF Consulting, a Tunisian consulting firm that specialises in the fields of environment, gender, social inclusion, and health and safety in Tunisia and internationally. Initial work undertaken is to assist CPSA in drafting a framework with respect to community engagement namely stakeholder plan, labour plan, and a LARF (Land Acquisition and Relocation Framework). In conjunction with CPSA personnel, the next stage of engaging ASF will be to compile and document a Development Charter for the project.

The Chaketma project has strong community support for its development. Tunisia has developed a high standard of education and skills training with extensive experience in phosphate mining and processing. The Chaketma construction phase will generate 1,000 employment opportunities for local Tunisian people over a two-year period. When in operation, employment opportunities should be created by the project for 330 to 440 local Tunisian people in the nearby communities. Personnel requirements will peak at around 440 persons when the mining strip ratio escalates with the mining of GK. Process and administrative personnel requirements are anticipated to be relatively stable throughout the mine life at 142 persons.

Water will be a key focus for the project, with initial project designs incorporating significant measures to reduce water consumption including filtering of tailings, recycling of all water streams in plant-designs, recycling of mine drainage water streams, and considering domestic wastewater for use in the process. Through these interventions, consumption of 0.7 m^3/t of ore treated can be achieved, less than 50% of other Tunisian phosphate operations.

Tailings from the process plant are benign and will be produced as a filter-cake and stored on a transit storage stockpile for co-disposal with waste rock. Further studies will be undertaken to ensure that chemicals used in the flotation system do not damage the environment during long-term storage on a co-disposal arrangement.

1.8 Conclusions and Recommendations

The Scoping Study confirms that the development of an open pit mining operation supplying a flotation concentrator to produce 1.5Mtpa of marketable rock phosphate product is technically and commercially feasible with no red flags identified.

Given the outstanding results delivered by the Scoping Study, upon receiving the Chaketma Mining Concession, the Board of PhosCo intends to proceed to project optimisation and definition works, and a Bankable Feasibility Study (BFS) for the Chaketma Phosphate Project based on a 1.5Mtpa production rate and a 46 year mine life.

2. Geology and Resources

Chaketma comprises seven large scale deposits with simple geology exposed on all sides, with consistent, thick and high-grade phosphate mineralisation close to surface.

2.1 Geology

The Chaketma project consists of sedimentary sequence of shallow marine shelf carbonates, sandstones and deeper marine clays and marls, dating Cretaceous to Miocene. The dominant stratigraphic sequence (from top to bottom) comprises a massive dolomitic limestone of Lutetian age, followed by the Ypresian phosphate suite and then a gradational transition to Paleocene marls on the footwall.

The top of the phosphate suite is a phosphatic dolomite/dolomitic phosphatic sandstone, grading sharply down to a high grade medium-grained phosphatic sandstone. This massive phosphatic unit occupies a substantial portion of the total mineralised sequence and is continuous over the entire deposit. Grain size decreases and marly intercalations gradually increase towards the bottom of the sequence, before passing into thicker marls below.

The phosphate unit in the Chaketma project is composed often of a single layer with a vertical variation of grain size of ore mineral and lateral variation of the thickness. The thickness of phosphate unit varies from 1m to 50m, with an average thickness of between 10m to 15m.

The sedimentary series surrounding and enveloping the phosphate mineralization is made up of, from the base to the surface, marls and marine clays from the Cretaceous to Paleocene, deposited in deeper environments, gradually passing to a suite of Ypresian phosphate, which is then covered by a massive bed of dolomitic limestone Lutetians to Nummulites that can be up to 150m in thickness.

2.2 Structure

The Chaketma project was deposited within an extensional 'pull-apart basin' which contains evidence of rotational-block and strike-slip faulting, slumping and warping. The northern end of the prospect has been subjected to dramatic EW-trending normal faulting with significant vertical displacement and associated drag folding.

A major NNW-SSE-trending bounding fault runs the entire length of the western side of the KEL, GK, and SAB deposits. The existence of this fault is confirmed stratigraphically with the juxtaposition of Eocene strata against older Cretaceous marls to the west, although the location has been inferred by changes in topographic profile.

A gentle synclinal fold occupies the central third of the GK deposit. The northern limb of the mineralized horizon dips approximately 15° SSW towards the fold axis, while the southern limb dips 12° NNW into the axis of an anticline located further south. Along both fold hinges evidence of faulting exists, although data is currently lacking to fully define relative movement.

The southern portion of GK is characterised by hummocky terrain which may be indicative of local block faulting, although the mineralised horizon remains consistent over the available points of observation.

The eastern side of the deposit is also fault-bounded along its entire length, although the boundary consists of NNW-SSE oriented listric faults with large-scale block slumping and rotation. These staggered blocks eventually merge with the DOH prospect to the east.

Figure 2.1 Typical Drill Core Lithological Section Chaketma Stratigraphy

The Chaketma phosphate deposit is situated in the southeast part of North Tunisia Phosphate Basin. This deposit consists of mainly seven blocks separated and dislocated by regional faults, six of which are contained within the Chaketma permit.

These blocks or prospects are known as:

- Kef El Louz (KEL)
- Gassa El Kebira (GK)
- Sidi Ali Ben Oum Ezzine (SAB)
- Douar Ouled Hamouda (DOH)
- Kef El Aguab (KEA) and
- Gassat Ezarbat (GE)

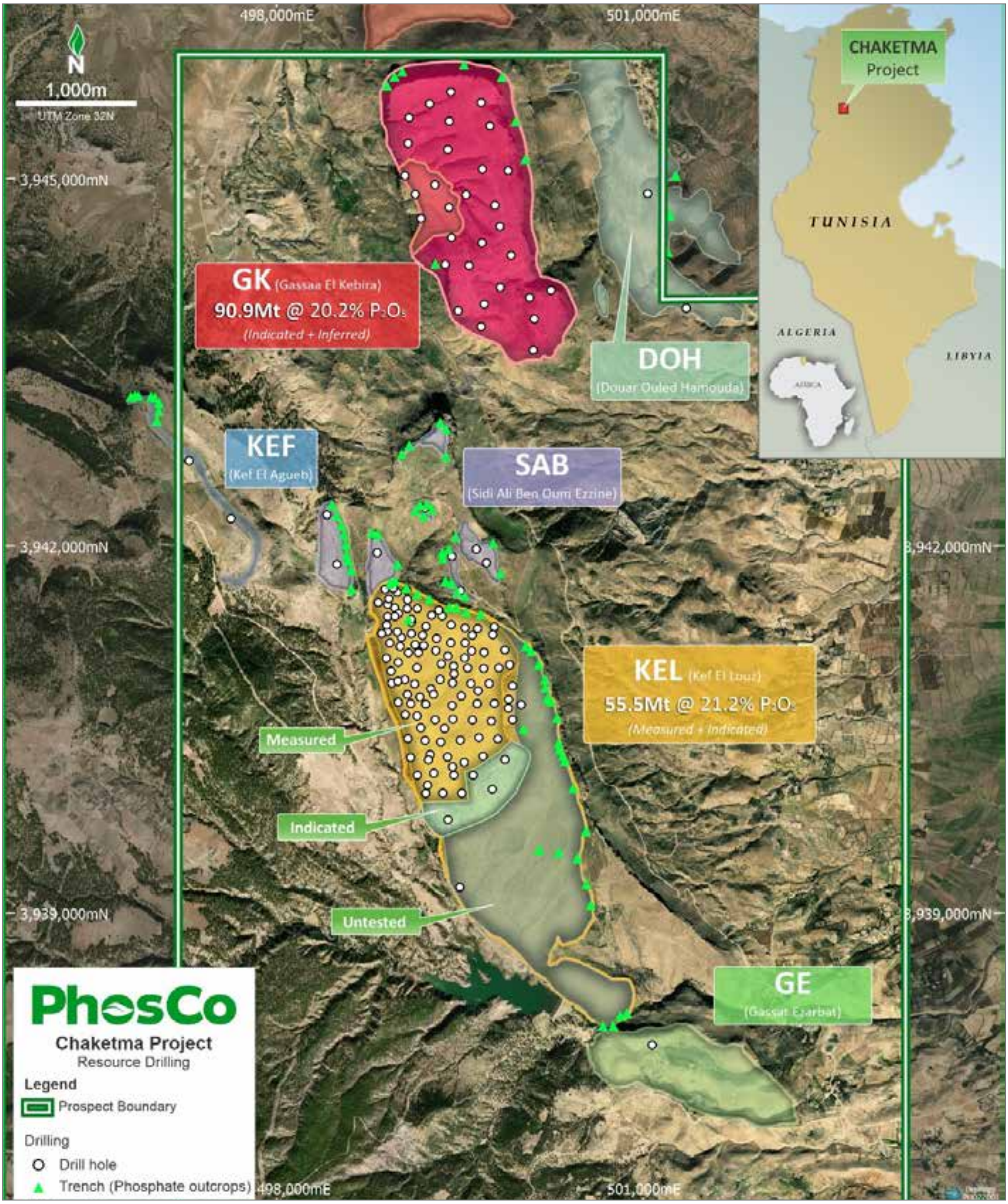


Figure 2.2 Chaketma Phosphate Resource Locations

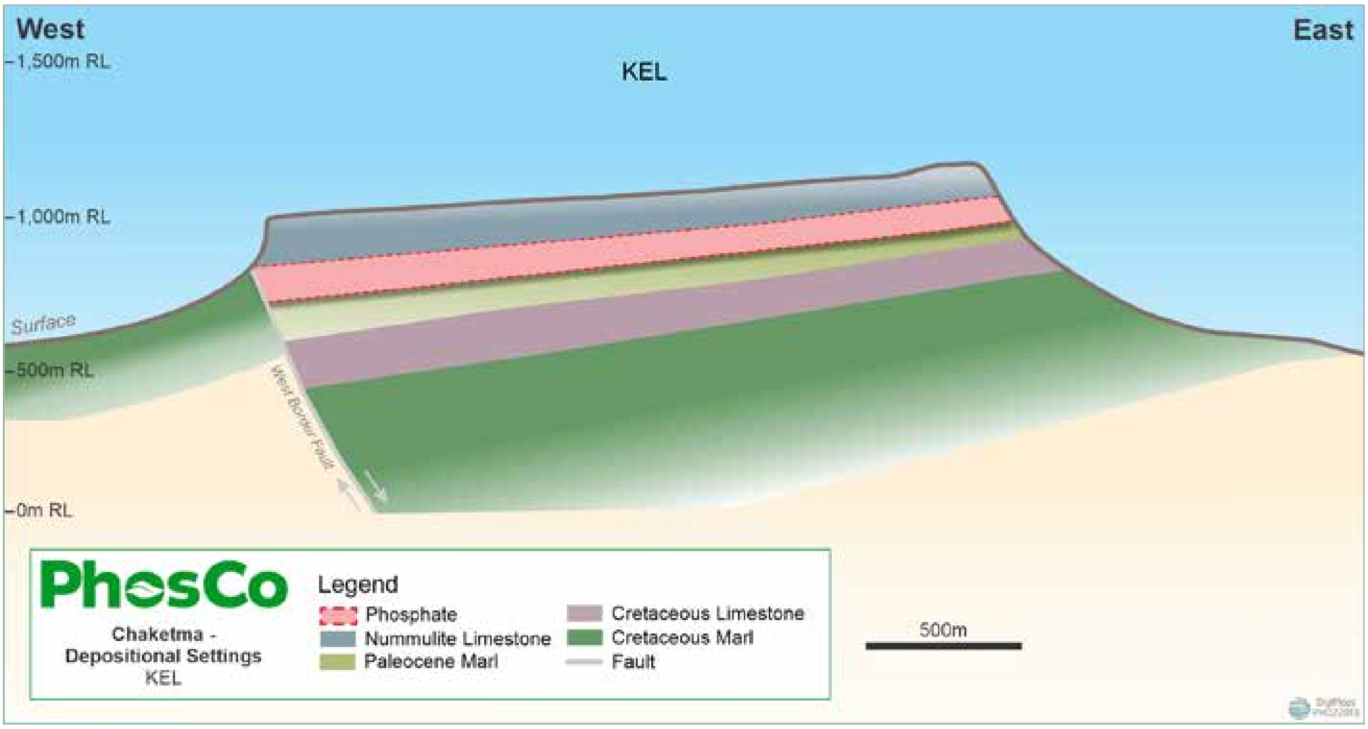


Figure 2.3 KEL Cross Section

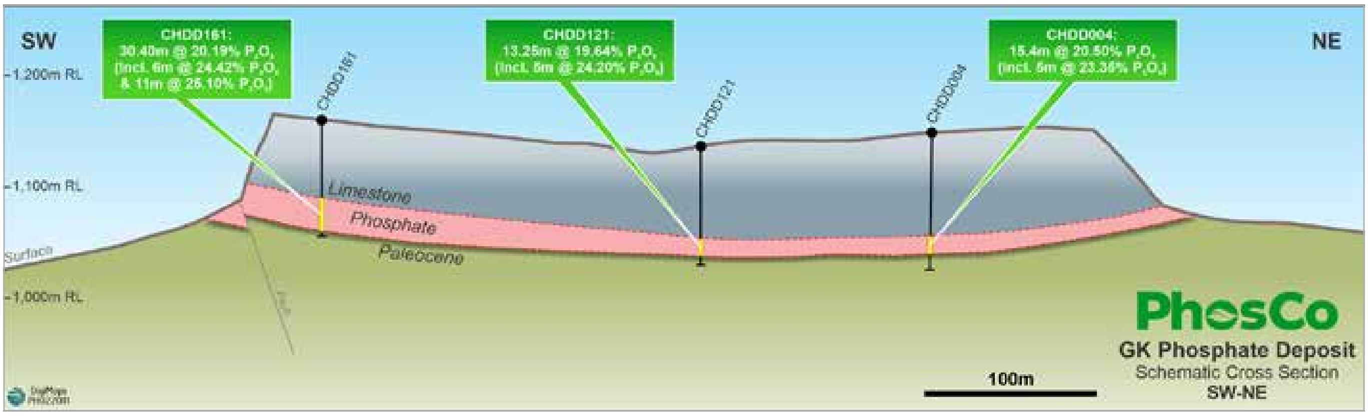


Figure 2.4 GK Cross Section

2.3 Exploration

The Chaketma Exploration Licence held by CPSA, has a surface area of 56 km² and was granted in 2010 with field work starting in May 2011 followed by diamond exploration drilling commencing in September 2011 and ongoing to late 2017:

- A total of 85 trenches have been dug either by hand or with a mechanical shovel for 835.15m.
- A total of 167 diamond core drillholes have been completed over the project area for a total drilled metres of 14,518 m.
- Systematic sampling of cores from the drill holes, trenches, outcrops and other locations, with the sampling of 9,058 samples.
- Multi-elemental chemical analysis of 7,115 samples collected from all the exploration samples.

Resource Area	Drill Holes		Trenches	
	Number	Length (m)	Number	Length (m)
KEL	120	9,289	32	156
GK	31	4,355	8	171
SAB	9	509	33	417
KEA	2	99	8	73
DOH	2	163	3	11
GE	1	102	1	8
TOTAL	**165**	**14,518**	**85**	**835**

Table 2.1 Summary of Chaketma Project Drill Holes and Trenching

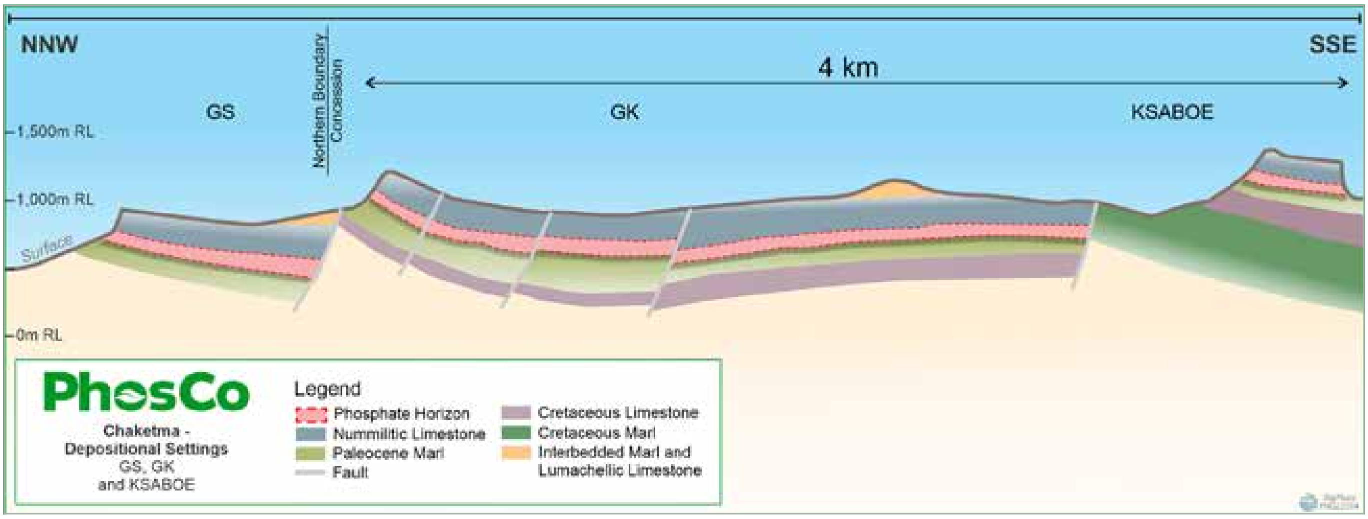


Figure 2.5 Folding and Faulting Structures of Northern Chaketma

Figure 2.6 Visual of Structures of Northern Chaketma

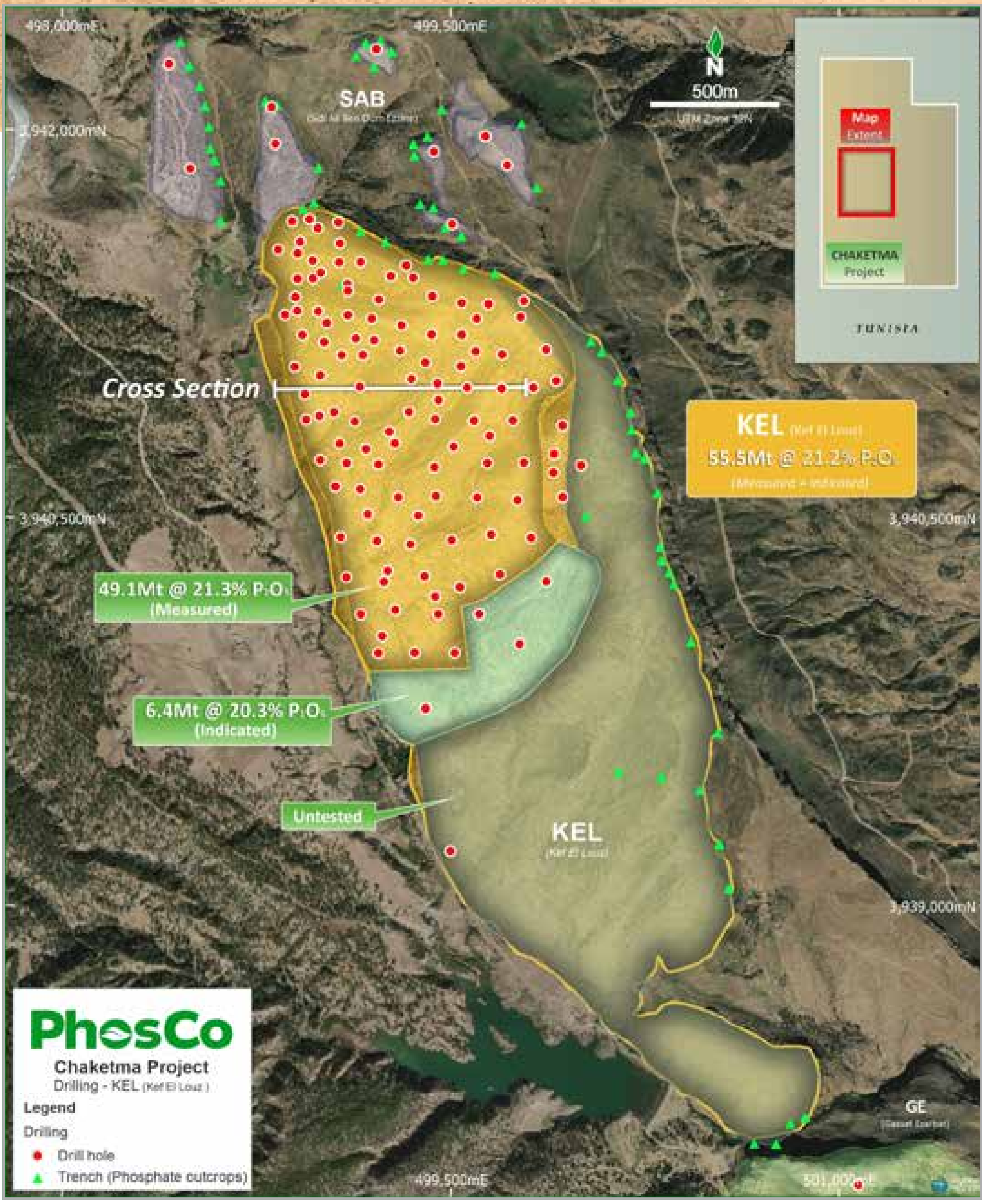


Figure 2.7 Chaketma Drillhole and Trench Locations

The phosphate series generally has three more or less distinct horizons which are from the top to the base as shown in the figure opposite:

Layer A A phosphate dolomite/dolomitic phospharenite at the top, grading rapidly towards the base to a phospharenite.

Layer B A coarse phosphatic sandstone of black gray color, showing a gradual shift from phosphate-rich coprolithic levels and locally in shark teeth, to a medium-grained phospharenite.

Layer C Gradual grading to a fine phospharenite weakly phosphated/marls phosphates, with marly intercalations and phosphated argillites more numerous towards the base of the sequence.

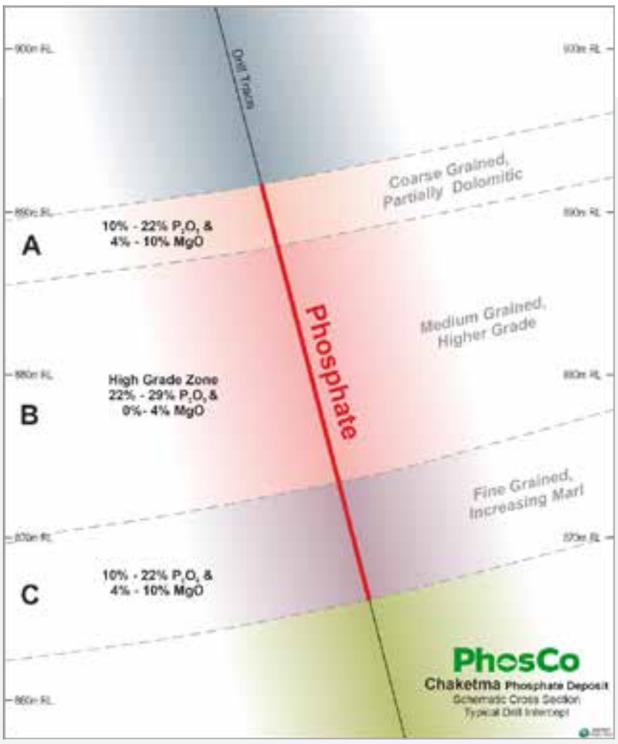


Figure 2.8 Phosphate Mineralised Layers

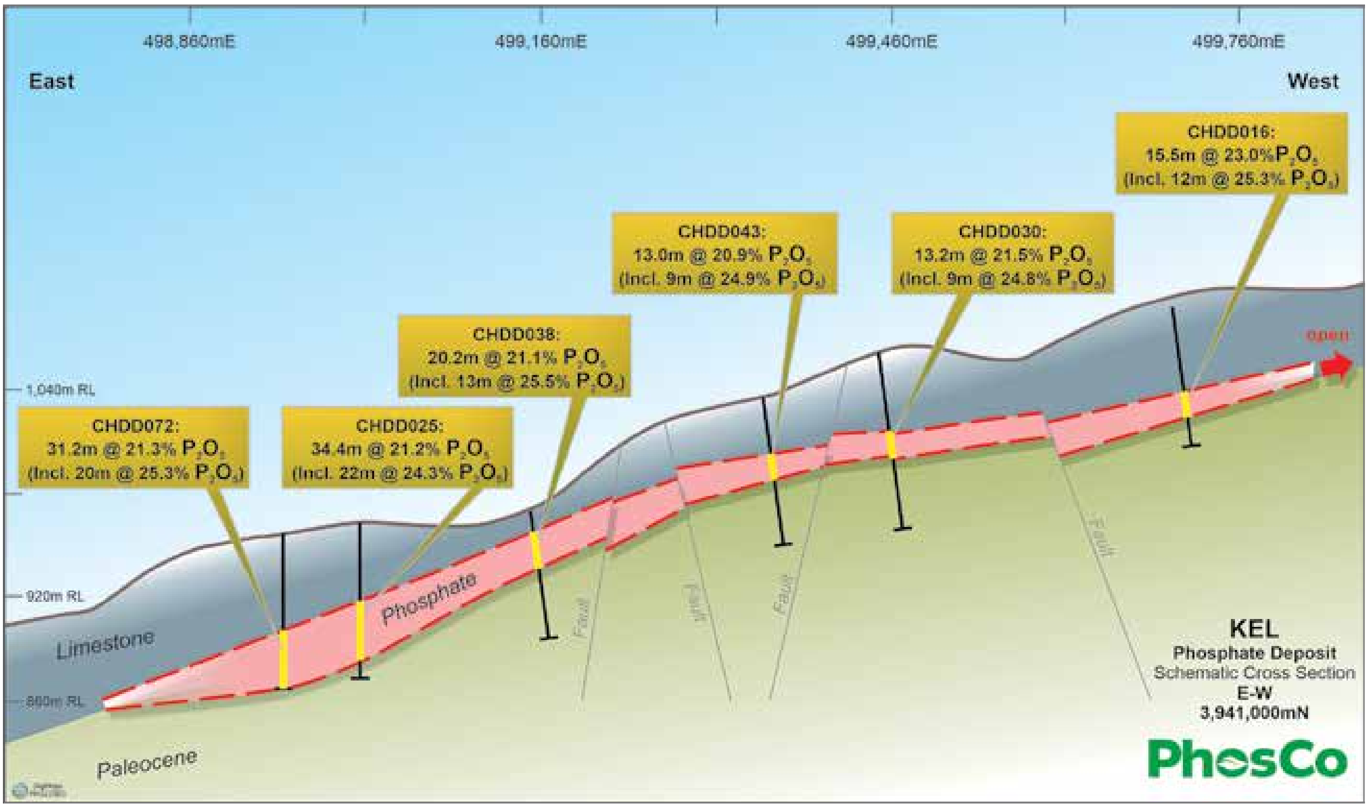


Figure 2.9 KEL Section 3,941,000mN

The above schematic cross-section is for KEL 3,941,000mN and demonstrates the continuity and impact of localised structures on the mineralisation.

2.4 Resources

On 17 November 2022[1], PhosCo announced a JORC (2012) compliant Mineral Resource Estimate (MRE) for the Chaketma Project of 146.4Mt at an average grade of 20.6% P_2O_5 (above a 10% P_2O_5 cut-off) made up of Resources from the KEL and GK prospects.

The KEL resource[2] is summarised in the following table, being 55.5Mt at 21.2% P_2O_5 using a 10% cut-off grade.

Mineralisation Layer	Classification	Volume (m3)	Tonnes	P_2O_5	Al_2O_3	CaO	Fe_2O_3	MgO	SiO_2	K_2O	Cd	U
				(%)	(%)	(%)	(%)	(%)	(%)	(%)	(ppm)	(ppm)
Layer A	Measured	3,010,000	7,900,000	18.75	0.49	42.7	0.92	6.89	4.66	0.20	19.8	23.0
	Indicated	460,000	1,200,000	16.63	0.49	41.4	0.74	8.07	4.92	0.18	19.4	32.8
	M+I	**3,470,000**	**9,100,000**	**18.47**	**0.49**	**42.5**	**0.90**	**7.04**	**4.70**	**0.20**	**19.7**	**24.3**
	Percentage of Total Resource		**16.4%**									
Layer B	Measured	10,610,000	28,800,000	24.96	0.83	44.3	0.93	2.82	8.13	0.25	55.5	24.1
	Indicated	1,260,000	3,400,000	24.43	0.86	43.7	0.92	2.84	8.77	0.24	56.7	28.4
	M+I	**11,870,000**	**32,200,000**	**24.91**	**0.83**	**44.2**	**0.93**	**2.82**	**8.20**	**0.25**	**55.6**	**24.6**
	Percentage of Total Resource		**58%**									
Layer C	Measured	4,620,000	12,400,000	14.55	1.99	35.2	1.47	7.63	12.50	0.68	18.4	18.6
	Indicated	680,000	1,800,000	15.16	1.66	36.1	1.37	7.69	11.10	0.53	19.6	22.6
	M+I	**5,300,000**	**14,200,000**	**14.62**	**1.95**	**35.3**	**1.46**	**7.64**	**12.42**	**0.66**	**18.6**	**19.1**
	Percentage of Total Resource		**25.6%**									
TOTAL Layers A, B & C	Measured	18,250,000	49,100,000	21.33	1.07	41.7	1.06	4.69	8.67	0.35	40.4	22.5
	Indicated	2,400,000	6,400,000	20.34	1.01	41.1	1.01	5.19	8.93	0.31	39.1	27.6
	M+I	**20,650,000**	**55,500,000**	**21.22**	**1.06**	**41.7**	**1.06**	**4.75**	**8.70**	**0.35**	**40.2**	**23.1**
	Percentage of Total Resource		**100%**									

Table 2.2 KEL Mineral Resource

1. Chaketma Phosphate Project – 90% Conversion of Inferred to Indicated Resources at GK, ASX Announcement 17 November 2022.
2. Chaketma Phosphate Resource ASX Update – 15 March 2022

The majority of the GK Mineral Resource has been upgraded from the previously released Inferred Resource estimate to an Indicated Resource category as summarised in the following table (**Table 2.3**).

The GK Resource update included additional drill and sample data to that utilised for the previously published 2012 resource.

Mineralisation Layer	Classification	Volume (m3)	Tonnes	P_2O_5	CaO	MgO	SiO_2	% Of Resource
				(%)	(%)	(%)	(%)	
Layer A	Indicated	2,350,000	6,390,000	13.9	41.6	8.0	5.8	7.0
	Inferred	400,000	1,100,000	12.4	37.7	11.3	6.2	1.2
	Subtotal	**2,750,000**	**7,490,000**	**13.7**	**41.0**	**8.5**	**5.9**	**8.2**
Layer B	Indicated	21,860,000	59,460,000	22.7	44.8	3.4	7.8	65.4
	Inferred	1,665,000	4,530,000	24.0	43.8	4.2	8.1	5.0
	Subtotal	**23,235,250**	**63,990,000**	**22.8**	**44.7**	**3.5**	**7.8**	**70.4**
Layer C	Indicated	6,580,000	17,890,000	14.1	37.9	5.5	12.8	19.7
	Inferred	575,000	1,570,000	14.0	35.8	6.9	13.4	1.7
	Subtotal	**7,155,000**	**19,460,000**	**14.1**	**37.7**	**5.6**	**12.8**	**21.4**
TOTAL All Layers A, B & C	Indicated	30,790,000	83,740,000	20.2	43.1	4.2	8.7	92.1
	Inferred	2,640,000	7,200,000	20.0	41.1	5.9	9.0	7.9
	TOTAL	**33,430,000**	**90,940,000**	**20.2**	**42.9**	**4.3**	**8.7**	**100.0**

Table 2.3 GK Mineral Resource

The published Resources from KEL and GK of 146.4Mt at a grade of 20.6% P_2O_5, prior to the application of mining dilution and recovery factors within provisional pit designs, has been utilised for the purposes of the Scoping Study.

In addition to the published resources for KEL and GK, preliminary exploration work has been undertaken over a number of the remaining prospects. Additional definition work is required for the southern area of KELS (Kef el Louz South), SAB and DOH which are seen as the prospects with the highest potential to provide additional project resources.

Overall, the current published resources and the perceived potential of the yet to be explored but known resource prospects make Chaketma a significant project with the potential for a long project life.

Inferred Resources

The Scoping Study includes both the KEL and GK deposits, including the 8% of the GK MRE (5% of total MRE) that remains classified as an Inferred Mineral Resource being 7Mt at 20% P_2O_5 (Arethuse 2022).

The Scoping Study incorporates the mining of GK from year 18 of the mine plan and as such minimises the potential impact on the project of the lower confidence associated with GK Indicated and Inferred resources at this time.

Resource	Confidence (JORC 2012)	Mt	% P_2O_5	% of Full Resource
KEL (March 2022)	Measured	49.1	21.3	34
	Indicated	6.4	20.3	4
	Subtotal	**55.5**	**21.2**	**38**
GK (November 2022)	Indicated	83.7	20.2	57
	Inferred	7.2	20.0	5
	Subtotal	**90.9**	**20.2**	**62**
Combined Resources	Measured	49.1	21.3	34
	Indicated	90.1	20.2	62
	Inferred	7.2	20.0	5
Global Resources	**All Categories**	**146.4**	**20.6**	**100**

Table 2.4 Chaketma Mineral Resources

3. Open Pit Mining

The Scoping Study indicates Chaketma to be a low-cost open pit operation, with a strip ratio of 3.6:1 for the first 18 years of operation scheduled from the KEL Resource (88% Measured, 12% Indicated).

The Scoping Study utilises the published KEL and GK Resources to establish an open pit diluted and recovered production target of 127.6Mt at a grade of 19.9% P_2O_5 and 4.5% MgO. The mine plan is targeted to deliver an annual concentrate production of 1.5Mtpa for a total of 69Mt of concentrate over the 46 year project life.

Mining commences in KEL at a rate of 2.8Mtpa ore and an associated 7Mtpa of waste (SR=2.5:1) increasing in years 11 to 17 to 12Mtpa waste (SR=4.3:1), before increasing further when mining of the higher strip ratio GK Resource is initiated around year 18 of the mine plan.

CPSA engaged mining specialists SRK Consulting (UK) Ltd (SRK) to undertake the initial mining and geotechnical studies for the project.

PhosCo believes it has reasonable grounds for disclosing a Production Target, given that the first eighteen years of production is solely from KEL, being 37% of the published resources with all mill feed scheduled from the Measured (88%) and Indicated Resources (12%) within KEL and subsequent production from GK being Indicated (92%) and a minor Inferred Resource component of 8%.

3.1 Recoverable Resources

The mine plan developed has considered the mining of the P_2O_5 (phosphate) Resource above a nominal 10% cutoff grade that includes the full ore horizon above that cutoff. Technical and economic factors have been considered in developing the mine plan as an open pit mine.

The published Mineral Resource Estimate has had dilution and ore recovery factors applied to both the upper and lower surfaces. An ore loss equivalent to 0.4m of material has been used with a further allowance of 0.4m of hangingwall dolomite included into the model as dilution. A factor of 0.2m has been applied to the lower surface. This results in equal amounts of loss and dilution in the roof and floor contacts but with grade adjustments made accordingly.

3.2 Geotechnical Assessments

Geotechnical investigations have been carried out by SRK that incorporated a field campaign including measurements of geotechnical and structural characteristics.

The stability of the mining excavations will be dictated by the:

- Competence of the limestone and phosphate mass;
- Orientation of the faces in relation to the network of fractures; and
- Existence or not of water at the phosphate-marl contacts.

SRK made the following design recommendations:

- 15° for the footwall in the Palaeocene marl, following the deposit dip;
- 75° internal slope angle for the limestone and phosphate units;
- 5m wide berms between benches;
- Interim slopes – working ore faces:
  - For an up-dip mining direction: 40° overall interim slope, further investigations needed regarding the toppling failure possibility and improve characterisation of the marl layer;
  - For a down-dip mining direction: 52° overall interim slope;
- 52.5° inter-ramp slope angle within the limestone and phosphate units. Further analyses to be done once the wall position relative to the West fault is known;
- An overall angle of 40° for the Cretaceous marls to the west of the border fault. This may be improved with further data;
- The northern pit walls within the Palaeocene marl will follow the OSA vs. slope height recommendations corresponding to c=55kP and phi=20°.

Stability analysis indicated that the Factor of Safety decreased with slope height but was always likely to be above 1.1 as shown in the following figure.

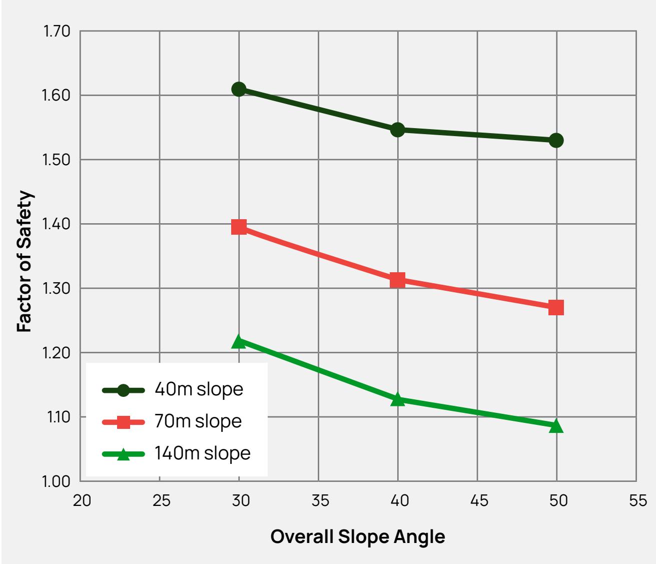


Figure 3.1 Stability Simulation Curves

3.3 Pit Optimisations

The optimisation parameters that were used by SRK in 2016 to identify the optimal pit extents of the deposit were based on the marginal operating costs (processing, infrastructure and general and administrative) as determined in the original 2012 Scoping Study. Key drivers from that optimisation were a sale price for phosphate concentrate of US$100/t (now US$150/t), recovery of 75% (now 80%) and base mining cost US$1.50 (now US$2.24/t).

The overall slope angles were taken from SRK's Preliminary Slope Angle investigations.

The optimisation parameters applied indicated a marginal cut-off grade in the order of 5% P_2O_5, which is less than the geological cut-off grade of 10% P_2O_5 used in the Resource model.

In summary, the SRK optimisation indicated that:

- The blocks for both KEL and GK deposits were all deemed economic in the margin ranking results;
- All blocks were included in the mine schedule; and
- Further refinement of the pit edge should be completed when pit designs are undertaken.

It is noted that these parameters are now out of date and require revision and revaluation in line with changes in capital and operating costs as well as product revenue. The Scoping Study's marginal economic cut-off grade has been estimated to be between 8% to 11% P_2O_5 based on a processing and concentrate handling cost of US$30/t feed, concentrate grade of 30%, 80% P_2O_5 recovery and sell prices of between US$150/t down to US$100/t concentrate. Indicating that the conclusions obtained are unlikely to change significantly.

3.4 Pit Designs

SRK divided the KEL deposit into four stages which progress from north to south, from the thickest phosphate seams and lowest strip ratio in the north heading to the south.

The box-cut of each successive stage is intended to be oriented along the north striking axis of the western fault and is planned to be mined up to the location of the western fault where the orebody is interpreted to cut out.

Preliminary designs have been completed based on the four stages and are shown in the following figures.

The intent for waste movement is to backfill the previously mined out stages, incorporating tailings co-disposal to minimise project impact outside of the mining area and to establish rehabilitated areas that would be of benefit for future agriculture.

Duration of operation (years)	4.1	Pit Design
Pit length (EO) (m)	690	
Pit width (NS) (m)	340	
Pit depth (m)	180	
Pit area (m2)	175950	
Slope height (m)	10	
Berm (m)	5	
Slope angle (°)	75	
Ramp width (m)	27	
Ramp Slope (%)	10	
Inter ramp (°)	52	
Integrative Slope (°)	45	

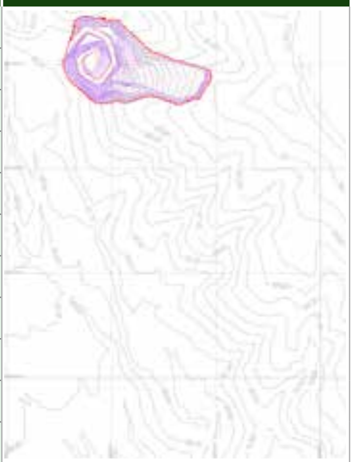


Figure 3.2 Preliminary KEL Pit Design – Phase 1

Duration of operation (years)	6.3	Pit Design
Pit length (EO) (m)	1100	
Pit width (NS) (m)	410	
Pit depth (m)	160	
Pit area (m2)	383350	
Slope height (m)	10	
Berm (m)	5	
Slope angle (°)	75	
Ramp width (m)	27	
Ramp Slope (%)	10	
Inter ramp (°)	52	
Integrative Slope (°)	45	

Figure 3.3 Preliminary KEL Pit Design – Phase 2

Duration of operation (years)	5.9	Pit Design
Pit length (EO) (m)	920	
Pit width (NS) (m)	420	
Pit depth (m)	150	
Pit area (m2)	309120	
Slope height (m)	10	
Berm (m)	5	
Slope angle (°)	75	
Ramp width (m)	27	
Ramp Slope (%)	10	
Inter ramp (°)	52	
Integrative Slope (°)	45	

Figure 3.4 Preliminary KEL Pit Design – Phase 3

Duration of operation (years)	5.2	Pit Design
Pit length (EO) (m)	850	
Pit width (NS) (m)	340	
Pit depth (m)	140	
Pit area (m2)	216750	
Slope height (m)	10	
Berm (m)	5	
Slope angle (°)	75	
Ramp width (m)	27	
Ramp Slope (%)	10	
Inter ramp (°)	52	
Integrative Slope (°)	45	

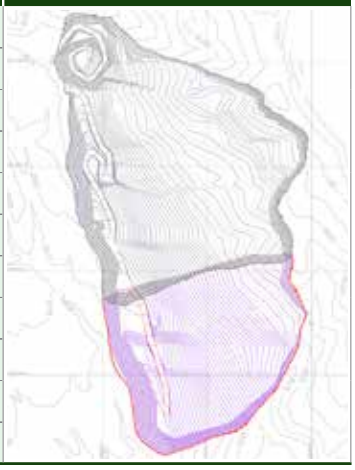


Figure 3.5 Preliminary KEL Pit Design – Phase 4

Duration of operation (years)	36.7	Pit Design
Pit length (EO) (m)	2350	
Pit width (NS) (m)	1150	
Pit depth (m)	190	
Pit area (m2)	2297125	
Slope height (m)	10	
Berm (m)	5	
Slope angle (°)	75	
Ramp width (m)	27	
Ramp Slope (%)	10	
Inter ramp (°)	52	
Integrative Slope (°)	45	

Figure 3.6 Preliminary GK Pit Design

It is envisaged that a detailed approach to the sequencing of the mining operations will be required in order to optimise the movement sequence, minimise mining costs and maximise the ability to replace waste material back into the excavation footprint.

Given the depth of the overburden at GK there is an option to evaluate the use of underground mining for this area of the prospect. For the purposes of the study, it has been assumed that this material will be mined by conventional drill, blast, load and haul later in the mine schedule.

Applying the pit designs to the Resource, incorporating recovery and dilution parameters gave the following production targets and waste strip summaries.

The more recent resource for GK did not contain the results for a range of the additional elements and as such only that analysis that is available for both deposits has been consolidation into the overall total.

Parameter	Units	In-Situ	RoM
Total			
Total Rock	Mt	852.5	852.5
Limestone	Mt	726.7	726.9
Phosphate	Mt	125.8	125.6
P_2O_5	%	20.3	19.7
MgO	%	4.4	4.4
CaO	%	42.2	41.5
U	%	-	-
SiO_2	%	8.5	9.1
Cd	%	-	-
Al_2O_3	%	-	-
Fe_2O_3	%	-	-
S	%	-	-
K_2O	%	-	-
Strip Ratio	t:t	5.8	5.8
KEL			
Total Rock	Mt	237.5	237 5
Limestone	Mt	186.2	186.2
Phosphate	Mt	51.3	51.3
P_2O_5	%	20.7	19.8
MgO	%	4.6	4.8
CaO	%	40.7	39.6
U	ppm	22.2	21.9
SiO_2	%	8.5	9.5
Cd	ppm	39.7	38.1
Al_2O_3	%	1.02	1.42
Fe_2O_3	%	1.03	1.21
S	%	0.19	1.29
K_2O	%	0.33	0.38
Strip Ratio	t:t	3.6	36.0
GK			
Total Rock	t	615.0	615.0
Limestone	t	540.5	540.7
Phosphate	t	74.5	74.3
P_2O_5	%	20.0	19.7
MgO	%	4.2	4.2
CaO	%	43.2	42.9
U	ppm		
SiO_2	%	8.5	8.8
Cd	ppm		
Al_2O_3	%		
Fe_2O_3	%		
S	%		
K_2O	%		
Strip Ratio	t:t	7.3	7.3

Table 3.1 KEL & GK Run of Mine Comparison to Insitu Resource

3.5 Mining Schedule

The Scoping Study foresees mining commencing at the northern end of the KEL prospect with the potential to source additional ore from SAB prospect (yet to be defined to resource standards), using:

- Conventional drill and blast, load and haul truck/ excavator operations;
- Waste to be placed in mined out areas during the life of the operation;
- Co-disposal of process plant tailings;
- Average ore mining rate of 2.8 Mtpa;
- Overall average head grade of 19.4% P_2O_5;
- Initial 10 yrs average head grade 20.1% P_2O_5;
- Concentrate production of 1.5 Mtpa.

Figure 3.7 – Chaketma Mining - Annual Production depicting the mining schedule as developed and used for the purposes of this Scoping Study.

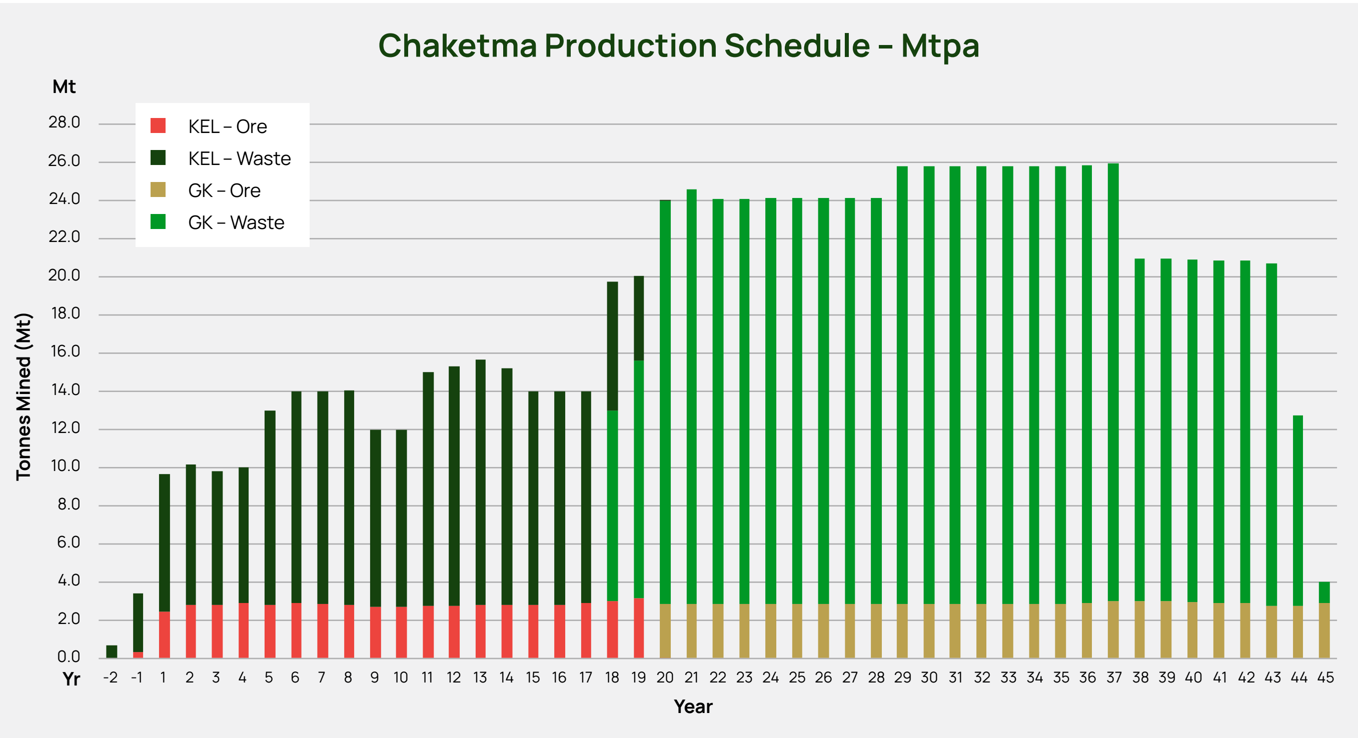


Figure 3.7 Chaketma Mining - Annual Production

Figure 3.8 – Annual Production – Mined Grades shows forecast annual mined grades for P_2O_5 and MgO.

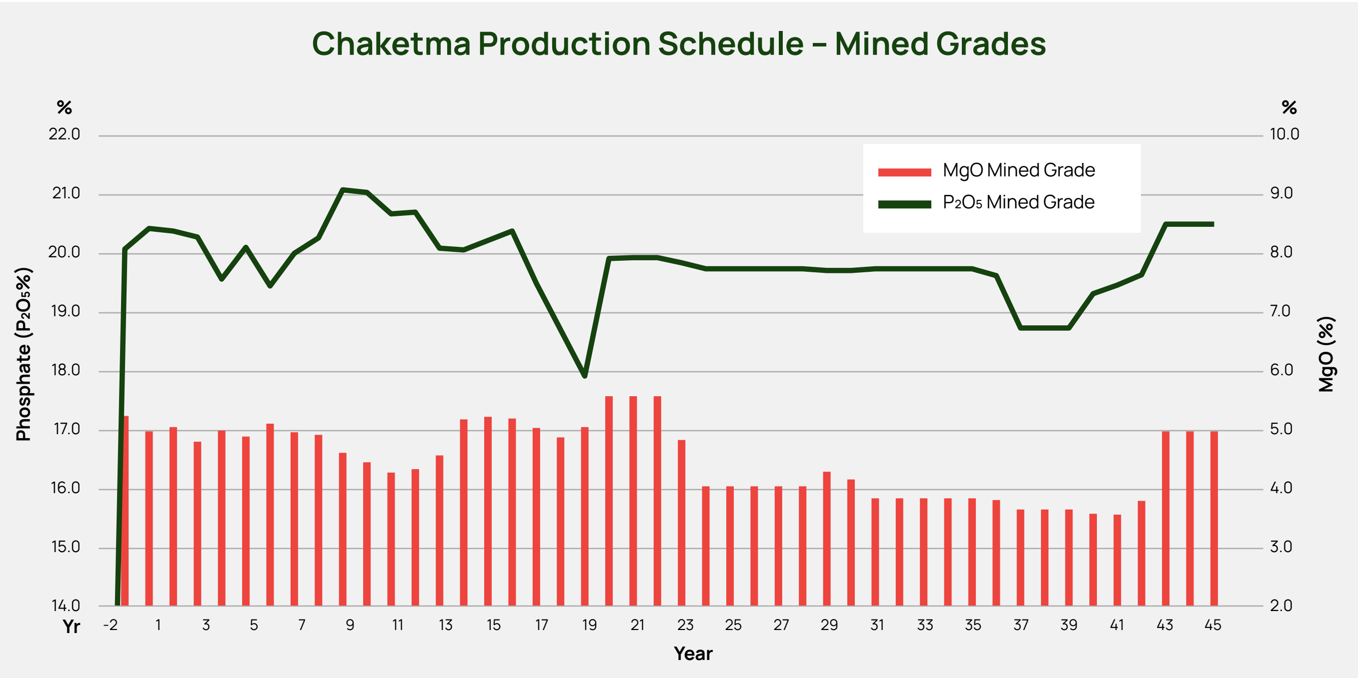


Figure 3.8 Annual Production – Mined Grades

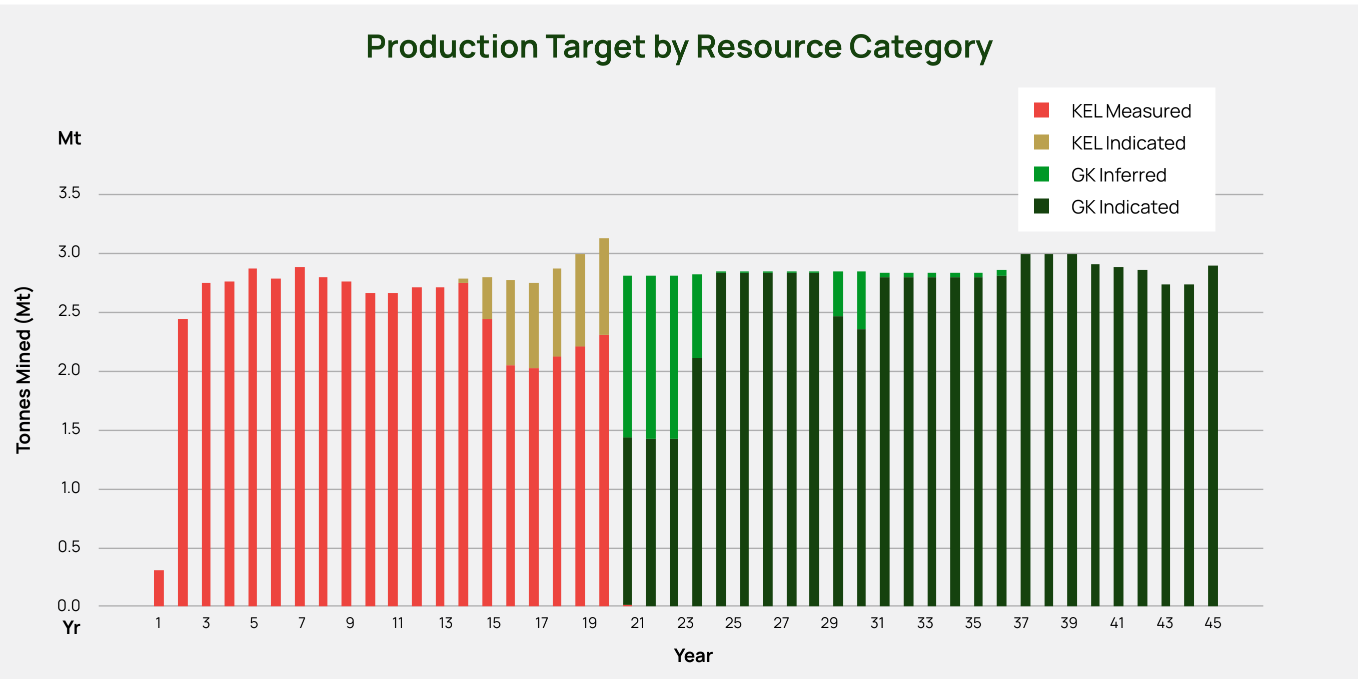


Figure 3.9 Production Schedule – Resource Category

The utilisation of a conventional surface mining fleet was deemed appropriate by this Scoping Study as it provides maximum flexibility and relatively low risk, particularly for the KEL prospect.

Alternative mining methods have been reviewed, and future evaluations may consider alternative mining methods in later years as a practical understanding of the resource is developed with operational experience. These may include options such as continuous surface miners, use of conventional haulage trucks, high wall mining or even underground access and stoping of the higher waste strip GK prospect.

This may enable the higher strip ratio mining areas to be more economically and efficiently exploited but given the current mine plan timing this is not critical to the project economics at this stage.

The annualised production profile as used for the Scoping Study is detailed in **Table 3.2**.

Total Movement (Mt)	Units	Total	Yr -2	Yr -1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		824.9	0.6	3.4	9.6	10.2	9.8	10.0	13.0	14.0	14.0	14.1	12.0	12.0	15.0	15.3	15.7	15.2	14.0	14.0	14.0	19.8	20.1	24.0	24.6
Waste	(Mt)	691.7	0.6	3.1	7.2	7.4	7.0	7.1	10.2	11.1	11.2	11.3	9.3	9.3	12.3	12.6	12.9	12.4	11.2	11.2	11.1	16.8	16.9	21.2	21.8
Strip Ratio	(t:t)	5.2		10.1	2.9	2.7	2.5	2.5	3.7	3.8	4.0	4.1	3.5	3.5	4.5	4.6	4.6	4.4	4.0	4.1	3.9	5.6	5.4	7.5	7.7
Phosphate	(Mt)	133.2		0.3	2.4	2.8	2.8	2.9	2.8	2.9	2.8	2.8	2.663	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.9	3.0	3.1	2.8	2.8
P_2O_5	(%)	19.4		20.1	20.5	20.4	20.3	19.6	20.1	19.5	20.0	20.3	21.1	21.1	20.7	20.7	20.1	20.1	20.3	20.4	19.5	18.7	17.9	20.0	20.0
MgO	(%)	4.5		5.2	5.0	5.1	4.8	5.0	4.9	5.1	5.0	4.9	4.6	4.5	4.3	4.3	4.6	5.2	5.2	5.2	5.0	4.9	5.1	5.6	5.6

Total Movement (Mt)	Total	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	824.9	24.1	24.1	24.1	24.1	24.1	24.1	24.1	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.9	26.0	21.0	21.0	20.9	20.9	20.9	20.7	12.7	4.0
Waste	691.7	21.3	21.3	21.3	21.3	21.3	21.3	21.3	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	18.0	18.0	18.0	18.0	18.0	18.0	10.0	1.1
Strip Ratio	5.2	7.6	7.5	7.5	7.5	7.5	7.5	7.5	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.0	7.7	6.0	6.0	6.2	6.2	6.3	6.6	3.6	0.4
Phosphate	133.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.9	3.0	3.0	3.0	2.9	2.9	2.9	2.7	2.7	2.9
P_2O_5	19.4	20.0	19.9	19.8	19.8	19.8	19.8	19.8	19.7	19.7	19.8	19.8	19.8	19.8	19.8	19.7	18.8	18.8	18.8	19.3	19.5	19.7	20.5	20.5	20.5
MgO	4.5	5.6	4.8	4.1	4.1	4.1	4.1	4.1	4.3	4.2	3.8	3.8	3.8	3.8	3.8	3.8	3.7	3.7	3.7	3.6	3.6	3.8	5.0	5.0	5.0

KEL Mining Schedule (Mt)	Units	Total	Yr -2	Yr -1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		243.2	0.6	3.4	9.6	10.2	9.8	10.0	13.0	14.0	14.0	14.1	12.0	12.0	15.0	15.3	15.7	15.2	14.0	14.0	14.0	9.8	7.6	0.0	
Waste	(Mt)	189.9	0.6	3.1	7.2	7.4	7.0	7.1	10.2	11.1	11.2	11.3	9.3	9.3	12.3	12.6	12.9	12.4	11.2	11.2	11.1	6.8	4.4	0.00	
Strip Ratio	(t:t)	3.6		10.1	2.9	2.7	2.5	2.5	3.7	3.8	4.0	4.1	3.5	3.5	4.5	4.6	4.6	4.4	4.0	4.1	3.9	2.3	1.4	0.00	
Phosphate	(Mt)	53.3		0.3	2.4	2.8	2.8	2.9	2.8	2.9	2.8	2.8	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.9	3.0	3.1	0.01	
P_2O_5	(%)	20.0		20.1	20.5	20.4	20.3	19.6	20.1	19.5	20.0	20.3	21.1	21.1	20.7	20.7	20.1	20.1	20.3	20.4	19.5	18.7	17.9	16.6	
MgO	(%)	4.9		5.2	5.0	5.1	4.8	5.0	4.9	5.1	5.0	4.9	4.6	4.5	4.3	4.3	4.6	5.2	5.2	5.2	5.0	4.9	5.1	5.4	

GK Mining Schedule (Mt)	Units	Total	Yr -2	Yr -1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Yr 18	19	20	21
		581.6																				10.0	12.5	24.0	24.6
Waste	(Mt)	501.8																				10.0	12.5	21.2	21.8
Strip Ratio	(t:t)	6.3																						7.6	7.7
Phosphate	(Mt)	79.8																						2.8	2.8
P_2O_5	(%)	19.0																						20.0	20.0
MgO	(%)	4.2																						5.6	5.6

GK Mining Schedule (Mt)	Total	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	581.6	24.1	24.1	24.1	24.1	24.1	24.1	24.1	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.9	26.0	21.0	21.0	20.9	20.9	20.9	20.7	12.7	4.0
Waste	501.8	21.3	21.3	21.3	21.3	21.3	21.3	21.3	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	18.0	18.0	18.0	18.0	18.0	18.0	10.0	1.1
Strip Ratio	6.3	7.6	7.5	7.5	7.5	7.5	7.5	7.5	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.0	7.7	6.0	6.0	6.2	6.2	6.3	6.6	3.6	0.4
Phosphate	79.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.9	3.0	3.0	3.0	2.9	2.9	2.9	2.7	2.7	2.9
P_2O_5	19.0	20.0	19.9	19.8	19.8	19.8	19.8	19.8	19.7	19.7	19.8	19.8	19.8	19.8	19.8	19.7	18.8	18.8	18.8	19.3	19.5	19.7	20.5	20.5	20.5
MgO	4.2	5.6	4.8	4.1	4.1	4.1	4.1	4.1	4.3	4.2	3.8	3.8	3.8	3.8	3.8	3.8	3.7	3.7	3.7	3.6	3.6	3.8	5.0	5.0	5.0

Table 3.2 Chaketma Mining Production Schedule

3.6 Waste Rock Strategy

External waste dumping will initially be required for both KEL and GK and it is proposed to incorporate these into useable landforms from an agricultural perspective.

It is envisaged that following completion of Stage 1 at KEL, the waste material from Stage 2 would be disposed of in the previously mined out pit void. The waste storage strategy will be to maximise the amount of waste that is backfilled within the pit footprint and to minimise haulage costs by direct placement of waste into previously mined panels by track dozer or blasting.

Figure 3.10 is a schematic of proposed method to minimise waste handing costs.

In addition, it is proposed that dewatered tailings will also be co-deposited with the waste rock into the same location. The dewatered tailings will be hauled and placed by truck into the previously mined out areas.

The mining sequence and backfill strategy, including tailings co-disposal, will impact on external waste dump and tailing storage requirements and a key activity of the feasibility study will be to construct a detailed mine plan and schedule that incorporates this strategy. Hydrological and geotechnical studies for the proposed locations as well as for the placed material are also part of the ongoing studies.

The potential to construct the waste dumps in the areas surrounding the SAB prospects will also be evaluated as this will provide access for exploitation of those deposits as well as potentially delivering a rehabilitated plateau style final surface that will be of use to the local farming community at the completion of mining operations in that area.

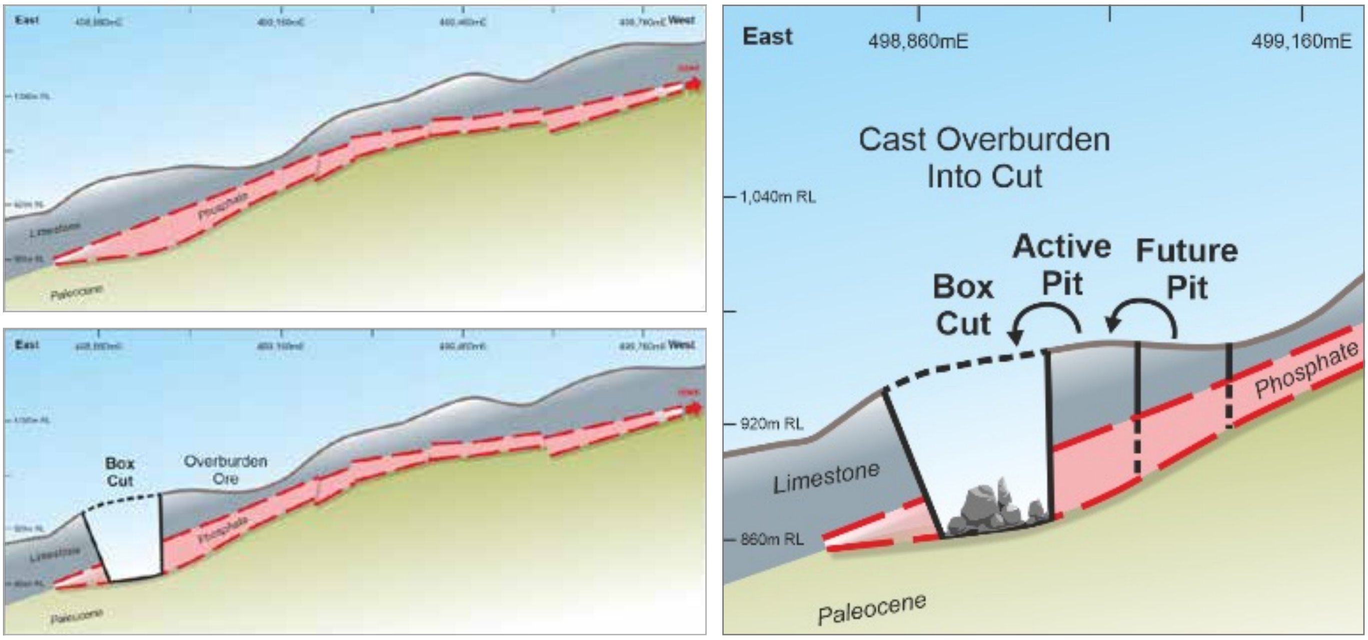


Figure 3.10 Schematic of Pit Stage Development

4. Processing

The Scoping Study plans a process plant to produce 1.5Mtpa of phosphate concentrate over the 46 year project life for a total of 67.6Mt of concentrate. The flowsheet is based on extensive testwork, uses established processes, and confirms the ability to produce high-quality product and phosphate rock concentrate of 30% P_2O_5 with approximately 80% weight recovery.

The evaluation of metallurgical and phosphate recovery methodologies has been ongoing for the Chaketma Project since 2012. Initially by CPSA personnel and then in 2016 by enlisting the services of the Jacobs Engineering Group to undertake a feasibility study evaluation, to international standards, of the resource for the purposes of refining the process parameters and equipment selection.

The brief being to develop a viable flowsheet for Chaketma phosphate processing and establish an optimum scenario for the investment necessary for the treatment and transport of the phosphate concentrate until its delivery in Tunisia or abroad.

This Scoping Study utilises the process parameters and details as developed by the Jacobs work and as utilised by SRK for the generation of the mining and processing schedules.

4.1 Initial Testwork

Preliminary metallurgical studies on the Chaketma deposit were carried out by CPSA with the objective to investigate the options for beneficiation of the Chaketma phosphate ore.

These preliminary tests were carried out on composite samples of about 30 kg each from the KEL, SAB and GK prospects.

That analysis indicated that the phosphate ore is made up of three main components, being:

- Phosphatic elements were comprised of pellets, oolites and phosphatised bone fragments and fish teeth. The predominant phosphate grain size is about 140 microns;
- The exogangue consisted principally of dolomite, calcite, quartz, clay minerals, glauconite and feldspar; and.
- An endogangue, that is to say fine inclusions found inside the phosphate elements, consist of carbonates (dolomite and rarely calcite) and sometimes organic material. The proportions generally appear not to exceed 3%. The size of the inclusions are of the order of 10 μm.

The mineralogy analysis work completed included microscopic examination and X-ray diffraction as shown in the following three figures.

X-Ray diffraction technique confirmed the presence of minerals observed by microscopic observations.

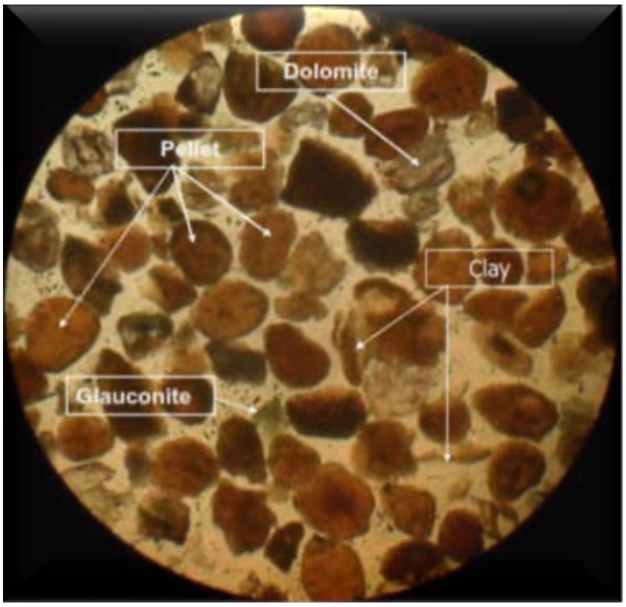


Figure 4.1 Microscopic view of the ore

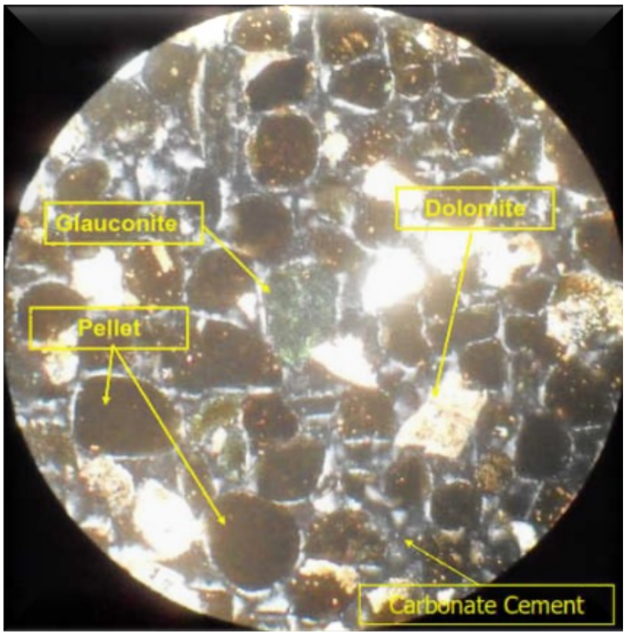


Figure 4.2 X-Ray diffraction image of ore

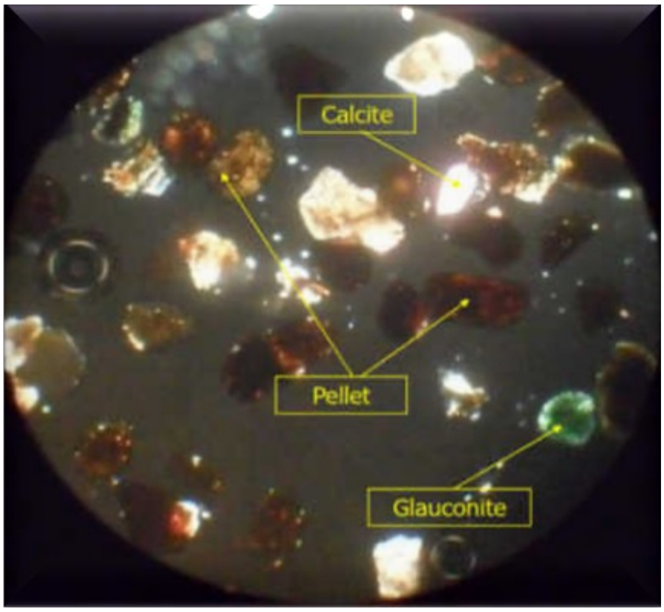


Figure 4.3 Alternative X-Ray diffraction image of ore

The chemical and mineralogical composition of the samples is shown in **Table 4.1** Mineral Composition of Samples.

Prospect	Apatite	Calcite	Dolomite	Silica
KEL	65.35	3.19	17.71	7.15
SAB	53.15	7.29	22.69	7.35
GK	60.29	7.02	18.23	7.57

Table 4.1 Mineral Composition of Samples (%)

Microscopic observations were performed on different size fractions for the samples to determine the percentage of liberated phosphate mineral in each size fraction.

The degree of liberation of free phosphate particles is defined as the number of free phosphate mineral/total phosphate particles.

Typical liberation data for the samples are presented in **Table 4.2**.

The percentage of liberated phosphate particles increased as the particle size became finer, but there was no significant change after minus 140 microns and as such the particle size for grinding to liberate the phosphatic elements from the exogangue was indicated to be in the order of 140 microns.

For the flotation testwork, the sub 40-micron material was rejected as waste while the plus 150-micron material was passed to a second grinding and if required a third grinding stage. Any material greater than 150-micron from the third stage was rejected.

The following variables were evaluated:

- Influence of collector addition;
- Influence of depressant;
- Influence of pH.

This early test work indicated that the flotation process was likely to have the capability to produce a phosphate concentrate suitable for export at an average target concentrate grade of 30 wt% P_2O_5, with that work forming the basis for future process evaluations and refinements.

4.2 Ore Characterisation

In 2015 Jacobs Engineering was engaged to undertake an engineering study into the processing of the Chaketma ores.

As part of that works a sample of ore from KEL was submitted to COREM, a Canadian company that specialises in mineral processing research services, to undertake further Chaketma Phosphate Mineral Characterisation[3].

1) The sample was crushed to 100% -200 µm and sieved into six size fractions: +150 µm, -150 +106 µm, -106 +75 µm, -75 +53 µm, -53 +38 µm and -38 µm.
2) Chemical analyses were completed for the six size fractions. It included analysis by x-ray fluorescence.
3) An X-ray diffraction analysis of the sample was completed to have a formal identification of the minerals present in the ore.
4) One polished section per size fraction (six size fractions) was prepared and studied under optical microscope and by MLA (Mineral Liberation Analyser).

3. Chaketma Phosphate SA – Chaketma Phosphate Mineral Characterisation Rpt No. T1843

Size fraction (µm)	GK		SAB		KEL	
	Liberated	Unliberated	Liberated	Unliberated	Liberated	Unliberated
250	47,98	52,02	45,12	54,88	48,34	51,66
140	81,06	18,94	82,14	17,86	80,91	19,09
80	85,22	14,78	87,12	12,88	84,88	15,12

Table 4.2 Sample Liberation Data (%)

The results of the chemical analysis of the size fractions are summarised in the following **Table 4.3** Sample Liberation Data.

Apart from the observed distribution variances of silica and phosphorous across the size fractions it was noted that the Total Carbon (from carbonate minerals) was a constant and that Rare Earths were in very low concentration in all size fractions.

X-Ray diffraction analysis was performed at Université de Québec å Montréal (UQAM) using the Rietveld quantitative analysis. These results are presented in **Table 4.4**.

Minerals	%
Quartz	6.7
Dolomite	13.1
Calcite	5.9
Hydroxylapatite	29.3
Carbonate Fluorapatite	16.2
Fluorapatite, syn	23.2
Phlogopite- Fe-rich	1.9
Clinochlore Fe	1.7
Albite	1.9
Pyrite	0.1
TOTAL	**100**

Table 4.4 Results of XRD Analysis

Size fraction		+150µm	-150 +106 µm	-106+75µm	-75 +53 µm	-53 +38 µm	-38 µm	Total
Masse	g	57.4	80.8	50.4	30.5	18.6	64.1	301.8
	%	19.0%	26.8%	16.7%	10.1%	6.2%	21.2%	100.0%
SiO_2	%	10.2	8.42	7.38	6.2	5.92	12.0	8.97
Al_2O_3	%	0.74	0.53	0.65	0.79	0.96	2.51	1.06
Fe_2O_3	%	1.07	0.81	0.91	0.91	0.88	1.39	1.01
MgO	%	4.38	3.51	4.29	5.19	6.02	5.3	4.51
Cao	%	40.7	43.0	42.7	41.7	41.1	36.9	41.0
Na_2O	%	1.28	1.43	1.38	1.24	1.18	1.07	1.28
K_2O	%	0.33	0.24	0.28	0.34	0.38	0.62	0.36
TiO_2	%	0.03	0.03	0.04	0.05	0.04	0.1	0.05
MnO	%	0.02	0.02	0.02	0.02	0.02	0.02	0.02
P_2O_5	%	20.7	23.1	22.3	20.8	19.4	17.4	:20.8
Nb_2O_5	%	0.05	0.05	0.05	0.05	0.05	0.04	0.05
ZrO_2	%	0.08	0.09	0.09	0.1	0.09	0.08	0.09
Ta_2O_5	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BaO	%	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Y_2O_3	%	0.04	0.04	0.04	0.04	0.03	0.03	0.04
SrO	%	0.14	0.15	0.14	0.12	0.11	0.15	0.14
ThO_2	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ce_2O_3	%	0.02	0.03	0.02	0.03	0.03	0.02	0.02
La_2O_3	%	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02
Nd_2O_3	%	0.05	0.04	0.05	0.04	0.05	0.04	0.04
LOI	%	16.3	14.3	15.9	18.2	20	19.2	16.7
C total	%	4.09	3.61	4.07	4.59	5.1	4.9	4.24
TOTAL	%	**96.1**	**95.8**	**96.2**	**95.8**	**96.3**	**96.9**	**96.2**

Table 4.3 Sample Liberation Data

COREM noted that the majority of the sample comprised three apatite types: -OH, -F and —Cl.

Two carbonate minerals are present: dolomite and calcite accounting for close to 20% of the ore. The main silicate is quartz, followed by micas and chlorite.

The minerals that were identified during Mineral Liberation Analysis (MLA) were grouped together to simplify the list. Groupings were made to present the apatite (pure and impure with the impurity seeming to be finely included quartz and clay minerals) and carbonate (association of calcite and dolomite). **Table 4.5** shows the results of the MLA by size distribution.

Size fraction		+150µm	-150 +106 µm	-106+75µm	-75 +53 µm	-53 +38 µm	-38 µm	Total
Masse	**g**	57.4	80.8	50.4	30.5	18.6	64.1	301.8
	%	19.0%	26.8%	16.7%	10.1%	6.2%	21.2%	100.0%
Apatite	%	55.8	66.0	61.7	57.1	52.9	46.6	57.5
Impure {SiO$_2$)Apatite	%	8.9	6.0	5.5	5.0	5.5	9.3	7.0
Calcite	%	2.6	1.7	2.1	2.8	3.1	3.5	2.5
Dolomite	%	22.5	17.7	22.9	27.9	31.3	27.9	23.5
Quartz	%	8.2	7.0	5.6	3.7	2.9	3.5	5.7
Orthoclase	%	0.4	0.3	0.4	0.6	0.9	1.4	0.6
Albite	%	0.1	0.1	0.1	0.2	0.3	0.9	0.3
Phlogopite	%	1.0	0.7	0.9	1.3	1.9	5.7	2.0
Biotite	%	0.2	0.3	0.5	0.8	1.0	0.8	0.5
Clinochlore	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pyrite	%	0.2	0.2	0.3	0.3	0.2	0.2	0.2
Goethite	%	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Rutile	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**%**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4.5 Modal Analysis

COREM also investigated total apatite liberation (including impure) by particle composition as tabulated in **Table 4.6** and shown in **Figure 4.4**.

The analysis indicated that based on grains containing at least 90% apatite the -150 +106 µm grind size appears to be adequate, recovering 87% of the apatite (yellow cell). Maximum liberation seems possible at -53 +38 µm (three cells to the right of the colored cell) at 91.2% recovery of apatite.

The maximum phosphate content that could be achieved by physical separation is indicated to be 34% P_2O_5. This is favourable when compared with that of the Gafsa basin which is around 29 to 30% P_2O_5.

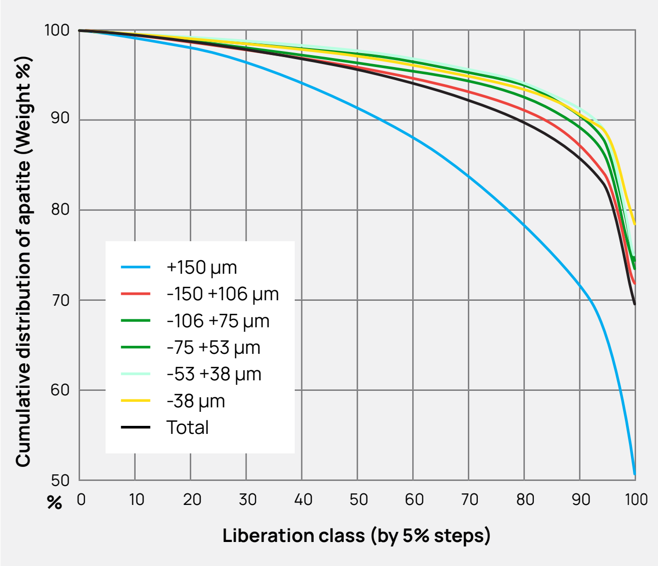


Figure 4.4 Apatite Liberation by Liberation Class

Minerals	Content (%)
P_2O_5	34.2
CaO	51.3
SiO_2	0.55
MgO	0.29
CaO/P_2O_5 ratio	1.5

Table 4.7 Chaketma Ore – Pure Phase Analysis

Liberation classes	+150 µm	-150+106µm	-106+75µm	-75+53µm	-53+38 µm	-38µm	Total
0%‹x‹=5%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
5% ‹X ‹ = 10%	99.8	99.8	99.8	99.8	99.8	99.8	99.8
10% ‹X ‹ = 15%	99.4	99.5	99.5	99.5	99.6	99.5	99.5
15% ‹X ‹ = 20%	98.8	99.1	99.1	99.2	99.4	99.2	99.1
20¾ ‹x ‹ = 25¾	98.1	98.7	98.8	98.9	99.1	99.0	98.7
25% ‹ X ‹ = 30%	97.3	98.3	98.3	98.6	98.9	98.8	98.3
30% ‹x ‹ = 35%	96.5	97.8	97.9	98.4	98.7	98.5	97.8
35% ‹x ‹ =40%	95.4	97.4	97.6	98.2	98.5	98.1	97.3
40% ‹X ‹ =45%	94.3	96.8	97.2	97.8	98.3	97.8	96.7
I 45% ‹x ‹ = 50%	93.1	96.3	96.7	97.5	98.0	97.4	96.2
50% ‹x ‹ = 55%	91.4	95.7	96.4	97.2	97.6	97.0	95.5
55% ‹x ‹ = 60%	89.9	95.2	95.9	96.9	97.2	96.5	94.8
60"/o ‹ X ‹ = 65%	88.1	94.6	95.4	96.5	96.7	95.9	94.0
65% ‹x ‹ =70%	86.3	93.9	94.9	96.0	96.2	95.5	93.2
70% ‹x ‹ =75%	83.9	93.1	94.3	95.3	95.6	94.9	92.3
75% ‹x ‹ = 80%	81.4	92.2	93.5	94.6	94.9	94.0	91.1
80% ‹x ‹ =85%	78.6	91.0	92.5	93.8	94.1	93.3	89.8
85% ‹x ‹ =90%	75.3	89.5	91.3	92.5	92.9	92.4	88.1
90% ‹x ‹ =95%	71.6	87.2	89.1	90.5	91.2	90.4	85.7
95% ‹X ‹ 100%	65.9	83.5	85.7	87.1	88.4	88.2	82.0
100%	50.9	71.9	73.1	74.3	75.1	78.4	69.7

Table 4.6 Apatite Liberation

In summary, the COREM analysis found:

- The submitted sample was made of an oolitic phosphate rock containing 57.5% apatite, approximately 7.0% of impure apatite and 23.5% dolomite.
- Apatite oolithes are approximately 200 μm in diameter and are well liberated (90%) in size fraction finer than 150 μm. The optimal size fraction for their liberation seems to be -150+106 μm.
- The pure apatite is a fluoroapatite that bears only 34.1% of P_2O_5 compared to the proposed 42.2% from the pure chemical composition.
- This apatite does not contain uranium.
- The impure apatite is in fact pure apatite bearing fine quartz inclusions, chloritic and clay minerals. Microanalysis done under microprobe seems to indicate that the silica proportion in such apatite could sometime be very high (up to 24.6% SiO_2).

4.3 Grindability Testwork

A grindability study of samples from KEL and GK has been carried out to determine the grindability of the Chaketma ore. The tests carried out on different Chaketma samples determined a range for Bond Rod Mill work index, Bond impact work index and Bond abrasion index as summarised in **Table 4.8** and compared to other phosphate projects in **Table 4.9.**

Property	Units	Range
Bond Rod Mill Work Index	kW.hr/t	5.4 - 9.0
Bond Impact Work Index	kW.hr/t	5.9 - 7.8
Bond Abrasive Index	g	< 0.011
Specific Gravity	g/cm³	2.90 - 2.95
Bulk Density	g/cm³	1.67 - 1.75

Table 4.8 Physical characteristics – Chaketma Phosphates

The Chaketma phosphate ore when compared to that of other producers is not as hard as the Moroccan and Canadian phosphates but is harder than that of Egyptian phosphates.

Hardness	Very Soft	Soft	Medium	Hard	Very Hard
BWi & RWi Range (kW.hr/t)	< 7	7 to 10	10 to 14	14 to 20	> 20
Example of Phosphate Sources	Egyptian Phosphate		Canadian Phosphate	Moroccan Phosphate	

Table 4.9 Reference Phosphates

4.4 Pilot Plant Test Work

Process

Jacobs further developed the processing methodology using a bulk ore sample from the trial mining works undertaken in 2016 by pilot plant testwork conducted at the Jacobs Lakeland facility in Florida USA.

The purpose of the pilot plant test was to:

- Obtain process data for use in the engineering part of the study;
- Confirm technical data for thickening and filtration of concentrate and tailings from the pilot plant;
- Provide concentrate for phosphoric acid testing.

A 28t of bulk sample was processed through an impact crusher and screening plant reducing the material to -4mm and the product blended, sub samples taken for evaluation and the remainder stored in a closed container to protect from the weather.

Nine separate head assays were taken, three from each flotation trial with the overall average being as per **Table 4.10**.

%P_2O_5	%Al	%Fe2O3	%Al_2O_3	%MgO	%CaO
22.11	8.15	0.87	0.70	3.65	41.73

Table 4.10 Average Head Assay - Bulk Samples

Size analysis was done on the samples both as received, following reduction to -4mm and after preparation for flotation feed with the flotation feed results tabulated in **Table 4.11**.

	Bulk	Analysis							Distributions						
μm	Mesh	grams	P_2O_5 %	Al %	Fe_2O_3 %	Al_2O_3 %	MgO %	CaO %	weight	P_2O_5 %	Al %	Fe_2O_3 %	Al_2O_3 %	MgO %	CaO %
150	100	5.10	24.96	6.77	1.28	0.35	2.71	45.90	1.1	1.2	1.2	1.7	0.9	0.9	1.2
106	150	119.40	24.76	6.82	0.77	0.31	3.05	45.93	26.8	28.6	27.4	23.3	18.9	22.8	27.2
75	200	113.5	24.17	6.14	0.81	0.35	3.38	46.23	25.5	26.5	23.4	23.3	20.3	24.0	26.1
53	270	76.4	23.23	5.17	0.79	0.38	3.95	45.88	17.2	17.2	13.3	15.3	14.8	18.9	17.4
38	400	32.3	21.95	4.97	0.76	0.43	4.43	45.10	7.3	6.9	5.4	6.2	7.1	9.0	7.2
20	635	48.0	21.09	5.36	0.84	0.52	4.59	44.05	10.8	9.8	8.6	10.2	12.8	13.8	10.5
<20	pan	50.7	20.11	12.18	1.57	0.97	3.34	41.20	11.4	9.9	20.7	20.1	25.1	10.6	10.4
Composite		**445.4**	**23.22**	**6.68**	**0.89**	**0.44**	**3.58**	**45.19**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4.11 Size analysis – FLOTATION Feed

The pilot metallurgical test work carried out by Jacobs in Florida on the 28-tonne bulk sample did not use water that will be used in the actual processing. Further tests will need to be conducted in Tunisia using both treated municipal wastewater and ground water from the targeted water sources to assess whether there is any impact on metallurgical recoveries.

The method of preparation of the material for introduction to the flotation circuit is summarised in **Figure 4.5**.

Locked cycle flotation tests were carried out using an agreed (Jacobs and CPSA) test workflow sheet as shown in **Figure 4.6**.

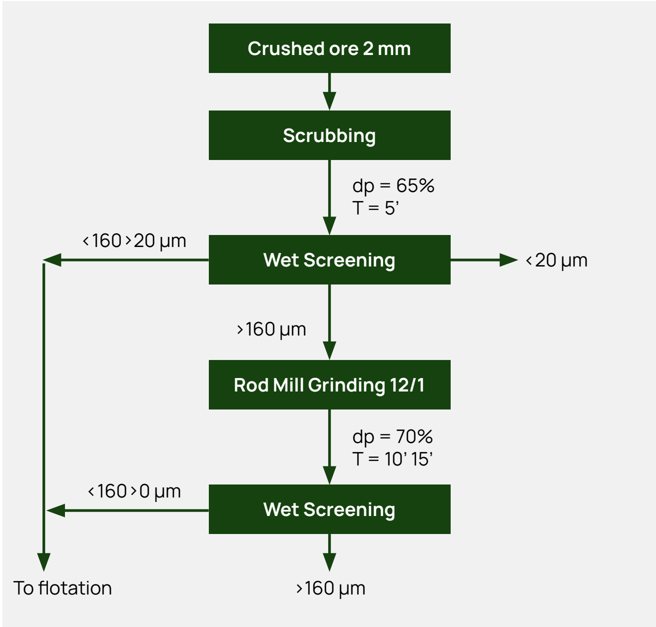
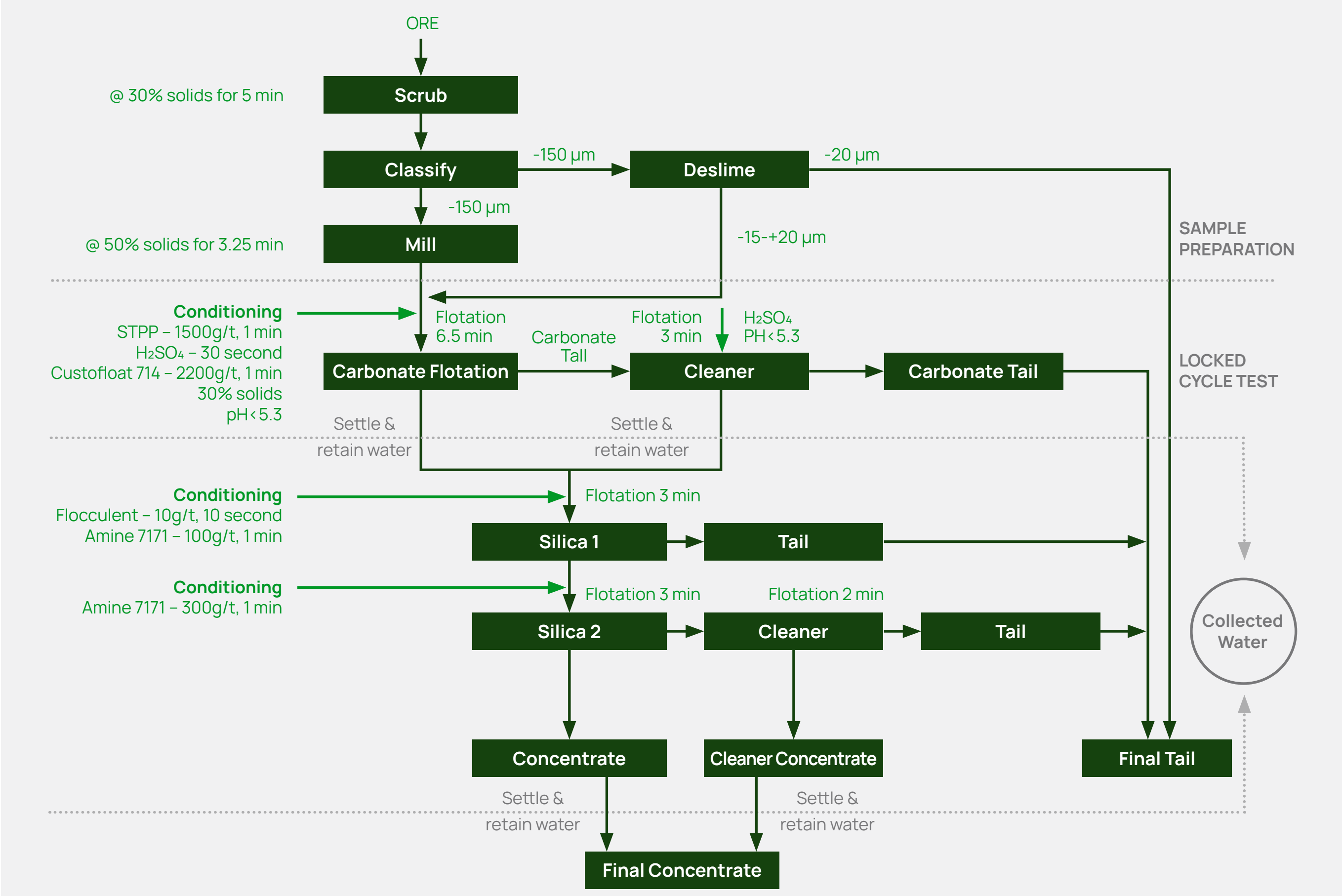


Figure 4.5 Diagram of Flotation Material Preparation



Locked Cycle Procedure
Test 1: Flotation test use fresh water & collect decanted water
Test 2: Flotation test use collected water + makeup fresh water & collect decanted water
Test 3: Flotation test use collected water + makeup fresh water & collect decanted water
Test 4: Flotation test use collected water + makeup fresh water & collect decanted water
Test n-1: Flotation test use collected water & collect decanted water
Test n: Flotation test use collected water

Figure 4.6 Bulk Sample Locked Cycle Testing Flowsheet

The summary of the average results achieved by the pilot plant testwork are shown in the following tables.

Test Number	Feed rate kg/h	P_2O_5 Concentrate grade %	MgO Grade in Concentrate %	Total P_2O_5 Recovery %	Mass Weight Recovery to Concentrate %
P1	192.2	30.20	0.64	76.1	57.8
P2	174.5	30.30	0.65	89.5	72.7
P3	191.0	30.20	0.52	84.5	60.5
P4	199.8	30.40	0.60	74.6	54.9
P5	195.7	30.90	0.50	76.2	55.4
P6	144.9	30.00	0.66	83.7	63.1
P7	147.4	30.40	0.55	80.8	60.6
Average	**177.93**	**30.34**	**0.59**	**80.8**	**60.7**

Table 4.12 Summary of Pilot Plant Grade and Recovery Results

Test Number	STPP kg/t	Collector 714 kg/t	Flocculant kg/t	Collector 7171 kg/t	Total H_2SO_4 kg/t
P1	1.65	2.16	0.006	0.42	2.54
P2	1.69	2.54	0.006	0.45	2.74
P3	1.70	2.56	0.005	0.42	3.05
P4	1.39	2.20	0.005	0.37	2.97
P5	1.47	2.31	0.006	0.42	3.17
P6	1.67	2.42	0.006	0.44	3.12
P7	1.93	2.77	0.006	0.50	3.25
Average	**1.64**	**2.42**	**0.006**	**0.43**	**2.98**
Target Consumption	1.5	2.2	0.005	0.40	

Table 4.13 Pilot Plant Reagent Consumption

Test Number	P_2O_5 Head grade %	P_2O_5 Slimes grade %	Slimes losses % by mass	Flotation feed size % passing 150micron	Flotation feed size % passing -20 micron
P1	22.8	15.30	4.3	91.1	14.8
P2	23.0	15.00	4.7	92.7	11.5
P3	22.6	15.20	4.3		
P4	22.7	14.60	3.8		
P5	22.3	14.90	3.5		
P6	23.5	15.00	5.0	94.7	11.4
P7	23.4	16.10	4.7	93.4	16.4
Average	**22.90**	**15.16**	**4.33**	**93.0**	**13.5**

Table 4.14 Summary of Other Pilot Plant Results

Overall, the operation of the pilot plant produced the following average data:

Feed rate to scrubber	177.93kg/h
Scrubber discharge % solids	30%
P_2O_5 head grade	22.90%
Slimes losses (% by mass)	4.33%
Slimes grade	15.16% P_2O_5
Flotation feed size % passing 150micron	93.0%
Total phosphate recovery	80.8%
Final concentrate grade	30.34%
Final concentrate grade MgO	0.59%
Mass weight of concentrate (total)	60.7%
Flotation time	total 16 min
Total sulfuric acid consumption (feed to flotation)	2.98kg/t
STPP consumption (feed to flotation)	1.64kg/t
Carbonate collector consumption (feed to flotation)	2.42kg/t
Flocculent consumption	0.006kg/t
Total amine collector consumption	0.43kg/t

These overall pilot plant results were deemed to be conservative with the potential to improve on a full-scale plant due to better instrumented process control.

Concentrate Analysis

Chemical analysis of a representative sample of the concentrate produced was tested by CPSA in three alternative laboratories, the results of which are shown in the following table:

Mineral	Units	Groupe Chimique Tunisien	Groupe Roullier	IFDC
P_2O_5	%	31.56	31.20	30.98
CaO	%	50.45	49.40	48.94
MgO	%	0.53	0.47	0.58
SiO_2	%	1.50	1.71	1.49
Al_2O_3	%	0.38	0.43	0.39
Fe_2O_3	%	0.81	0.87	0.83
Na_2O	%	-	1.52	1.40
K_2O	%	-	0.26	0.23
Cl	ppm	400	-	-
F	%	3.75	3.74	3.91
Cd	ppm	20.0	31.7	29.5
CaO/P_2O_5 ratio	%	1.60	1.58	1.58

Table 4.15 Chemical Analysis of Phosphate Concentrate Produced

Dewatering

FLSmidth[4] was engaged to conduct thickening and filtration test work on:

- Flotation concentrate – Thickening and Filtration
- Flotation tailings – Thickening and Filtration

The sedimentation of the phosphate concentrate was rapid, after one hour the density of required pulp was attained whereas for tailings, the particles remained in suspension far longer taking three hours to reach the wt% target.

The use of flocculant is likely to be required to allow these particles to settle much more rapidly.

Laboratory pressure filtration tests were carried out on the concentrate of phosphate and on the slimes produced by the pilot plant by FLSmidth.

These laboratory tests achieved the goal of simulating the operation of a membrane filter press.

Conclusions

It was concluded that the pilot plant testing of the bulk sample demonstrated that:

- The metallurgical process tested was robust;
- Locked cycle tests showed that re-cycle water had minimal/little effect on the flotation performance;
- The performance of the pilot plant was acceptable;
- The results achieved the targets set by CPSA;
- Chaketma phosphate ore can be upgraded to 30% P_2O_5 with recovery greater than or equal to 80% and with an excellent CaO/P_2O_5 ratio of between 1.55 and 1.6; and
- Results indicate the potential to produce a commercial grade concentrate capable of conversion to high quality products, Mono Ammonium Phosphate (MAP) and/or Diammonium Phosphate (DAP), using conventional methods and reagents.

4. F L Smidth Report Ref 9232505302 :- Thickening and Filtration – Phosphate Concentrate & Slimes

4.5 Plant Design Parameters

The proposed Chaketma process plant will produce a phosphate concentrate suitable for export.

The major processing steps are crushing, grinding, desliming, reverse flotation, filtration and drying.

The beneficiation plant capacity design is based on being available for operation on a continuous basis, 24 hours per day, 7 days per week, 52 weeks per year.

The operating availability time for the primary, secondary and tertiary crushing sections has been based on a nominal 6,000 hours per year or 68.5% availability.

The operating availability time for the beneficiation plant (comminution, flotation) is based on 7,680 hours per year or 87.7% availability per year.

The design production rate from the Chaketma beneficiation plant is 1.5 Mtpa of dry concentrate per year at an average grade of 30 wt% P_2O_5. The design annual feed of ROM material to the plant is 3.5 Mtpa of ore at a grade of 19.4 wt% P_2O_5.

The annual feed criteria were based on the original works completed during 2012 to 2016. Applying the latest parameters on both recovery and resource grade would indicate that for a target of 1.5Mtpa of dry concentrate production the likely feed rate will vary from 2.7Mtpa to 3.3Mtpa.

Initial test work was undertaken in Tunisia under the supervision of consultant Dr Ammar Henchiri, a world authority on phosphate flotation.

The following conservative base parameters were initially applied as Chaketma process facility design criteria. The pilot plant testwork results will be used to refine these criteria for later studies:

- Plant concentrate recovery of 50 wt% of dry ROM ore feed;
- Slimes generation of 12 wt% of dry ROM ore feed;
- Concentrate grade of 30 wt% P_2O_5. and a range of 1-3 wt% MgO; and
- Phosphate recovery to concentrate 70 wt% of ROM ore feed content.

The proposed overall site layout using a semi-permanent remote crusher with ore trucked to the main process facility is shown in **Figure 4.7**. Under Tunisian regulations, PhosCo will be able to apply for an ancillary permit for mine infrastructure, including infrastructure outside of the mining tenement area.

Figure 4.8 shows a schematic for the proposed process plant layout.

Figure 4.9 is a simplified process flow schematic of the plant design.

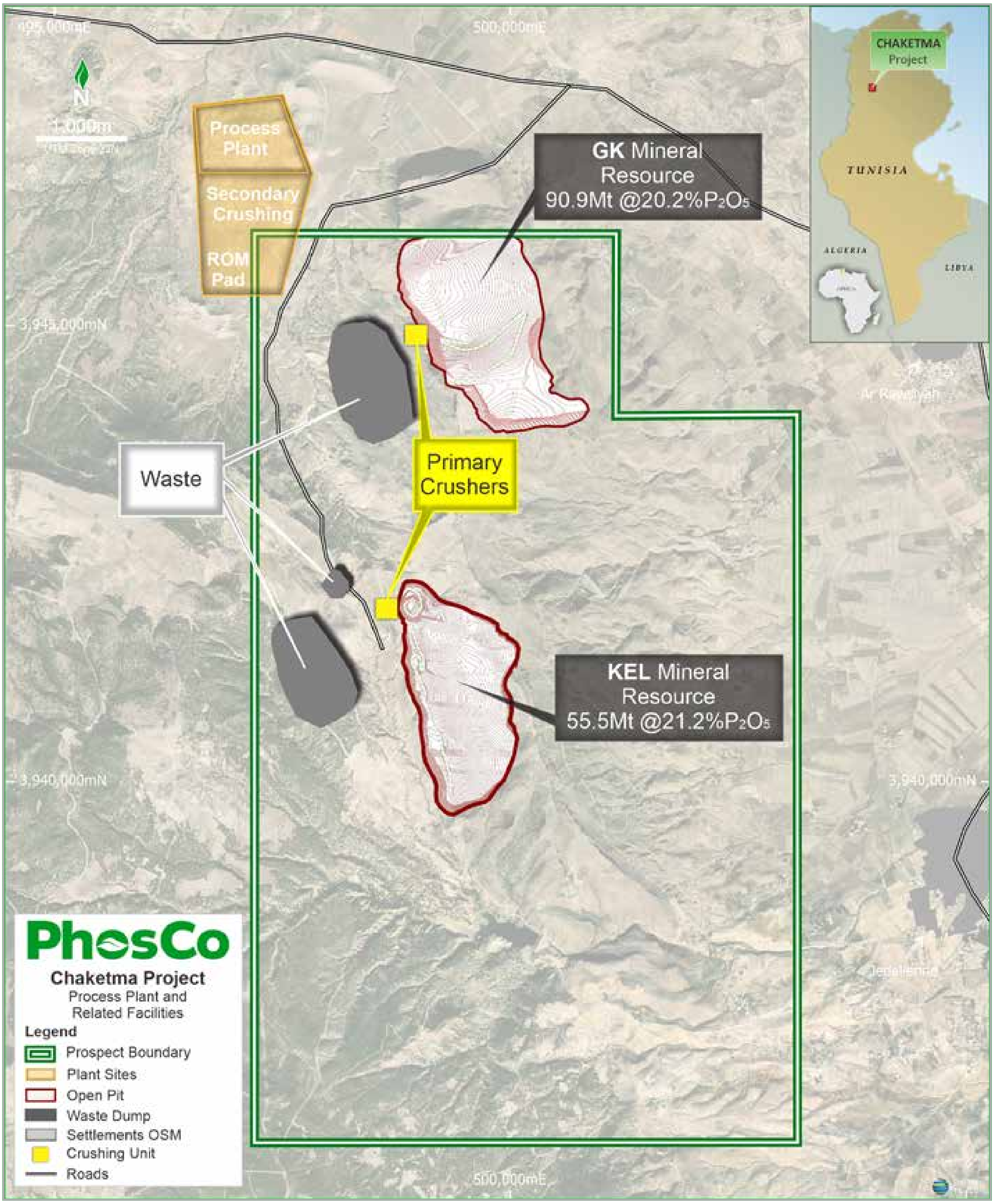


Figure 4.7 Chaketma Project – Overall Site Layout

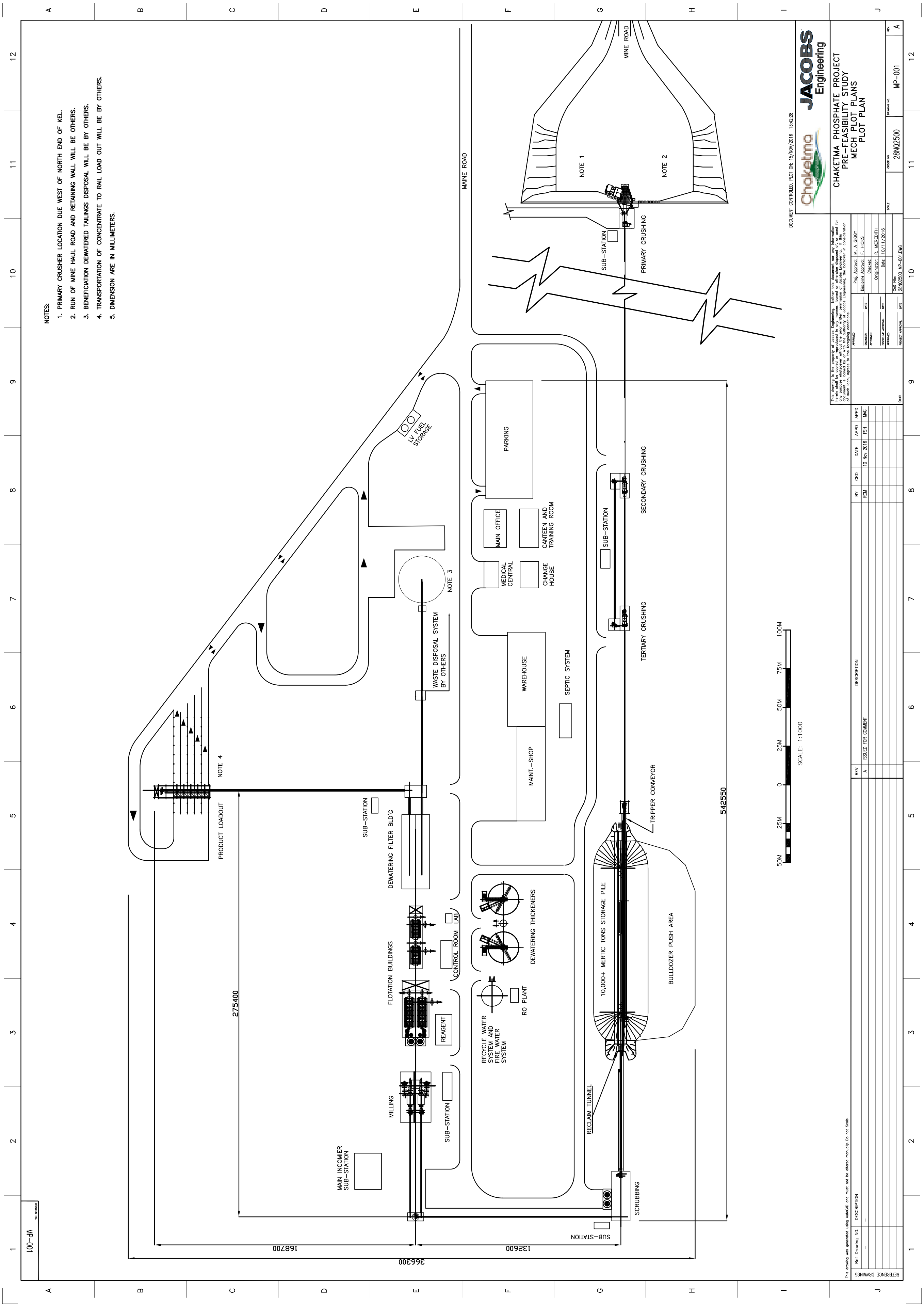


Figure 4.8 Process Facility Plant Layout

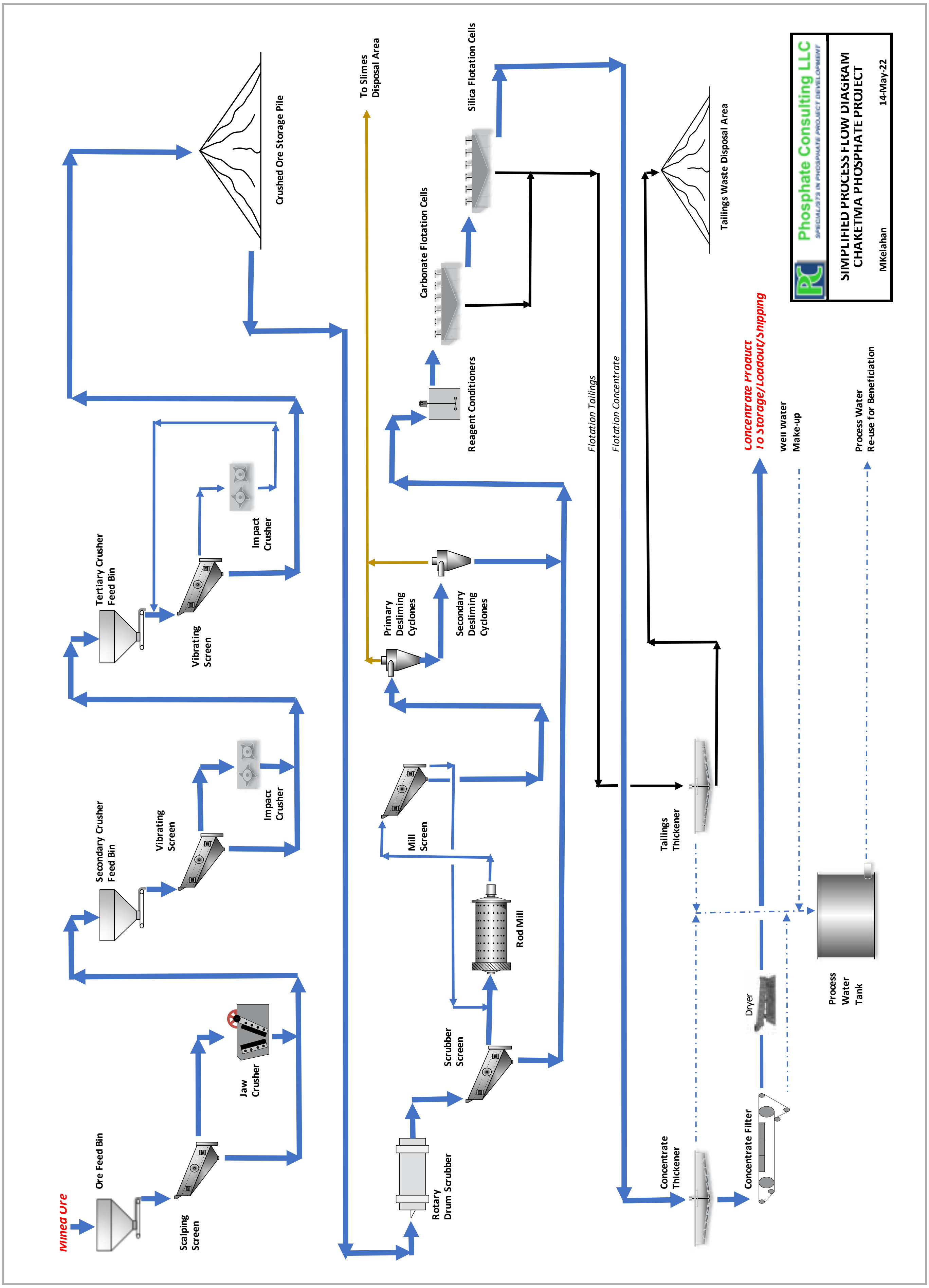


Figure 4.9 Simplified Process Flow Schematic

4.6 Process Plant Stage Descriptions

Crushing Circuit

Ore coming from the mining operations is tipped via a grizzly into a primary crusher feed hopper of 500t capacity. The maximum ore size would be around 1,000mm with ore greater than this requiring to be reduced in size by use of a rock breaker.

The current plan has this primary crusher located in the vicinity of the mine areas.

Ore is moved via an apron feeder, over a screen of 100mm, and the larger ore discharged into a primary crusher being a Metso C160 that has a feed capacity of 430-610tph based on a closed size setting of 150mm.

Two alternatives exist to move this material to the secondary/tertiary crushers located at the main process facility either by rehandle and trucking or an overland conveyor. The current study is based on rehandle by truck.

Material then moves via a conveyor and secondary screen to the secondary and tertiary crushers being Hazemag API 1320's and discharged onto an intermediate stockpile in advance of the grinding circuit.

Milling Circuit

This area includes the crushed ore stockpile, the settling, crushing and classification areas.

The effective operating time for the beneficiation plant (milling, flotation, product storage, drying, and load out, waste disposal and water distribution) used is 7,680 hours or 87.7% availability per year

Below the stockpile, there is a reinforced tunnel equipped with vibrating feeders and a drum scrubber feed conveyor. The crushed material is drawn off the stockpile at a controlled rate and fed to the scrubber being of dimensions 4.8m diameter and 12.07m long.

Process water is added at the scrubber feed chute. The discharge from the scrubber goes to the vibrating screen. Additional water is added as required.

Material is then fed to the rod mills. Particles less than 4 mm from the scrubber vibrating screen discharge into the primary cyclone feed tank

The discharge from the rod mill is transferred by pump to the cyclone group. The underflow of this group of cyclones (coarse material over 150 microns) is returned to the feed chute of the rod mill and the overflow of less than 150 microns gravitates to the tank conditioner feed tank

Particles less than 4mm from the scrubber screen discharge into the primary cyclone feed tank. Process water is added to the primary cyclone feed tank to ensure pulp density is maintained at a constant level. The pulp is transferred to the group of primary cyclones. The primary cyclone group underflow (coarse material over 20 μm) gravitates to the primary cyclone underflow tank and the cyclone overflow gravitates to the feed tank for the tails filter presses.

The primary cyclone underflow pulp is transferred to the group of secondary cyclones. Secondary cyclone overflow (less than 150μm) gravitates to the conditioner feed tank. The secondary cyclone underflow gravitates to the secondary cyclone overflow tank and this material is returned to the rod mill feed chute.

Flotation Circuit

This zone includes the conditioning and flotation circuits for the carbonates and silica.

The pulp from the conditioner feed is pumped into the tanks equipped with agitators.

Various reagents are added as the material moves through the flotation cells with the phosphate concentrate and flotation tailings being both transferred by pump to the filter presses.

4.7 Tailings

Tailings from the process plant will be dewatered and produced as a filter-cake and deposited onto a transit storage stockpile at the limits of the plant area. It is anticipated that the tailings will be benign in nature. Studies will be undertaken to ensure that chemicals used in the flotation system do not have the potential to present damage to the environment as part of the tailings disposal process.

Initially the tailings produced will be deposited in a tailings storage facility and later, once capacity and geotechnical conditions allow, the tailings will be co-deposited with waste rock and incorporated within the waste dump construction process. The scheduling to do this will be an integral aspect of the mine plan development.

Dewatering

This area includes the phosphate concentrate and tailings filter presses.

The filters are of plate/frame type.

The dewatered concentrate is discharged onto the concentrate storage infeed conveyor to the concentrate loadout.

The dehydrated tailings are transferred via the tails conveyor to the tailings disposal.

Concentrate Loadout

This area includes conveyors and loading hoppers.

The filtered concentrate is discharged into elevated concentrate storage hoppers, that will have a rectangular shape with a pyramidal section at the bottom equipped with a guillotine valve.

Each hopper will be able to load a minimum sized 30 tonne truck for transport of concentrate to the railhead. This will be done by contractors with the expectation that the actual truck capacity will be decided based on safe operating procedures, road capability and siding area logistics.

Reagents Handling

The reagents used in processing the Chaketma phosphate ore and the annual quantities to be used are given in the below table.

This area includes the storage of sulfuric acid (pH modifier), Custamine 7171 (silica collector), sulfonated fatty acid Custofloat 714 (carbonate collector) and tripolyphosphate of sodium STPP (phosphate depressant).

Water

The design of this area includes water storage, the reverse osmosis plant, the gland seal water system and fire water.

Air

The design incorporates two air compressors, one for the crushing and beneficiation section and one for the product filtration and drying section. Each compressor feeds an instrument air receiver and a plant air receiver.

The air plant will be a vendor supplied package for the compressors, receivers, filters and instrumentation.

Property	Purpose	Reaction Zone	Annual Use (3mtpa feed)
Tripolyphosphate sodium (STPP)	Depression of phosphates	Conditioning	4,500
Sulfuric acid (H2N/A4)	pH modifier	Conditioning	9,000
Custofloat 714	Carbonate collector	Flotation of carbonates	6,900
Custamine 7171	Silica collector	Silica flotation	1,200

Table 4.16 Reagents used, uses and quantities

4.8 Process Design Capacity

The Scoping Study concentrate production has been based on the nominal target of delivering 1.5Mtpa of saleable product at a nominal 30% P_2O_5, and MgO of less than 1%.

As such the ore mining schedule varies each period to deliver the required quantity of ore that will achieve that target taking into account the feed grade and recovery criteria as currently understood.

This results in annual ore tonnes mined, and annual process facility throughput, varying from 2.7Mtpa when mining the higher grade KEL ore (21% P_2O_5) in the initial periods of the schedule, up to 3.3Mtpa for lower grade periods.

In practice, the process plant is likely to be run at an optimum design throughput rate which would result in more consistent feed tonnes and a varying concentrate production.

The KEL Resource is indicated to be likely to deliver a reasonably consistent grade for the majority of its mining activity. A high level review of the likely impact on concentrate production for varying feed tonnes has been completed utilising the recovery factors as applied to the existing schedule, the results of which are summarised in **Table 4.17** and **Figure 4.10** based on the first ten years of mining of the KEL Resource.

There exists potential to increase the mining rate for KEL to more than that currently scheduled, a rate that has been limited to that required to deliver the fixed concentrate production target. This would support a scenario of higher feed tonnes for the process facility and the potential to produce additional concentrate. The SAB deposit will also provide an option for early access and an additional mining production area should the flexibility be required.

Engineering design and market sales potential should be reviewed to establish an optimum design capacity, logical feed rate steps and associated capital costs, based on process equipment capabilities and confidence in market demand for concentrate within the constraints of capital guidelines and downstream concentrate handling capacity.

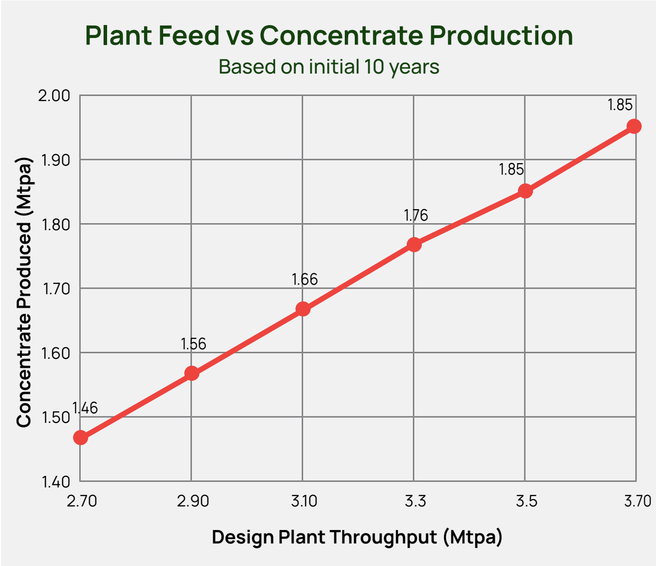


Figure 4.10 Plant feed Rate vs Concentrate Production – Initial 10 years

Detail	Units	Production Scenarios					
Plant Feed Rate	Mtpa	2.70	2.90	3.10	3.30	3.50	3.70
Total Plant Feed (10 yrs)	Mt	27.1	28.9	30.7	32.5	34.3	36.1
Concentrate Produced (10 yrs)	Mt	14.6	15.6	16.6	17.6	18.5	19.5
Annual Concentrate Production	Mtpa	1.46	1.56	1.66	1.76	1.85	1.95

Table 4.17 Mill Feed and Concentrate Production Scenarios

5. Infrastructure and Services

The Scoping Study leverages excellent existing infrastructure including access by bitumen road, nearby railway, access to ports, with gas and grid power close to site. Water is to be secured from sources that will not negatively impact the community and aim to minimise water consumption.

5.1 Water Supply

Aquifer Supply

Initial project designs have incorporated significant measures to reduce water consumption, including:

- Filtering of tailings and recycling of all water sources;
- Recycling of all mine drainage water sources, and domestic water;

As a result of these water conservation techniques, the project water demand is indicated to be approximately 5,500 m^3 per day (~65 l/s).

Local water sources in the immediate project area are indicated to be potentially over-exploited by current users and it is anticipated that any attempt to further exploit these stressed systems will not be acceptable.

After a number of reviews, initially in 2012 and updated in 2016, a land survey was undertaken to explore the potential of sourcing project water supply from the El Bouajer aquifer to the west of the project.

The aquifer system of El- Bouajer-Hmaima-Ain Hamedna contains a series of groundwaters situated in mainly limestone formations and has a groundwater resource indicated to be in the order of 3.5M m^3/year. Current exploitation of this resource is still relatively moderate (1.5M m^3/year) from shallow aquifers. The project will aim to exploit deeper, untapped aquifers known to exist in the region. Actual yield and performance of these deeper aquifers remains to be confirmed. This will require establishing several deep bores and a 25 km pipeline to transport the water to the site.

An evaluation program designed to define and test this potential was undertaken and a number of locations for water bores established. The Governate of Siliana has drilled two boreholes into the aquifer and monitoring of those bores should assist in future evaluations. Cost estimates to complete test bores have been obtained but further works have been on hold.

Treated Wastewater

Two wastewater treatment plants are a potential alternative water resource with the capacity of around 10,500 m^3/d (approximately two times Chaketma's requirements), respectively distributed between the municipalities of Kasserine (7,000 m^3/day) and that of Sbeitla (3,500 m^3/day).

Part of this water is used in agriculture (0.6M m^3/year for Kasserine and 0.5M m^3/year for the Sbeitla) leaving approximately 2.7M m^3/year (7,400m^3/day) available for alternative uses. These two treatment stations are located respectively 68 and 54 km by road from the Chaketma permit area and at lower elevations of approximately 170m-190m. Exploitation of this resource would require the installation of a pumping station and a pressure main. This resource will be evaluated as a potential alternative to the borefield as part of the preliminary BFS studies.

5.2 Electrical Power & Gas

The estimated power requirement for the project is in the order of 15 MW at full production. This will be provided by Société Tunisienne de 'Electricité du Gaz (STEG) through its existing transmission line network.

Additionally, STEG will also supply the gas requirements of approximately 120 MJ/hr.

5.3 Site Infrastructure

It is planned to accommodate the workforce in the nearby towns including Rouhia, Jedeliane and Sbiba. Transport will be provided to the site. A minor network of site roads will be constructed to connect the plant, mine and administration to the national highway network.

5.4 Rail

The Scoping Study is based on export of concentrate through the Port of Rades, with a study previously undertaken into the transportation and shipping of product from the site to the port for export market(s).

Additional work is required to confirm this basis with the relevant authorities in-country.

Société Nationale des Chemins de Fer Tunisiens (SNCFT) which operates the existing rail network in Tunisia has an operating rail line into the north and west of Chaketma with two potential connection options of either 35km or 55km from the project site and existing rail alignments.

Additional rail infrastructure required to facilitate the export of phosphate through the Port of Rades includes:

- New rail siding at the mine site to facilitate the loading of the trains (should rail be extended to site);
- New siding at the Port of Rades to facilitate shunting activity and the unloading of the trains.

5.5 Port Facilities

The Office de la Marine Marchande et des Ports (OMMC) operates the commercial port facilities throughout Tunisia. The Port of Rades has available capacity for handling the phosphate concentrate for the Chaketma Project. It is close to the capital Tunis and accessible by the existing operational rail network.

The Port of Rades bulk storage and export port location has shared access to a 30,000 DWT ship berth, and the capacity to build a dedicated additional 30,000 DWT if required. The facility has a previously operational rail siding and a non-operational bottom dump rail wagon unloading facility. While these facilities will require upgrade and recommissioning work, the facilities and their condition permit for a fast track and lower-cost port terminal development.

The required port terminal scope of works will include the development of a storage facility of capacity to 50,000T.

6. Project Resourcing Considerations

The Scoping Study envisages 300-400 local jobs during operation, with 1,000 jobs during construction, leveraging Tunisia's pool of experienced personnel for a phosphate mining operation.

Tunisia has an excellent availability of semi-skilled, skilled and professional personnel with experience in mining, transport, metallurgical processing and similar industries.

Tunisia, as a nation, has a priority focus on creating new employment opportunities and support for creating sustainable new work opportunities is made at all levels of government, business and communities.

Tunisia has developed a high standard of education and skills training with extensive experience in phosphate mining and processing. These are all important and invaluable to the project's construction and ongoing operations.

The construction phase will generate up to 1,000 employment opportunities for local Tunisian people over a two-year period. When in operation, employment opportunities should be created by the project for approximately 330 people of whom a high proportion will be local Tunisian people from the nearby communities. Personnel requirements will peak at around 445 persons when the mining strip ratio escalates with the mining of GK. Process and administration personnel requirements are anticipated to be relatively stable throughout the mine life at 142 persons.

The use of a mining contractor for the mining operations will incorporate a commitment to train and utilise local personnel. A relatively slow mining buildup will provide training opportunities and Key Performance Indicators and schedules will be focused on the transition from any initial non-local operational workforce required to local personnel as a key criterion.

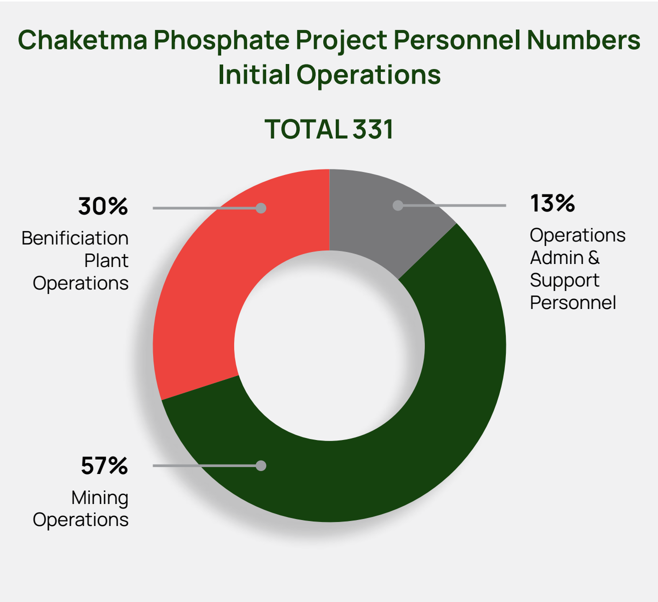


Figure 6.1 Chaketma Phosphate Project Personnel Numbers – Initial Operations

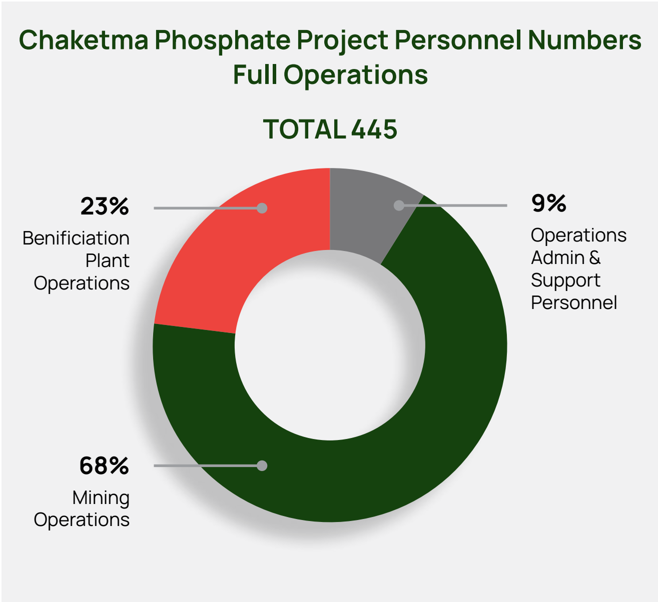


Figure 6.2 Chaketma Phosphate Project Personnel Numbers – Full Operations

7. Social and Environmental Aspects

PhosCo is committed to developing the Chaketma Project to international ESG standards. The Scoping Study has not identified any red flags that would prevent development of the project.

Administratively, the study area extends over the delegation of Erouhia, in the Governorate of Siliana and the delegations of Jedeliane, Sbiba and El Ayoun, in the Governorate of Kasserine. The area considered within the Chaketma Phosphate Exploration Permit encompasses 56 km^2.

The objective of the environmental and social studies that have been completed were to ascertain if there were any constraints that exist now or have the potential to exist in the future which may affect the viability of the project and to assess whether any 'fatal flaws' or high-risk areas exist within and around the project area.

An environmental impact study was conducted by Golder Associates for the Tunisian Government Mining Concession application. Additional works have been initiated with respect to community engagement with the assistance of ASF Consulting, a Tunisian consulting firm that specialises in the fields of environment, gender, social inclusion and health and safety in Tunisia and internationally.

Initial work undertaken is to assist CPSA in drafting a framework with respect to community engagement, namely:

- Stakeholder plan;
- Labour plan;
- Land acquisition and relocation framework.

In conjunction with CPSA personnel, the next stage of engaging ASF will be to compile and document a Development Charter for the project. Potential issues that have been highlighted during ASF's initial engagement will also be incorporated.

The Chaketma area is characterised by a continental climate. The winter is rigorous, snowfalls occur on the hills, whilst the summer hot winds and the 'sirocco' can cause temperatures to exceed 40°C. The rainfall is irregular and can be torrential mainly occurring in spring and autumn. Average for the last 10 years has been 244mm/yr.

A large part of the area surrounding the Chaketma Project is dominated by the cultivation of cereal crops. Natural vegetation is mainly found on the mountain massifs where most of the phosphate potential occurs. Fauna species likely to occur in the study areas are common on all the semi-arid bio-climatic zones of the north-west of Tunisia. No plant or animal species occur in the study area that are listed in the International Union for Conservation of Nature red list as endangered, vulnerable or threatened. There are no national parks or protected areas in the study area.

Agriculture and animal husbandry are the main socio-economic activities. Several zones have been identified as of important archaeological interest. A number of these have the potential to be impacted by phosphate exploration and mining activities and CPSA will work with the Tunisian authorities to help preserve these significant cultural sites.

The nearest town is Sbiba which is outside the permit, whilst the largest village adjacent to the permit is Rouhia. A network of secondary sealed roads occurs throughout the permit providing good access.

The project will aim to comply with international and Tunisian environmental standards. Initial studies have indicated that there are no significant environmental issues which will be potential obstacles to the project, with the major factors to be managed including:

- Tailings – will be produced as a filter-cake and stored on a transit storage stockpile for co-deposit with waste rock (co-disposal). The tailings from the processing plant is considered to be benign.
- Waste Rock – there will be considerable quantities of waste rock generated, a significant proportion of which will be scheduled to be sequentially returned to previously mined-out stages of the open pits.
- Water – exploration, definition and the obtaining of the required approvals to ensure an adequate supply of appropriate quality water for the project.
- Chemicals – chemicals will be used in the flotation system. Further studies will be undertaken to ensure that these do not damage the environment during long- term storage on a co-disposal arrangement.
- Archaeology – there are known archaeological sites that will be managed in co-operation with Tunisian authorities.
- Road Traffic – there will be a significant amount of truck traffic into and out of the site. A traffic management plan will be established to ensure the impacts of this are minimised and controlled, in collaboration with Tunisian road authorities.

Further downstream positive impacts will arise from the planned operating expenditures, much of which will be spent with local businesses or contractors, creating further employment opportunities.

8. Marketing

The Scoping Study indicates that Chaketma rock phosphate product will be readily saleable in the international market, with strong market fundamentals underpinned by sustained agricultural growth. PhosCo has assumed a long-term rock phosphate price of US$150/t FOB North Africa, compared to the current spot price of US$300/t assuming the current geo-political environment normalises.

8.1 Marketing Analysis

Phosphate rock is an important input for the global agricultural sector. About 90% of the phosphate rock produced is used in the manufacture of fertilisers, which are available as a wide range of products. There are no known substitutes for the use of phosphates fertilisers.

Phosphate is also used in the manufacture of phosphoric acid, phosphorus based industrial chemicals and phosphorus. These are mainly used in detergents, animal feed supplements and food products.

Most phosphate rock extraction operations tend to involve surface mining which entails large volume extraction and reasonably low transport distances to market. The five top producers of phosphate rock in 2020 were China, Morocco, the United States, Russia and Jordon who collectively represent in excess of 75% of production (source IFA). In 2020, Tunisia ranked number 10 as a world producer.

The five largest consumers of phosphate rock production (collectively over 71%) were China, the United States, Morocco, Russia and Brazil. In addition, Europe is one of the largest global markets consuming about 23% of total shipped phosphate rock in 2010.

Tunisia has been mining phosphate for more than a century and was one of the top five producers of phosphate rock globally. It has developed downstream phosphate products over the last 50 years including phosphoric acid, DAP, TSP, DCP and other products which it exports to over 50 countries on five continents. It is well placed geographically to continue to supply the important European market.

Tunisia has the requisite infrastructure, skills and expertise to be a global player in the phosphate market.

8.2 Phosphate Rock Prices

The industry's most widely quoted price is from Morocco which is utilised and published by the World Bank and trade journals. Over the past five years, agricultural commodity prices, including phosphate rock have experienced sharp increases.

There are strong demand factors in the agricultural sector from a growing population and growing uses of agricultural products for biofuels, which have a flow-on effect to agricultural inputs including phosphate rock. These factors have led the International Fertilizer Association to make the prediction of annual growth of 3.1% per annum in the next five years.

The rock phosphate price has increased significantly in recent times, responding to geopolitical instability. Russia's invasion of Ukraine has exacerbated already rising prices in fertiliser. This trend started in mid-2020 with increasing energy prices and export restrictions imposed by leading suppliers to control domestic prices, most notably by China and Russia before the invasion of Ukraine. Higher prices paid for food also increased the demand for fertiliser as farmers wished to increase production.

PhosCo has assumed a longer-term phosphate price of US$150/t FOB North Africa, compared with current spot pricing of US$300/t. The current spot price reflects geopolitical events including the war in Ukraine and Chinese export restrictions. This longer-term pricing assumption is likely to be consistent with the phosphate price used by project financiers, reflecting both a reduction in global demand due to high fertiliser prices and a supply-side response from new and existing mines.

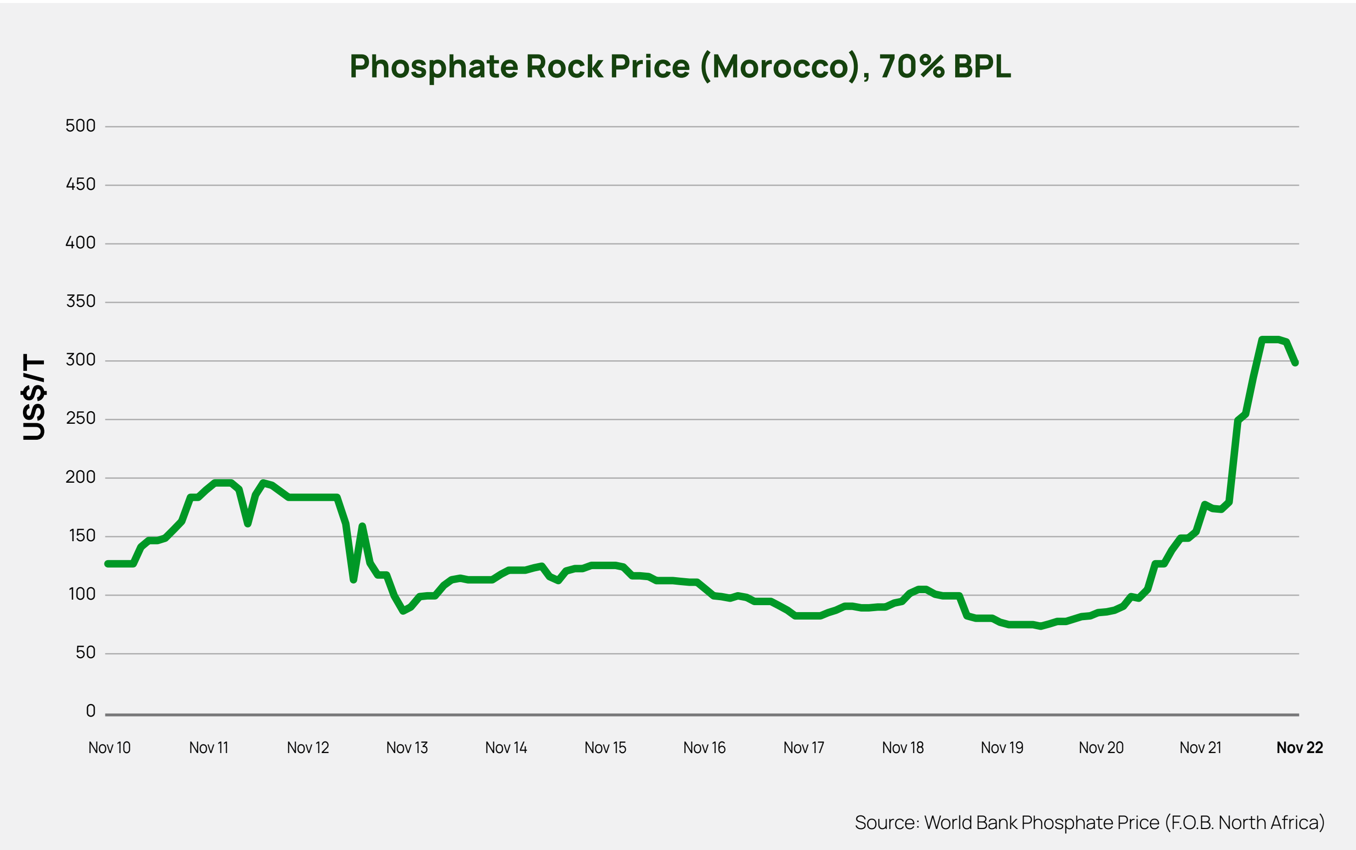


Figure 8.1 Phosphate Rock Prices

9. Project Economics

The project economic metrics indicate that the Chaketma Project has the potential to deliver outstanding financial outcomes including an estimated project post tax NPV of US$657M, a post-tax IRR of 54% and a rapid post tax capital payback of 1.5 years. Operating costs of US$79/t for the first 10 years reflect the low strip ratio open pit, high grade phosphate mineralisation, and the low operating cost environment in Tunisia.

9.1 Capital

For the purposes of this Scoping Study the plant configuration as developed by Jacobs and associated equipment list has been utilised for these estimations. To develop a plant capital cost estimate for the purposes of this Scoping Study the capital list from Jacobs has been used to approach a number of suppliers in Australia for current pricing with respect to major capital items. Additional capital allowance has been included for associated infrastructure and earthworks and a Total Installed Cost (TIC) factor applied.

Total capital spending associated with this technical case is US$170M, which includes US$96M for plant construction, concentrate handling and port works, US$20M for mining mobilisation and infrastructure (excluding contractor mining equipment), and a further US$43M for common infrastructure site works and land procurement.

A summary of the principal capital expense areas is shown in the following **Table 9.1** – Chaketma Capital Expenditure Summary.

The capital expenditure profile is indicated to be:

- **Year 2**, Site establishment, mobilisation, plant earthworks and procurement – US$76.2M
- **Year 1**, Ongoing plant construction, site services, rail and port facilities – US$93.4M

As per **Table 9.3** – Chaketma Capital Expenditure Schedule on the following page.

	US$M
Chaketma Capital Expenditure	**$170**
Mining Capital	**$20.4**
Pre-Production Mining	$12.0
MMA & Explosives Magazines	$4.6
Miscellaneous Mining	$3.8
Processing Capital	**$96.2**
Process Facility	$76.0
Rail Loadout	$5.5
Site Earthworks	$3.8
Concrete/Foundation works	$1.8
Port Facility	$9.3
Infrastructure & Auxillary Capital	**$43.3**
Site Services	$15.9
Common Site Surface Infrastructure	$8.9
Miscellaneous Capital	$8.5
Land Procurement and Resettlement	$10.0
Engineering, Procure, Construct & Manage	**$9.6**

Table 9.1 Chaketma Capital Expenditure Summary

Capital					
Breakeven for IRR =					
Breakeven for NPV @		**10%**		**$987 M**	
Factor	**Price**	**Cashflow**	**NPV**	**IRR**	**Payback**
70%	$119 M	$3,065 M	$698 M	72.2%	13 Mths
75%	$127 M	$3,059 M	$691 M	68.3%	14 Mths
80%	$136 M	$3,052 M	$684 M	64.9%	14 Mths
85%	$144 M	$3,046 M	$677 M	61.8%	15 Mths
90%	$153 M	$3,039 M	$670 M	59.0%	16 Mths
95%	$161 M	$3,032 M	$664 M	56.4%	17 Mths
100%	**$170 M**	**$3,026 M**	**$657 M**	**54.0%**	**18 Mths**
105%	$178 M	$3,019 M	$650 M	51.9%	18 Mths
110%	$186 M	$3,012 M	$643 M	49.9%	19 Mths
115%	$195 M	$3,006 M	$636 M	48.0%	20 Mths
120%	$203 M	$2,999 M	$629 M	46.3%	21 Mths
125%	$212 M	$2,992 M	$622 M	44.6%	22 Mths
135%	$229 M	$2,979 M	$609 M	41.7%	23 Mths
145%	$246 M	$2,966 M	$595 M	39.2%	25 Mths
155%	$263 M	$2,953 M	$581 M	36.9%	27 Mths

Table 9.2 Chaketma Sensitivity – Capital

9.2 Operating Costs

Mining Costs

Mining costs were generally estimated from first principles with an average rate per unit mined being utlitised for the cost profile.

These base mining costs have been escalated by 20% to cover the overheads and profit component usually applied by a mining contractor.

Analysis of the Chaketma project economics' mining cost component has been based on utilising an average mining excavation and haulage cost which as such is not an optimal mining approach. Initial mining of waste will be to the external waste locations, but when scheduling allows the placement of waste back into the previously mined stages, potentially by track dozer push rather than load and haul, this should allow for reduced waste handling costs.

Table 9.4 – Base Mining Cost Inputs summarises the inputs used based on contractor mining operations.

ORE – Direct		Contractor
Drilling Costs	per Dry Tonne Ore	0.378
Blasting Costs	per Dry Tonne Ore	0.288
Loading Cost	per Dry Tonne Ore	0.222
Haulage/Handling Cost	per Dry Tonne Ore	0.908
		$1.80
OVERBURDEN – Direct		**Rate**
Drilling Costs	per Dry Tonne Ore	0.205
Blasting Costs	per Dry Tonne Ore	0.196
Loading Cost	per Dry Tonne Ore	0.222
Haulage/Handling Cost	per Dry Tonne Ore	0.775
		$1.40
SUPPORT COSTS		**Rate**
Personnel - Admin & Management	per Tonne Mined	0.063
Personnel - Direct Operations	per Tonne Mined	0.072
Personnel - Maintenance	per Tonne Mined	0.046
Ancillary Support Equipment	per Tonne Mined	0.474
Mine Overheads	per Tonne Mined	0.066
		$0.72

Table 9.4 Base Mining Cost Inputs

Chaketma Finance Model		Select Mining Cost Basis		
Capital Expenditures – Real US Dollars – Million		**Full Life**	**Year -2**	**Year -1**
Mining Capital				
Development Capital				
Pre-Production Mining		11.996	3.153	8.843
MMA & Explosives Magazines		4.560	4.560	
Miscellaneous Mining		3.832	3.832	
Mobilisation & Establishment				
Subtotal Mining Capital		**20.388**	**11.545**	**8.843**
Processing Capital				
Development Capital	**Area**			
Process Facility	1000 - 8000	75.968	36.005	39.963
Rail Loadout	9000	5.460		5.460
Site Earthworks	10000	3.750	3.750	
Concrete/Foundation works	10000	1.800	1.800	
Port Facility	11000	9.261		9.261
Subtotal Mining Capital		**96.239**	**41.555**	**54.684**
Infrastructure & Auxillary Capital Expenditure				
Development Capital				
Site Services		15.859		15.859
Common Site Surface Infrastructure		8.881	8.881	
Miscellaneous Capital		8.543		8.543
Land Procurement and Resettlement		10.000	10.000	
Sustaining Capital – Owner				
Total Infrastructure & Auxillary Capital Expenditure		**43.283**	**18.881**	**24.402**
Engineering, Procure, Construct & Management		9.624	4.156	5.468
Total EPCM		**9.624**	**4.156**	**5.468**
TOTAL CAPITAL EXPENDITURE		**169.533**	**76.136**	**93.397**

Table 9.3 Chaketma Capital Expenditure Schedule

PhosCo

Overall total mining operating costs for the project are estimated at US$2.1B or an average of US$2.44/t mined, equivalent to US$16.41/t of ore.

The initial ten years of mining at the lower KEL waste to ore strip ratio, is forecast to have mining operating costs of US$320M or an average of US$2.61/t mined (has higher overhead cost component), equivalent to US$11.53/t of ore.

Processing Costs

Processing costs have generally been estimated, where possible, based on the current cost for estimated inputs and consumption where available, and varying process tonnes as required to maintain a consistent 1.5Mtpa concentrate production.

Reagents utilise the consumption rates established by the pilot test work updated for 2022 prices. Power and gas are based on estimates of consumption requirements and Tunisian supply arrangements. Materials handling and transport of ore from primary crusher to plant, concentrate to Kalaa Khasba rail siding and dewatered tailings back to the pit for co-disposal are calculated costs.

Processing costs are generally consistent on a cost per tonne processed and as such vary depending on feed grade as delivered by mining required to achieve the targeted 1.5Mt of annual concentrate production.

The below table summarises the inputs applied.

MINING OPERATIONS (US$M) – Includes Contingency		
Direct	**First 10 yrs**	**Total**
Ore (Mined Ore)	$56	$258
Overburden & Waste	$150	$1,155
Mining – Support Equipment	$64	$448
Subtotal – Operations	**$270**	**$1,861**
Mining Labour		
Personnel – Mining Operations	$12	$68
Personnel – Mining Maintenance	$8	$44
Subtotal – Labour	**$20**	**$112**
Mining Operations – Overheads		
Personnel - Mining Operations - Management	$10	$41
Mining Management - General	$20	$84
Subtotal – Overheads	**$30**	**$125**
TOTAL MINING OPERATING COST	**$320**	**$2,095**
Ave. Cost/Total Tonne Mined	**$2.61**	**$2.44**
Ave. cost/Ore Tonne Mined	**$11.53**	**$16.41**

Table 9.5 Mining Cost Summary

BASE PROCESSING COSTS INPUT			
Processing	**Basis of Estimate**	**Measure**	**Rate**
Utilities	2012 Scoping Study Escalated by 10%	per Tonne Feed	0.20
Ore Haul Primary Crusher to Secondary	Calculated	per Tonne Feed	0.62
Tails Haulage Plant to Backfill	Calculated	per Tonne Feed	0.40
Reagents	Calculated	per Tonne Feed	8.98
Consumables	2012 Scoping Study Escalated by 10%	per Tonne Feed	0.26
Maintenance	5% of Capital Cost Annualised	per Tonne Feed	1.79
Miscellaneous	2012 Scoping Study Escalated by 10%	per Tonne Feed	0.34
Labour	Calculated	per Tonne Feed	0.49
Other	Calculated	per Tonne Feed	0.19
			$13.26
Energy			
Energy – Gas	Calculated	per Tonne Feed	0.76
Energy – Power	Calculated	per Tonne Feed	2.51
			$3.27
Concentrate Handling			
Plant to Rail siding	Calculated	per Tonne Concentrate (Dry)	5.04
Rail siding to Port	Rate	per Tonne Concentrate (Dry)	6.48
Port Handling	Estimated	per Tonne Concentrate (Dry)	5.40
		per Tonne Concentrate (Dry)	**16.92**
			$8.77
Contingency			
Process, Energy, Concentrate	Calculated @ 10% of costs	per Tonne Feed	2.53
			$27.84

Table 9.6 Base Processing Cost Inputs

PhosCo

Overall Operating Costs

A 10% contingency allowance has been applied to all operating costs.

The following tables give a summary of the nominal annual costs.

Given the extended life of the project the mining capital associated with the earthmoving equipment has been included in this summary based on a lease arrangement and incorporated into the hourly costs of each item of equipment. This compensates for the difficulty and complication in profiling replacement schedules of the mining equipment. It also allows for ease of factoring for contractor provided mining services.

For 1.5Mtpa of concentrate production (**Table 9.7**) total operating cost is forecast to be US$6,091M for an average cost of US$90/t of concentrate.

The initial 10 years full production for the first 15Mt of phosphate concentrate is forecast to be at a cost US$1,190M for an average cost of US$79/t of concentrate.

Item	Operating Cost - Years 1-10			Operating Cost - Full Project		
	USD $M	Per Tonne Ore Feed	Per Tonne Concentrate	USD $M	Per Tonne Ore Feed	Per Tonne Concentrate
		27.7Mt	15.0Mt		127.6Mt	67.6Mt
Ore Mining	$64.2	$2.32	$4.28	$295.5	$2.32	$4.37
Waste Mining	$177.5	$6.40	$11.83	$1,392.7	$10.91	$20.61
Personnel - Mining	$22.4	$0.81	$1.49	$97.3	$0.76	$1.44
Overheads - Mining	$17.9	$0.65	$1.19	$110.3	$0.86	$1.63
Personnel - Processing	$13.8	$0.50	$0.92	$61.1	$0.48	$0.90
Processing - Reagents	$249.2	$8.98	$16.61	$1,146.5	$8.98	$16.96
Processing - Consumables	$7.3	$0.26	$0.49	$33.7	$0.26	$0.50
Processing - Maintenance	$51.7	$1.86	$3.45	$237.8	$1.86	$3.52
Processing - Miscellaneous	$9.5	$0.34	$0.63	$43.5	$0.34	$0.64
Processing - Utilities	$5.5	$0.20	$0.37	$25.3	$0.20	$0.37
Processing - Overheads	$5.7	$0.20	$0.38	$23.7	$0.19	$0.35
Ore Handling Primary crusher to plant	$17.2	$0.62	$1.14	$79.0	$0.62	$1.17
Tails Handling - Plant to Backfill	$10.5	$0.38	$0.70	$49.6	$0.39	$0.73
Power	$69.6	$2.51	$4.64	$320.1	$2.51	$4.74
Gas	$22.0	$0.79	$1.47	$99.3	$0.78	$1.47
Product Delivery - Rail/Port	$253.9	$9.15	$16.92	$1,143.8	$8.96	$16.92
Site Overheads	$12.8	$0.46	$0.85	$55.5	$0.44	$0.82
Contingency	$101.0	$3.64	$6.74	$521.5	$4.09	$7.72
Royalty, Sales & Marketing	$78.8	$2.84	$5.25	$354.8	$2.78	$5.25
	$1,190.3	**$42.91**	**$79.35**	**$6,090.9**	**$47.72**	**$90.12**
Average Annual Cost	**$119.0**			**$126.9**		

Table 9.7 Operating Cost Summary – 1.5 Mtpa Concentrate Production

9.3 Project Economics

Based on the published resource estimate as used in this Scoping Study the project life is anticipated to be 46 years, where 127.6Mt of ore and 730Mt of waste at a strip ratio of 5.7:1 will be mined to produce approximately 67.6Mt of phosphate concentrate at an average grade of 30% P_2O_5.

Using a product sale price of US$150/t the project is indicated to have a potential net cashflow in the order of **US$3.0B** and an **NPV** using a discount rate of 10% of **US$657M**, with an indicated IRR of **54%**.

Project NPVs are estimated from the assumed Financial Investment Decision (FID) date for the project which for the purposes of the Scoping Study, coincides with the commencement of construction activities. Project cashflows are on a real, pre finance basis.

Payback is based on an 18-month construction schedule with project commencement in Q3 of the first year, being major equipment procurement, mining equipment mobilisation, majority of site earthworks as well as concrete pours and initial construction particularly the crushing and general infrastructure areas. Completion of the plant facility, site infrastructure, rail loadout and port facilities would be undertaken in the subsequent 12 months, with plant commissioning commencing towards the end of the last quarter.

The project payback is forecast by Q3 of the second full year of production being four years from commencement of site works and 18 months from commissioning.

Chaketma Finance Model			Full Life
Revenue – Real U.S. Dollars - Million			
Concentrate Produced (Kt):			67.59
Product Sales			10,138
Less: Royalty	1.0%		(101)
Less: Sales & Marketing Commission	2.5%		(253)
Total Revenue			**9,783**
Cash Flow Statement – Real U.S. Dollars - Million			
Cash Inflows			10,138
Cash Outflows			
Royalty			101
Sales and Marketing Commission			253
Operating Costs (inc. Contingency)			5,736
Income Tax **Tax Free period =**	5 yrs	Rate=25%	861
Capital Expenditures			
– Exploration & Pre-Feasibility			
– Mining Capital			20
– Processing Capital			96
– Infrastructure & Auxillary Capital			43
Total Cash Outflows			**7,112**
Net Cash Flow – AFTER TAX			$3,026 M
Cummulative Cash flow			
Discounted Value - Midyear YEAR 2	@10%		**$657 M**
Cummulative Discounted Cash Flow			
IRR		IRR =	**54%**

Table 9.8 Chaketma Base Case – Project Financial Summary

Table 9.9 – Chaketma Base Case – Initial 10 years Cash Flow summarises the projected revenue, expenditure and net cash flow profile for the project from project commencement and then the first ten years full production period for the project.

Chaketma Finance Model		Select Mining Cost Basis		Contractor											
				Yr -2	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
Revenue – Real U.S. Dollars - Million															
Concentrate Produced (Kt):			15.00		164	1,336	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Product Sales			2,250		24.54	200.47	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00
Less: Royalty	1.0%		(22.5)		(0.25)	(2.00)	(2.25)	(2.25)	(2.25)	(2.25)	(2.25)	(2.25)	(2.25)	(2.25)	(2.25)
Less: Sales & Marketing Commission	2.5%		(56.3)		(0.61)	(5.01)	(5.62)	(5.63)	(5.63)	(5.63)	(5.63)	(5.62)	(5.62)	(5.62)	(5.62)
Total Revenue			**2,171**		**23.68**	**193.45**	**217.12**	**217.13**	**217.13**	**217.13**	**217.13**	**217.12**	**217.12**	**217.12**	**217.12**
Cash Flow Statement – Real U.S. Dollars - Million															
Cash Inflows			2,250		24.5	200.5	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0
Cash Outflows															
Royalty			23		0.25	2.00	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Sales and Marketing Commission			56		0.61	5.01	5.62	5.63	5.63	5.63	5.63	5.62	5.62	5.62	5.62
Operating Costs (inc. Contingency)			1,112		12.51	97.08	106.73	106.17	108.41	113.51	117.33	115.91	115.41	109.18	109.28
Income Tax **Tax Free period =**	5 yrs	Rate=25%	115								20.71	21.07	21.19	24.65	26.96
Capital Expenditures															
– Exploration & Pre-Feasibility															
– Mining Capital			20	11.54	8.84										
– Processing Capital			96	41.56	54.68										
– Infrastructure & Auxillary Capital			43	18.88	24.40										
Total Cash Outlfows			**1,465**	**71.98**	**101.30**	**104.09**	**114.60**	**114.04**	**116.28**	**121.38**	**145.91**	**144.85**	**144.48**	**141.71**	**144.12**
Net Cash Flows			$785 M	(72.0)	(76.8)	96.4	110.4	110.96	108.72	103.62	79.09	80.15	80.52	83.29	80.88
Cummulative Cash flow				(72.0)	(148.7)	(52.4)	58.0	168.99	277.70	381.32	460.41	540.55	621.08	704.37	785.26
Discounted Value - Midyear YEAR 1	@10%		$418 M	(72.0)	(73.2)	83.5	87.0	79.5	70.8	61.3	42.6	39.2	35.8	33.7	29.7
Cummulative Discounted Cash Flow				(72.0)	(145.2)	(61.6)	25.4	104.8	175.6	237.0	279.5	318.76	354.58	388.26	417.99
IRR		IRR =	**54%**												

Table 9.9 Chaketma Base Case – Initial 10 years Cash Flow

Figure 9.1 – Chaketma Project Evaluation Cashflow depicts the project economics for the full project life graphing the project expenditure, project revenue and overall project cash flow by year.

The SRK schedule focuses on the higher grade and lower strip ratio areas of KEL in the initial years supported by the tax-free status of the first five years delivers improved cashflow in those years. The 30% increase in waste mining quantity from year five onwards and associated mining and support equipment additions, as well as the commencement of tax payments, sees a step change in costs and an associated reduction in project net cash surplus.

The higher waste strip ratio associated with the mining of GK as well as reduced phosphates grades sees a further reduction in cash surplus from years 19 to 23.

There are alternative mining scenarios that have the potential to improve these years by substituting lower waste strip and potentially higher-grade ore from the other known prospect areas yet to be delineated as mentioned earlier. This would be seen as a natural development of the project once operations are commissioned and the mining of KEL has progressed to a stage that warrants the serious evaluation of alternatives to the extension of operation into GK.

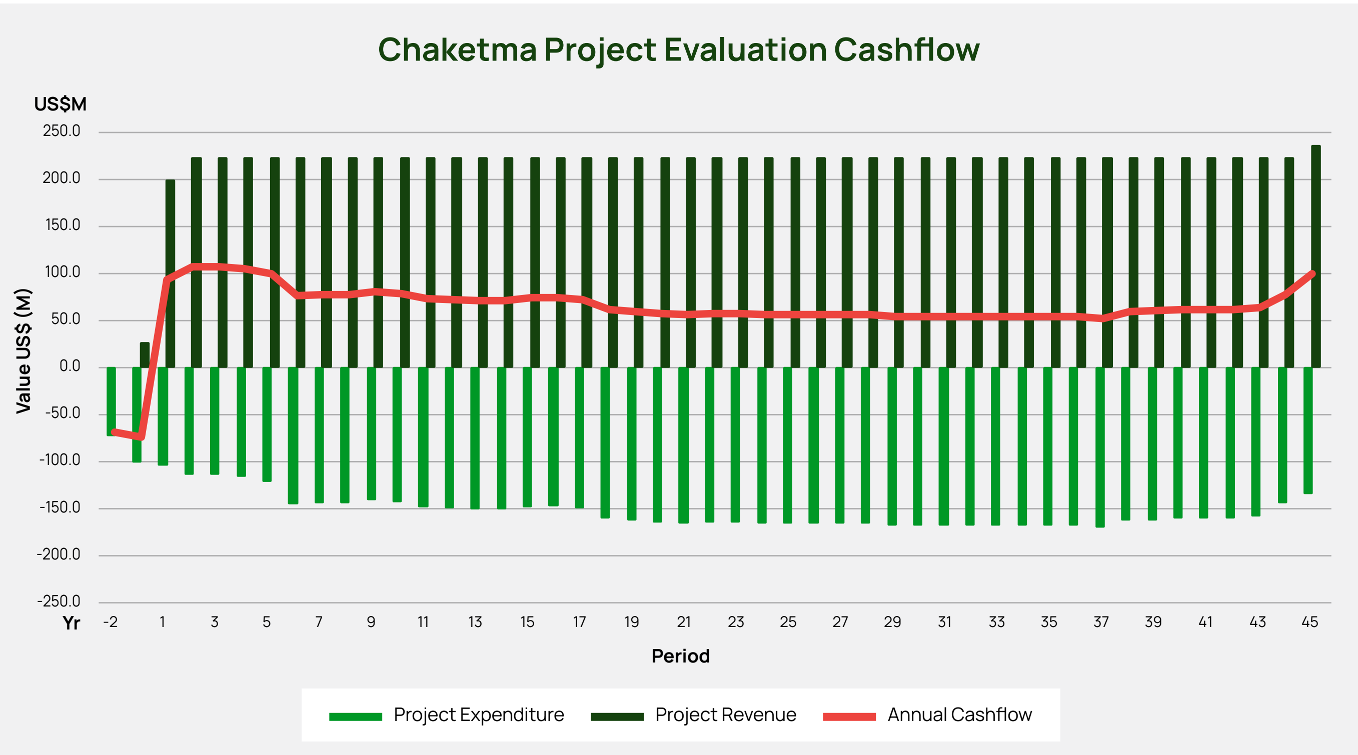


Figure 9.1 Chaketma Base Case - Project Economics

9.4 Project Sensitivity

A primary objective of the Scoping Study has been to demonstrate that there continues to be no 'fatal flaws' in the Chaketma project. It also allows examination of the sensitivity of the project to its primary inputs whereby the characteristics of the best targets for the delineation and feasibility studies can be identified.

The following graphs are a summary of the impact on the project NPV, IRR and overall cashflow of varying a number of the key parameters in increments of 5% from the base figure to values in a range of +/-35%.

The parameters evaluated include the concentrate sale price, ore feed grade, total mining cost, total process cost and capital spend.

All evaluations are based on changing just the single variable under consideration and do not consider the potential impact on other components of the project economics.

As can be seen from the charts the project is relatively robust with respect to the mining and processing costs as well as the capital spend. The key cost drivers with respect to the project value are indicated to be the concentrate sale price and the ore feed grade/ore recovery both of which have a similar impact for each percentage variation from the base case.

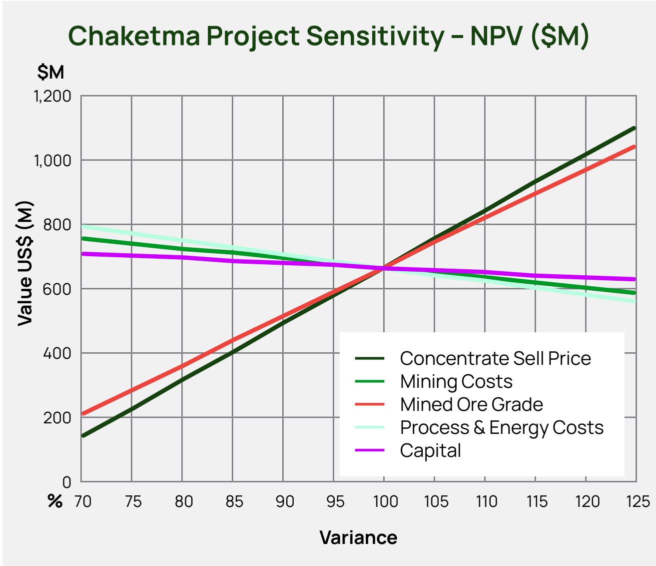


Figure 9.2 Project Sensitivity Review – NPV

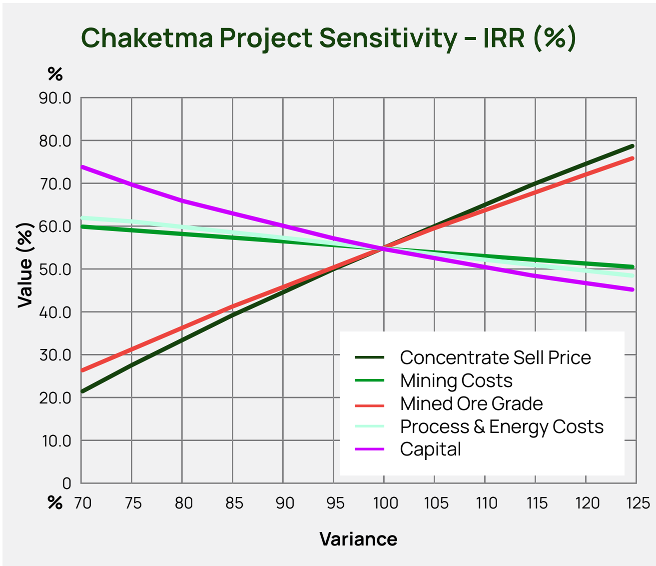


Figure 9.3 Project Sensitivity Review – IRR

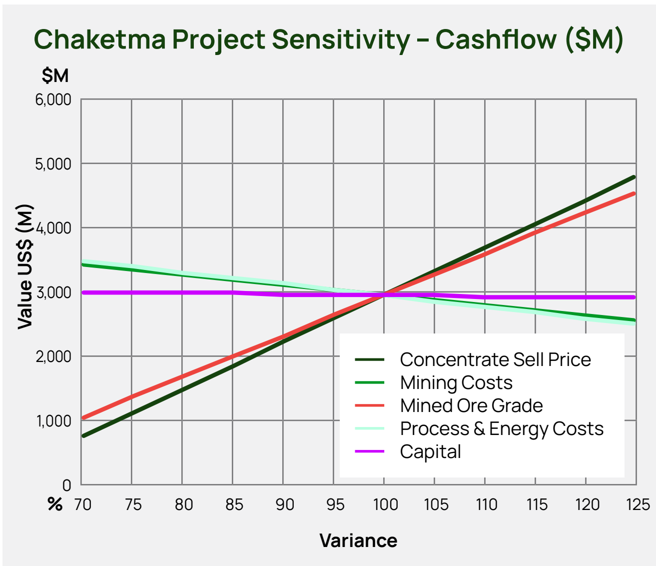


Figure 9.4 Project Sensitivity Review – Cashflow

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The details of the data as used for the previous graphs are contained in the following tables.

Concentrate Sale Price		
Breakeven for IRR =	**0%**	**$91/t**
Breakeven for NPV @	**10%**	**$93/t**

Factor	Price	Cashflow	NPV	IRR
70%	$105/t	$743 M	$138 M	21.5%
75%	$113/t	$1,123 M	$224 M	27.6%
80%	$120/t	$1,504 M	$311 M	33.3%
85%	$128/t	$1,884 M	$397 M	38.7%
90%	$135/t	$2,265 M	$484 M	44.0%
95%	$143/t	$2,645 M	$570 M	49.1%
100%	**$150/t**	**$3,026 M**	**$657 M**	**54.0%**
105%	$158/t	$3,406 M	$743 M	58.9%
110%	$165/t	$3,786 M	$830 M	63.6%
115%	$173/t	$4,167 M	$916 M	68.2%
120%	$180/t	$4,547 M	$1,003 M	72.7%
125%	$188/t	$4,928 M	$1,089 M	77.2%
133%	$200/t	$5,562 M	$1,233 M	84.4%
167%	$250/t	$8,098 M	$1,810 M	111.5%
200%	$300/t	$10,634 M	$2,386 M	136.4%

Table 9.10 Chaketma Sensitivity – Concentrate Sale Price

Mined Ore Grade		
Breakeven for IRR =	**0%**	**10.8%**
Breakeven for NPV @	**10%**	**11.2%**

Factor	Grade	Cashflow	NPV	IRR
70%	13.90%	$1,048 M	$207 M	26.4%
75%	14.89%	$1,377 M	$282 M	31.4%
80%	15.89%	$1,707 M	$357 M	36.2%
85%	16.88%	$2,037 M	$432 M	40.9%
90%	17.87%	$2,366 M	$507 M	45.4%
95%	18.87%	$2,696 M	$582 M	49.8%
100%	**19.86%**	**$3,026 M**	**$657 M**	**54.0%**
105%	20.85%	$3,355 M	$732 M	58.2%
110%	21.84%	$3,685 M	$807 M	62.4%
115%	22.84%	$4,015 M	$882 M	66.4%
120%	23.83%	$4,344 M	$956 M	70.3%
125%	24.82%	$4,674 M	$1,031 M	74.2%

Table 9.11 Chaketma Sensitivity – Mined Grade

Factor	Price	Cashflow	NPV	IRR
70%	$1.55/t	$3,508 M	$744 M	58.8%
75%	$1.66/t	$3,428 M	$730 M	58.0%
80%	$1.78/t	$3,347 M	$715 M	57.2%
85%	$1.89/t	$3,267 M	$701 M	56.4%
90%	$2.00/t	$3,187 M	$686 M	55.6%
95%	$2.11/t	$3,106 M	$671 M	54.8%
100%	**$2.22/t**	**$3,026 M**	**$657 M**	**54.0%**
105%	$2.33/t	$2,945 M	$642 M	53.3%
110%	$2.44/t	$2,865 M	$627 M	52.5%
115%	$2.55/t	$2,784 M	$613 M	51.7%
120%	$2.66/t	$2,704 M	$598 M	50.9%
125%	$2.77/t	$2,623 M	$584 M	50.1%

Table 9.12 Chaketma Sensitivity – Mining Costs

Factor	Price	Cashflow	NPV	IRR
70%	$11.63/t	$3,570 M	$779 M	60.9%
75%	$12.46/t	$3,479 M	$759 M	59.8%
80%	$13.29/t	$3,388 M	$738 M	58.6%
85%	$14.12/t	$3,298 M	$718 M	57.5%
90%	$14.95/t	$3,207 M	$698 M	56.4%
95%	$15.78/t	$3,116 M	$677 M	55.2%
100%	**$16.61/t**	**$3,026 M**	**$657 M**	**54.0%**
105%	$17.44/t	$2,935 M	$636 M	52.9%
110%	$18.28/t	$2,844 M	$616 M	51.7%
115%	$19.11/t	$2,754 M	$595 M	50.5%
120%	$19.94/t	$2,663 M	$575 M	49.4%
125%	$20.77/t	$2,572 M	$555 M	48.2%

Table 9.13 Chaketma Sensitivity – Process & Energy Costs

10. Opportunities and Risks

The Scoping Study identifies a number of areas of work that have potential to add material value and further de-risk the project. This includes the ability to further leverage Chaketma's scale, long-life, and excellent metallurgy.

Significant work has been completed on improving the understanding of the Chaketma project. The metallurgical works completed by CPSA and Jacobs have significantly improved the understanding of the resource. In addition, the release of the KEL and GK Geological Resources has allowed increased confidence in the mine plan and treatment parameters for the project.

10.1 Opportunities

Opportunities that have the potential to add value to the project are considered to be:

a) Increase the targeted concentrate production rate from the nominal 1.5Mtpa, to match market demand/offtake agreements and in line with logical incremental increase in primary process plant equipment and capital constraints.

b) Definition of additional resources with potential for lower strip ratios/mining costs than that of GK.

c) Incorporation of the low strip, but yet to be defined to a publishable resource standard, SAB prospect into the early mine schedule.

d) Utilisation of the area surrounding SAB for initial waste dumps rather than the current planned waste dump locations outside of the resource area to the west.

e) Refining the mining schedule to provide details on alternative production scenarios.

f) Detailed mine plans to incorporate reduced waste handling by load and haul equipment (direct placement from face to void) as well as integration of tails co-disposal.

g) Early mining of higher-grade layer B proportion of the ore body with the potential to direct ship.

h) Review of mining options for GK, some considerable time in the future, to establish the optimum approach to exploitation of that resource.

i) Alternative process plant scenarios utilising single stage flotation and or washable process opportunities.

j) Alternative reagents based on developments in the industry since 2016/17.

k) Extension of a rail connection to site to streamline concentrate handling offsite and delivery of consumables to site.

l) Conveyor transport of crushed ore from primary crusher to plant and potential to do the same for tailings from the plant back to the mine area.

m) Consideration of the use of wastewater from the facilities at Kasserine or Sbiba instead of, or in addition to the borefield options.

n) Allow for capability in plant design and layout to facilitate future expansion of capacity.

10.2 Risks

There remains some delineation works to be completed with the key risks areas as understood being:

a) Lease tenure – new application for mining concession has been lodged but still to be approved.

b) Water supply – preliminary explorations works done, but no confirmed source of water supply for the project.

c) Community engagement – expectations of both employment and general district benefit are high and CPSA will need to rise to those expectations.

d) Concentrate handling – Method of transport to rail siding is considered to be high risk from a logistical perspective given the quantity per day and road conditions. Requires more work and alternatives evaluated.

e) Mining sequencing – detailed plan for development, minimisation of distance waste is moved, as well as sequencing of co-disposal of tailings. Impacts placement requirements outside of mine area. To be scheduled in detail.

f) Port facilities – options to be further investigated.

g) Offtake arrangements to underwrite planned production rate are yet to be confirmed.

h) Processing options remain under discussion, particularly with advancements made since 2016. While this may delay the project development it is not considered a major risk, given that the test programs have confirmed at least one robust path to process the ore.

i) The additional risk factors include FOREX changes, materials and labour costs changes, and critically, the prevailing phosphate price and the appetite of equity and debt providers to fund the execution of the project at that time.

11. Project Implementation

The outstanding results delivered by the Scoping Study support proceeding to project optimisation and definition works, and a BFS for the Chaketma Phosphate Project based on a 1.5Mtpa phosphate concentrate production rate and a 46 year mine life.

Development of the BFS is planned to proceed as follows:

Scoping Study Stage	Completed
Start Delineation Phase	**Circa twelve to fifteen months envisaged**
Update Metallurgical evaluations	
Start Front End Engineering Design	
Complete BFS	

Critical path activities for construction will follow the receipt of the mining concession.

ASF Consulting (a renowned sustainability consulting entity in the ESG space) has been appointed by PhosCo to progress preparatory work addressing update of the listed permitting as far as possible within constraint of moratorium on activities on the Exploration Permit.

The key required permits and approvals for the Chaketma Phosphate Project are:

- Landowner's Identification (permitting)
- Project Description
- Change in Land Use (vocation preparation)
- Change in Land Use (vocation approval)
- EIA's for Project
- Approval of EIA's
- Hazard Study
- Authorisation to Open & Operate 1st Class Establishment

Permits updates are subject to the mining concession award which will allow development proponents the authorisation to carry out activities on the Exploration License as required to update studies for full permitting.

The critical path lies through the development of the Project Description, EIA's, Hazard Study and Authorisation to Open and Operate a Class Establishment.

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Detailed Technical Discussion and Supporting Information Required under ASX Listing Rules, Chapter 5

In accordance with ASX Listing Rules and the 2012 JORC reporting guidelines, a summary of the material information used to estimate the Mineral Resource is detailed below (for more detail please refer to JORC Table 1, Sections 1 to 3 included below and the previous market announcements, Chaketma Phosphate Resource Update – 15 March 2022 and 90% Conversion of Inferred to Indicated Resources at GK dated 17 November 2022).

It is noted that for the reported Mineral Resources in this announcement, there have been no changes to the interpretation of the mineralisation domains, to the estimation of mineralisation or to the classification from the Mineral Resource announced 17 November 2022.

Prospect Geology and Geomorphology

Chaketma is one of several known phosphate deposits in Northern Tunisia. Phosphate deposits in Northern Tunisia share a similar character and differ from the phosphate deposits of the Gafsa basin in the South. The Gafsa basin phosphates tend to be thicker, higher-grade, are free digging, and can be beneficiated by washing. Phosphate deposits in Northern Tunisia tend to be lower grade and require drill and blast mining. The Chaketma local geology consists of a transitional sequence of shallow water Eocene marine dolomitic limestone cover grading down through phosphatic sediments to deeper marine sandstones, clays, and marl. The upper phosphorite at Chaketma is a dolomitic phosphatic sandstone grading into a higher grade coarse coprolitic phosphate and finally fine grained phosphatic marls.

The basin was uplifted, tilted, and faulted. KEL and GK are two of six prospects at Chaketma which are remnants of a once continuous phosphate rich basin that has been pulled apart. KEL and GK, the two largest prospects at Chaketma, now occupy prominent topographic mesas with phosphate exposed on the flanks. The high degree of exposure of the phosphatic geology makes exploration easy and is likely to make exploitation of the resources relatively straight forward.

The geological unit of economic interest is a stratified phosphate horizon composed of three distinct layers (A, B and C) that are chemically distinct. The chemical differences between layers reflect variations in mineralogy and will have an impact on metallurgy. The highest grade Layer B comprises 66% of the total resource. Both the KEL and GK MRE's are reported according to each layer in Table 3 – Chaketma Mineral Resources Summary (November 2022).

While testwork to date has focused on composite samples of all layers, the metallurgical properties of each layer require to be individually established in order to generate a geometallurgical model of the project.These contrasting mineralogies may behave differently in a processing plant and potentially present an opportunity to optimise reagent usage, concentrate properties and overall recovery by selective feeding during the beneficiation process.

Exploration History

There have been 162 holes drilled at Chaketma since first drilling in 2011. Most of the drilling has focused on KEL (117 holes) and GK (31 holes) (Table 1).

Chaketma Distribution of Drilling by Prospect			
Prospect	Area (Km^2)	Number of holes	Total Metres
KEL	3.56	117	9,128
GK	2.23	31	4,355
SAB	0.40	9	491
KEA	0.53	2	100
DOH	1.36	2	163
GE	0.82	1	102
Total	**8.90**	**162**	**14,338**

Table 1 Chaketma Distribution of Drilling by Prospect

Drill Hole Data

The KEL resource estimate is based on 117 diamond drill holes (summarised in Table 2). Geological observations and samples taken from 28 trenches have contributed to interpretation, but have not been used to inform block model grades.

The GK resource estimate is based on 31 diamond drill holes and 8 trenches.

Drilling, trenching, sampling and the recording of geological data was conducted by Tunisian Mining Services (TMS). Samples of half core cut from HQ diameter diamond drilling core were assayed at either Al Amri or ALS Spain and Ireland which are independent, internationally accredited assay laboratories with sufficient intercalation of blanks and standards. Major elements and oxides have been assayed by XRF, and trace elements by ICP-OES. The Exploration data for the KEL prospect has been consolidated into a custom-designed exploration database. Field data was provided as Excel logging sheets and assay returns in their original laboratory formats. Validation has been performed throughout the data acquisition phase.

KEL Exploration Data Summary					
Drilling Campaign	Hole type	No of drill-holes	Lengths (m)	Assay method	Laboratory
2011	DD	1	42.3	XRF24	ALS
2012	DD	43	3713.6	XRF24 or XRF24+ICP	Al Amri
	TR	28	182.1	XRF24	Al Amri
2013	DD	41	3106.7	XRF24+ICP	Al Amri and ALS
2015	DD	32	2247.5	XRF24+ICP	ALS

Table 2 KEL Exploration Data Summary

GK Exploration Data Summary Used in November 2022 GK MRE					
Drilling Campaign	Hole type	No of drill-holes	Lengths (m)	Assay method	Laboratory
2011	DD	7	991.8	XRF and XRF+ICP-AES	Al Amri and ALS Spain
	TR	5	169.7	XRF	Al Amri
2012	DD	3	426.1	XRF	Al Amri
	TR	3	70.0	XRF	Al Amri
2015–2016	DD	21	2936.5	XRF+ICP-AES	ALS Ireland

Table 3 GK Exploration Data Summary

Interpretation

While the KEL DTM surface topography was based on field survey information, the GK surface topography DTM was generated from a LiDAR survey conducted in second half of 2022 with sub-meter accuracy.

The upper and lower limits of the phosphate layer have been modelled, defining three geological units: an uppermost limestone unit, the phosphate unit, and an underlying marl.

Three dimensional wireframes were created for each geological unit, based on drill-hole logging and surface mapping which were used to define cross cutting faults. Faults were mapped at surface, draped on the surface Digital Terrain Model (DTM) and extended to depth using the dip measured at surface. The phosphate layer is composed of three distinct chemical/geological domains:

- Upper layer A: coprolitic phospharudite.
- Middle layer B: phospharenite/phospharudite.
- Lower layer C: marly phospharenite.

These three layers are principally defined based on MgO and P_2O_5 abundance, and have been separately wireframed. The higher P_2O_5 grading (22-30%) middle layer B also features a lower abundance of MgO (0-4%), whilst the upper and lower A and C layers are lower P_2O_5 grade (10-22%) and higher MgO (4-10%).

For the GK resource modelling Layer B was further delineated based on phosphate grades with the upper area Layer B1 having average values in the range of 24 to 25% P_2O_5:, the middle section of the layer, designated Layer B2 having lower average values in the range of 15 to 18% P_2O_5: before progressing to the lower mineralisation within Layer B zone, .designated Layer B3 again having higher P_2O_5:in the order of 24 to 25%.

Estimation

KEL Resource

After wireframing in Surpac, exploratory data analysis was performed using Surpac, Isatis and XLStats.

Typical drill spacing varies between 80 to 150m in the northern area (Measured) and approximately 250x250m in the central portion (Indicated). The southern portion of the prospect is undrilled and has not been modelled (untested).

Model block dimensions of 25x25m was selected as this was considered most suitable for the most densely drilled northern portion of the KEL Resource. Data for all modelled elements are highly continuous over the whole of the modelled Resource, so whilst a 25x25m block size is small for the less closely drilled central and southern areas given excellent data continuity this block size is considered an acceptable compromise. High confidence volume definition is provided with the use of sub-blocking, and the chosen subblock size allows adequate volume calculations. Sub-blocking (6.25m x 6.25m x 1.25m) has been selectively employed to model shallow zones of mineralization.

The block model includes 3 categorising variables:

- Rocktype: Geological facies of the block, assigned from the 3D geological model and according to the current topography.
- Classification: Levels of resource classification “measured” and “indicated”.
- Layer: Distinction between the three mineralized layers of the phosphate unit (A, B and C).

All the results were issued from Surpac V6.6 constrained block-model reports. Block model volumes were checked against corresponding wireframe volumes; the differences between them were negligible.

The interpolation was restricted by wireframes for layers A, B, and C, and constrained by topography. The three layers have been interpolated independently.

Orientation and dip of the phosphate layers have been used to adapt the search ellipsoid parameters. Horizontal search distances have been estimated from geostatistical analysis: the rounded values of first and second structures of semi-variograms have been adopted as horizontal search distances for first and second passes. The interpolation of each pass will then be directly linked to the continuity degree of the samples.

The maximum search distance has been adapted according to the maximum size of the deposit, learnings from order two stationarity study and ranges of the variogram model. All domains/variables have been interpolated using 3x3x3 discretisation points.

For each solid, the variable estimated has been interpolated independently from composite samples contained in each mineralized layer. Three passes of interpolation by ordinary kriging have been used with increasing search distances and decreasing minimum number of samples used for interpolation. Inverse Distance method was used for Al2O3 within Layer A. No maximum number of samples per drill-hole were defined.

GK Resource

The GK phosphate series was first modelled using Implicit Modelling functionality in Micromine, guided by the drill holes and trenches data, notably using a 10% P2O5 cut-off. The internal Layer B boundaries were then modelled including hanging wall and footwall surfaces. Those surfaces were then used to in Boolean operations to create solids above the hanging wall of Layer B (Layer A) and solids below the footwall of Layer B (Layer C) The B2 sublayer was further modelled as an inclusion inside Layer B.

Samples were composited to a length of 2m, a minimum of 1m was accepted, residual lengths were added to the previous composite; composites were not allowed to span domain boundaries. Exploratory data analysis was then performed using Micromine and IsatisNeo.A block model was restricted to all phosphate layers using block factors for the percentage of each block falling within each layer. P_2O_5, CaO, MgO and SiO_2 were estimated into the blocks on a layer-by-layer basis. The B2 sub-layer was estimated separately from the B1 and B3 layers which show similar distributions.

Block cell size was 10 mE x 10 mN x 0.8 mZ. Block models then were flattened along with the composite data to allow smoother estimation and then interpolated with parent block factor equal five. Essentially this means a cell size of 50 mE x 50mN x 4 mZ was used for grade estimation (approximately one third to one fifth of the data spacing), but with a smaller cell size to better map the geometry of the geology.

Finally, the block model was sub-blocked/assigned to the individual wireframe and the grade values from each layer combine to a single column in the block model.

Grade Estimation was completed using single-pass ordinary kriging. Block Discretization was 5 x 5 x 2 divisions East, North and Z respectively. A maximum of 2 composites per drillhole were used, and a maximum of 12 points in total accepted per search. A single sector, flat search with radii 400 m East and North and 100 m Z was used, although the Z radius is arbitrary as the wireframes control the extrapolation of the points. Data was estimated in flattened space. Grades are at most extrapolated by 250m, although grade variability is very low within the individual layers.

Block model data was checked visually and statistically against samples and composites data; the comparisons return positive results. Block model volumes were also checked against corresponding wireframe volumes; the differences between them are negligible.

Classification

Resources have been classified based on a combination of confidence in the geological and grades continuity, drill spacing, data quality, and interpolation quality based on sample correlation distance.

The KEL variographic analysis of all the elements indicated that the first structure of all semivariograms is observable around 200m. Where drilling is closer spaced than 200m, a classification of Measured is considered warranted. The second structure of semivariograms is most commonly observable around 500m: outside of areas classified as Measured, drill spacing does not exceed 500m and so these areas have been classified as Indicated. These drill densities match the confidence in the geological model as well.

Following the classification discussion above, the MRE at KEL was manually contoured based on distinct difference in drill spacing between two areas:

- The first area has a high density of drill-holes (about 100 to 150m between two holes). This area is classified as Measured.
- The second area has a lower density of drilling (about 200 to 350m between two holes), but sufficient to perform interpolation between drill-holes with an acceptable confidence. This area is classified as Indicated.

The GK variographic analysis of the main oxides showed that the range of all semi-variograms is observable around 300-400m. Where drilling is closer than 300m, a classification of Indicated is considered warranted. However, the geological and grades continuity is uncertain where important faulting occurs and such areas have been classified as Inferred.

Following the classification discussion above, the MRE at GK can be manually contoured based on distinct difference in the structural setting, as most of the holes are apart from each other by ~150-300m:

- The western area marked by a topographic depression and a complex faulting system is classified as Inferred;
- The remaining of the mineralization is classified as Indicated.

Reporting

The Mineral Resource Estimates for KEL[1] and GK[2] have been reported in compliance with JORC 2012 above a cut off of 10% P_2O_5:

Chaketma Mineral Resource Summary (November 2022)								
Mineralisation Layer	Confidence (JORC 2012)	Prospect	Tonnes	P_2O_5 (%)	CaO (%)	MgO (%)	SiO_2 (%)	% Of Resource
Layer A	Measured	KEL	7.9 Mt	18.8	42.7	6.9	4.7	9
	Indicated	KEL	1.2 Mt	16.6	41.4	8.1	4.9	1
	Indicated	GK	6.4 Mt	13.9	41.6	8.0	5.8	7
	Inferred	GK	1.1 Mt	12.4	37.7	11.3	6.2	1
	Subtotal		**16.6 Mt**	**16.3**	**41.8**	**7.7**	**5.2**	**18**
Layer B	Measured	KEL	28.8 Mt	25.0	44.3	2.8	8.1	20
	Indicated	KEL	3.4 Mt	24.4	43.7	2.8	8.8	2
	Indicated	GK	59.5 Mt	22.7	44.8	3.4	7.8	41
	Inferred	GK	4.5 Mt	24.0	43.8	4.2	8.1	3
	Subtotal		**96.2 Mt**	**23.5**	**44.6**	**3.2**	**7.9**	**66**
Layer C	Measured	KEL	12.4 Mt	14.6	35.2	7.6	12.5	14
	Indicated	KEL	1.8 Mt	15.2	36.1	7.7	11.1	2
	Indicated	GK	17.9 Mt	14.1	37.9	5.5	12.8	20
	Inferred	GK	1.6 Mt	14.0	35.8	6.9	13.4	2
	Subtotal		**33.7 Mt**	**14.3**	**36.7**	**6.5**	**12.6**	**37**
All Layers	Measured	Both	49.1 Mt	21.3	41.7	4.7	8.7	34
	Indicated	Both	90.1 Mt	20.2	42.9	4.3	8.7	62
	Inferred	Both	7.2 Mt	20.0	41.1	5.9	9.0	5
A, B & C	**TOTAL**		**146.4 Mt**	**20.6**	**42.4**	**4.5**	**8.7**	**100**

Table 4 Chaketma Resource Summary (November 2022)

1. Phosphate Resource Update Delivers 50% Increase at KEL, ASX announcement 15 March 2022.
2. Chaketma Phosphate Project – 90% Conversion of Inferred to Indicated Resources at GK, ASX Announcement 17 November 2022.

Reporting continued

Geological Resource by Prospect							
Prospect	Confidence	Tonnes	P_2O_5 (%)	CaO (%)	MgO (%)	SiO_2 (%)	% Of Resource
KEL (Kef El Louz)	Measured	49.1 Mt	21.3	41.7	4.7	8.7	34
	Indicated	6.4 Mt	20.4	41.1	5.2	8.7	4
	M & Ind	**55.5 Mt**	**21.2**	**41.7**	**4.7**	**8.7**	**38**
GK (Gassaa Kebira)	Indicated	83.7 Mt	20.2	43.1	4.2	8.7	57
	Inferred	7.2 Mt	20.0	41.1	5.9	9.0	5
	Ind & Inf	**90.9 Mt**	**20.2**	**42.9**	**4.3**	**8.7**	**62**
TOTAL	**M, Ind & Inf**	**146.4 Mt**	**41.1**	**84.9**	**9.0**	**17.4**	**100**

Table 4 Chaketma Resource Summary (November 2022)

Cutoff Grade, Including Basis For Selected Cut-off

A nominal cut-off grade of 10% has been utilised for the purposes of resource modelling on what appeared to be a natural cut-off based on lithology. Previous resource optimisation inputs stated that a lower marginal cutoff was appropriate from a mining and processing perspective. This 2022 Scoping Study evaluation indicated that based on the costs details as utilised and applying the most recent metallurgical parameters, the 10% cut-off remains appropriate.

Mining and Metallurgical Processes

It is proposed that the KEL resource, being the initial 18 years of the project will be mined by open pit methods utilising a conventional drill, blast, load and haul mining approach. Conceptual pit optimisation studies and designs have been previously completed by independent mining consultants SRK Consulting (UK) Ltd with mining costs updated by Direct Mining Services an Australian based independent mining consultant. The same mining approach has been applied to GK despite the higher strip ratio and associated mining costs. The opportunity exists to review alternative mining methods prior to the need to access the GK resource some considerable time in the future of the project life.

It is proposed that the Chaketma Phosphate ore will be processed through a reverse flotation process. Metallurgical testwork has been undertaken on a range of samples initially on a bench scale basis with the validity of the process subsequently confirmed by a pilot plant scale evaluation undertaken by Jacobs Engineering. Whist the testwork has confirmed the capability to produce a phosphate concentrate of greater than 30% P_2O_5 and less than 1.0% MgO there remains potential to further refine the process from a reagent's usage and cost basis and as such metallurgical test work remains ongoing.

The results have demonstrated that there are reasonable prospects for the eventual economic extraction of the phosphate mineralisation by open pit mining with processing by reverse flotation to produce a saleable phosphate concentrate product.

This announcement is an Executive Summary of the updated 2022 Chaketma Phosphate Project Scoping Study that included consolidated details of extensive works completed by a range of independent and company sources on the project, updated where appropriate and compiled by consultants Direct Mining Services Pty Ltd who undertook the previous scoping study in 2012.

In accordance with ASX Listing Rules, the following is a summary of material assumptions and associated financial information related to the Chaketma Phosphate Scoping Study, including consideration of the modifying factors under the JORC 2012 code. Additional detail on the material assumptions can be found in the Executive Summary compiled for this release and the full Scoping Study report.

Mineral Resource Estimate for Conversion to Production Targets

The KEL Production Target estimates utilise the KEL Mineral Resource announced on 15 March 2022, based on information compiled and reviewed by Mr Remi Bosc of Arethuse Geology, a Competent Person, who is a Member of the European Federation of Geologists and an independent consultant.

The GK Production Target estimates utilise the Gassaa Kebira Resource announced on 17 November 2022. This estimate is also based on works and information compiled and reviewed by Dr Julien Feneyrol of Arethuse Geology.

The information in this report that relates to Exploration Results is based on, and fairly represents information and supporting documentation prepared by Mr. Donald Thomson, a Competent Person who is a Member of Australasian Institute of Mining and Metallurgy. Mr. Thomson is an employee of Celamin Limited (PhosCo).

SRK Consulting (UK) Ltd (October 2016) applied modifying factors of a standard ore loss and dilution approach to the upper and lower surfaces of the modelled resources for KEL and the original 2012 GK resource. The factors allowed for equal volumes of ore loss and dilution to both contacts of 0.4m for the upper surfaces and 0.2m for the lower surfaces. The same approach ore loss and dilution approach has been applied to the November 2022 GK resource model, within the 2017 SRK defined GK pit design. These adjusted and diluted resources were the basis of the Production Targets as used in the Scoping Study.

Site Visits

Arethuse undertook four site visits during 2015 to conduct an independent sampling and data review prior to completing the resources estimate for KEL.

SRK completed a number of site visits by various personnel over the period 2016/2017 as part of a review of resources, geotechnical data and for compilation of a number of mining studies at that time. Direct Mining Services personnel spent considerable time onsite during 2012/2013 as part of the early project development, but have not returned to site since that time.

Travel restrictions have limited the ability to undertake site visits since that time but the Arethuse Geology Competent Person had the opportunity to visit the Gassaa Kebira area in May 2022, when trench and drill hole locations were verified, local geology and main structural features were witnessed and discussion held with PhosCo staff.

No drilling operations nor sampling happened during Arethuse Geology CP site visit in May 2022 (as the last hole was drilled in 2016). The core shed where samples are stored was not accessible either to check them.

Study Status

The Production Target estimates have been developed to a Scoping Study level of accuracy. The study, including capital estimates and operating cost estimates was completed to an accuracy of ±35%, which is considered appropriate for a Scoping Study. As the study is based on low-level technical and economic assessments it is insufficient to support the estimation of an Ore Reserve.

Cut-off Parameters

The upper and bottom limits of the phosphate layer correspond to the upper and bottom limits of the mineralised phosphate horizon for both KEL and GK. This incorporates natural cut-offs for P_2O_5 and MgO generally observed to be greater than 10% P_2O_5 and less than 10% MgO. The Scoping Study marginal economic cut-off grade was estimated to between 8% to 11% P_2O_5 based on a processing and concentrate handling cost of $30/t feed, concentrate grade of 30%, 80% P_2O_5 recovery and sell prices of between US$150 down to US$100/t concentrate.

Mining Factors and Assumptions

The Scoping Study foresees the mining of KEL and GK by open pit mining methods utilising a mining contractor, with mining commencing at the northern end of the KEL prospect. Mining will target the delivery of a consistent 1.5Mtpa of phosphate concentrate production that is indicated to require an ore mining rate of 2.8 Mtpa at the initial head grade 20% P_2O_5. and for a strip ratio of 3.1 for the initial five years of production.

Conventional drill, blast, load and haul truck/excavator operations will be employed with the plan being to maximise backfill of previously completed stages of the works for placement of both waste rock and dewatered tailings. Where the schedule requires external waste capacity these dumps will be located to the west of the prospects.

Mining estimates are based on the use of 90t trucks and 100t hydraulic excavators with ore transported to a primary crusher sited in the vicinity of the pits with the subsequent rehandle of the crushed product, by truck, to the plant location. All waste rock has been assumed to be handled by the truck fleet to a nominal centroid location with an average productivity and cost applied throughout the schedule. The expectation is that a proportion of this material will be moved by either direct blasting or dozer push to the previously mined excavations that may reduce the waste mining cost.

Ore mining is assumed to be on 5m bench heights, blasted using 127mm blastholes with track dozers utilised to trim waste from the upper contacts and mine ore to the desired footwall. Waste prestrip will have the potential to be mined on larger bench heights using 165mm blastholes.

Preliminary geotechnical analysis has indicated that the primary geotechnical risks will be the underlying marl material, particularly if water is present, from both a mining excavation and waste dump stability perspective. Further work has been recommended to better quantify these risks.

High-level infrastructure designs were completed together with the mine design to address the required mine infrastructure, mine access, mine and waste deposit drainage, power supply, controls, and communication requirements.

The lower confidence GK Resource (92% Indicated and 8% Inferred Resource) has been included for the scoping study assessment with waste mining to commence in year 18 and initial mill feed from GK in year 20 of the Life of Mine (LoM) plan. The KEL resource scheduled in the initial 20 years of plant feed, is classed as Measured (88% of feed tonnes) and Indicated (12%), no inferred resources are utilised during this period of the LoM. The GK proportion of Inferred Mineral Resources material accounts for just 5% of the Production Target over the life of the presently defined project. No Ore Reserves are currently declared for the Chaketma Phosphate Project.

Metallurgical Factors and Assumptions

The evaluation of metallurgical and phosphate recovery methodologies has been ongoing for the Chaketma resource since 2012. Initially by CPSA personnel and then in 2016 by enlisting the services of the Jacobs Engineering Group to undertake a feasibility study evaluation, to international standards, of the resource for the purposes of refining the process parameters and equipment selection.

Analysis indicated that the phosphate ore is made up of three main components, being:

- Phosphatic elements comprised of pellets, oolites and phosphatized bone fragments and fish teeth. The predominant phosphate grain size being about 140 microns;
- An exogangue consisting principally of dolomite, calcite, quartz, clay minerals, glauconite and feldspar; and.
- An endogangue, that is to say fine inclusions found inside the phosphate elements, consisting of carbonates (dolomite and rarely calcite) and sometimes organic material. The proportions generally appear not to exceed 3%. The size of the inclusions are of the order of 10 µm.

The maximum phosphate content that could be achieved by physical separation is indicated to be 34% P_2O_5.

A grindability study of samples from KEL and GK has been carried out to determine the grindability of the Chaketma ore. The tests carried out on different Chaketma samples determined a range for Bond Rod Mill work index of 5.4 -9 kW.hr/t, Bond impact work index of 5.9 -7.8 kW.hr/t, and a Bond abrasion index < 0.011g;

Overall, the operation of the pilot plant, conducted by Jacobs Engineering produced the following key average data as used as guidance for the objectives applied by the Scoping Study:

- Total phosphate recovery – 80.8%
- Final concentrate grade – 30.34%
- Final concentrate grade MgO – 0.59%
- Mass weight of concentrate (total) – 60.7%

These overall pilot plant results were deemed by Jacobs to be conservative with the potential to improve on a full-scale plant due to better instrumented process control.

Based on the pilot plant work the proposed Chaketma Process Plant design incorporated the major processing steps of crushing, grinding, desliming, reverse flotation, filtration and drying.

The beneficiation plant capacity design estimate was based on an availability for operation on a continuous basis, 24 hours per day, 7 days per week, 52 weeks per year.

The operating availability time for the primary, secondary and tertiary crushing sections was based on a nominal 6,000 hours per year or 68.5% availability.

The operating availability time for the beneficiation plant (comminution, flotation) was based on 7,680 hours per year or 87.7% availability per year.

The design production rate from the Chaketma beneficiation plant is 1.5 Mtpa of dry concentrate per year at an average grade of 30 wt% P_2O_5. The design annual feed of ROM material to the plant was initially 3.4 Mtpa of ore at a grade of 19.4 wt% P_2O_5. Applying the latest parameters on both recovery and resource grade indicate that for a target of 1.5 Mtpa of dry concentrate production the likely feed rate will vary from 2.7Mtpa to 3.3Mtpa.

Infrastructure

The Chaketma project covers approximately 56 km^2 and is located some 200km WSW of Tunis, the capital of Tunisia. It is accessed by a sealed highway from Tunis followed by local sealed roads to the project area.

Société Tunisienne de l'Electricité du Gaz (STEG) will supply the natural gas and electricity for the project with the project to be connected to the country grid.

Potential water supply sources for the project have been reviewed, with a preliminary ground survey undertaken for a number of water bore locations in an aquifer located to the west of the project. In addition, the potential to utilise waste water from a number of domestic water treatment plants is also under consideration.

The project assumes concentrate will be railed from a nearby rail siding to the port of Rades for export with preliminary costs allowed for road transport from site to the siding as well as storage and handling at the siding and at the port. The extension of the rail network to the site as well as alternatives to truck transport are value-add activities under ongoing evaluation.

Environmental and Social

Extensive social and environmental works have been undertaken on the project with a number of activities ongoing to build on those studies. ASF Consulting a Tunisian consulting entity in the ESG space has been engaged to progress those works

The Chaketma project has three main population centers in the vicinity of the project and it is the intent to provide both direct and indirect employment and business opportunities to stimulate those local communities. The project plan includes allowances for training and upskilling as necessary to facilitate those opportunities.

Revenue Factors

Plant feed grades and mining quantities are based on an annualised mining schedule targeted to deliver a concentrate production target of 1.5Mtpa. Process recoveries and concentrate specifications are based on the pilot plant demonstrated capability of the proposed process.

Financial assumptions, phosphate prices, exchange rates and concentrate assumptions have been made by PhosCo with the assistance of industry consultants with relevant industry experience such as analyst forecasts and commercial terms for similar products.

Costs

Mining infrastructure capital costs are based on previous engineering assessments with mining equipment capital estimated to Scoping Study level of accuracy by DMS utilising industry enquiries and recent database information. Plant capital costs enquiries were made to several process plant suppliers, based on technical and commercial scopes of work to source the updated capital costs. Processing and non-processing capital cost estimates are presented in first quarter 2022 United States dollars (US$) to an accuracy of ±35%.

Mining operating cost estimates are based on mining schedule with inputs and estimations developed from first principles but applied as an average unit cost over the project. Processing operating costs have been derived using inputs from the pilot plant evaluations, preliminary engineering assessments and the application of industry factors relevant to a scoping study level of accuracy.

Market Assessment

The Scoping Study indicates that the Chaketma rock phosphate product will be readily saleable in the international market, where strong market fundamentals are underpinned by sustained agricultural growth. PhosCo has assumed a long-term rock phosphate price of US$150/t FOB North Africa, compared to the current spot price of US$300/t assuming the current geo-political environment normalises.

Tunisia has been mining phosphate for more than a century and was one of the top five producers of phosphate rock globally. It has developed downstream phosphate products including phosphoric acid, DAP, TSP, DCP and other products which it exports to over 50 countries on five continents. It is well placed geographically to continue to supply the important European market.

Tunisia has the requisite infrastructure, skills and expertise to again be a global player in the phosphate market and the Chaketma Project has the potential to participate in that growth.

Project Economics

A financial model for the Chaketma Phosphate Project has been created for the purposes of the Scoping Study evaluation. Cashflows are discounted using a rate of 10% real. The estimates are presented in USD with exchange rates outlined in Chapter 16 of the Scoping study report. The project financial outcomes are favourably impacted by tax benefits in the initial five years of the project production time line. The project Net Present Value (NPV) is most sensitive (at +/-10%) to the phosphate concentrate sell price, feed grade and metallurgical recoveries. The project is less sensitive to variations in operational and capital costs.

Funding

To achieve the range of Chaketma Phosphate Project outcomes indicated in the 2022 Scoping Study, funding in the order of an estimated US$190 million will likely be required by the Company.

Based on the current market conditions and the results of feasibility studies to date there are reasonable grounds to believe the Project can be financed via a combination of debt and equity. Debt may be secured from several sources including development banks, international banks, resource credit funds, and in conjunction with product sales of offtake agreements. It is also possible the Company may pursue alternative funding options, including undertaking a corporate transaction, seeking a joint venture partner or partial asset sale. There is, however, no certainty that PhosCo will be able to source funding as and when required.

PhosCo has engaged with debt adviser HCF Consulting and a number of potential financiers on the Chaketma Phosphate Project and these financial institutions have expressed an interest in being involved in the funding of the project.

Other

PhosCo's wholly owned subsidiary, Celamin Limited, was successful in the arbitration and court processes regarding the dispute with its partner TMS. Enforcement of the return of PhosCo's interest and regaining control in the Chaketma Phosphate Project via its holding of a 50.99% interest in CPSA was implemented in October 2021.

In late 2017, CPSA applied to convert the Chaketma Exploration Permit to a Mining Concession ahead of the February 2018 deadline. The Chaketma Mining Concession has not yet been granted and the application remains under consideration by the mining administration in Tunisia. CPSA previously submitted a range of feasibility work to the Tunisian Government in support of the Mining Concession application. The bulk of this work has been accepted by the Government, who requested an updated finance plan for the Project proving the capability to finance the development. Debt advisors HCF International Advisors were engaged to assist with the finance plan to develop Chaketma, with positive engagement with a number of development and commercial banks. CPSA lodged the financing plan with the Tunisian Government on 20 September 2022. As of the date of this announcement, in accordance with the Tunisian Mining Code, the existing exploration licence remains in good standing until such time as a final decision approving the mining concession or cancelling the existing licence takes place and is duly publicly gazetted. If the application for the mining concession is formally rejected by the Minister of Mines the exploration permit will lapse.

Audits or reviews

The Scoping Study was internally reviewed by PhosCo. No material issues were identified by the reviewers. All study inputs were prepared by Competent Persons identified in this announcement.

The following tables are provided for compliance with the JORC Code (2012 Edition) requirements for the porting of Exploration Results and Mineral Resources at the Chaketma Project.

Appendix 1. JORC Code, 2012 Edition – Table 1

Section 1 Sampling Techniques and Data (Criteria in this section apply to all succeeding sections.)	
Criteria	**Commentary**
Sampling techniques	Diamond drilling and channelling on excavated trench or outcrop: Diamond core was split lengthwise, and half cored using a diamond saw; one half was used for sampling, the other half was retained for reference. Targeted sample length was 1 m, with variation from 0.4 m to 1.7 m depending on the geological boundaries. The whole phosphate layer was sampled, and generally samples were also collected on several metres above and below the mineralisation. Channel sampling on excavated trench or on outcrop was done after cleaning the surface, then using angle grinders with diamond blades to cut a slot (about 20 cm wide and 2-3 cm deep). The sample material was then removed from the rock face using jack hammers. Targeted sample length was 1 m, with variation from 0.7 m to 2.5 m depending on the geological boundaries. The whole phosphate layer was sampled, and when possible, samples were collected above and below the mineralisation.
Drilling techniques	All DD holes were drilled using HQ diameter. Most of the holes were drilled vertical, but a few of them were drilled with an inclination of 75° with various azimuths. Cores were not oriented. Most of the runs were 3 m long. 2011-2012 holes were drilled using a tyre-mounted Longyear LF70 and a track-mounted Longyear DB520 under normal circulation using a mixture of water and locally-manufactured bentonite. No downhole survey was performed. 2015-2016 holes were drilled using both track-mounted Boart Longyear DB520 and DB525. Downhole surveys were recording using a Camteq Proshot Dual CTPS100, with a shot every 9 to 24 m depending on the hole.
Drill sample recovery	Cores recoveries have been systematically measured for each run. Per drill hole it ranged between 95 and 100%, which is excellent. Phosphate layer is massive and coherent and does not break nor pulverize giving excellent recovery. Thus, no relationship was observed between sample recovery and grades.
Logging	Lithology for diamond holes and trenches, and structures (relative to core axes) and geotechnical data (including recovery and RQD10) for diamond holes were captured. Lithology was logged using a simplified code, reflecting the main lithological groups for both overburden and footwall, and for the three main phosphate layers. Contacts between the overburden and footwall of the rock types are particularly well defined. However, the internal boundaries between phosphatic layers A, B and C are mostly gradational. Where these boundaries were clearly defined, the boundaries were marked on core. Drill holes were logged in their entirety (total of ~4,355 m). Geological logging was conducted by a competent team, and cross-verified by comparing the logged lithologies against assay results. Core boxes were properly marked: box number, core depths, driller's blocks (with run depths) and sample depths were systematically reported. All holes (in core boxes with the above-mentioned marks) were photographed. Trenches have been logged to the full length of the exposed phosphate (176.8m). All logs, as well as assay logs files, are available for all diamond holes and trenches, and are properly stored and organised for rapid reference.

Criteria	Commentary
Sub-sampling techniques and sample preparation	HQ cores were cut longitudinally in half using a diamond saw, with a usually good quality cut. Always the same side of half cores was collected in a plastic bag and was associated with sample tags. The other side of half cores was kept as witness in the core shed close to site. All core and trench samples were tagged with a ticket id and were processed using an established sample scheme: (i) first crushing down to 5 mm using a jaw crusher; (ii) second crushing down to 2 mm using a roll crusher; (iii) riffle splitting to get a ~500g sub-sample poured into a plastic bag along a sample tag bearing the ticket id. The 500g crushed split sub-samples were sent to external commercial assay laboratories for final preparation, i.e., pulverisation down to 75 µm, and assay. Given the massive nature of the phosphatic material, the sub-sampling techniques are straightforward and efficient.
Quality of assay data and laboratory tests	Assays were conducted in two independent laboratories as part of the sampling/assaying procedure. Al Amri Labs, Jeddah, KSA, operating in an ISO 9001:2000 environment, assayed all the trench samples and the core samples from the 2011-2012 campaigns, using the following schemes: • Major elements – XRF with lithium borate fusion extraction (detection limits of 0.01 %). • LOI – gravimetry ALS Dublin, Ireland, an internationally accredited laboratory, assayed all the core samples from the 2015-2016 campaign, using the following schemes: • Major elements – XRF with lithium borate fusion extraction (detection limits of 0.01 %) • LOI – calcination (detection limit of 0.01%). • Multielement - ICP-AES, 33 elements, including S • F and Cl – ion chromatography • Total carbon and organic carbon – combustion. A comprehensive QAQC program was implemented for trenches and diamond holes, including 4 different CRMs, with staged P205 values (from 13 to 26%), coarse blanks (non-certified), and crushing duplicates. A total of 224 quality control samples were inserted in the sampling chain along with 1,147 original trench and core samples. The quality control performance is overall acceptable, guaranteeing the quality of the assays. 139 samples from 2011-2012 drill holes were also tested by an umpire laboratory being ALS Seville, Spain, to compare the results with Al Amri Labs. The schemes used by ALS Spain were: • Major elements – XRF with lithium borate fusion extraction (detection limits of 0.01 %) • LOI – calcination (detection limit of 0.01%) Multielement - ICP-AES, 32 elements, including S The comparison between Al Amri and ALS Spain returned a ~6% P2O5 bias, ALS assays getting the highest grades. This bias is considered as not critical for the resource estimate but should be investigated further for exploitation purposes. No particular bias was observed for the other major elements.
Verification of sampling and assaying	Independent audits by external consultants of sampling procedure were undertaken in March 2013, February 2015 and again in January 2017. These reviews comparing core boxes, geological logs and assay, were positive. • Check logging of 15 holes, core box vs geol. Log vs assay results • Re-sampling of 46 samples (1/4 cores) for independent assay at ALS • Independent verification and audit of the drilling database A complete restoration and audit of the exploration database was performed by SRK (Sydney Australia) in 2022 from original drill logs, samples sheets and raw assay files.

Criteria	Commentary
Location of data points	Coordinates are reported as Universal Transverse Mercator (UTM) North Zone 32 (WGS84 spheroid). All drill hole collars and trenches were surveyed using differential GPS (DGPS) by TMS between 2011 and 2016. A second survey of drill hole collars was realised in May-June 2022 by TDIS using a Leica 1200 DGPS. For most of the holes, the surveyed coordinates were repeated quite well. No down-hole survey was performed for the 10 holes drilled in 2011-2012. Downhole survey was performed on the 21 holes drilled in 2015-2016 using a Camteq Proshot Dual CTPS100, with a shot every 9 to 24 m depending on the hole. No flaw was observed in the downhole survey data. Surface topography was initially surveyed using a total station by TMS in 2015-2016. It was re-surveyed in 2022 with high-accuracy LiDAR. Topographical surface is representative of actual topography with sufficient detail for resource estimation. 2022 collars elevation survey and LiDAR topography were compared. Except for one hole, both surveys are very close. For the resource estimate, it was decided to drap the collars onto the LiDAR surface topography.
Data spacing and distribution	The KEL and GK prospects are located on a prominent ridge. The phosphate layer is exposed in outcrop on three sides and is mapped to an unusually high level of certainty. Drilling and sampling spacing is sufficient for resource estimation, giving sufficient confidence for both geological and grade continuity, as well as to support future strategic mine planning. No particular drill hole nor trench spacing covers the area investigated. Drill holes at Gassaa Kebira mesa are generally spaced by 150 m to 300 m, and cover the whole ~2.4km N-S by ~1.0km E-W prospect. A nominal 1m-length was targeted for sampling, and no further practical compositing was made.
Orientation of data in relation to geological structure	The mineralised sedimentary phosphorite horizon is a large tabular ore-body, dipping at 10-20° west. Drill holes range from vertical to 65o dip and are designed intersect the orebody at a proper angle with minimal downhole exaggeration of intercept width. Some faulting is known to occur. Faults are subvertical and subparallel to drilling direction making them difficult to locate with drilling. Outcrop mapping is used to locate these features. Faulting tends to reduce rather than increase the width of intercepts. Observed fault displacements are minor and have limited impact on the volume of the phosphate layer.
Sample security	Cores boxes and sample rejects are acceptably stored in the core-shed off site. Paper documentation helps to track samples, rejects and pulps, and most of them are available for verification.
Audits or reviews	Geos Mining (Brisbane, Australia), estimated an Inferred Resource with a comprehensive review of data in March 2013. An audits of drilling results and procedures was conducted in January 2015 (Arethuse, GEOS). More detailed audits of drilling results and materiality were conducted in January 2015 (Arethuse, GEOS), and in June 2015 (Arethuse). Arethuse and SRK (Cardiff Wales office) in January 2017. In September 2021 SRK Sydney were commissioned to reconstruct the master exploration database, incorporating missing data and re-established the chain of data custody, critical to allocation of Mineral Resources compliant with the 2021 edition of the Joint Ore Reserves Committee Guidelines (JORC). The restored master database is hosted on the Microsoft Azure cloud platform, ensuring centralised and secure data access for all authorised parties.

Section 2 Reporting of Exploration Results (Criteria listed in the preceding section also apply to this section.)	
Criteria	**Commentary**
Mineral tenement and land tenure status	The Chaketma Project is held by Chaketma Phosphates SA (CPSA), a Special Project Company and public limited company under Tunisian law which is 50.99% owned by PhosCo via its 100% owned subsidiary Celamin Ltd. CPSA was created in May 2014, with the purpose of exploration, development and operation of the Chaketma Phosphate Project and has 100% ownership of the Chaketma Phosphate Research Permit. The Chaketma Research Permit was granted to Celamin Limited in February 2010. Permit was renewed in 2013 and ownership transferred to CPSA in 2014 for a 3-year period expiring 10th February 2016 (JORT No 33 22/04/2016). This permit expired in February 2018. In late 2017 CPSA applied to convert the Chaketma Exploration Permit to a mining concession, ahead of the February 2018 deadline. The Chaketma Research Permit is valid and in good standing whilst the application is being considered by the Tunisian regulatory authorities. The Company has made representation to the national government and local authorities to ensure good standing remains whilst the application is under consideration.
Exploration done by other parties	The Chaketma phosphate deposits have reportedly been studied by several parties over the last 100 years, including the Research Centre for Studies on Mineral Phosphates (CERPHOS) on behalf of Tunisian mine management and the Company Phosphate Gafsa (CPG). Celamin has been unable to obtain copies of these studies.
Geology	The Chaketma project is a marine sedimentary phosphorite deposit of upper Paleocene (Lower Ypresian) age. It is a single continuous sub-horizontal layer (dipping at < 20° westward), with a thickness varying from a few meters to approximately 50 metres.It is overlain by a thick (~55 to 155 m) Eocene numilitic dolomitic limestone. The deposit is bound by a major NNW-SSE normal fault on the western margin and is bounded by faults (E-W and NE-SW) at its northern end. Syn-depositional faulting is interpreted to control the thickness of the deposit, suggesting structural control of sedimentary sub-basins by subsidence during deposition.
Drill hole Information	Exploration Results are not presented in this report.
Data aggregation methods	Exploration Results are not presented in this report.
Relationship between mineralisation widths and intercept lengths	Exploration Results are not presented in this report.
Diagrams	A plan of drill holes locations is given in Figure 2.2, with representation cross-sections shown in Figures 2.4, 2.7, 2.8, and 2.9.
Balanced reporting	Exploration Results are not presented in this report.
Other substantive exploration data	Exploration Results are not presented in this report.
Further work	Further drilling is required to convert the Inferred Resources to Indicated and Measured Resources.

Section 3 Estimation and Reporting of Mineral Resources (Criteria listed in section 1, and where relevant in section 2, also apply to this section.)		
Criteria	**Commentary – GK – November 2022**	**Commentary – KEL - March 2022**
Database integrity	In September 2021 SRK Sydney was commissioned to reconstruct the master exploration database, incorporating missing data and re-established the chain of data custody, critical to allocation of Mineral Resources compliant with the 2021 edition of the Joint Ore Reserves Committee Guidelines (JORC). The restored master database is hosted on the Microsoft Azure cloud platform, ensuring centralised and secure data access for all authorised parties. The database was compared to original logs, some minor errors were detected in the digital data relating to intervals and these were corrected. The database was checked for errors such as overlapping intervals, intervals beyond drill hole collar depth, missing intervals, missing drill holes and large deviations in drill hole surveys. The drill hole traces were also visually inspected. Several minor errors were detected and corrected.	The original drilling data were collected in a master spreadsheet that has been imported into a Microsoft Access database, where a series of checks were done. Non-matching and double-up records were checked for all tables using Microsoft Access requests, and no major issues were reported. Coherence of depths between tables were verified in the 3D package, and minor issues were duly corrected. Independent review of 16 holes in June 2015 has been carried out with positive results based on this database. Data 117 diamond drill holes and 28 trenches was used in the 3D-model.
Site visits	Arethuse Geology Competent Person visited Gassaa Kebira area in May 2022, with the following realisations: • trench and drill hole locations verified • local geology and main structural features witnessed • discussion with PhosCo staff No drilling operations nor sampling happened during Arethuse Geology CP site visit in May 2022 (as the last hole was drilled in 2016). The core shed where samples are stored was not accessible either to check them.	Four site visits were conducted by ARETHUSE on Chaketma deposits, since February 2015, including a structural expertise and a geological model validation, as well as review of exploration work practices, and an independent verification of data and sampling, that was carried out in June 2015.
Geological interpretation	The deposit is stratiform in nature and consists of the A, B1, B2, B3 and C layers. Given the available drilling data, outcrop of the phosphate layers and trench data, it is possible to interpret the geological continuity with relatively high confidence. An area in the Northwest of the deposit is subject to more complex faulting and the interpretation of unit thickness in this area is subject to lower confidence.	The geological model is based on detailed geological mapping and structural interpretation of surface and drilling data, which allowed proper constrain on faults emplacement and displacement, as well as deposit thickness variations, giving a good confidence on geological continuity. Three phosphatic layers were early identified corresponding to variation in environmental conditions and reflected by chemical grades. The deposit is bounded on its western side by a NNW-SSE normal faults that controlled the deposition of the phosphatic layers. It is as well crosscut by a number of secondary E-W and NW-SE normal faults.

Criteria	Commentary – GK – November 2022	Commentary – KEL – March 2022
Dimensions	The deposit is approximately 2.5 km long from north to south and 1.2 km from east to west. Thickness is typically 10-15 m, with some locally thicker and thinner areas.	The deposit is about 1.750km North South and 1.2 km E-W. The phosphate unit in Chaketma project is composed often of a single stratified phosphate horizon with vertical variation of ore characteristics and lateral variation of the thickness. The thickness of phosphate unit varies from 1m to 42m, and average thickness is about 10m to 15m. The strip ratio is typically below 4 but can reach in the far south of the deposit up to 10 to 12, due to the thinness of the deposit in the south and in the East.
Estimation and modelling techniques	The estimate was completed using Micromine Origin and Beyond v2022.5 software. Drill hole and trench data were used as input to generate 3D solid models for the whole phosphate series and the individual phosphate layers. The solids were restricted by bounding faults and the topography. The phosphate series was divided into 3 layers based on their P_2O_5 and MgO grades: **Layer A**: P_2O_5 values between ~10% and ~18%, and MgO > ~4%; **Layer B**: P_2O_5 values between ~24% and ~25% P2O5, and MgO < ~4%, with a few exceptions with values below the average; this layer was subdivided into: – Layer B1: P_2O_5 between ~24% and ~25%; – Layer B2: P_2O_5 between ~15% and ~18%; – Layer B3: $P_2O_5$5 between ~24% and ~25%; **Layer C**: P_2O_5 between ~10% and ~18%, and MgO > ~4%. Implicit modelling was used to generate the solids, additional control points were inserted to guide the interpretation. Modelling was checked again paper geological cross-sections. Samples were composited to a length of 2 m, a minimum of 1 m was accepted, residual lengths were added to the previous composite, composites were not allowed to span domain boundaries. There was no need for grade capping. A block model was restricted to all phosphate layers using block factors for the percentage of each block falling within each layer. P2O5, CaO, MgO and SiO2 were estimated into the blocks on a layer-by-layer basis. The B2 sub-layer was estimated separately from the B1 and B3 layers which show similar distributions. Block cell size was 10 mE x 10 mN x 0.8 mZ. Block models then were flattened along with the composite data to allow smoother estimation and then interpolated with parent block factor equal five. Essentially this means a cell size of 50 mE x 50mN x 4 mZ was used for grade estimation (approximately one third to one fifth of the data spacing), but with a smaller cell size to better map the geometry of the geology.	Samples within phosphate layer have been composited to 1m. No capping has been applied to the composited samples. The interpolation was conducted between the different limits, corresponding to three units within the single stratified phosphate horizon: A, B, and C. The three units have been interpolated independently. Orientation and dip of the phosphate units have been used to adapt the search ellipsoid parameters. The horizontal search distances have been deduced from geostatistical analysis. For each solid, the variable estimated has been interpolated independently from composite samples contained in each mineralized layer. 3 passes of interpolation have been used for ordinary kriging method and for inverse distance method, with increasing search distances and decreasing minimum number of samples used for interpolation. No maximum number of samples per drill-hole was defined.

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Estimation and modelling techniques continued	Finally, the block model was sub-blocked/assigned to the individual wireframe and the grade values from each layer combine to a single column in the block model. Grade Estimation was completed using single-pass ordinary kriging. Block Discretization was 5 x 5 x 2 divisions East, North and Z respectively. A Maximum of 2 composites per drillhole were used, and a maximum of 12 points in total accepted per search. A single sector, flat search with radii 400 m east and North and 100 m Z was used, although the Z radius is arbitrary as the wireframes control the extrapolation of the points. Data was estimated in flattened space. Grades are at most extrapolated by 250 m, although grade variability is very low within the individual layers. It is not anticipated that the individual layers will be mined selectively but modelling them individually allows for a better estimate of the chemical composition. The model was inspected in cross section against drillholes and found to visually compare well. The model was also validated by comparison of the input and output statistics.	
Moisture	No moisture measurement was done. Tonnes are estimated and reported on a dry tonnage basis.	
Cut-off parameters	The interpolation was performed within >8-10% P_2O_5 wireframes, thus no cut-off parameters are applied. All of the deposit modelled is expected to be considered for economic extraction.	Several natural cut-offs have been identified for P_2O_5 and MgO, showing different populations corresponding to three distinct mineralized layers within phosphate. These three layers are mineralized, and can be discriminated using P_2O_5 and MgO. The typical ranges of values, for the three phosphatic layers, are: • Layer A: 10-22% P_2O_5/4-10% MgO • Layer B: 22-30% P_2O_5/0-4% MgO • Layer C: 10-22% P_2O_5/4-10% MgO Finally, a natural cut-off of 10% P_2O_5 has been applied with some flexibility down to 8% P_2O_5.

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Mining factors or assumptions	The previous Gassaa Kebira resource was investigated by SRK in 2016. That resource has been updated by Arethuse with a limited impact on the overall quantities and grade. To this end the SRK GK pit design perimeters from 2016 have been applied to the more recent Arethuse GK resource, : Production target includes: • assumption of ore loss of 0.4 m of mineralisation thickness on the hanging wall and 0.2m on the footwall from the modelled resource. • assumption of an inclusion of 0.4 m thickness of dolomite waste material on the hanging wall and 0.2m marl on the footwall of the modelled resource as dilution. • a nominal 10% P_2O_5 cut-off grade; • whole deposit mined by open-cut, although some of the mineralisation may be suited to underground exploitation. • the strip ratio was estimated at 7.3.	The deposit's economics were assessed during the 2012 Scoping Study which envisaged an open pit by standard truck and shovel operation. The Kef El Louz resource was investigated by SRK in 2016/17. That resource was the basis of the March 2022 Arethuse resource update. The SRK produced pit designs, production targets and mining schedule have been utilised for the Scoping study. Factors applied are: Production target includes: • assumption of ore loss of 0.4 m of mineralisation thickness on the hanging wall and 0.2m on the footwall from the modelled resource. • assumption of an inclusion of 0.4 m thickness of dolomite waste material on the hanging wall and 0.2m marl on the footwall of the modelled resource as dilution. • a nominal 10% P_2O_5 cut-off grade; • whole deposit mined by open-cut, • the strip ratio was estimated at 3.6.
Metallurgical factors or assumptions	Beneficiation tests conducted for the scoping study and showed that the ore was amenable to floatation producing a commercial concentrate, with reasonable level of deleterious elements. The deposit's economics were assessed during the 2012 Scoping Study which envisaged a beneficiation by flotation to produce a marketable P_2O_5 concentrate. Average deleterious elements were estimated at 40ppm Cd, 23 ppm U, 1.2% S.	
Environmental factors or assumptions	All environmental aspects have been addressed in the scoping study, which were out of the scope of the resource estimation process. No major environmental issue, other than usual related to open pitting, were identified during the field visits. Not considered an environmentally sensitive area. Local inhabitants occasionally protest the lack of available employment on the project, although efforts are being made to incorporate local labour wherever possible.	
Bulk density	Dry bulk density measurements were performed using the water displacement method on unsealed cores. 70 density records were acquired, of which 22 in the phosphate layers. The number of determinations within each individual layer were insufficient to allow application of a variable density on a layer-by-layer basis. Two samples also appeared to be erroneously high measurements and were discarded. As such a mean bulk density for all phosphate horizons was used. A final bulk density of 2.72 g/cm³ was used.	The dry bulk specific gravity has been systematically assessed by a water displacement method on the whole deposit for both ore and overburden, which is adequate for that type of material. from 2011 to 2013, 723 density measurements were carried out, including 233 measures within the phosphate layer. Constant values have been assigned in the different lithological units (limestone, marl and phosphates).

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Classification	Given the confidence in thickness and grade continuity, the data spacing, reliability of the data and outcrop of the phosphate unit, the majority of the estimate is classified as Indicated. An area which is subject to more complex faulting and variable thickness is classified as Inferred. The result reflects the CPs view of the deposit.	Given the good geological continuity, drill spacing, compared to variography results, was the main driver for the resource confidence classification. Measured resources are mainly in the northern part of the deposit, and indicated resources, represent a small portion in the southern part of the resources. The resources are being opened to the south that carries some additional potential that remains to be assessed.
Audits or reviews	The 3D model and the estimate were internally peer-reviewed by Arethuse and were compared to the previous works of Geos Mining in 2013 and SRK in 2017, with comparable results.	The KEL resource estimate process went through a high-level internal peer-review (ARETHUSE).
Discussion of relative accuracy/ confidence	The geological continuity has been strongly evidenced by the correlation between natural exposures and drilling. The 2015-2016 additional holes have not modified much the volumes and grades of the phosphate series from the 2011-2012 campaign. The variography range (~300 m) is higher than the drill hole spacing (~150-300 m), which gives confidence on the grades' continuity, but not sufficiently for a detailed mining plan. The geological continuity in the Inferred area is not sufficiently understood due to faulting, and locally tonnage and grade may vary. A conservative approach was preferred.	The geological and the grade continuity are considered well understood. Drilling, sampling, assaying technics, and drill spacing are relevant for this type of mineralisation, and other similar projects. There is a high confidence level in the accuracy of the resource model, at a sufficient level to support a mine planning: with sufficient density of drill-holes, to the Northern and central part of the deposit. Complete and relevant QAQC support the confidence classification of the Mineral Resources into the Measured classification.