Black Rock Completes Front End Engineering Design, Reconfirming Mahenge as Tier 1 scale project with compelling projected returns

HIGHLIGHTS

- **Independent Technical Expert completes review of Front-End Engineering Design (FEED)**
- **eDFS Update reconfirms Mahenge's compelling projected returns**
- **Peer analysis confirms Mahenge's 1st quartile position on the global cost curve**
- **Draft ESIA being updated to Equator Principles (EP4) and IFC Performance Standards**
- **FEED outcomes support debt financing for Module 1, term sheets expected Q4 CY22**

Tanzanian graphite developer Black Rock Mining Limited (**BKT**: ASX) (**Black Rock** or the **Company**) is pleased to announce the completion of the Independent Technical Expert review of Module 1 and the Front-End Engineering Design (**FEED**) works and update of the eDFS (**eDFS Update**), which reconfirms the Tier 1 scale Mahenge Graphite Project (**Mahenge** or **Project**) in Tanzania, as a robust project with attractive forecast returns.

Background

As announced on 26 April 2022, the Company engaged highly experienced engineering design and construction company, CPC Engineering[2] (**CPC**) to undertake a FEED workstream which was designed to ensure the Project is construction ready, subject to finance. Key deliverables of the FEED work included detailed engineering, cost estimation, schedule optimisation, development of Project Execution and Operational Readiness plans, and tenders for long lead equipment items. The FEED works and supporting Environmental and Social Impact Assessment (**ESIA**) updates have been subject to an Independent Technical Expert review as part of a project debt financing process for Mahenge. The completion of FEED works enables the Company to update the Mahenge project metrics and progress the debt finance process prior to a Final Investment Decision.

Table 1 – eDFS Update: Robust Project with Attractive Returns

eDFS Update		Key Project Metrics	Expert Consensus** price forecast	Fastmarkets price forecast
Initial capex for Module 1*	US$m	182		
Average C1 Cash Costs over first 10 years	US$/t	466		
Steady state production	ktpa	347		
Graphite Price Forecast for Mahenge Basket	US$/t		1,709	2,563
NPV post-tax, post 16% Govt free carry	US$m		1,376	2,837
IRR post-tax, post 16% Govt free carry	%		36	55
Payback Period (post construction)	years		3.8	2.7

Note: Based on all 4 modules, NPV is unlevered and based on a 10% nominal discount rate. The Executive Summary of the eDFS Update is attached to this release. The Reserves & Resources for Mahenge have not changed as a result of FEED or the eDFS Update.
* Forecast Capex has been classified as a Class 3 estimate with accuracy of ±10% as defined by AACE International
** Expert Consensus is the average price forecast for Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie over the first 10 years as outlined in Chart 3 below.

[2] CPC is one of the most experienced engineering companies when it comes to building graphite mines in Africa. CPC has been working with Black Rock on Mahenge since 2018.

A snapshot of the Mahenge Graphite Project

Simple open pit mine development with outstanding forecast returns[1]

US$1.4B $NPV_{10\ nom}$ post tax, post 16% FC	**36%** Post-tax, ungeared, real IRR	**89ktpa** Module 1 production* (1Mtpa)
US$182M Module 1 development capex**	**347ktpa** Steady production (4 x 1Mtpa)	**95 – 99%+ TGC purity** **59% +80 mesh, 41% -80** Concentrate product
US$1,709/t Basket graphite price***	**US$518/t** All-In-Sustaining-Cost*	**26 years** Initial operating life

[1]All technical parameters, including in the estimation of Mineral Resources or Ore Reserves, underpinning the estimates continue to apply and have not materially changed. The estimated Ore Reserves and Mineral Resources underpinning the production and financial forecasts were prepared by Competent Persons in accordance with the requirements in Appendix 5A (JORC Code). Forecast Capex has been classified as a Class 3 estimate with accuracy of ±10% as defined by AACE International.
*Average over first 10 years. **Excludes US$33m to bring the power line forward for grid power from year 1. Black Rock is exploring options to fund the power line externally.
***Expert Consensus based on the average graphite price forecast from Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie over the first 10 years.

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FEED Outcomes

All targeted outcomes were achieved by the FEED work for Module 1 which has been reviewed by an Independent Technical Expert (**ITE**). The ITE was selected from a shortlist of potential candidates based on discussions and feedback with potential project finance lenders. In its report for lenders, the ITE wrote:

> *"No fatal flaws were identified in any of the areas of the Project with the underlying studies completed by BKT having reached a DFS level of confidence."*

Key outcomes of the FEED workstream included:

- Finalisation of Project execution strategy and key technical decisions;
- Optimised plant design;
- Technical documents required for detailed plant design;
- Confirmation of commercial graphite product types to customer specifications;
- Refined budget, scope and schedule for the Project;
- Documented Project procedures and systems; and
- Preparation and progress of tenders for key long lead procurement items.

Findings from the FEED work come against a backdrop of steady increases in the graphite price and an exceptionally strong supply-demand market outlook.

Based on the FEED work, the updated capital cost estimate for the development of the Mahenge Graphite Mine is US$182m, including a contingency allowance of US$22m or 13.8% (US$22m/US$160m). The updated capital cost breakdown by segment is shown in Table 2 below.

Table 2 – Updated Initial Capex for Mahenge Graphite Project

	eDFS, July 2019 US$m	eDFS Update, Sept 2022 US$m	Change %
Mining	10	11	3%
Ifakara	1	1	-7%
Process Plant	51	70	38%
Infrastructure	14	29	106%
Site Support	2	1	-29%
Indirect costs	10	6	-39%
Owners Costs	13	25	92%
Village / Resettlement	3	17	466%
Contingency	11	22	97%
Total	**116**	**182**	**58%**

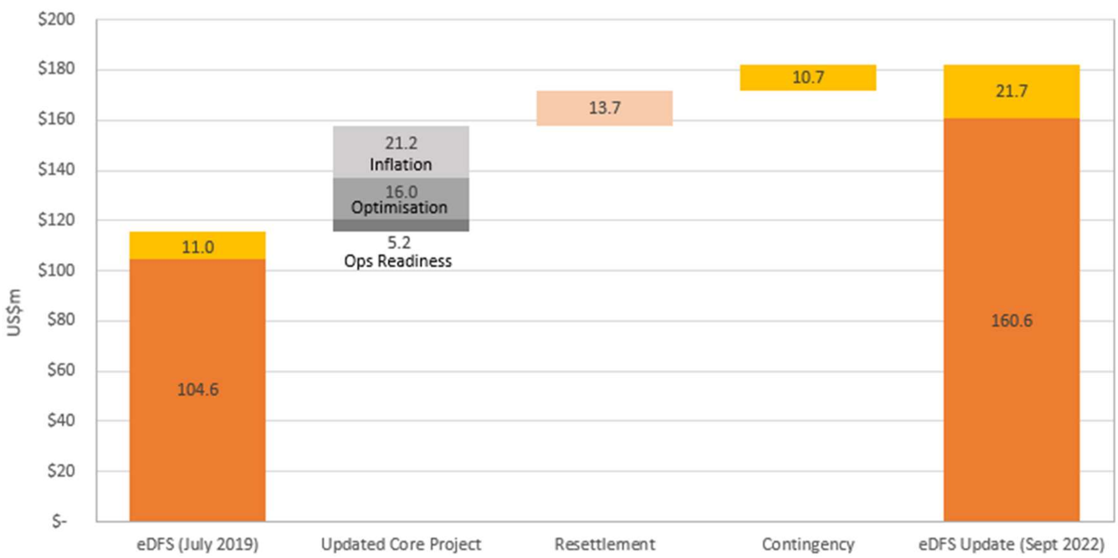
Note: Forecast Capex has been classified as a Class 3 estimate with accuracy of ±10% as defined by AACE International. Percentages based on exact figures including decimal places (not whole numbers)

The increase in capex since the eDFS in July 2019 was driven by:

- Inflation in the cost of building materials, labour, energy and other consumables (32% of the increase);
- Project optimisation and debottlenecking enhancements to improve the flowsheet and to provide additional operational flexibility to de-risk the production of high-purity graphite concentrates (24% of the increase);
- An increase in the cost of relocation and resettlement to ensure the Company adheres to the highest global standards of ESG compliance and community stakeholder engagement (21% of the increase); and
- Additional contingency added (16% of the increase).

The ESIA has been updated to reflect Project evolution and to ensure full compliance with the updated Equator Principles (**EP4**) and the IFC Performance Standards.

Chart 1 – Change in Mahenge Initial Capex Since the eDFS in July 2019



Source: Black Rock Mining FEED outcomes

Access to clean, low-cost grid power

One of the key differentiating features of Mahenge is its access to low-cost grid power in Tanzania. Grid power generation in Tanzania in 2022 is sourced from ~40% hydroelectric and ~60% natural gas with the proportion of hydroelectricity expected to grow. The nearby Julius Nyerere Hydro project is in construction and will have an installed capacity of 2,115 megawatts and is due to be commissioned in June 2024. As a result, graphite from Mahenge will have a *very* low carbon intensity compared to peers and is likely to have one of the lowest carbon footprints of any graphite project globally.

The eDFS assumed the ~60km power line to Ifakara to connect Mahenge to grid power would be built in parallel with the commissioning of Module 2. However, given the elevated level of diesel prices and the substantial benefit to Project economics and green credentials, Black Rock is exploring options to bring forward the construction of the power line to align with first production from Module 1. Black Rock is in discussions with several parties to explore funding the US$33m power line project outside the Project.

Changes to the Mahenge Graphite Project since the eDFS in July 2019

Black Rock released a detailed eDFS for Mahenge in July 2019 and in most respects the Project is largely unchanged since the eDFS. However, the key changes to the project since July 2019 comprise:

- A move to contract mining instead of owner operator mining;
- An increase in throughput for Module 1 to 1.15mtpa during the first ~5 years while mining oxide;
- Optimised project layout and flow sheet to incorporate lessons learned from 500t pilot plant; and
- A 20-month construction period (previously 15-18 months) reflecting current supply chain disruptions.

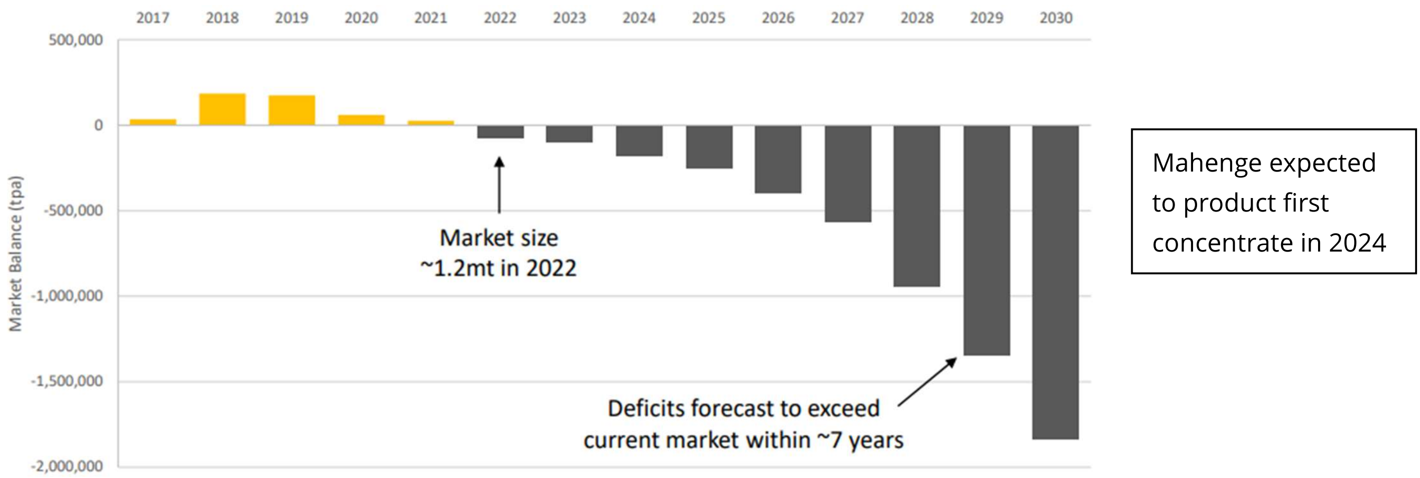
All other material assumptions underpinning the production target, and the forecast financial information derived from the production target set out in the Executive Summary of the eDFS Update attached to this release.

Graphite market industry context

Lithium-ion batteries contain 7-10x more graphite than lithium by volume and as the mainstream adoption of electric vehicles gathers pace, several experts are forecasting substantial deficits in graphite markets.

The size of the natural flake graphite market in 2022 is a relatively modest ~1.2mt and Benchmark Mineral Intelligence expects substantial graphite supply deficits over the next few years which provides a very promising outlook for graphite prices. By 2029, Benchmark expects the market deficits to exceed the entire graphite supply today, as highlights in the chart below:

Chart 2 – Structural Deficits in Natural Graphite Predicted from 2022



Sources: Public releases, Benchmark Mineral Intelligence, Black Rock Mining

Black Rock Mining Ltd
ACN 094 551 336
ASX: BKT

Australian Office
Level 1, 1 Walker Ave
West Perth WA 6005
Ph: +61 8 6383 6200
E: info@blackrockmining.com.au

Tanzanian Office
Faru Graphite Corporation Limited
Diamante Building, 3rd Floor Wing A, 22 Chole Road
Plot No. 2016, Masaki,
P. O. Box 11, Mahenge-Ulanga
Dar es Salaam, Tanzania

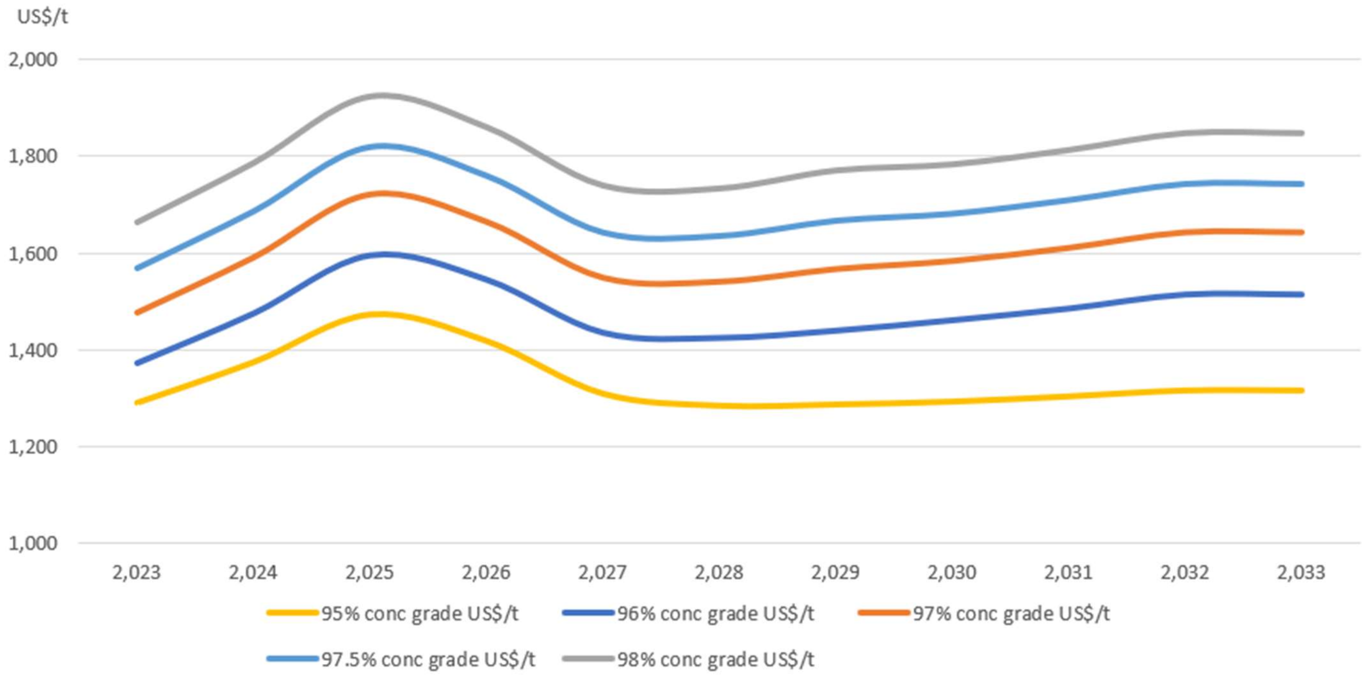
Directors
Richard Crookes Chairman
John de Vries Managing Director & CEO
Ian Murray Non-Executive Director

www.blackrockmining.com.au

Fastmarkets is expecting natural graphite demand to outstrip supply and effectively forecasting a basket price for Mahenge's graphite products of US$2,563/t over the first 10 years of production, which compares to a current basket price of ~US$1,200/t.

Black Rock has utilised Expert Consensus graphite price forecasts based on the average graphite price forecasts provided by Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie. The chart below provides a summary of Expert Consensus for Mahenge's basket of graphite products at a range of concentrate purities. Through the largest volume pilot plant program in the industry which processed over 600t of ore, Black Rock has demonstrated the ability to produce graphite concentrates up to 97-98%.

Chart 3 – Expert Consensus Graphite Price Forecast for Mahenge Basket



Source: Expert Consensus comprises average graphite forecast prices provided by Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie

Table 3 - Project Sensitivity to Graphite Prices

Graphite Price US$/t	Price Change %	NPV* US$m	NPV Change %	IRR** %	IRR Change %
1,385	(20%)	835	(39%)	27%	(26%)
1,558	(10%)	1,106	(20%)	32%	(13%)
1,731	-	1,376	-	36%	-
1,904	10%	1,645	20%	41%	12%
2,077	20%	1,914	39%	45%	23%

* Unlevered NPV post-tax, post free carry at 10% nominal discount rate, based on all 4 Modules
** Unlevered IRR post-tax, post free carry
*** Expert Consensus based on the life of mine average forecast prices from Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie

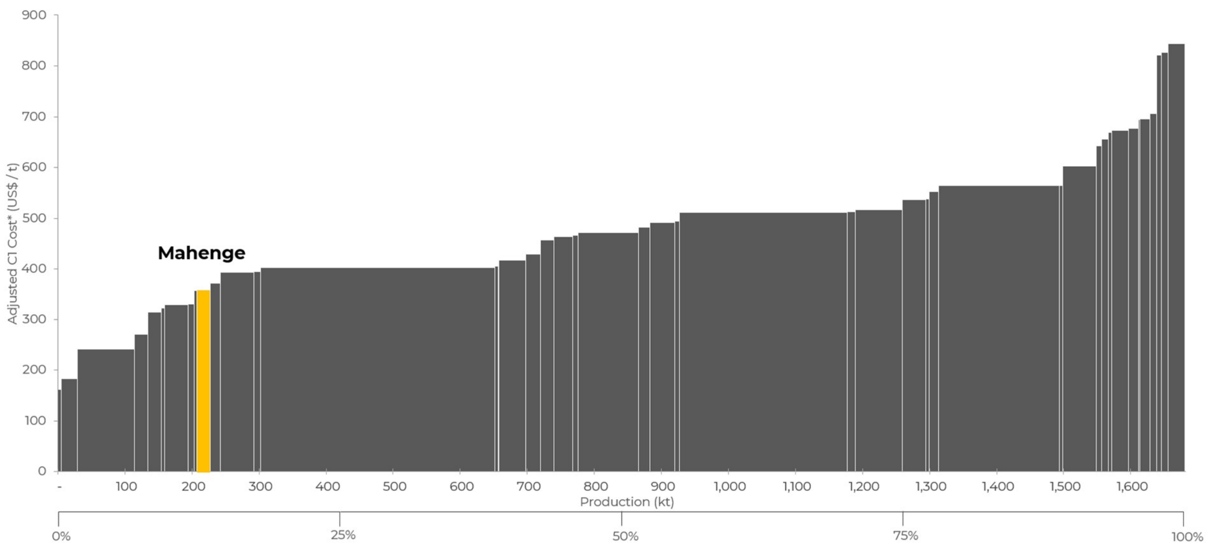
Mahenge confirmed a 1st quartile graphite project on the global cost curve

Black Rock has prepared the 2024 Adjusted C1 Cost Curve below based on data provided by Benchmark Mineral Intelligence in its Flake Graphite Report Q2 CY22.

The analysis confirms that Mahenge is well positioned compared to its global peers and sits comfortably within the first quartile of the cost curve. This analysis is conservative on several fronts:

- This chart ignores the benefit of Mahenge's much higher purity concentrates than most peers, which could potentially improve Mahenge's relative position by US$40-60/t per 1% above 95% pricing;
- Benchmark's data does not include Black Rock's highest value +32 mesh product and so the higher revenue expected from this product has also been ignored. The analysis for the chart assumes Black Rock's +32 mesh product is sold at the lower +50 mesh prices understating Mahenge's advantage compared to peers;
- Mahenge's costs have been updated to Sept 2022 prices, but some of the peer data is several years old and has not been escalated. Escalating the peer data should potentially improve Mahenge's relative position.

Chart 4 – 2024 Adjusted C1 Cost Curve*



Sources: Benchmark Mineral Intelligence Flake Graphite Report Q2 CY22, Black Rock Mining, Company Data
*C1 Costs adjusted for flake size distribution: Based on forecast pricing for 94-95% in 2024, Mahenge's average price is forecast to be US$107/t above the peer average due to a higher proportion of large flake. Mahenge's Adjusted C1 Costs of US$359/t are based on C1 Costs of US$466/t less the US$107/t for above average revenue compared to the peer group.
Ignores the benefit of Mahenge's higher purity concentrates of up to 98% which could potentially improve BKT's relative position by up to ~US$40-60/t per 1% above 95% pricing.

Potential to bring forward Module 2, if substantial prepayment or equity support can be secured

On 9 September 2022, Black Rock announced it had signed a Conditional Framework Agreement (**Agreement**) with Urbix Inc., an emerging American cleantech graphite refining company. Under the Agreement, Black Rock would potentially bring forward the construction of Mahenge Module 2 concurrent with Module 1, subject to Urbix providing substantial prepayment or equity support to secure Offtake for Mahenge Module 2.

The updated capex estimate for Module 2 is US$107m, or 59% of the capex US$182m capex for Module 1, because the capex for Module 1 includes the cost of roads, infrastructure as well as compensation and resettlement. Bringing forward Module 2 would approximately double Project debt capacity and combined with a substantial prepayment and/or equity support through Urbix, is expected to lead to a similar Company equity funding requirement to building Module 1 only. The updated capex for Module 3 and 4 is US$117m and US$104m respectively.

Commenting on the completion of the FEED workstream and eDFS Update, Black Rock CEO, John de Vries, said:

> *"We are extremely pleased with the outcome from our FEED process and eDFS Update, which continues to demonstrate that Mahenge will be a globally significant graphite mine. Importantly, it now delivers:*
>
> - *Updated economics that reconfirm Mahenge's attractive forecast returns;*
> - *A pathway to complete debt financing;*
> - *High confidence to all stakeholders that the Company can take advantage of the significant market tailwinds with respect to clean energy storage and decarbonisation strategies; and*
> - *Confirmation on the Company's discipline and commitments to Tanzania, investors, and the local communities for a best-in-class approach to ESG principles.*
>
> *With increasing interest and market sentiment for graphite continuing to grow, Black Rock is now well positioned to become a meaningful producer into the strongly growing clean energy thematic."*

Forward Looking and Cautionary Statements

This announcement contains forward-looking statements. Wherever possible, words such as "intends", "expects", "scheduled", "estimates", "anticipates", "believes", and similar expressions or statements that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved, have been used to identify these forward-looking statements. Although the forward-looking statements contained in this announcement reflect management's current beliefs based upon information currently available to management and based upon what management believes to be reasonable assumptions, the Company cannot be certain that actual results will be consistent with these forward-looking statements. Several factors could cause events and achievements to differ materially from the results expressed or implied in the forward-looking statements. These factors should be considered carefully, and investors should not place undue reliance on the forward-looking statements. Forward-looking statements necessarily involve significant known and unknown risks, assumptions and uncertainties that may cause the Company's actual costs, results, events, prospects, and opportunities to differ materially from those expressed or implied by such forward-looking statements. Although the Company has attempted to identify important risks and factors that could cause actual actions, events, or results to differ materially from those described in forward-looking statements, there may be other factors and risks that cause actions, events or results not to be anticipated, estimated, or intended, including those risk factors discussed in the Company's public filings. Any forward-looking statements are made as of the date of this announcement, and the Company assumes no obligation to update or revise them to reflect new events or circumstances, unless otherwise required by law.

Mineral Resources and Ore Reserves, Production Target and Forecast Financial Information

The information in this announcement that relates to estimates of Mineral Resources and Ore Reserves has been extracted from the Company's ASX announcement released on 3 February 2022 titled "BKT Confirms 25% increase in Measured Resources." Black Rock confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement, and in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed.

The results of the eDFS Update including the production target and forecast financial information derived from the production target are summarised in the Executive Summary of the eDFS Update provided below and attached to this announcement. The Ore Reserve and Mineral Resource estimates underpinning the production target have been prepared by a Competent Person in accordance with the requirements in Appendix 5A of the JORC Code 2012. The production target has been prepared by a Competent Person in accordance with the requirements in Appendix 5A (JORC Code).

The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original market announcement released on 3 February 2022 titled "BKT Confirms 25% increase in Measured Resources."

This ASX release was authorised on behalf of the Black Rock Board by:
John de Vries, Managing Director & CEO

For more information:

John de Vries
Chief Executive Officer
Black Rock Mining
+61 438 356 590
jdv@blackrockmining.com.au

Steuart McIntyre
GM Corporate Development
Black Rock Mining
+61 413 555 609
sm@blackrockmining.com.au

Elvis Jurcevic
Investor Relations
IRX Advisors
+61 408 268 271
ej@blackrockmining.com.au

About Black Rock

Black Rock Mining Limited is an Australian based company listed on the Australian Securities Exchange (ASX:**BKT**). The Company has an 84% interest in the world-class Mahenge Graphite Project (**Mahenge**) located in Tanzania. Mahenge has a JORC compliant Mineral Resource Estimate of 213m tonnes at 7.8% TGC. It also has Ore Reserves of 70m tonnes at 8.5% TGC. The Ore Reserves support a mine life of up to 350k tonnes of graphite per annum for a reserve life of 16 years. Since the release of the Mineral Resource Estimate, the Company confirms that it is not aware of any new information or data that materially affects the Mineral Resource Estimate.

In October 2018, the Company released a Definitive Feasibility Study (**DFS**) for Mahenge, which was based on strong customer demand. This was enhanced (**eDFS**) in July 2019 (ASX Announcement 25 July 2019). Black Rock has obtained all Environmental approvals, Mining Licences and its Resettlement Action Plan with clear title to the eDFS project area.

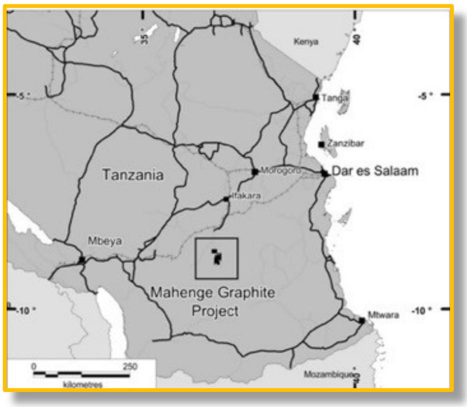
In June 2020, the Company announced a Strategic Alliance with POSCO Group for the development of Mahenge. This included an equity investment of US$7.5M, signed in February 2021, followed by an offtake agreement, with a US$10M prepayment facility. In December 2021, Black Rock signed a Framework Agreement with the Government of Tanzania confirming their 16% Free Carried Interest shareholding, agreed to consolidate its Mining Licenses into a Special Mining Licence (SML) and committed to jointly develop Mahenge. The Company is construction-ready subject to financing and issue of the SML.

Black Rock completed Front-End Engineering Design (**FEED**) and updated the eDFS for Mahenge (**eDFS Update**) in October 2022 as part of the debt financing process. The FEED work and eDFS Update reconfirmed Mahenge as a robust project with attractive returns. Key project metrics comprise:

- *Tier 1 Scale*: Mahenge has a resource of over 200mt and the 2nd largest graphite reserve globally
- *Modular development approach*: Module 1 Capex of US$182m*;
- *1st quartile on the global cost curve*: Adjusted C1 Cash cost of US$359/t**
- *Attractive projected returns: Unlevered IRR post-tax, post free carry of 36%****
- *Substantial upside potential*: $NPV_{10\ nominal}$ post-tax, post free carry of A$2.1bn or US$1.4bn***

The estimated Ore Reserves and Mineral Resources underpinning the production target has been prepared by competent persons in accordance with the requirements in Appendix 5A (JORC Code).

JORC Compliant Mineral Resource Estimate and Ore Reserve******			
Ore Reserves	Tonnes (Mt)	Grade (% TGC)	Contained Graphite (Mt)
- Proven	0	0.0	0.0
- Probable	70.5	8.5	6.0
Total Ore Reserves	**70.5**	**8.5**	**6.0**
Mineral Resources			
- Measured	31.8	8.6	2.7
- Indicated	84.6	7.8	6.6
Total M&I	**116.4**	**8.0**	**9.3**
- Inferred	96.7	7.4	7.2
Total M, I&I	**213.1**	**7.8**	**16.6**



Location of Black Rock's Mahenge Graphite Project in Tanzania

For further information on Black Rock Mining Ltd, please visit **www.blackrockmining.com.au**

* Forecast Capex has been classified as a Class 3 estimate with accuracy of ±10% as defined by AACE International
** Adjusted for larger proportion of higher value large flake compared to global peers
*** Based on Expert Consensus graphite price forecasts, based on the average graphite price forecasts from Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie
**** Resource Estimate as released to ASX on 3 February 2022: BKT Confirms 25% increase in Measured Resources and Ore Reserve Estimates. Black Rock confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements referred to above, and in the case of estimates of mineral resources or ore reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original market announcements.

BLACK ROCK MINING LIMITED

MAHENGE GRAPHITE PROJECT

ENHANCED FEASIBILITY STUDY UPDATE

Update post completion of Front-End Engineering Design

October 2022

Disclaimer

This report has been prepared by Black Rock Mining Limited (Black Rock) with input from CPC Project Design Pty Ltd (CPC) and other consultants based on assumptions as identified throughout the text and upon information and data supplied by others.

The report is to be read in the context of the methodology, procedures and techniques used, Black Rock's assumptions and the circumstances and constraints under which the report was written. The report is to be read as a whole and sections or parts thereof should therefore not be read or relied upon out of context.

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As noted above, an investment in Black Rock securities is subject to investment and other known and unknown risks, a number of which are beyond the control of Black Rock. Black Rock (nor its related bodies corporate) does not guarantee any particular rate of return or the performance of Black Rock, nor does it guarantee the repayment of capital from Black Rock or any particular tax treatment. Prospective investors should make their own enquiries and investigations regarding all information in this report.

Non-IFRS financial information

This report includes financial information presented other than in accordance with accounting standards (non-IFRS financial information). As non-IFRS financial information does not have a standardised meaning prescribed by IFRS, they are not necessarily comparable to similar measures presented by other companies.

Rounding

A number of figures, amounts, percentages, estimates, calculations of value and fractions in this report are subject to the effect of rounding. Accordingly, the actual calculation of these figures may differ from the figures set out in this report.

Forward Looking and Cautionary Statements

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Persons' findings are presented have not been materially modified from the original market announcement.

Production Target and Forecast Financial Information

The information and production target presented in this report is based on an enhanced feasibility study for the Mahenge Graphite Project. The Ore Reserve and Mineral Resource estimates underpinning the production target have been prepared by a Competent Person in accordance with the requirements in Appendix 5A of the JORC Code 2012. The production target has been prepared by a competent person in accordance with the requirements in Appendix 5A (JORC Code). 74% of the production target referred to in this report is based on Probable Ore Reserves and 26% is based on Inferred Mineral Resources. 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. The stated production target is based on Black Rock's current expectations of future results or events and should not be relied upon by investors when making investment decisions. Further evaluation work and appropriate studies are required to establish further confidence that this target will be met.

Black Rock has concluded that it has a reasonable basis for providing the forward-looking statements (including the production targets) included in this report. The detailed reasons for that conclusion are outlined throughout this report and all material assumptions, including the JORC modifying factors, upon which the forecast financial information is based are disclosed in this report. This report has been prepared in accordance with the JORC Code 2012 and the ASX Listing Rules.

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1 EXECUTIVE SUMMARY

1.1 Introduction

Black Rock Mining Limited (**Black Rock**) is developing the Mahenge Graphite Project (**the Project**) in Tanzania. The Project comprises an open pit mine, process plant, and associated infrastructure including a new transmission line which will not only supply the Project but also the surrounding region, providing a significant development benefit.

Natural flake graphite is a critical mineral for the high growth electric vehicle and energy storage markets, as well as having a wide range of industrial applications including high value applications for larger flake sizes. Mahenge is a tier-one graphite asset.

Black Rock is an Australian public company listed on the Australian Stock Exchange (ASX ticker: BKT). Black Rock is jointly developing the Project with the Government of Tanzania via a joint venture company, Faru Graphite Corporation (**Faru**), established pursuant to a Framework Agreement signed with the Government in December 2021.

The Project site is located 450 kilometre (**km**) by road from Tanzania's largest port, Dar es Salaam and is contained within 255 square km of exploration tenements in the Ulanga district. The Mahenge deposit is the fourth largest (JORC compliant) contained graphite resource in the world.

The Project development area will be around the Ulanzi, Cascade and Epanko deposits, which provide a nominal mine life of more than 26 years. Black Rock has recently reduced the Project footprint by adopting processes to dewater mill residue, thereby avoiding the need for large areas of tailings facilities.

Black Rock completed a definitive feasibility study (**DFS**) on the Project in October 2018 and an enhanced definitive feasibility study (**eDFS**) in July 2019. The Company completed Front-End Engineering Design (**FEED**) for Module 1 in October 2022 which was reviewed by an Independent Technical Expert (**ITE**) appointed for the debt financing process. The ITE was selected from a shortlist of potential candidates based on discussions and feedback with potential project finance lenders. The Company is in the process of securing project financing and plans to progress into construction with first production targeted in 2024. In its report for lenders, the ITE wrote:

> *"No fatal flaws were identified in any of the areas of the Project with the underlying studies completed by BKT having reached a DFS level of confidence."*

The financial analysis indicates a net present value (**NPV**) at a 10% nominal discount rate (post tax, ungeared after 16% free carry) of US$1,376M for the base case production profile and price assumptions, which provide for an internal rate of return (**IRR**) of 36% (post tax, ungeared after 16% free carry).

The financial analysis indicates the Project is financially viable and results in strong financial returns. With a short payback period of 3.8 years from first ore processed, the Project has relatively low exposure to the key risk factor of long term commodity prices, mitigating exposure to the financial risk associated with the Project's capital funding requirements. The strong financial returns under the base case assumptions provide a positive risk versus reward assessment.

1.2 Project Background

1.2.1 Project Location

The Project is located in southeast Tanzania, in the Ulanga district of the Morogoro region, approximately 250 km inland from the coast, 70 km south of the town of Ifakara, and 350 km southwest of Tanzania's largest city, Dar es Salaam. The nearest town is Mahenge, 9 km from the mine site.

The Tanzania Zambia Railway Authority (**Tazara**) railway line is located at Ifakara approximately 70 km north of the Project by road and runs to the deep-water port at Dar es Salaam.

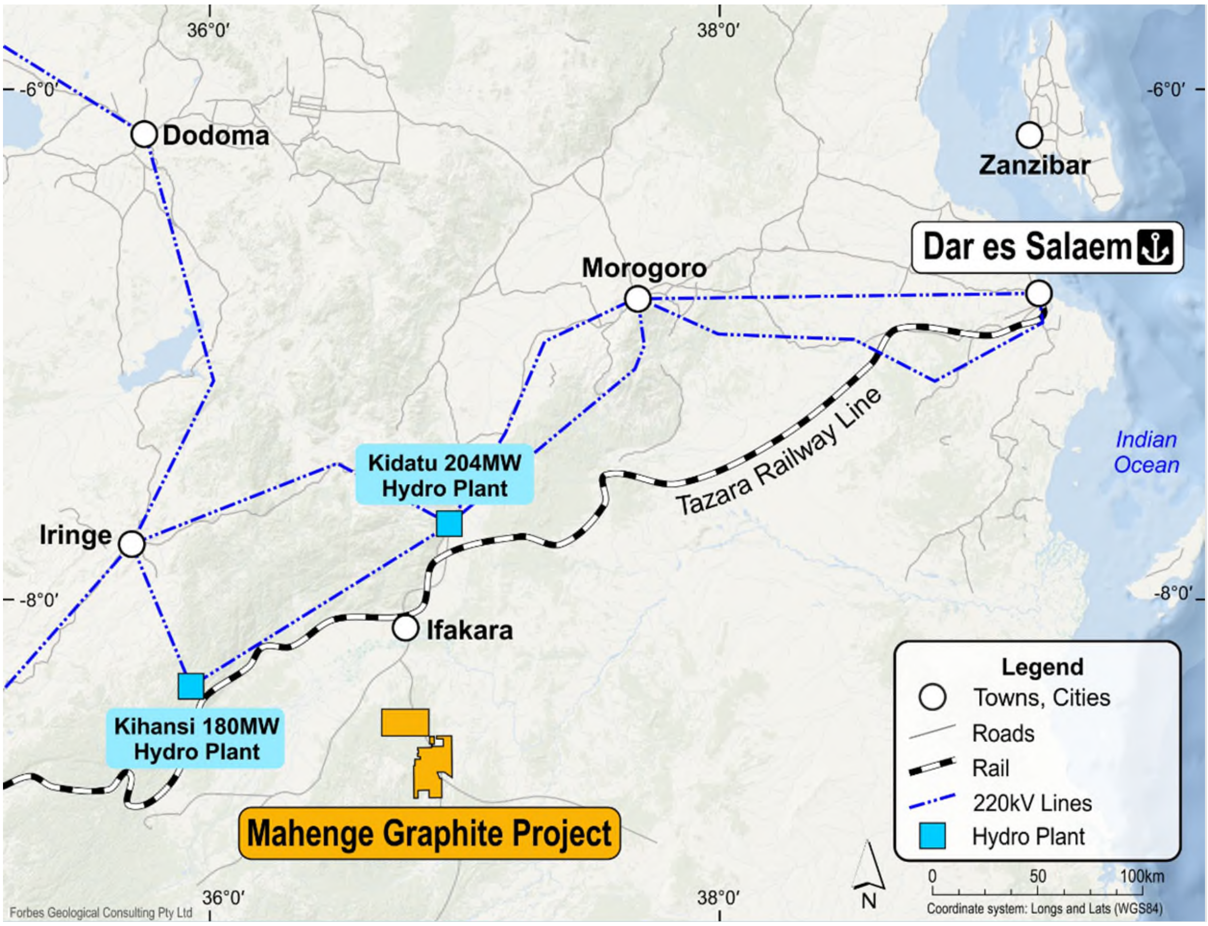


Figure 1 Location of the Mahenge Project

The Project sits on the edge of the Mahenge Mountains in an open area between hilly terrain with the process plant at an elevation of 487 m above sea level. The Mahenge District forms part of isolated mountain blocks of the Eastern Arc Mountains.

Land use at the Project site is dominated by subsistence agriculture and forestry, traditional housing and artisanal gem mining. An estimated 80% of the Project site has been cleared for farmland. Agriculture is the main source of income for the area.

The nearest regional population centre is Mahenge township, located approximately 9 km southeast from the centre of the Project. The population of the Mahenge district is around 10,000. There are a number of villages within the Project area, and some re-settlement is required for the Project. The Project is in a low earthquake hazard area.

1.2.2 Jurisdictional Overview

1.2.2.1 Tanzania country profile

Geography and demography

- Location: East Africa, bordering Kenya, Uganda, Rwanda, Burundi, Democratic Republic of the Congo, Zambia, Malawi, Mozambique and the Indian Ocean.

- Major centres: Dodoma is the capital city and Dar es Salaam is the commercial capital and major port. Dar es Salaam port also serves neighbouring land-locked countries.
- Topography and Climate: Varied, from hot and humid low plains in the east, to generally cool highlands in the north and south. The central part features a largely arid plateau.
- Landmass: 886,000 km; the largest in East Africa.
- Population: 61 million.

Political Governance

Tanzania is a stable unitary republic with both a national government and a devolved government of Zanzibar, which has autonomy for non-union matters. The country's political system is organised in a unitary presidential republic framework, whereby the President of Tanzania is both head of state and head of government.

The multi-party system is dominated by the Chama Cha Mapinduzi ('Revolutionary State Party' or **CCM**).

Tanzania recently underwent a smooth transition of power following the death of President John Magufuli in March 2021. The then Vice- President, Ms Samia Suluhu Hassan, was sworn into office in March 2021 as the sixth President and Tanzania's first female President. Based on the 5-year fixed term for an incumbent President, President Hassan will face elections in 2025. A mandatory maximum of two terms will see President Hassan step down in 2030.

Tanzania is composed of 26 administrative regions, comprising 21 regions on the mainland and 5 in Zanzibar. Tanzania also has 98 districts each with at least one council created to increase local authority.

History

Tanzania is a result of the unification of Tanganyika (the mainland) and the Zanzibar islands. In 1891 Germany declared the region a protectorate as part of German East Africa. During World War I, Britain captured the German holdings, which became a British mandate (1920) under the name Tanganyika Territory. Britain retained control of the region after World War II, when it became a United Nations trust territory. Tanganyika gained independence on 9th December 1961 and became a republic one year later. On 26th April 1964, it joined with Zanzibar to form the United Republic of Tanganyika and Zanzibar.

Economic and development overview

Following two decades of sustained growth, Tanzania reached an important milestone in July 2020, when it formally graduated from low-income to lower-middle-income country status. Tanzania's achievement reflects sustained macroeconomic stability that has supported growth, in addition to the country's rich natural endowments and strategic geographic position.

The World Bank estimates that in 2021 Tanzania had a real GDP growth rate of 4.3%, a current account deficit equal to 2.9% of GDP, and a national poverty rate of 27.0 percent.

Tanzania's inflation rate rose to 4.1 percent in November 2021, its highest level in the past three years, but it remains among the lowest and least volatile in the East African Community.

The latest joint IMF-World Bank Debt Sustainability Analysis, conducted in September 2021, concluded that Tanzania's risk of external debt distress had increased from low to moderate. The downgrade primarily reflected the collapse of tourism exports during the COVID-19 pandemic. Growth is expected to strengthen over the next two years, assuming pandemic conditions ease and the external environment improves. The real GDP growth rate is projected to reach 4.5–5.5 percent in 2022 and average about 6 percent over the medium term as exports and domestic demand recover.

1.2.2.2 Tanzania Mining Sector

Tanzania is an established mining jurisdiction with a skilled labour force and abundant supply of minerals, including significant gold, diamond, and tanzanite projects in operation, along with large-scale rare earth, graphite, and nickel development projects.

Mining is a leading industrial sector in Tanzania. In 2020-21, the mining and quarrying sector contributed 6.7% to Tanzania's GDP, with gold accounting for more than 80% of mining revenue. The value of gold exports grew to US$3.0 Billion in 2020-21, accounting for 46% of total goods exports. The Government of Tanzania reportedly aims to have mining contribute 10% of GDP by 2025.

The main body regulating mining activities in Tanzania is the Mining Commission. In 2017 the Parliament of Tanzania made a number of significant changes to the regulatory framework for mining, including introduction of a Government 16% free-carried interest in all large scale (>US$100m) mining projects.

The Government of President Samia Suluhu Hassan, formed in March 2021, supports business investment, and has pledged to grow the mining sector.

In October 2019 Barrick settled a long-running tax dispute with the Government of Tanzania, which had previously impacted the mining investment climate. Barrick and the Government formed a new joint venture operating company called Twiga Minerals Corporation ("Twiga") to manage the Bulyanhulu, North Mara and Buzwagi gold mines and to implement a 50/50 economic benefit sharing agreement. The parties agreed for the Government to acquire a free carried shareholding of 16% in each of the mines and the Government will receive its half of the economic benefits from taxes, royalties, clearing fees and participation in all cash distributions made by the mines and Twiga. An annual true-up mechanism will ensure the maintenance of the 50/50 split.

Aside from the Twiga mines, other significant mine projects currently in operation / development in Tanzania include the Kabanga Nickel Project (Kabanga Nickel, with BHP holding a substantial share; in development); Geita Gold Mine (AngloGold Ashanti; operating); New Luika Gold Mine (Shanta Gold; in operation); Williamson Diamond Mine (Petra Diamonds; in operation); Singida Gold Project (Shanta Gold; in development); Nyanzaga Gold Project (OreCorp; in development); Fungoni Mineral Sands Project (Strandline Resources; in development); and the Ngualla Rare Earths Project (Peak Rare Earths; in development).

The settlement agreement between Barrick and the Government of Tanzania provided a catalyst for progress in relation to other mining investments in Tanzania. In December 2021, after lengthy discussions, the Government signed framework agreements with Strandline, OreCorp and Black Rock. In January 2022 BHP invested US$50m in the Kabanga Nickel Project and agreed to invest a further US$50m subject to Kabanga achieving agreed milestones.

1.2.3 Site Access

The Project is accessed by driving west from Dar es Salaam to Morogoro, then southwest to Mikumi. At Mikumi the road turns south passing through the regional township of Ifakara and then onto Mahenge. Access to the Project site is predominantly by sealed and local gravel roads.

There is no air strip at the Project site and one is currently not planned to be constructed for the Project. Charter flights can be arranged between Dar es Salaam and the Mbunga or Ifakara air strips.

All travel to/from the Project site will be by a bus service between Dar es Salaam and Ifakara.

1.2.4 Environmental Data

The climate is warm and temperate with monthly temperatures ranging from a minimum of 15°C to a maximum of 30°C. Rainfall generally follows a bi-modal rainfall pattern with short rains between

November and January and long rains between February and April. The typical dry season extends from May to October.

The annual rainfall is approximately 1,650 millimetre (**mm**) and evaporation is 1,188 mm so the overall water balance is positive. Figure 2 shows the monthly average rainfall and evaporation for the Project.

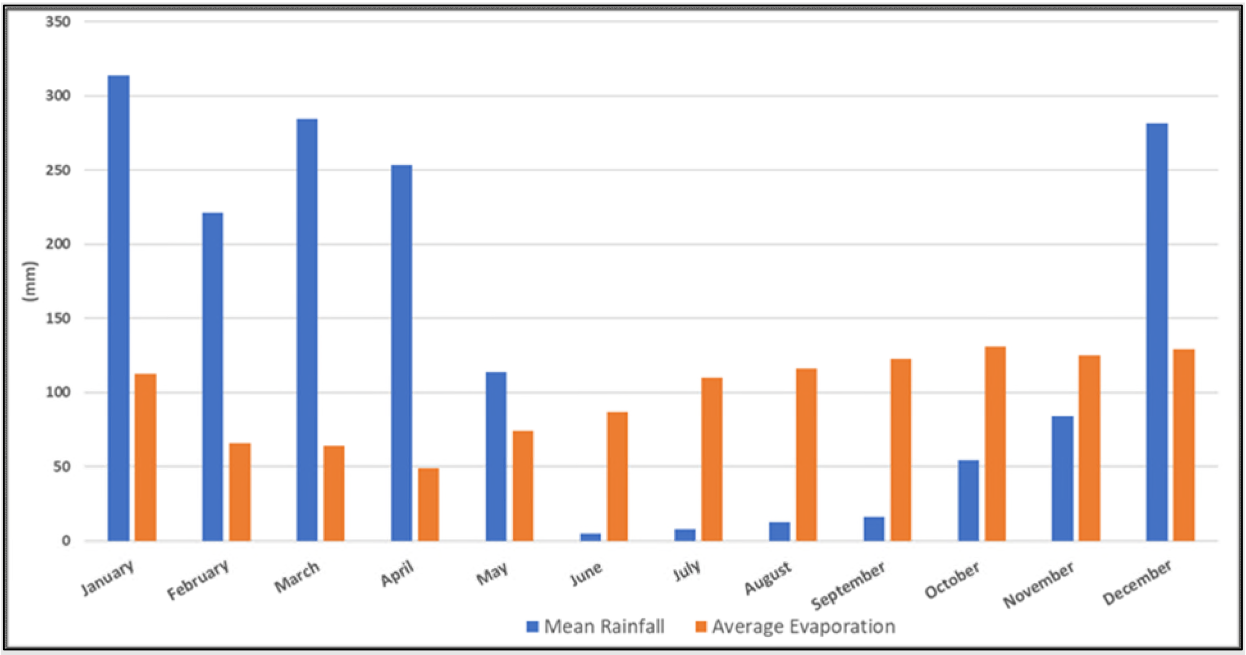


Figure 2 Average Monthly Rainfall and Evaporation for the Project site

The site has an overall average net positive water positive balance of 700 mm per year. The highly seasonal nature of the wet season results in generation of decant water and a requirement during the dry season to access stored water.

1.2.5 Site Topography and Drainage

The Project is located on the edge the Mahenge Mountains, which rise to 1500 m above sea level. The Project area is characterised by north-south orientated steep hills and valleys. It is well drained with rapid to moderate water infiltration rates and rapid run-off on mountain slopes. The mountains have linear slope gradients ranging between 70% to 85% while the U-shaped valleys are nearly flat with average slope gradient of about 18%.

The Mbaha River is a local watercourse that crosses the proposed Ulanzi mining pit and potential mill residue dry stack area. It joins the Luri River, which is one of the only permanent rivers in the region. Other local rivers include the Shilangazi (Epanko), Iroko and Mdindo Rivers.

The locations of the principal local rivers within the proposed mining area are shown in Figure 3.

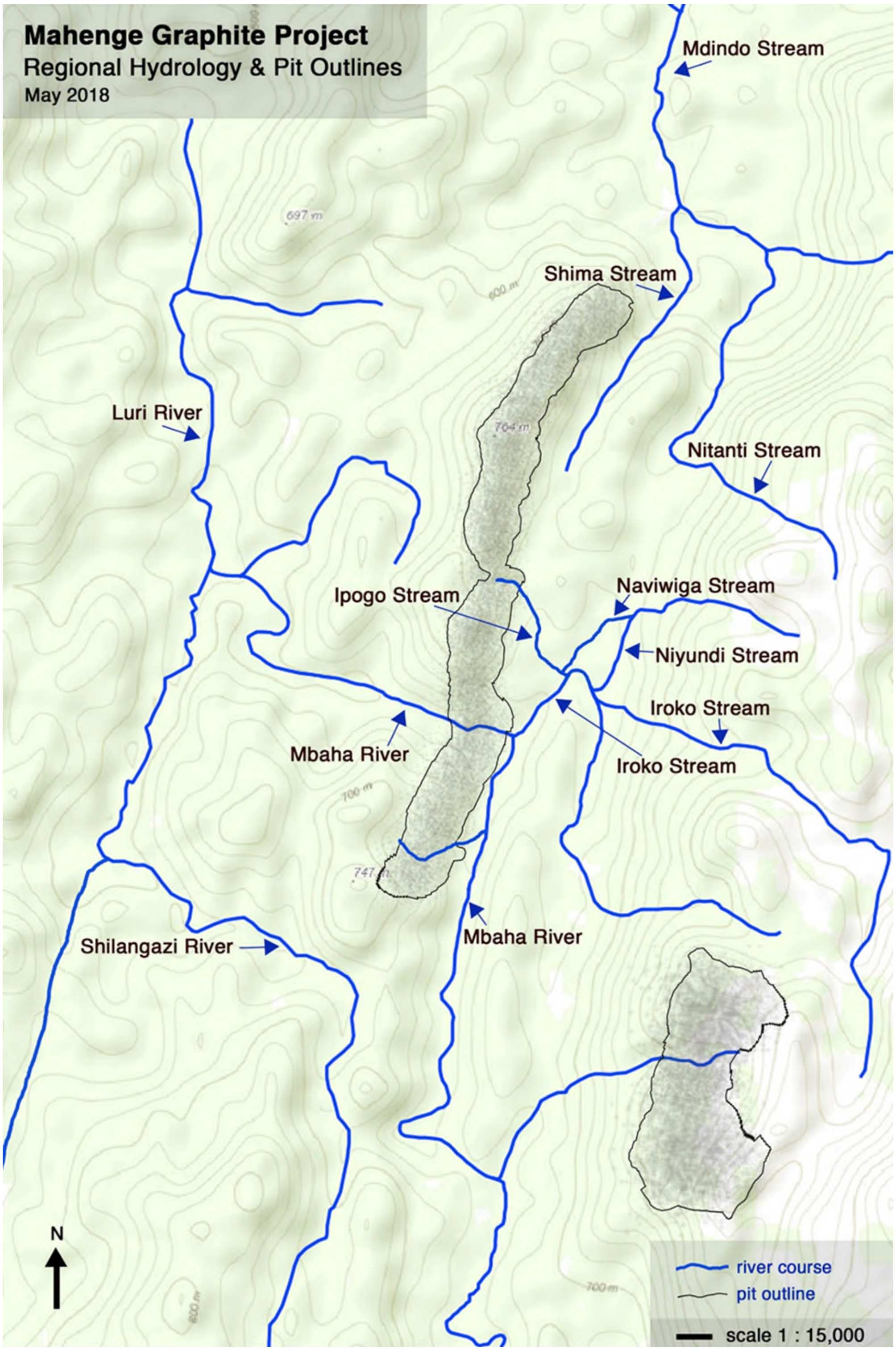


Figure 3 Regional Hydrology and Pit Outlines

1.2.6 Existing Infrastructure

The closest port is Dar es Salaam. The Project area is situated in the Morogoro district and is approximately 70 km to the south of the town of Ifakara which is close to the railway line running to Dar es Salaam. There is also an airstrip at Ifakara. Grid power is currently available from Ifakara from the Kidatu Hydroelectric Scheme. Basic lodge accommodation is readily available, and for the duration of the work programs described here the site staff stayed at the 'Mbega Hilltop Lodge'.

Communication with GSM cellular network is generally good with the Vodacom and Tigo networks providing good coverage in the Mahenge area.

1.3 Ownership and Leases

In February 2019 the Tanzanian Ministry of Minerals granted two contiguous Mining Licences (**ML**) ML611/2019 and ML612/2019 to Black Rock's Tanzanian subsidiary, Mahenge Resources Limited (**MRL**). Together the MLs covered c.20 km^2, including the area required for the Project. Each ML had a term of 10 years.

The December 2021 Framework Agreement between Black Rock and the Government of Tanzania provided for the Project to be conducted on a Special Mining Licence (**SML**), to be consolidated from the 2019 MLs, and to be issued to Faru, the joint venture company established by Black Rock and the Government.

On 5th September, 2022 the Ministry granted SML 676/2022 to Faru. Whereas the MLs each had a term of 10 years, the SML has a term of 26 years. The SML term is matched to the Project duration assuming Black Rock implements its 4-stage expansion strategy. Tenure is extendable on a "no default" basis. The area covered by the SML is 35 km^2. A map of the SML area is shown in Figure 4.

The Project includes two prospecting licences, PL 10427/2014 and PL 21382/2022. PL 10427/2014 is 100% owned by Black Rock through its Tanzanian subsidiary Mahenge Resources Limited. PL 21382/2022 is owned by Black Rock subsidiary Faru and is currently under application. Table 1 below summarises current licences associate with the Project.

The prospecting licence boundaries are depicted in Figure 5.

Table 1 Summary of Licence Tenure

Licence Type	Licence Number	Area (km^2)	Date Granted	Expiry Date	Status	Ownership (%)
SML	SML 676/2022	34.96	09.09.2022	08.09.2048	Active	Faru
PL	PL 21382/2022	108	-	-	Application	Faru
PL	PL 10427/2014	111.59	02.02.2014	01.12.2029	Pending Renewal	Mahenge Resources
Total		**254.55**				

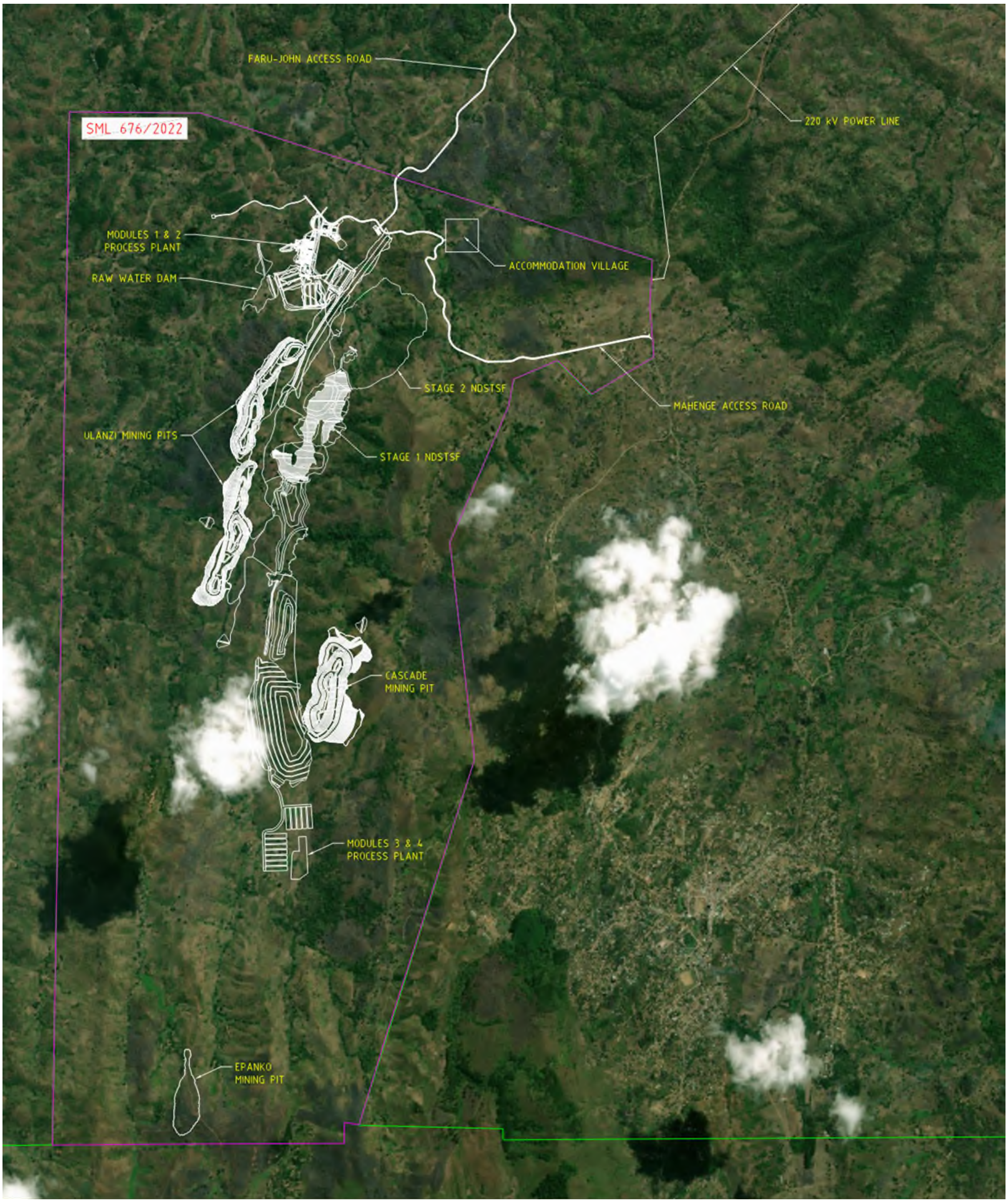


Figure 4 Map of SML Area

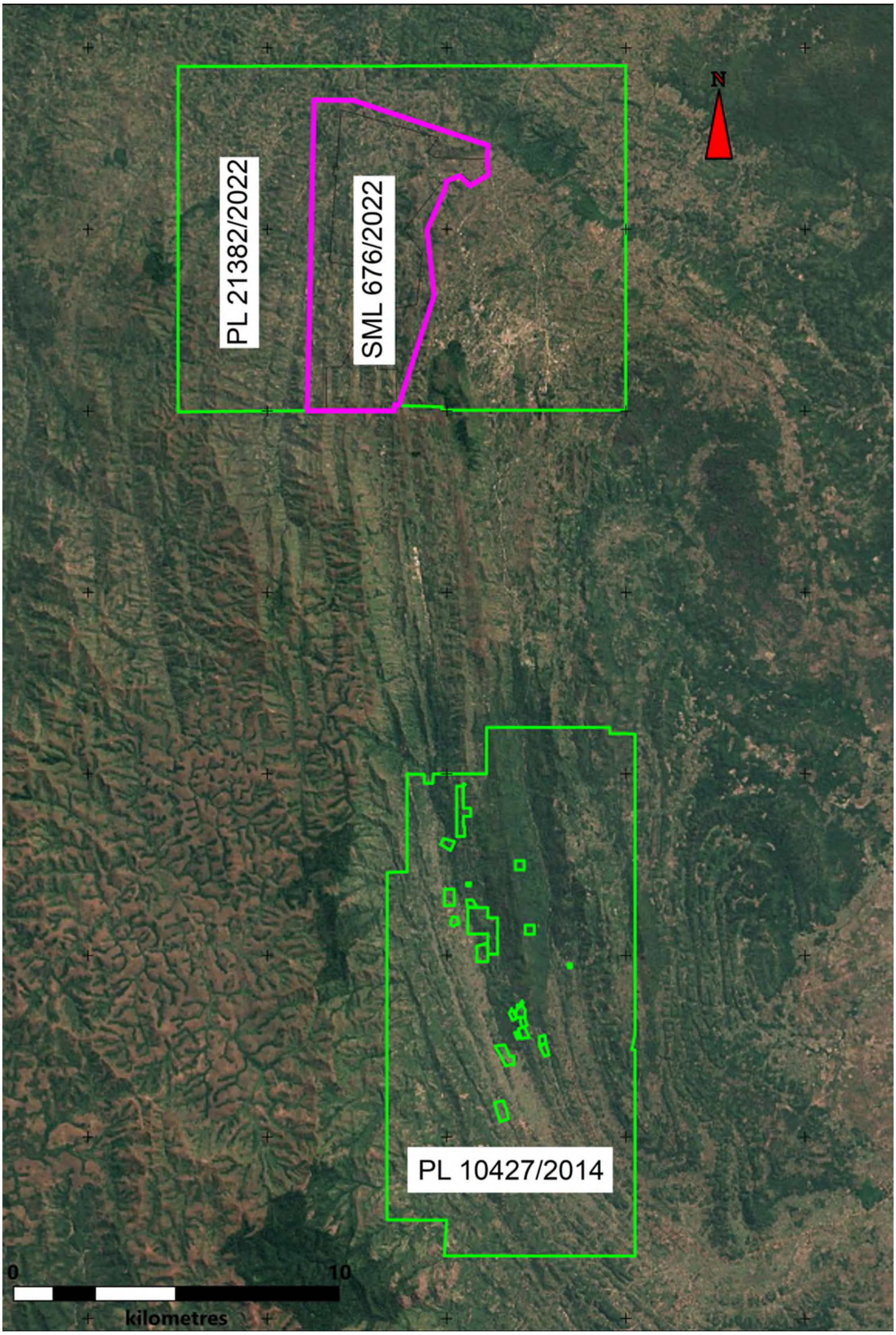


Figure 5 Tenements for Key Exploration Targets on the Mahenge Property

1.4 Geology and Resources

In mid-2021, Black Rock requested that Trepanier Pty Ltd update the Mineral Resources estimate for the Ulanzi Graphite Deposit which together with the Cascade Graphite Deposit and the Epanko North Graphite Deposit form the Project.

The Project is located within the rocks of the Proterozoic Mozambique Orogenic Belt that extends throughout eastern Africa. It consists of high-grade mid-crustal rocks with a Neoproterozoic metamorphic overprint. The Mozambique Belt is divided into the Western Granulite and the Eastern Granulite, the latter of which hosts the Project as shown in Figure 6. The two granulites are separated by flat-lying thrust zones and younger sedimentary basins of the Karoo.

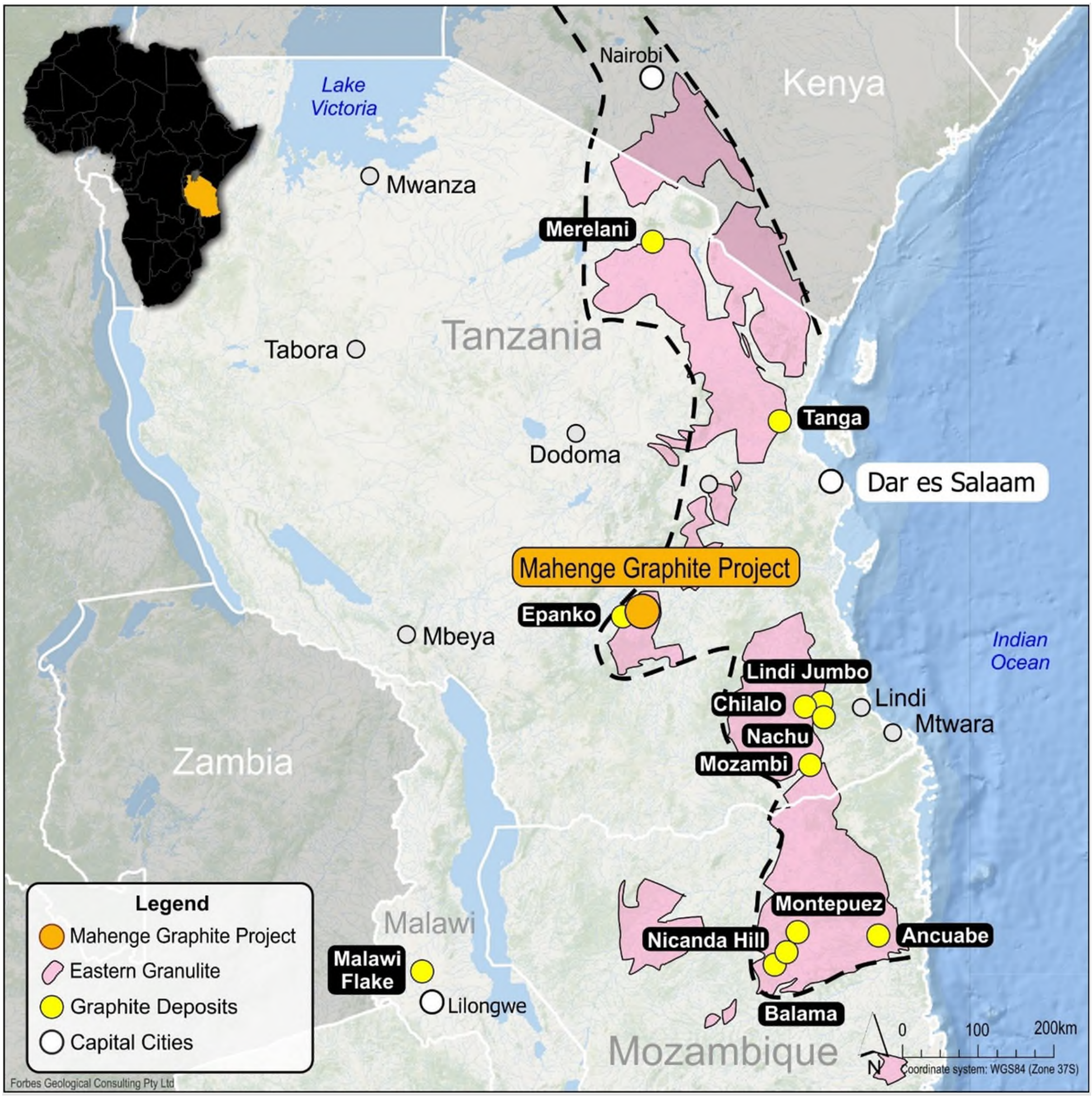


Figure 6 Geological Location of the Mahenge Graphite Project

The belt has undergone granulite phase metamorphism that has been subsequently retrograded to upper amphibolite facies. Structurally, the Mahenge region has undergone intense deformation forming a tight poly-phase sequence of marble, mafic and felsic gneisses and graphitic schists as part of the km-scale Mahenge Synform. The Mineral Resources are located on the western flank of the synform where the bedding and foliation dip between 60° and 80° towards the east. The units typically strike to the north and rotate to the northeast as they wrap around the fold nose.

The geological interpretation used in the Mineral Resource estimate was based on mapping of surface outcrop, multiple pits and trenches in conjunction with two phases of reverse circulation (**RC**) and diamond (**DD**) drilling. The 3D geological wireframes were created using well-defined foot-wall and hanging-wall boundaries based primarily on changes from graphite-dominated gneiss to mica or garnet gneissic units, which as expected also reflected a decrease in the graphite grade. The wireframes were extrapolated along strike to half-section spacing.

The latest resource model is based on information from 175 RC drill-holes for 15,280.7 m and 66 diamond drill-holes for 5,851.3 m (includes diamond drilled "tails" on existing RC drill-holes), all drilled by Black Rock. Black Rock has used 100 m by 100 m, 100 m by 50 m and 50 m by 50 m grid drill spacing, which has been sufficient to confirm geological and grade continuity. The drilling has been oriented perpendicular to the mineralisation or as close to perpendicular as possible subject to drill access.

Grade envelopes have been wireframed to an approximate 4% to 5% total graphitic carbon (**TGC**) cut-off, allowing for continuity of the zone. Based on visual and statistical analysis of the drilling results and geological logging of the graphite rich zones, this cut-off tends to follow a natural geological change and coincides with the contact between the graphite rich schists and the other host rocks (i.e. biotite schists and gneisses, garnet gneisses and occasional dolomites).

Black Rock completed specific gravity test work on 1,078 drill core samples across the Epanko, Ulanzi and Cascade deposits using hydrostatic weighing (uncoated). Of these, 587 are from within the modelled mineralised domains. Statistical analysis of the samples and comparison against depth and TGC grade identified a subjective relationship between bulk density (**BD**) and TGC grade. As such, the BD used for fresh material was the average for the deposits (90% confidence interval) at 2.73 t/m^3 and 2.74 t/m^3 at Cascade (with a standard deviation of 0.05).

Directional variograms were modelled by domain using traditional variograms. Nugget values for TGC are low to moderate (around 15% to 30%) and structure ranges up to 270 m. No top-cuts were required at Ulanzi and Cascade. Grade estimation was completed using ordinary kriging (**OK**). The OK estimates were constrained within the discrete wireframe domains for each deposit and generated with multiple estimation passes completed with expanded sample searches.

The Mineral Resource has been classified based on confidence in the geological model, continuity of mineralised zones, drilling density, confidence in the underlying database and the available bulk density information. The Mahenge Mineral Resources have been classified as Measured, Indicated and Inferred according to JORC (2012) and are shown in Table 2.

Table 2 Global Mineral Resource Estimate for the Mahenge Graphite Project

Prospect	Category	Tonnes (Mt)	Grade (% TGC)	Contained Graphite (Mt)
Ulanzi	Measured	19.6	8.8	1.7
	Indicated	46.2	8.2	3.8
	Inferred	48.7	7.8	3.8
	Sub-total	**114.5**	**8.1**	**9.3**
Cascade	Measured	12.1	8.3	1.0
	Indicated	20.8	8.3	1.7
	Inferred	27.3	7.9	2.2
	Sub-total	**60.2**	**8.1**	**4.9**
Epanko	Measured	-	-	-
	Indicated	17.6	6.4	1.1
	Inferred	20.8	5.9	1.2
	Sub-total	**38.4**	**6.1**	**2.3**
Combined	Measured	31.8	8.6	2.7
	Indicated	84.6	7.8	6.6
	Inferred	96.7	7.4	7.2
	Total	**213.1**	**7.8**	**16.6**

Note: Appropriate rounding applied

1.5 Mining

During the DFS, key mining items were addressed, and design was advanced from the PFS which included:

- Optimisation of the mining fleet;
- Resolution of the mining operating approach (owner mining vs contracting);
- Simplification of the haul road network;
- Mining below natural streams;
- Ore category simplification;
- Ore handling controls;
- Ore stockpile management;
- Dry mill residue and waste rock management;
- Responding to overall site layout changes and revised mining schedule; and
- Material sequencing to meet key requirements.

The Mineral Resource, pit inventory, pit design and staging, staged milling development and throughputs used in the DFS have remain unchanged since the updated PFS. For the DFS, the mining schedule was updated to reflect the improved haulage networks, changes in the site layout and revised mining equipment adopted for the study. The inclusion of the Epanko North (Epanko) deposit was included in this enhanced feasibility study.

The 95.5 million tonnes (**Mt**) of Mineral Resource in the mining schedule consists of 70.5 Mt of Ore Reserves and 25.0 Mt of Inferred Resource representing 74% and 26% of mill feed respectively. The inclusion of the Inferred Resource and its distribution particularly over the second half of the mine life, currently projected to exceed 25 years, is not a determining factor in the Project's viability.

Pit shells include some Inferred material of which there is a low level of geological confidence and there is currently no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

The underlying JORC Resource and Reserve assumptions remain consistent with that announced to the ASX on 3 February 2022.

The Resource and Reserves are outlined in Table 3.

Table 3 JORC Compliant Mineral Resource Estimate and Ore Reserve

Category	Tonnes (Mt)	Grade (%TGC)	Contained Graphite (Mt)
Ore Reserves			
Proven	0	0	0
Probable	70.5	8.5	6.0
Total Ore Reserves	**70.5**	**8.5**	**6.0**
Mineral Resources			
Measured	31.8	8.6	2.7
Indicated	84.6	7.8	6.6
Total Measured and Indicated (M&I)	**116.4**	**8.0**	**9.3**
Inferred	96.7	7.4	7.2
Total Measured, Indicated and Inferred (M, I&I)	**213.1**	**7.8**	**16.6**

The Project will be an open pit mining operation based on mining the Ulanzi, Cascade and Epanko deposits using a conventional truck and shovel operation. Mining commences at Ulanzi in Year 0 followed by Cascade in Year 2. In the early periods, widely available 20-tonne (**t**) rear tipper trucks will be matched to 45 t class excavators for site establishment and pioneering works. After Year 1, once sufficient workspace is established, and pit development has matured, the mining fleet will be upgraded to a larger 50 t class articulated dump trucks and 90 t class excavators to increase mine productivity and attain economies of scale. In additional to mining, the mining fleet will be required to undertake mill residue handling and ore stockpile rehandling activities on a campaign and as required basis. The mining fleet build-up from pre-production through the first five years is shown in Table 4.

An owner operator mining approach including drill and blast and pit dewatering, is adopted for the LOM study. Blast consumables will be sourced from a reliable and reputable supplier. Mine assay samples will be sent to the onsite laboratory for analysis and enable a quick turnaround for results. This follows the outcome of a vendor capability and capacity study conducted for a range of equipment suppliers and service providers during the DFS.

The open pit mining activities have been sequenced and scheduled by pit staging to optimise cashflow, provide a continuous ore feed to the processing plant, minimise stockpile inventory and provide a managed waste rock schedule for constructing key infrastructure.

Initial waste rock generated from pre-stripping and mining is to be used for constructing key infrastructure such as upgrading the haul road to the Ulanzi processing plant, run of mine (**ROM**) pad construction, causeway construction, reshaping drainage terrain and surface water embankments.

The remaining LOM waste will be diverted to a central waste dump to be located east of the Ulanzi deposit and west of the Cascade deposit.

Initial dewatered mill residue generated from the process plant will be deposited next to the dewatering facility. Dewatered mill residue will then be trucked to the final deposition site, levelled and stacked in layers with each layer roll compacted using impact rollers.

The total material movement over the LOM is shown in Figure 7.

Table 4 Mining Fleet Build-up First Five Years

Data	Pre-production	Year 1	Year 2	Year 3	Year 4	Year 5
Mining Shifts per Day	1	1	1	2	2	2
Mining – Ulanzi	Pre-strip	Operating	Operating	Operating	Operating	Operating
Mining – Cascade	-	-	Pre-strip	Operating	Operating	Operating
Mining – Epanko North	-	-	-	-	-	-
Processing	-	Stage 1	Stage 1 and 2	Stage 1, 2 & 3	Stage 1,2, 3 & 4	Stage 1,2, 3 & 4
Equipment – Make/Model						
Small Truck – Sinotruk 20 t	3	8	-	-	-	-
Big Truck – Bell B60E	-	-	11	15	17	17
Large Excavator – Caterpillar 390F	-	-	3	3	3	3
Small Excavator – Caterpillar 349D2L	1	1	-	-	-	-
Front End Loader – Caterpillar 980M	1	2	2	3	4	4
Drill – Epiroc FlexiRoc D50	1	1	3	3	3	3
Dozer – Caterpillar D7R	1	2	2	3	3	3
Grader – Caterpillar 140K	1	2	3	4	5	5
Water Truck – SinotrukWC	1	2	2	3	4	4
Maintenance Truck – Sinotruk with Crane	1	1	1	1	1	1
Service Truck – Sinotruk	1	1	1	1	1	1
Tractor – CaselH Optum 270	1	1	2	2	3	3
Compactor Towed – Broons HD1300	1	1	2	2	3	3
Compactor Self Propelled – Caterpillar CS-563E	1	1	1	1	1	1

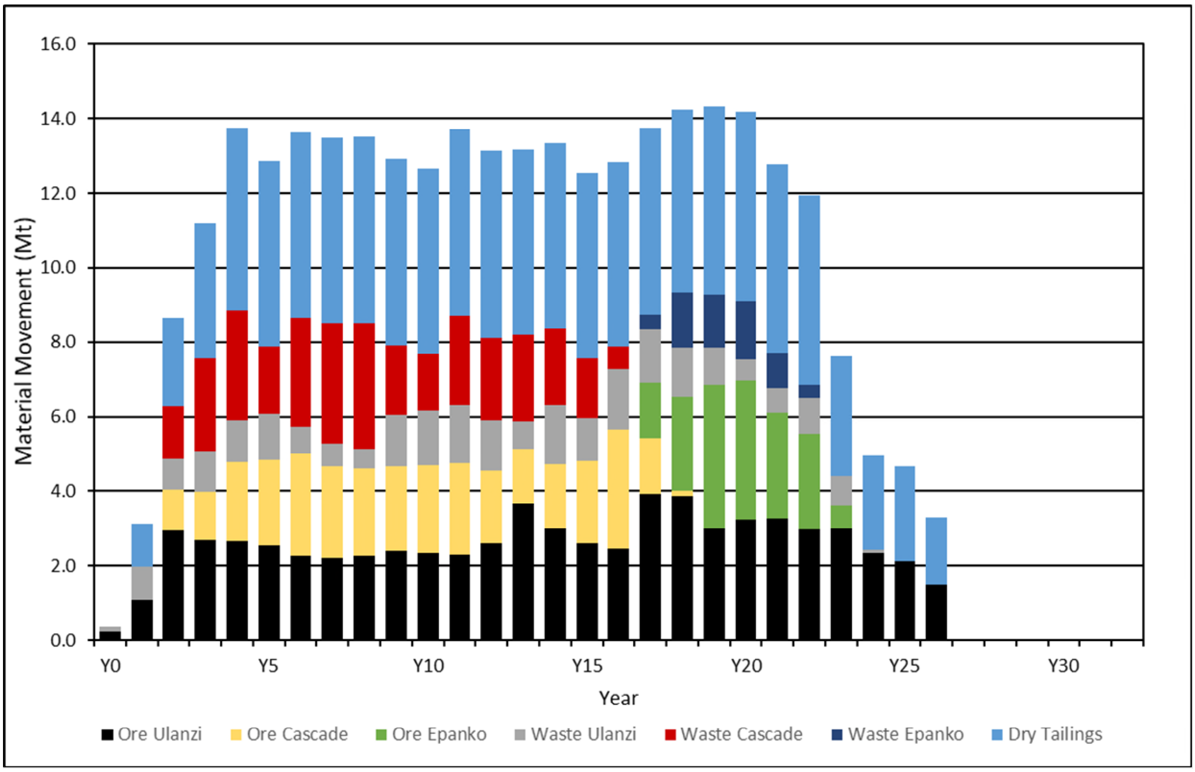


Figure 7 Total Material Movement

Scheduled mill feed sourced from the Ulanzi and Cascade deposits is reported below. Additional material has been scheduled from Epanko for the enhanced mine schedule however this material resides at the latter half of the life of mine. The Epanko material is currently not considered in the Ore Reserve.

Table 5 Sources of Mill Feed

Category	Ulanzi		Cascade		Epanko		Total	
	Mt	%TGC	Mt	%TGC	Mt	%TGC	Mt	%TGC
Proved	0	-	0	-	0	-	0	-
Probable	47.5	8.5	23.1	8.6	0	-	70.5	8.5
Sub-total	**47.5**	**8.5**	**23.1**	**8.6**	**0**	**-**	**70.5**	**8.5**
Inferred	9.4	6.6	5.7	8.7	9.9	6.7	25.0	7.1
Total	**56.9**	**8.2**	**28.7**	**8.6**	**9.9**	**6.7**	**95.5**	**8.2**

Consideration for inclusion of Epanko in the Ore Reserve will occur as part of the normal ore reserve cycle associated with statutory ore reserve reporting.

1.6 Metallurgy

The aim of testwork for the FEED study was to confirm that the optimised flowsheet was appropriate for processing ore from the Ulanzi deposit. This involved a variability testwork program that simulated the optimised flowsheet on samples representing the different lithologies present at Ulanzi, these were oxide, transition and fresh. The testwork confirmed that Ulanzi ores are readily upgradable to high-grade concentrates using the optimized flowsheet.

FEED testwork included the following;

- Comminution testwork conducted on variability samples collected from the Ulanzi deposit;
- Flotation testwork conducted on variability samples collected from the Ulanzi deposit using the optimized flowsheet;
- Sulphide removal testwork was successful in reducing the sulphide level of the fresh tailings material using flotation technology. This testwork was done to confirm that removal of significant amount of sulphides from fresh tailings is possible and not for implementation in the proposed design. This is because sulphide is present in only some parts of the fresh ore and that ore won't be processed at a significant level until after more than 10 years of operation so the sulphide circuit can be delayed until then;
- Tailings filtration testwork conducted on a representative blend of oxide and transition material to achieve the target tailings cake moisture content;
- Pilot plant testing of a 500 tonne sample using a process that simulated the optimized flowsheet; and
- Downstream processing of the pilot plant concentrates for supply to offtake partners.

Ore from the Cascade deposit wasn't tested in the FEED phase of the Project as the testing was to focus solely on Ulanzi to align with the mining production schedule.

Optimisation testwork and piloting in the previous DFS phase demonstrated that it was not warranted to incorporate a split flotation flowsheet for separate processing of larger and finer flakes when considering the financial and operability benefits of employing a single flotation-filtration-drying train. Therefore a single train flowsheet had been adopted as the optimised flowsheet.

The product specification targets are based on marketing feedback and testwork that indicated product graphite grades can be tailored to 95 or 97.5% TGC, by varying the number of stages of polishing and flotation. The flowsheet to produce 95 and 97.5% TGC concentrates was determined in lab scale optimisation testwork and confirmed with variability testwork and in a 500 t pilot plant.

Testwork showed that the graphite particle size distribution (**PSD**) is generally weighted towards the market-defined coarse product fractions, as opposed to the medium flake product fractions. Good alignment was seen between lab scale PSDs and pilot plant PSDs, with 70% of concentrate being regularly greater than 150 µm.

The comminution variability testwork showed that the ore was relatively soft, with low to medium abrasiveness, lending itself to a relatively low energy comminution circuit. No clay issues were identified.

The flotation variability testwork showed that target concentrate grades and recoveries can be achieved when feeding different parts of the Ulanzi deposit through the flowsheet.

Extensive tailings filtration testwork was undertaken in the FEED phase using a specialized filtration laboratory (RMS Corp) located in Vancouver. The work showed pressure filtration to be the appropriate technology to achieve the target cake moisture content.

Equipment suppliers were approached to confirm technology suitability and design data for a variety of unit operations including, thickeners (high rate thickener), filters (pressure filtration), dryers (column flash dryer) and dry screens (Plansifter Screen). Results of the equipment supplier findings include:

- The plant tailings thickens well in a high rate thickener;

- Pressure filtration is most suitable technology to achieve target cake moisture content for plant tailings;
- The concentrate thickens relatively well in a high rate thickener and filters effectively under pressure in a pressure filter;
- The concentrate can be dried using either a flash or rotary dryer and a trade-off study selected column flash dryer technology as the most appropriate for the duty; and
- Previous DFS testwork had shown that dry concentrate was reported to be difficult to screen by linear vibrating screens however an efficient split can be achieved, while plansifter screens had achieved better results requiring fewer screening units.

In the previous DFS phase materials handling testwork was undertaken by Jenike & Johanson (J&J) to define mechanical design criteria for solids handling components within the process plant. Results showed that the crushed ore exhibits a higher than normal propensity to hold-up and rathole. Chutes and bins have been sized in accordance with the recommendations from the J&J report.

The flowsheet was reviewed by an Independent Technical Expert (**ITE**) in September 2022. In the ITE's report it noted:

> *"The Ulanzi ores are readily upgradable to high-grade concentrates in a relatively uncomplicated flowsheet compared to other graphite projects"*

1.7 Process Plants

The Mahenge ore will be processed over the LOM using a four-stage approach where four process plants will be constructed, sequentially, in a modular format. Processing throughput will initially be 1 million tonnes per year (Mt/y) when Module 1 Process Plant is commissioned, increase to 2 Mt/y when Module 2 is commissioned, 3 Mt/y when Module 3 is commissioned and finally 4 Mt/y with the completion of Module 4.

The four stages will be developed over the initial years of the mine with the current mine schedule indicating a LOM of 26 years, after which the current defined deposits will be depleted. Module 1 and 2 Process Plants will process ore from the Ulanzi deposit while Module 3 and 4 Process Plants will process ore from the Cascade and Epanko deposits. Table 6 summarises the key parameters for all processing modules.

Table 6 Key Process Parameters for the LOM

Parameter	Units	Module 1	Module 2	Module 3	Module 4	Total
Commence Operation	year	1	2	3	4	-
Nominal Mine Life	years	-	-	-	-	26
Process Throughput*	kt/y	1,061	1,061	1,061	1,061	-
LOM Ore Treated	Mt	27.3	25.9	21.7	20.0	95.0
Average Feed Grade	TGC %	8.24	8.19	7.96	8.06	8.13
Recovery	%	92.8	92.8	92.8	92.8	92.8
Average Concentrate Grade	TGC %	97.3	97.3	96.1	96.1	96.8
Graphite Concentrate Production	Mt	2.15	2.03	1.7	1.6	7.4

*Note: Plant throughput is expected to run up to 1.15mtpa with oxide and transition ore feed during the first 5 years.

The focus of the FEED study was to develop the design of the Module 1 Process Plant.

The Module 1 Process Plant will be fed ROM ore at an average grade of 8.24% TGC and will recover approximately 93% of this graphite to produce approximately 87,000t of graphite products per year over the first 20 full years of production. Production is expected to be higher in the early years with an average of 93ktpa over the first 5 full years of production and an average of 89ktpa over the first 10 years of full production.

The Module 1 Process Plant is designed to produce various graphite products targeted at specific graphite end users. Each grade is classified into size fractions relevant to specific graphite end users. The process for the Module 1, 2, 3 and 4 Process Plants is illustrated in Figure 8 and summarised as follows:

- ROM ore is crushed in a three-stage crushing and screening plant;
- Crushed ore is milled in a primary milling circuit to prepare for flotation;
- Milled slurry is treated in a rougher flotation circuit that includes a secondary mill and scavenger regrind circuit to increase recovery;
- Rougher flotation concentrate is sent to the primary polishing and cleaner flotation circuit to increase concentrate grade;
- Secondary and tertiary cleaner flotation circuits further increase the grade of the concentrate depending on production requirements;
- Secondary or tertiary concentrate is delivered to the concentrate thickening and filtration area where the bulk of the liquor is recovered and returned to the process. The remaining moisture is evaporated in a flash dryer to reduce the concentrate moisture suitable for classification;
- Dry product is classified, and each product size bagged separately for transport to customers;
- Tailings from the flotation circuits are thickened and delivered to a tailings filtration plant to reduce the metallurgical moisture content to a target value suitable for dry stacking. Recovered filtrate is returned to the tailings thickener; and
- Filtered tailings cake is transported to a dry stack tailings storage facility.

Additionally, space for a future Sulphide Rejection Circuit has been allowed for in the Process Plant layout. This circuit will not be required during the first 10 years of operation because sulphides will not be present in fresh ore to any significant level until after Year 10. The Sulphide Rejection Circuit will include grinding and flotation processes to liberate and recover sulphides. Sulphide concentrate will be filtered for export and tailings from the circuit will report to the Process Plant tailings thickener and filtration plant for disposal.

The Module 1 and 2 Process Plants are located approximately 800 m due north of the Ulanzi open pit. The location for the process plants is in an area that is large enough to accommodate the Module 1 and 2 plants while minimising earthworks.

The Module 2 Process Plant duplicates much of the layout and equipment used in the Module 1 Process Plant. However, some equipment, such as the bagging plant, is shared.

The Module 3 and 4 Process Plants will be located approximately 800 m due south of the Cascade open pit and will duplicate the process and equipment used for Modules 1 and 2. It is intended that the layout of the Module 3 and 4 Process Plants replicate the layout of the Module 1 and 2 plants. However, this may vary somewhat because the terrain of the area designated for Modules 3 and 4 is different to Modules 1 and 2.

A process control philosophy has been developed for the Module 1 Process Plant. This will be similar for the subsequent Modules 2, 3 and 4. The process plants will be automated as much as practicable, to among other things, enable and control the production of consistent graphite products. Overall control will be managed from a central control room. The system will include remote capabilities to allow for off-site monitoring, analysis and troubleshooting.

Lessons from the 500t pilot plant trials and the straightforward circuit adopted for the Project, compared to similar projects, provide confidence that the plant ramp-up will be better than the McNulty series 1 curve, with 75% of design throughput achieved by month 3 and 100% by month 6 at the design product grade.

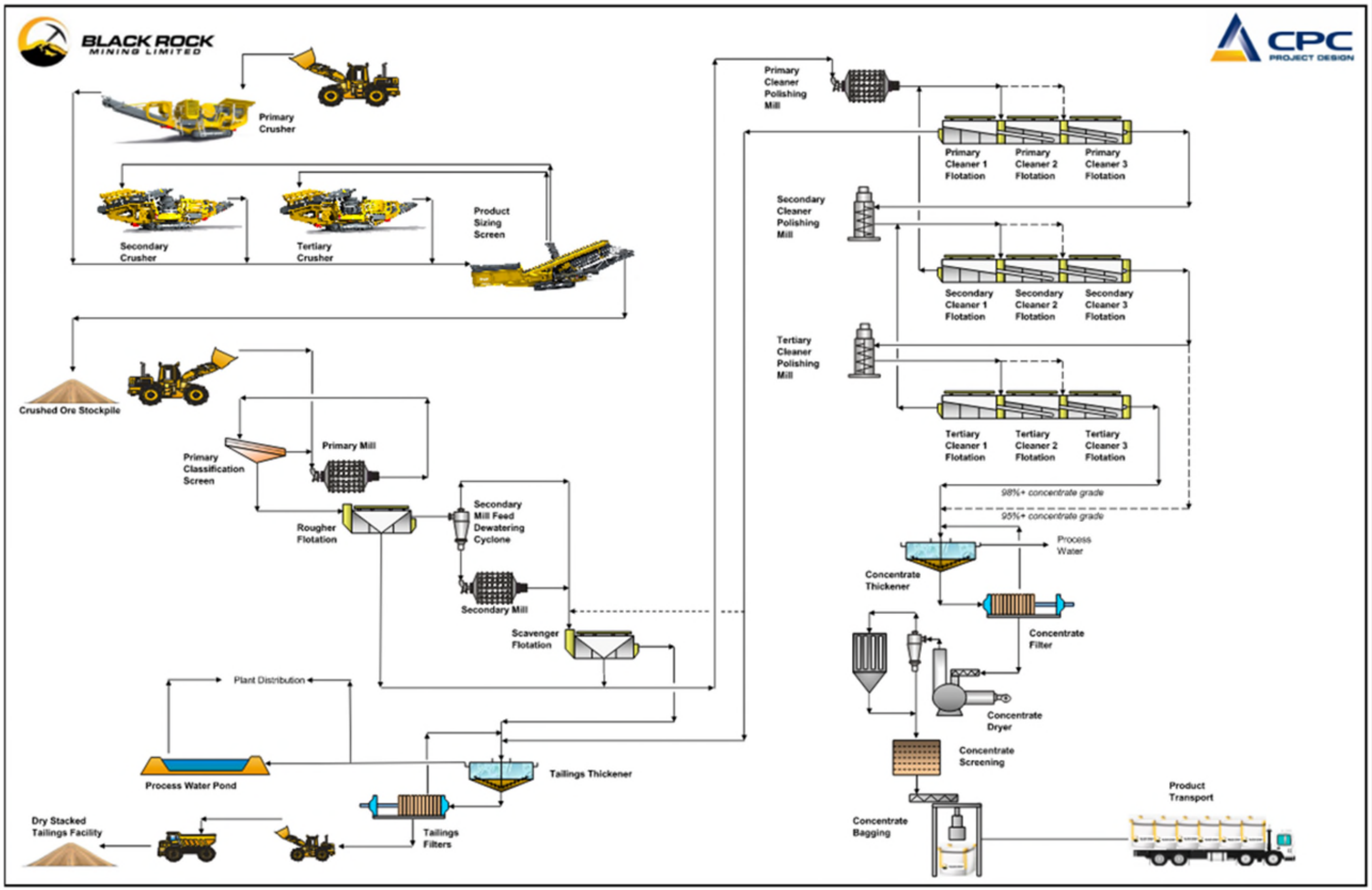


Figure 8 Simplified Process Diagram

1.8 Infrastructure

1.8.1 Site Layout

The Project infrastructure will consist of:

- Modules 1, 2, 3 and 4 Process Plants including reagents storage, product warehouses and truck loading areas;
- Power supply from the TANESCO grid system;
- Raw and process water dams;
- One shared ROM pad for Modules 1 and 2 and a separate shared ROM pad for Modules 3 and 4;
- Mined ore stockpiles;
- Mined waste dumps;
- Mine haul roads;
- Mining services area including administration buildings, workshops and staging area;
- Explosives magazine;
- Site administration area including offices, medical clinic, canteen, metallurgical laboratory, warehouse, workshops, core shed, etc;
- Security/gatehouse;
- Weighbridge;
- Tailings filtration plant – located near the tailings storage areas;
- Dry stack tailings storage areas;
- Access roads to and around the Project Site and within the Process Plants; and
- Accommodation Village.

The Module 1 and 2 Process Plants are located close to the Ulanzi deposit which is the first ore feed source. Most of the infrastructure is also located within this area as it is close to the Mine Site Gatehouse and Accommodation Village.

The future Modules 3 and 4 Process Plants will be located near the Cascade open pit (approximately 5 km from Ulanzi).

The site layout for the Project is illustrated in Figure 9.

Figure 9 Site Layout

1.8.2 Roads

Initial access to the Project Site will be via an existing public unsealed road. This road is approximately 4.5 km long and begins at the Makanga Junction on the Ifakara to Mahenge Road. It is currently a single lane road, approximately 3 m wide. It will be upgraded to a wider single lane unsealed road. The Accommodation Village is also accessed from this road.

Future access to the Project Site will be via an alternative road that follows the route of an existing dirt track. This route is approximately 8 km long, and a new dual lane unsealed road will be constructed. Discussions have been held with the Tanzanian Road Authority (**TARURA**). TARURA have reviewed the road route and indicated they will document and gazette it. The new road will be known as the Faru-John Road and will also be for public use. It will also open new areas suitable for resettlement and farming.

Other roads that will be created include:

- Process Plant and Mining Services Area access roads;
- Site administration and workshop access roads;
- Magazine access road;
- Mine haul roads; and
- Tailings filtration area access road.

1.8.3 Mining Services Area

The Mining Services Area will include:

- Mining contractor offices;
- Workshops consisting of converted freight containers with dome shelter roof between containers;

- Vehicle wash bays; and
- Ablution facilities.

A common Mining Services Area will service all Project stages.

1.8.4 Explosives Magazine

The Explosives Magazine is located northwest of the Ulanzi deposit and to the west of the Module 1 and 2 Process Plants. It is located within a blast radius of 500 m to achieve the require safety distances to all facilities. The magazine is accessed by a single lane unsealed road beginning near the entrance to the Module 1 Process Plant. This will allow explosives to be delivered to the magazine without going through the process plants and associated facilities.

The magazine consists of freight containers surrounded by security fencing. Explosives materials will be stored in approved containers. Initiation products will be stored in separate approved containers.

Explosives will be emulsion phase as this will eliminate the use of security sensitive ammonium nitrate and minimises potential for nitrate contamination of surface waters.

1.8.5 Accommodation Village

The Mahenge Accommodation Village will provide accommodation for 320 people in total.

Initially, the Village will be used to accommodate construction personnel during the construction of Stage 1. Then it will accommodate 120 operations personnel when Stage 1 is operating. Thereafter, it is expected that each Project stage will add 20 operating personnel resulting in a maximum of 180 operations personnel being accommodated.

The excess accommodation capacity, over and above that required for operations personnel, will be used for construction personnel during the development of all four Project stages and process plant modules.

1.8.6 Site Buildings

Site buildings will be constructed from a variety of methods to suit the application.

Modular buildings will be used for the following purposes:

- Site administration – Provides working space for management, supervision, geology, engineering, and other operations support staff;
- Security/gatehouse – Located at the entrance to the Mine Site. Entry to Site will be monitored with a facial recognition system and access card readers;
- Canteen – Provides dining facilities for all personnel working on Site. Initially, one canteen will be located at the Module 1 and 2 Process Plants. An additional canteen will be constructed for the Module 3 and 4 Process Plants;
- Ablutions; and
- Plant control room - Initially, one control room will be located at the Module 1 and 2 Process Plants. An additional control room will be constructed for the Module 3 and 4 Process Plants.

Concrete blockwork buildings will be used for the process plant electrical switchrooms.

Steel framed and clad buildings will be used for the following purposes:

- Product warehouse - will be constructed adjacent to the Module 1 Process Plant bagging building allowing for all product to be stored under cover as well as provide space for loading trucks. The building will be extended for the Module 2 Process Plant. An additional product warehouse will be constructed for the Module 3 and 4 Process Plants;
- Core shed – for cutting, processing and storage of geological core samples; and
- Plant air compressor shed – located within the process plants.

Converted freight containers with dome shelter roofs between them will be used for the following purposes:

- Plant warehouse;Plant maintenance workshop;
- Light vehicle workshop; and
- Reagents store – located within the processing plants; and
- Filtered tailings shelter – provides approximately 12 hours of storage of filter cake which will provide a buffer for the tailings dry stacking operations.

The Plant Warehouse, Plant Maintenance Workshop and LV Workshop will be located inside a fenced area that will be used for the storage of large equipment spares, or goods that cannot be stored in the Plant Warehouse.

An additional warehouse and workshop will be constructed for the Module 3 and 4 Process Plants.

1.8.7 Contractor Operated Buildings

The following buildings will be supplied and operated by contractors:

- First aid clinic – expected to be a modular building;
- Metallurgical laboratory – expected to be a steel framed and clad building; and
- Mining services area offices and workshops – expected to be a combination of converted freight containers and dome shelters.

1.8.8 Fuel Storage and Distribution

A Bulk Fuel Storage Facility (**BFSF**) (for diesel) will be located near the Mining Services Area. It will have a total storage capacity of 460,000 litres covering both operational and standby needs. The total capacity will provide for 4.7 weeks operation without refill. Refills will be undertaken on a 3-week cycle. Fuel will be delivered by a Tanzanian bulk fuel supplier using their existing fleet.

Diesel will be used for the following purposes:

- Mining and process plant vehicles;
- Flotation reagent emulsification (in process plants);
- Diesel powered concentrate dryer (in process plants);
- Raw and bore water remote pumping stations; and
- Standby gensets and miscellaneous diesel operated equipment e.g., diesel welders.

The BFSF will include separate off-loading and fuel bowser stations that will minimise the interaction between light and heavy vehicles.

An automatic vehicle identification (**AVI**) and management system will be installed to only allow authorised users to dispense fuel.

Diesel used for processing operations (product dryer and flotation reagents) will be pumped from the BFSF to a day tank located in the Process Plant. The diesel will then be pumped to the process equipment as needed.

1.8.9 Water Storage, Supply and Distribution

1.8.9.1 Raw Water

Raw water for the Process Plants will be supplied from the Raw Water Dam (**RWD**). The RWD will be located southeast of the Module 1 and 2 Process Plants.

The RWD will be supplied from rain fall (via its upstream catchment area), local streams and a bore field. Pumping stations will be located at the Mbaha River and the Mdindo Stream and will be used to convey water to the RWD. Similarly, with the bore field.

Initially, the capacity of the Raw Water Dam will be set to suit the requirements of the Module 1 Processing Plant. When required, the capacity will be expanded to suit the requirements of the Modules 2, 3 and 4 Process Plants.

The RWD is designed as cross-valley facility with a homogeneous embankment, and cut-off trench under the upstream zone of the embankment to capture seepage, geomembrane on the upstream face of the embankment to reduce erosion from wave action, finger drains on the downstream side of the embankment to counteract uplift pressures and enhance stability, and a spillway to allow excess water to overflow in a controlled manner.

Water from the RWD will be delivered to the Raw Water Tanks (**RWT**s) located in the Process Plants. Each RWT will have 12 hours of process surge capacity plus additional capacity for fire water.

A site wide water balance has been developed that accounts for all possible water sources and uses.

1.8.9.2 Potable Water

All potable water will be produced at the Accommodation Village and delivered to the Process Plant areas as required. Raw water for the Water Treatment Plant (**WTP**) will be sourced from the bore field system.

The WTP is a containerized package capable of meeting the expected potable water requirements for all four stages of the Project.

From the WTP potable water storage tank, the treated potable water will be delivered to:

- All Village buildings as required via the Village potable water distribution system;
- The Mine Site potable water storage tank for distribution to the Module 1 and 2 Process Plants; and
- A second Mine Site potable water storage tank for distribution to the Module 3 and 4 Process Plants.

At the Mine Site, potable water is distributed to all buildings where potable water is required, e.g., ablutions, laboratory, and the administration building, etc. It is also distributed to Process Plant safety shower ring main.

1.8.10 Fire Protection Systems

The Project has a fire detection and fighting system that will provide fire protection at each process plant.

1.8.11 Sewage Waste Disposal

A Wastewater Treatment Plant (**WWTP**) will be located at the Accommodation Village. It will be an activated sludge bed bioreactor that has been sized on peak flows estimated for up to 320 persons using the Village, or up to 300 persons using the ablutions facilities at the Mine Site.

Sewage generated at the Village will flow via gravity into two sewerage macerator pump pits, that will pump to a central collection pit, acting as a balance tank to feed the WWTP.

Sewage generated at the Mine Site will flow via gravity into several smaller pits that will be emptied as required by a vacuum truck and transported to the central collection pit at the Village.

Treated water from the WWTP will be delivered to a spray field.

Solids waste from the WWTP waste will be disposed of at either a municipal waste treatment plant or bagged for drying and disposal in an approved landfill site.

1.8.12 Solid Waste Disposal

All non-hazardous solid waste from the Mine Site will be transported to a geomembrane-lined landfill site located close to the Mine Site. Waste will be placed and compacted in layers, and each layer covered with a mixture of sand, gravel and topsoil. Runoff water will be diverted to a collection area.

An incinerator will be provided for disposal of Village waste.

Other hazardous wastes such as batteries, certain lamps, and pathological waste are expected to be generated in small quantities and will be sent to an authorised facility for disposal.

Recyclable wastes including scrap metal, glass, wood, paper and plastics will be reused within the Project to the extent possible, and the remainder sorted and transferred to external recycling facilities.

1.8.13 Hydrocarbon Waste Disposal

A tank will be provided at the BFSF for storage of waste oils and lubricants. From there waste oil and lubricants will be disposed by using them as a supplementary fuel in the process plant product dryers.

1.8.14 Power Supply

Demand and Sources

The total installed load for all Project stages/modules (processing 4Mtpa) is approximately 45.2 MW, with maximum demand of approximately 33.2 MW and average load of approximately 31.5 MW. Table 7 summarises the electrical loads for all stages/modules.

Table 7 Power Loads under Varying Conditions

Throughput	Installed Load (kW)	Maximum Demand (kW)	Average Load (kW)
Stage 1 (1 Mt/y)	13,010	9,029	7,727
Stage 2 (2 Mt/y)	22,656	16,682	15,848
Stage 3 (3 Mt/y)	34,363	25,075	23,821
Stage 4 (4 Mt/y)	45,222	33,185	31,525

Permanent power will be sourced from the Tanzanian national grid. Hydro power currently accounts for 39% of Tanzanian grid power and Black Rock expects the hydro share to increase above 40% following commissioning of the nearby Julius Nyerere Hydropower Plant (2,115MW) in 2024.

Access to grid power requires construction of the following infrastructure:

- A new 67 km 220kV transmission line between Ifakara and Mahenge;
- A new substation (the Mahenge Substation) near Makanga Junction on the Ifakara to Mahenge Road; and
- A new 7 km 33kV transmission line from the Mahenge Substation to the Project Site.

Collectively, the above-mentioned transmission lines and Mahenge Substation are referred as “the Grid Connection”.

Construction of the Grid Connection is planned to run 2 months ahead of first production of concentrate, and before then (for construction and process plant commissioning) the Project will use rented diesel gensets.

Grid Connection

Faru is in advanced discussions with the national utility, Tanzania Electric Supply Company Limited (**TANESCO**), regarding cooperation on development of the Grid Connection. TANESCO is a parastatal organization under the Ministry of Energy with the mandate to generate, transmit, distribute and sell electricity in Tanzania.

TANESCO is supportive of the Grid Connection development as, in addition to supplying the Project, the Grid Connection will supply local communities and other businesses in the Ulanga district. There is an existing 33kV line between Ifakara and Mahenge, however this has insufficient capacity to meet future demand, and the power which it provides already suffers from voltage drop. There is a desire from the Tanzanian Government (and from the local Mahenge community) to improve voltage supply in the Mahenge area and to provide reliable power supply to potential new industries in the area. TANESCO sees the Grid Connection as part of a wider rural electrification program, improving quality, reliability and security of power supply.

TANESCO is in the process of building a new substation at Ifakara, which will facilitate the Grid Connection.

The Ifakara Substation will receive power by teeing into the existing Kidatu - Kihansi 220kV transmission line. Both the Kidatu and Kihansi substations are on a 220kV link between the Dodoma and Chalinze substations, which are both on the 400kV backbone. The May 2022 ECG DFS notes that this will ensure a reliable power system for the Mahenge site. Additionally, Chalinze will be connected to the Julius Nyerere Hydropower Plant (**JNHPP**) (2,115MW) in 2024, which will provide a further boost to the power reliability in the region.

TANESCO completed a PFS on the Grid Connection and an environmental and social impact assessment (**ESIA**). TANESCO has received National Environment Management Council of Tanzania (**NEMC**) approval for the ESIA and has been granted an EIA Certificate for the Grid Connection.

Black Rock engaged ECG Engineering to conduct a definitive feasibility study (**DFS**) on the Grid Connection, and ECG completed this DFS in May 2022. The DFS estimates a schedule of 20 months including surveys, design, and commissioning. The DFS also estimates the variable tariff charged by TANESCO (before any discount) is TZS 152/kWh (equivalent to US$0.066/kWh @ 2,320 TZS/USD).

1.8.15 Communication System Infrastructure

A new mobile telephone tower will be built near the Mine Site Administration Area by one of the major Tanzanian telecommunications providers.

Communications to the Mine Site will be via a 24-core fibre optical cable from the mobile telephone tower.

Each building requiring communications will be equipped with a communications panel containing fibre-optic cable termination equipment and at least one Ethernet switch with Gigabit backbone capability.

Communications between the Process Plant and the remote areas (Mining Services Area, Tailings Filtration Area and Accommodation Village) will be via a 33 kV powerline optical ground wire (**OPGW**) system.

Wireless internet will be provided in the Administration Building, Mining Services Area, Accommodation Village and the Ifakara Office.

A UHF radio system will be provided at the Mine Site and the Ifakara Facility. The system includes base stations, handheld and vehicle radios.

A Private Automatic Branch Exchange (**PABX**) communications server will be provided in the Administration Building for the site Voice Over Internet Protocol (**VOIP**) telephone system. Telephones will be provided in the Administration Offices, Plant Warehouse, Mining Services Area, Ifakara Office, Process Plant Control Room and Process Plant Switchrooms.

1.8.16 Infrastructure Flood Protection

Hydrological studies have been undertaken to assess Project flood risk and to determine flood mitigation measures.

A hydraulic model has been developed to simulate the flood characteristics of the Project area for a range of flood events (10-year, 20-year, 100-year and 1000-year annual recurrence interval (**ARI**)) to determine site hydrology and drainage, assess the inundated areas, maximum flood depths and stream flow velocities.

The identified flood risks have been mitigated with a range of measures including drainage and diversion channels, levees and culverts and floodways across roads.

The most significant mitigation measure is the construction of a large drainage channel through the area occupied by the Modules 1 and 2 Process Plants. This channel has been designed and sized for a 1000-year flood event. This channel will eliminate flood risk of the plant area.

1.9 Tailings Dry Stacking

A mine surface water and groundwater management study was completed in 2017 to investigate methods of tailings disposal. The study concluded that up to eight tails storage dams would be required over the LOM which raised several economic, environmental and social risks for the Project. Subsequently, a further review in late 2017/early 2018 examined alternative approaches to tailings management and resulted in wet tails dams being replaced in the design with dewatering and dry stacking of the tails. The dry stack option results in:

- A significantly reduced water management risk as the site has an average net positive water balance and the use of dry stacking to store tailings significantly reduces complexity associated conventional wet tailings management systems;
- Less infrastructure requirements; and
- A development footprint that contains the tailings storage within three areas in the vicinity of the Ulanzi.

A risk assessment conducted in April 2018 confirmed that tails dewatering and dry stacking was the preferred design approach. The dry stack tailings storage facilities (**DSTSFs**) will be side-hill free standing structures.

The DSTSFs and water dams were designed for the Project as part of the DFS. The designs were prepared in accordance with:

- Tanzanian Regulations - Water Resources Management (Dam Safety) Regulations, GN 237, dated 2 August 2013; and
- ANCOLD (Australian National Committee on Large Dams) Guidelines (2012) 'Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure'.

The design objectives for the DSTSFs are:

- To maximise the storage of mine residue within a restricted footprint area. Studies were carried out to examine storage capacity at selected sites, stack geometry and the optimisation of the Project layout which had to incorporate various infrastructure;
- To provide adequate stack stability. Studies were conducted to examine stack geometry, various slope reinforcement methods and stack drainage;
- To reduce environmental impact due to seepage and dusting of the tailings;
- To provide a solution to excessive decant water management due to the overall average net positive water balance;
- To reduce the risk of catastrophic dam failure; and
- To minimize long term capital and operating costs associated with significant dam inventory.

In accordance with the Water Resources Management Regulations of Tanzania, the DSTSFs and water dams are categorised as Low 'C' for:

- Loss of life;
- Economic and social loss; and
- Environmental and cultural loss.

In accordance with ANCOLD (2012), the level of severity rating for the DSMRSFs and water dams is medium, and the consequence rating is 'Significant'.

The tailings will be thickened in the Process Plants and pumped to the Tailings Filtration Plant adjacent to the storage areas. After processing to reduce the moisture content of the tailings, it will be delivered to the DSTSFs by trucks.

There are three areas designated for dry stacking:

- The Stage 1 Northern DSTSF (Stage 1 NDSTSF), which will be commissioned first. This area will provide approximately 7 years of storage capacity. When completed, the Stage 1 NDSTSF will be covered by low grade ore stockpiles;
- The Stage 2 Northern DSTSF (Stage 2 NDSTSF), which will be activated when the Stage 1 NDSTSF is 'full'. This area will provide a further 13 years of storage capacity; and
- The Western DSTSF (WDSTSF) will be commissioned later in the Project life and store the final 6 years of tailings production.

The LOM dry stacks are illustrated in Figure 10.

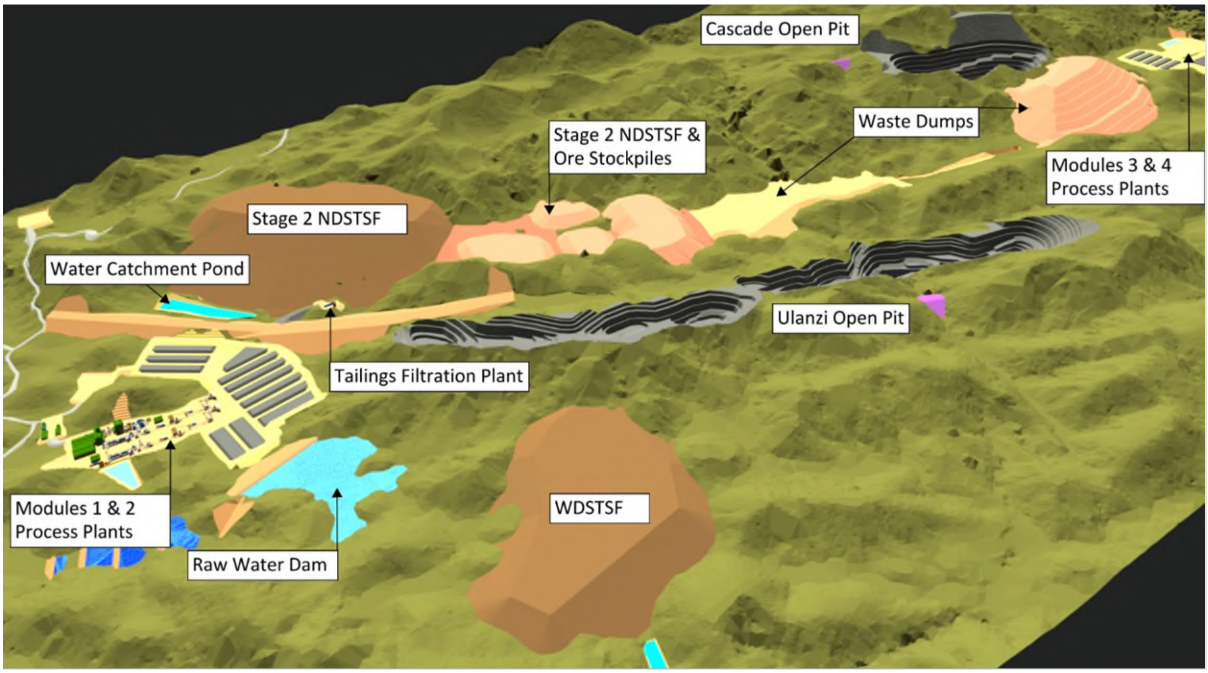


Figure 10 LOM Dry Stacks

All DSTSFs will accommodate approximately 92 Mt of tailings at an in-situ dry density of 1.7 t/m^3. Finals heights of the DSTSFs will be:

- Stage 1 NDSTSF – 55 m;
- Stage 2 NDSTSF – 140 m; and
- WDSTSF – 87 m.

Stacking rates will vary according to operational requirements.

Stability analyses have been performed to confirm overall stack stability and define the operating criteria which will govern the stacking operations.

The stacks will be built as a series of compacted terraces, nominally 5 m high.

Exposed perimeter faces of the stacks will be battered at a slope of 1V:2.5H, and covered with geotextile, mine waste, topsoil and mulch when the batters are completed.

During the wet season, stacking operations will need to be confined to smaller work fronts and may need to cease for short periods during storm events. To deal with such events, a temporary storage scheme will be used for:

- Short term storage of material that cannot be placed on the dry stack because of inclement weather, i.e. if the dry stack is 'shutdown'; and
- Longer term storage for material that is too wet to place on the dry stack.

The temporary storage area consists of one (1) 1.5-hectare storage cell, with space allocation and provision for an additional 1.5-hectare storage cell. It is lined with a waterproof bituminous geomembrane. Each storage cell provides at least 7 days storage capacity.

1.9.1 DSMRSFs Water Management

To control rainwater runoff, stack seepage, etc., the various DSTSFs will have liners, underdrains, surface drains and diversion drains. The extent of liners and drainage systems will vary from stack-to-stack and will depend on the terrain (where each stack is located) and the geometry of the stacks.

The drainage systems that capture contaminated water will report to strategically located catchment ponds. Water collected in the catchment ponds will be pumped to the Raw Water Dam.

The drainage systems that capture un-contaminated water will direct the water away from the stacks into local catchment areas.

1.10 Product Logistics

1.10.1 Product Logistics Overview

Concentrate product will be bagged and loaded into 20-foot shipping containers on site at Mahenge (20 x 1t bags in each container; 20t per container). The containers will be transported by road c.70 km to Ifakara, and then carried by rail c.350 km to Dar es Salaam port for export.

Product handling & logistics from the plant to the customer will be outsourced to a contractor, including unloading of the product containers from the rail line, delivery to the ship, stevedoring and all other associated port management. The logistics contractor will also be responsible for returning empty containers back to the rail line for shipping to Ifakara.

All costs associated with transport of the product from site to FOB (free on board) the ship are included in the operating cost estimate.

1.10.1.1 Ifakara facility

Faru will establish a container laydown yard and rail loading facility at Ifakara. A suitable site has been identified and Faru has commenced the process to secure the land.

Containers will be consolidated into shipments and dispatched as a total order at the Ifakara facility. Shipments are loaded onto rail cars at Ifakara and transported on the TAZARA rail line to Dar es Salaam which is located approximately 470 km northeast of the Project site. Figure 11 shows the location of the port in Dar es Salaam relative to the Project site along with other smaller ports in the region.

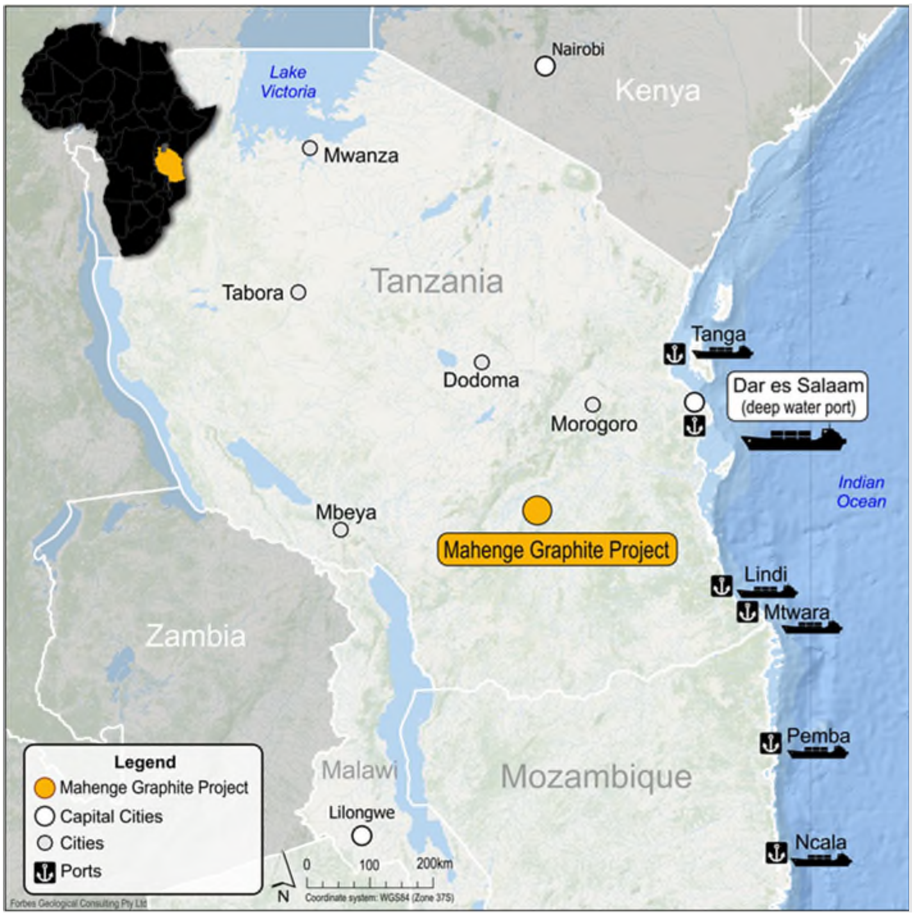


Figure 11 Port of Dar es Salaam and Smaller Ports Relative to the Project site

1.10.1.2 Rail

The rail line from Ifakara to Dar es Salaam is part of a longer, major railway connecting with Zambia.

Faru is in discussion with the Tanzania Zambia Rail Authority (**TAZARA**) regarding an agreement to secure access to rail capacity and rolling stock, and also in relation to construction of the rail siding.

1.10.1.3 Port

The port of Dar es Salaam was selected as the preferred port for export of Mahenge product (Figure 12). Dar es Salaam port is the principal deep-water port for Tanzania and handles approximately 95% of Tanzanian international trade. The port also serves the landlocked countries of Malawi, Zambia, Democratic Republic of Congo, Burundi, Rwanda and Uganda. It is the 4th largest port on the Indian Ocean coast of Africa.

The port is not seasonal with consistent annual operations. It is strategically placed to serve as a convenient freight linkage not only to and from East and Central Africa but also to Asia, Europe, Australia and North America.

Figure 12 Aerial view of Dar es Salaam port

Dar es Salaam port has a rated capacity of 4.1m dwt dry cargo and 6m dwt bulk liquid cargo. The port has a total quay length of approx. 2.6 km with 11 deep-water berths (draught 9.5 to 11.5m). The container terminal berths (berths 8-11) are leased to Hutchison Ports Tanzania - Tanzania International Container Terminal Services Ltd (**TICTS**) by the Tanzanian Port Authority (**TPA**). TICTS is a member of Hutchison Ports, the world's leading port investor, developer and operator.

The port's intrinsic capacity of container cargo is approx. 10m TEUs per annum. The container terminal has a total quay length of 540m. The port has both open and covered storage yards for containers.

Dar es Salaam is a net import port, and export capacity is expected to be available. Black Rock has engaged with the Tanzania Port Authority and TICTS to secure port capacity and has established that sufficient capacity exists.

1.11 Environment and Community

1.11.1 Environment

1.11.1.1 Environment and Social Impact Assessment (ESIA)

Black Rock is updating the ESIA for the Project. The impact assessment adheres to good international industry practice to enable international financing, including meeting:

- IFC Environmental and Social Performance Standards (2012);
- Equator Principles; and

- Other relevant international standards and guidelines.

The ESIA process constitutes a systematic approach to the evaluation of the Project and its associated activities. The process includes:

- Screening and scoping;
- Defining the base case design and Project alternatives;
- Describing the existing environmental and social conditions;
- Stakeholder consultation;
- Conducting an impact significance assessment, proposing mitigation and assessing residual impacts; and
- Management and implementation.

1.11.1.2 Vegetation, Flora and Fauna

The surveys of the Project conducted for the ESIA report that the vegetation categories classified within the Project footprint are well represented regionally.

An estimated 80% of the Project site has been cleared for farmland, although this figure includes abandoned and fallow fields. About 15% of the landscape in total is currently being actively farmed.

The consolidated vegetation surveys (across both wet and dry seasons) identifies seven broad habitat / vegetation categories, namely:

- Open woodland (with bamboo clumps);
- Wooded grassland;
- Riverine forest;
- Gulley forest;
- Dry forest;
- Miombo woodland; and
- Farmland with settlements.

A recent botanical survey identified the presence of 203 vascular plant species, including 90 tree species, 48 shrub species, 30 herb species, twelve (12) grass species, two (2) fern species, and one (1) palm species, from 63 families.

The Project area hosts a moderate number of native fauna species, including migratory and vagrant birds. As more native and natural habitat has converted to agricultural cropland overtime, the native fauna has become increasingly isolated and populations are diminished through human settlement and farming activity.

Hunting has resulted in larger ungulates (elephants, buffalos, etc.) becoming locally extinct; however, smaller, more tolerant species remain in some areas, including wild pigs and Sharpe’s grysbok.

1.11.2 Social factors

1.11.2.1 Population Centres

The nearest regional population centre is Mahenge, located approximately 10 km southeast from the centre of the Project. The population of the Mahenge district is around 10,000.

Within the Project envelope (Ulanzi area), the Mdindo village is located and has an estimated population of around 1,500 people. To the south, the village of Kisewe (est. population 990 people) is located about 1.3 km from the edge of the Cascade pit. The villages of Kwiro and Nawenge are located approximately 1.5 km to the southeast of the Cascade pit. These two villages are contiguous with the Mahenge township.

1.11.2.2 Land Ownership and Use

Land in the Project area is largely under customary ownership. There are no government reserves within the Project footprint, including nature reserves. Within the customary land tenure system, agricultural land (including fallow land) is held by individual households or families; other rural lands are communal community land. Other privately owned areas are typically associated with church (predominantly Catholic) and school buildings.

1.11.2.3 Socio-economic Context

The major ethic groups found in Ulanga District are Pogoro, Ndamba, Sukuma, Ngindo, Ndewe and Hehe (NBS, 2020a). Most people speak Kipogoro and Kiswahili.

Kiswahili and English are taught in the local (Kisewe) Primary school, with Kiswahili being used as the main written language in the villages. A secondary school is located at Nowenge, and also at Mahenge.

Ulanga District has a total of 28 health facilities, which are owned by private individuals (2), faith-based organizations (6), and the government (20). The health facilities include a district hospital, two health centres and 25 dispensaries. The nearest health facility from the Project is the district hospital in Mahenge.

Agriculture is the main source of income, with the majority of households undertaking subsistence agricultural activity. The crops grown include maize, rice, cassava, banana trees and vegetables. Involvement in waged labour is relatively low and centres around employment in small business or the artisanal and small-scale, gem stone and marble, mining sector. Individuals may also supplement income by harvesting building materials, specifically bamboo from community land and forested slopes and gather plants with cultural significance at certain times of the year, as well as foraging for medicinal plants, forest fruits and fungi. Some households within each hamlet undertake small scale business activities, including restaurants, maize milling, and the sale of local beer. There is no industrial activity in the Project area.

1.11.3 Resettlement Action Plan

On 18 July 2022 the Company commenced the Resettlement Action Plan compensation process. The total estimated cost of the plan is A$11,543,397 over four stages.

These stages comprise:

- Stage 1: Compensation payments for affected persons to relocate – Ulanzi Mine and Plant Area (A$2,589,087)
- Stage 2: Compensation payments for affected persons to relocate – Cascade Mine Area (A$6,629,476)
- Stage 3: Costs for removal of graves (A$344,503)
- Stage 4: Top up payments to align the compensation with the Equator Principles (A$1,980,331).

The company has commenced negotiations, signing contracts and making initial payments with affected persons under Stages 1 and 2.

1.11.4 Resettlement Village

A resettlement village will be constructed in accordance with the Resettlement Action Plan (**RAP**). The resettlement village will be constructed approximately 2 km north of the development and will be accessed from the Lower Access Road.

The resettlement village will consist of the following:

- 297 houses;
- Public primary school including kindergarten;
- 2 churches;
- Dispensary;
- Market place;
- Access roads; and
- Provision of utilities to the resettlement area.

1.12 Project Implementation

1.12.1 Staged Construction Approach

The Project will be executed in four stages to accommodate a staged development around the three currently identified deposits, Ulanzi, Cascade and Epanko.

Stage 1 will be the first Ulanzi process plant module capable of a nominal throughput of 1 Mtpa to produce an average of 87,000 t/y of graphite concentrate over the first 20 years full years of production. Stage 1 will include infrastructure to support Module 1 and Module 2 and will be the initial production plant.

Stage 2 consisting of the second Ulanzi process plant module is based on using the same design as the first module and will double the plant throughput, increasing graphite concentrate production to an average of 174,000 t/y. The Module 2 process plant will be commissioned approximately one year after Module 1.

The Stage 3 process plant module will be located near the Cascade deposit and will use the same design as the first module, tripling the Stage 1 throughput and increasing graphite concentrate production to a total average of 261,000 t/y. Stage 3 will include infrastructure to support Module 3 and Module 4. The Stage 3 process plant module will be commissioned approximately two years after Stage 1.

Stage 4 consisting of the second Cascade process plant module is based on using the same design as the first module and will quadruple the plant throughput, increasing graphite concentrate production to a steady state level of 347,000 t/y. The Stage 4 process plant will treat Cascade and Epanko ore and will be commissioned approximately three years after Stage 1.

1.12.2 Implementation Plan

The Project will be constructed by an integrated project team consisting of Black Rock executives in key roles, with assistance from experienced organisations providing skilled engineering, procurement, information management, construction management and logistics management personnel, and well proven project delivery systems. Higher risk and / or more specialised design will be contracted to industry recognised expert organisations.

Construction Management will be undertaken by an integrated team, which will be led by Black Rock's Construction Manager and consist of selected Black Rock personnel plus personnel from a suitably qualified EPCM services company which will also be providing construction management systems.

The rationale for using an integrated team approach is as follows:

- Promotes a flexible execution philosophy (EPC vs E/P/CM vs Self Perform work-packages);
- Support different risk mitigation options across packages;
- More transparency across costs, progress and risks (can re-allocate work if / as required);
- Allows Black Rock more control over change, direction mitigation strategies;
- Transparent and Standard Reporting across the Project;
- Black Rock retains Project history, technical knowledge. Builds capability for Operations and development of future modules; and
- Enables full compliance with Tanzanian local content requirements.

Black Rock has assembled an executive team with significant project development experience which is supported by the Black Rock Board of Directors which also has significant project delivery experience.

An operations team will be mobilised early in the Project development to implement the business readiness plan and ensure a smooth transition from construction to operations. The business readiness plan will include implementation of systems, recruitment and training of all operations personnel for the Project. The operations team will also support the integrated project management team.

1.12.3 Contracting Strategy

Black Rock's integrated project delivery team will compile and manage the contracting / procurement of scope packages. The formal tender and award process will be based on comprehensive contract / procurement packages, which must also comply with the Tanzanian local content regulations for in-country contracts.

The processing plant and associated infrastructure is well defined through FEED and detailed design, allowing Black Rock to:

- source lump sum contracts with suitable qualified and experienced (including African experience) companies;
- procure bulk commodities and process equipment (for installation by contractors), eliminating or minimising contractor procurement margins; and
- elicit performance guarantees;

1.12.4 Implementation Schedule

A master schedule has been developed for the Project covering all major activities from Project approval through to commissioning and hand-over to the operations team. It also includes key milestones for the Project, some of which are imposing constraints. The schedule will be extended to the next level of detail with inputs from contractors and suppliers once the Project is approved and contractors are appointed.

The schedule consists of a logic-networked critical path schedule based on project requirements and acknowledges current manufacturing periods for major equipment which may change due to global demand.

The schedule indicates a 20-month construction period for Module 1 from a final investment decision reflecting current supply chain disruptions.

1.13 Operational Readiness

1.13.1 Operational Readiness Purpose and Objectives

The purpose and objective of the Operational Readiness (**OR**) Planning (**ORP**) is to;

- Maximise start-up effectiveness;
- Reduce ramp-up duration;
- Optimise subsequent asset performance; and
- Reduce overall lifecycle costs.

and to ensure that;

- It is safe,
- All systems are functional, operable, and maintainable,
- Can be effectively operated by capable, trained, and motivated staff,
- It delivers on business case targets or better,
- It meets community and environmental requirements and regulatory standards and are consistent with the Equator Principles and IFC Standards.
- It provides a general level of stakeholder satisfaction against expectation, at an acceptable level of risk.

A comprehensive enterprise risk-based program was developed to ensure Black Rock has identified the requisite capability and systems to operate the Project successfully from day one and forms the basis of the current operations readiness program.

1.13.2 Company Values

A simple but powerful set of company values, known as the Reaching for the STARS values, has been firmly established within Black Rock and will underpin the operational strategy of the company.

Safety*: All of us have an equal right to go home safely.*

Team Work*: We achieve superior results by working together.*

Accountability*: We are accountable to our family, our community and our colleagues – do them proud, give it your best.*

Respect*: We are a diverse organisation who respect each other.*

Stakeholders*: Our stakeholders measure our success – our customers, our investors and our community - all have expectations of us.*

The company's values articulate the required behaviors expected from everyone who joins the Black Rock team and a cornerstone element to build an effective team and workplace culture.

Safety is the number one company value and priority for its people. Black Rock is committed to all its people having an equal right and expectation to go home safely after every shift. ISO, Australian and Tanzanian safety standards are being applied and embedded as the number one, non-negotiable priority. A Safety by Design process is being used in the Detailed Engineering phase to ensure safety is 'built in not bolted on'.

1.13.3 Operational Strategy

The operational strategy hasn't fundamentally changed from the 2019 eDFS, however since that time key roles have started to be filled i.e. Manager Operational Readiness. The early inclusion of this lead role has allowed advancement of the ORP to the next level of detail.

The Mahenge mine with be initially developed using a Mining Contractor under an owners team (i.e. Mine Manager, mine planning and technical services) who will support the contractor. The processing facility will be operated by a predominantly Tanzanian workforce and a Tanzanian leadership team (TLT), with minimal long-term reliance on permanent expatriate personnel. This strategy will create a high level of government and community acceptance and pride in the Project.

To ensure the Project is run safely and will reliably produce an on-specification product at nameplate capacity and cost from day one, a robust suite of management systems and operating standards are based on the ISO Standards and are being developed jointly by an early recruited leadership team and the Perth head office and implementation will commence prior to commissioning.

There will be early recruitment of key management and technical roles for the express purpose of developing and implementing the management systems, and then training the operating staff in the lead up to operations.

The design of the organisation structure and operational systems will be fit for purpose striking the right balance between the required level of governance and operating efficiency which will ensure sustained performance of safe, efficient, on specification operational delivery through the life of the Project.

1.13.4 Risk Based Approach

An operational readiness plan has been developed using a strong risk-based approach. The lesson from other projects is that where there is a failure to fully understand and prepare for operational risks early, projects are exposed to significant value loss arising from production shortfall, out of specification product, and cost increases, collectively referred to as "start-up dip". In addition, there is often a high level of safety and environmental incidents.

Project risk workshops identified the following key project risks:

- Failure to achieve Project financing;
- Failure to achieve Project permitting and land compensation arrangements;
- Project cost overrun or delay resulting in significant dilution of value for existing shareholders;
- Excessive working capital requirements for the Project and possible loss of market niche for Mahenge's high value graphite products, due to:

  - Inadequate orebody knowledge or unexpected complexity;
  - Inadequate operational preparedness and capability resulting in out of specification product;
  - Product logistics delays;
  - Sales and marketing issues; and
  - Production issues.
- Loss of government or community support for the Project; and
- Health, safety and environmental (HSE) risks.

These risks have been captured in a comprehensive and detailed risk register containing over 400 detailed risks, which are being actively mitigated as the Project progresses. Risk controls have been identified for all risks, comprising:

- Mitigation actions to be completed prior to commencement of construction and operations; and
- Operational standards and management systems which will govern operations and mitigate risks throughout the life of the Project.

Risk mitigation actions from the eDFS that have been completed to date:

- Clarification on the structure of, and resolution of the government 16% holding (free carry). Resulting in the creation of Faru Graphite Corporation entity (Black Rock 84%, Tanzanian Government 16%);
- Specific trade-off studies to ensure full anticipation of technical, quality, reliability and environmental issues have been completed during the FEED phase of work;
- Engagement of specialist consultants to advise on critical technical, marketing and government and community aspects of the Project;
- Design reviews to ensure engineering controls are included in plant design;
- Specific obligations to include in third-party contracts that will be critical to safety, environment, production and product quality;
- Identification and communication of key points of difference between Mahenge and its competitors in financial, labour and product markets and for the government and community;
- Definition of infrastructure upgrades and government co-commitments;
- Establishment of project controls for construction management; and
- Planned and targeted early recruitment and training aligned with the Project schedule.

On-going control of risk through the life of the operation will be through effective implementation of 44 standards and 86 management systems.

In particular, the controls for HSEQ risks are documented in a set of HSEQ policies, standards and systems which collectively define the Integrated Management System (IMS) which provides the framework for the operation is based on ISO standards (namely 9001, 14001, 45001). Current progress in their development has defined Policies and the Critical Risk Control standards to mitigate high risk activities.

1.13.5 Development of Operational Readiness Plan

These risk mitigation actions have been prioritised and sequenced into a comprehensive work plan for operational readiness. The work plan also includes completing the design of standards and systems in a prioritised way and implementing these as required for the Project construction phase and for the operations phase of the Project.

The operational readiness plan (ORP) has been developed and includes:

- WBS – integrated into Project WBS;
- Fully costed with contingency; and
- Schedule aligned and integrated with the Project schedule.

The ORP is also integrated with the:

- Project Execution Plan; and
- Commissioning Plan.

As part of the systems design work the following has been undertaken in preparation for the commencement of the Construction and Operations phases:

- Integrated Management System (IMS) has been developed based on Safety, Environment and Quality ISO Standards (9001, 14001, 45001);
- HSEC Policies developed and approved e.g. Fit for Work Fit for Life;
- Critical Risk Control Standards developed e.g. Confined Spaces Standard; and
- IT strategy and system architecture

An ORP forward work plan has been developed based on risk and priorities of the Project.

1.13.6 Implementation of the Operational Readiness Plan

The operational readiness plan will be implemented by an early recruited operations team, supported by expert consultants where required, and with a Project Services function to track and report on progress. The recruitment schedule is aligned with the operational readiness plan to ensure just-in-time on-boarding of key roles to complete work plan tasks. The clear remit of early recruited roles will be to build the organisational systems and to have their teams fully operationally-ready at start of operation.

1.14 Human Resources

Black Rock's purpose is to build a sustainable graphite business in Tanzania. As such the organisation design and the workforce resourcing phases have been clearly defined from project construction, through transition, and into operations (i.e. steady state production). Roles required to execute on the core functions and build out the Black Rock technical departments at each phase have been given due consideration, as has the 'non-core' functions that may be resourced externally and/or contracted to deliver.

The Black Rock organisational structure is shown in Figure 13. The workforce ramps up to 905 with all four (4) modules in production is shown in Figure 14. The structure outlines the roles that are likely to be performed by expatriates, nationals, and locals. Regardless of engagement type, employee or contractor, Black Rock aims for the whole workforce to have a clear understanding of their role clarity and how their individual contribution contributes to the team and organisational goals and success.

Building trust, nurturing diversity and inclusion, developing skills and experiences through learning and new opportunity, are critical in the development of the workplace culture and engagement of people at Black Rock.

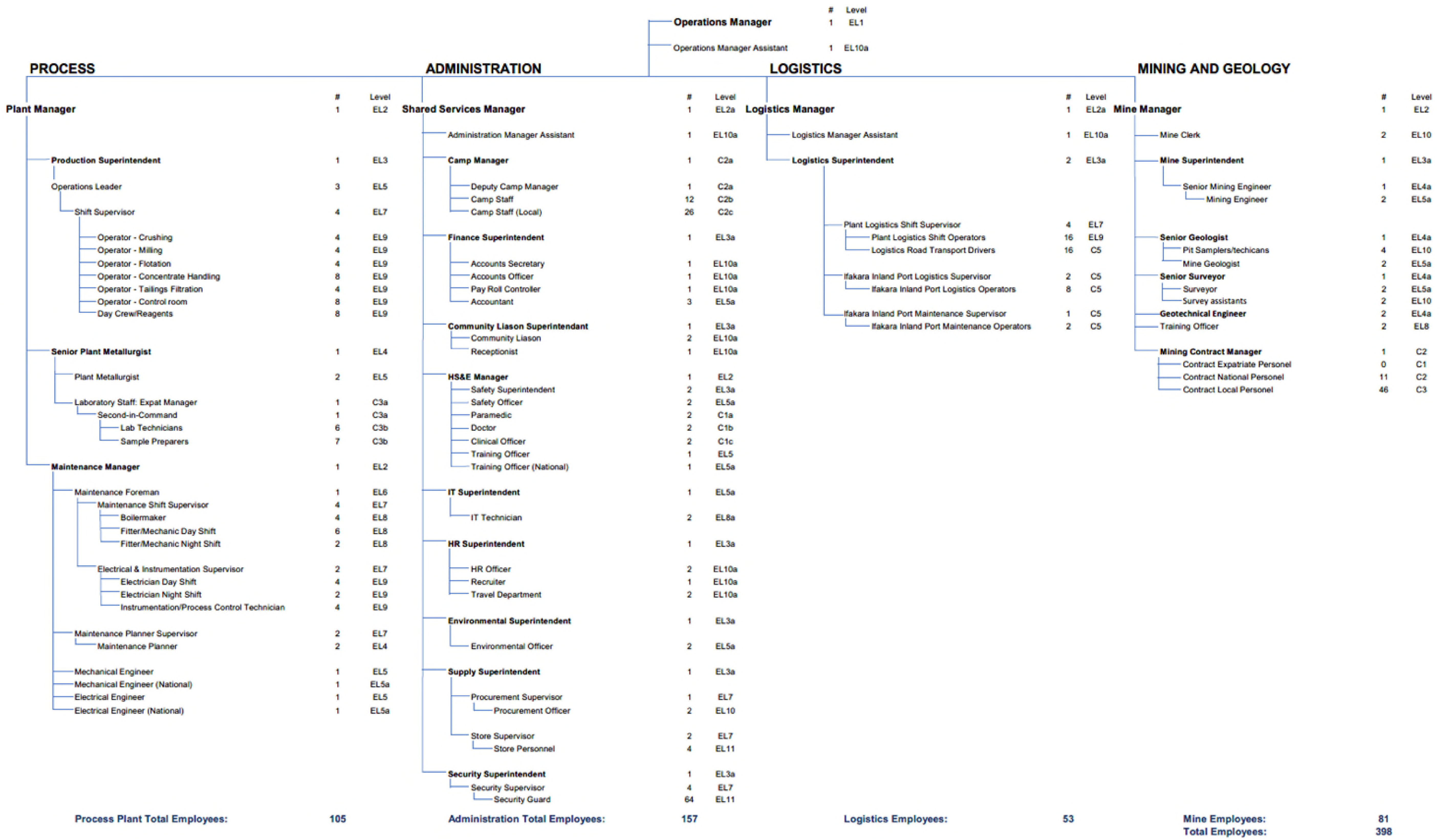


Figure 13 Stage 1 Organisational Chart

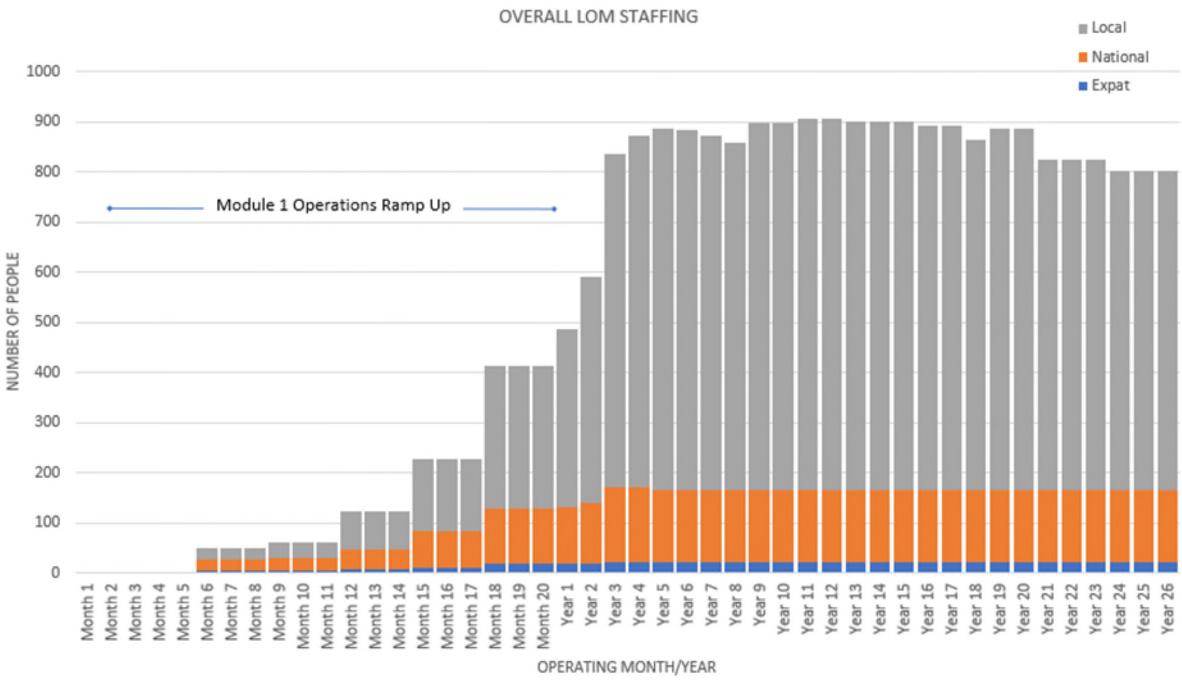


Figure 14 Production Labour Ramp

To deliver the right workplace culture, Black Rock will develop a common and shared ethos of success. The systems and processes to be developed will establish a common measure of success for the MGP through its people. This expectation will be communicated to candidates throughout the recruitment process and will be re-enforced during onboarding and throughout the employment relationship.

To encourage and establish a company culture that promotes and strives for sustainable engagement with our host communities, specifically in the areas of employment and skills training, either within the Company or with our local and regional contract partners

The workplace culture will be fundamentally underpinned by two key philosophies:

- To foster diversity and inclusiveness, where the differences between people are embraced and respected, with zero tolerance towards discrimination, harassment, sexual harassment, physical violence, bullying, vilification, and victimization; and
- To encourage and strive for sustainable engagement with our host communities, specifically in the areas of employment and skills training, either within the company or with our local and regional contract partners

Where local talent is not available in the first instance and national or international talent is required, Black Rock's commitment is to develop locals and nationals to perform the roles in the longer term. The company will also look to implement trainee, intern and apprenticeship programs in the medium to long term to deliver on this commitment.

The expectations of every single person employed or engaged by Black Rock is for them to be a valued team member, committed to safe behaviour, acting responsibly and with competence, fairness and respect. Black Rock is committed to having people in permanent roles wherever possible and developing talent in the region and nationally. Black Rock will implement a robust program to manage talent, career paths, internal mobility and localisation. This is a key component of the company's commitment to 'employ local' wherever possible.

Black Rock will comply with (and seek local legal advice as appropriate) the *The United Republic of Tanzania Employment and Labour Relations Act [Cap. 366 R.E. 2019]* and the published/ subsequent Government Notices for Employment and Labour Relations Regulations. All employment conditions and leave provided to Tanzanian nationals will align and conform to the statutory requirements and all People processes, and systems will be compliant with the laws of The United Republic of Tanzania.

1.15 Corporate Social Responsibility (CSR)

Black Rock commits to working with its local government stakeholders and communities within which it operates, to act as a good corporate citizen.

The company will undertake regular stakeholder engagement to ensure alignment with the Ulanga district guidelines on CSR, and develop, in time, targeted strategic commitments into social and community enhancement programs.

1.16 Operating Cost Estimate

An operating cost estimate (OPEX) was developed for the Project and is presented in US dollars (US$) using prices obtained in, or escalated to, the second calendar quarter of 2022. The estimate has an accuracy of ±10% and were developed by CPC Project Design Pty. Ltd. (CPC), using inputs from other study sub-consultants and Black Rock where appropriate.

The estimate covers all costs associated with mining, processing and transporting the final concentrate to end users and includes general and administration (G&A) costs associated with the Project.

The costs exclude all taxes, permitting costs, corporate administrative costs and other government-imposed costs unless otherwise noted with no allowance for escalation or inflation.

Mining costs have been based on the expected mining schedule tonnage movements and all in mining cost developed by Black Rock from first principles based on quotes obtained from contract mining service providers. This cost includes all labour and fuel costs based on contract mining.

The processing cost estimate is based on new processing facilities for graphite production built in four modules consisting of near identical processing trains staggered in development with each module bringing on a plant feed throughput of 1 Mt/y beginning with Module 1 in year 1, followed by Module 2 starting in year 2, Module 3 in year 3 and finally, Module 4 in year 4.

Labour workforce requirements have been estimated for direct maintenance, operations, administration and logistics personnel. Labour salaries and on-costs were provided by Mercer.

Electrical power draw quantities were derived from the mechanical equipment list and are based on utilisation and expected demand. Grid power will be provided by a 220 kV transmission line developed by the Project. Cost for purchasing grid power and associated tariffs has been provided by TANESCO, the in-country provider of power.

Diesel fuel consumption is based on estimates from suppliers for equipment and mobile fleet. Diesel pricing was quoted by a local provider.

Maintenance costs are taken as a percentage of initial equipment capital costs. This accounts for replacement of wear parts and other miscellaneous components for the equipment.

Administration costs includes general site costs, insurances, vehicles, Ifakara operating expenses and other ancillary costs associated with operating the Project. Contracts for operation of the camp, medical and first aid facility and laboratory have been sourced and updated budget pricing was obtained for use in the opex.

Product logistics will be managed by Black Rock with the movement of containers from the rail terminal in Dar es Salaam to the site via the Ifakara freight terminal and back outsourced to a logistics provider.

The operating cost summary for the first 10 years of operation is show in Table 8 .

Table 8 Summary of Average Operating Costs Over the first 10 years

Area	Average Over First 10 years
	US$/t graphite product
Mining	191
Processing	143
Administration	14
Logistics, Transport & Freight	118
Total	466

1.17 Capital Cost Estimate

The capital cost estimate (capex) has been compiled by Professional Cost Consultants (PCC) and is based on the design, supply, fabrication, construction and commissioning of a new graphite process plant in Tanzania and includes supporting infrastructure and indirect costs. In addition, mine establishment and infrastructure costs are included.

The capex covers the design and construction of the Project process plant and all associated infrastructure, equipment and ancillaries. The estimate has a base date of Q2 2022 and is reported in US$. No allowances were made for the costs of escalation, pre-implementation studies, financing, taxation, mining rights, rehabilitation and closure.

The capex has been classified as a Class 3 estimate with an accuracy of ±10% as defined by AACE International. The estimate relies predominantly on supplier and/or contractor quotations and/or tenders. Material take offs (MTOs) for earthworks, structural steel, platework, concrete, piping, valves, instrumentation and cables were developed by CPC to determine quantities for estimating based on FEED.

Contingency was determined by developing a probabilistic contingency risk model using the Oracle "Crystal Ball" software package. The P50 Probabilistic Value was selected as the capex contingency allowance.

The capital cost required to develop the Project is estimated at US$182 million (M) for Module 1.

Where appropriate, capital costs were deferred and included in the sustaining costs of the Project. This applies to construction of Module 2, Module 3 and Module 4 processing facilities, tailings dry stacking lifts, final pond embankments, storm water embankments and mobile equipment addition/replacement.

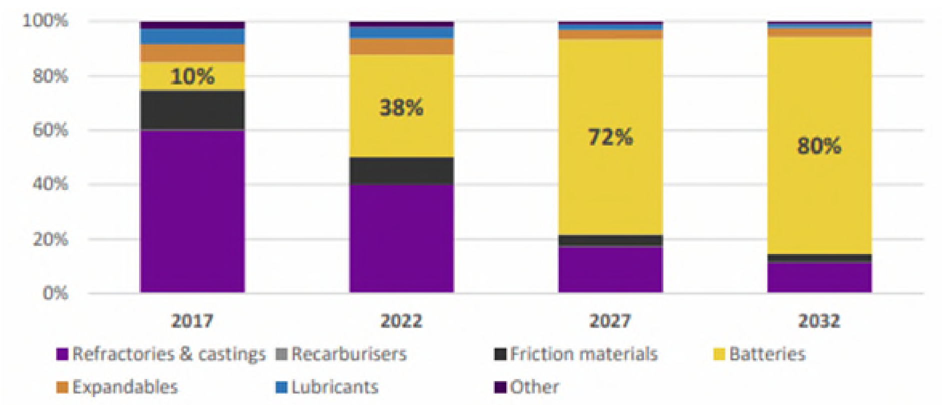
The estimated capital costs for all four Modules are reported in Table 9.

Table 9 Total Project Development Capital Costs

Area (WBS Level 1)	Stage 1 US$M	Stage 2 US$M	Stage 3 US$M	Stage 4 US$M	Total US$M
Mining	11	-	-	-	11
Ifakara	1	1	0.4	0.2	3
Infrastructure	29	8	12	10	59
Process Plant	70	64	68	59	261
Site Support (Temporary Services)	1	1	1	1	4
Indirects	6	9	9	9	32
Owners Costs	42	7	7	7	64
Contingency	22	18	20	17	76
Total	**182**	**107**	**117**	**104**	**510**

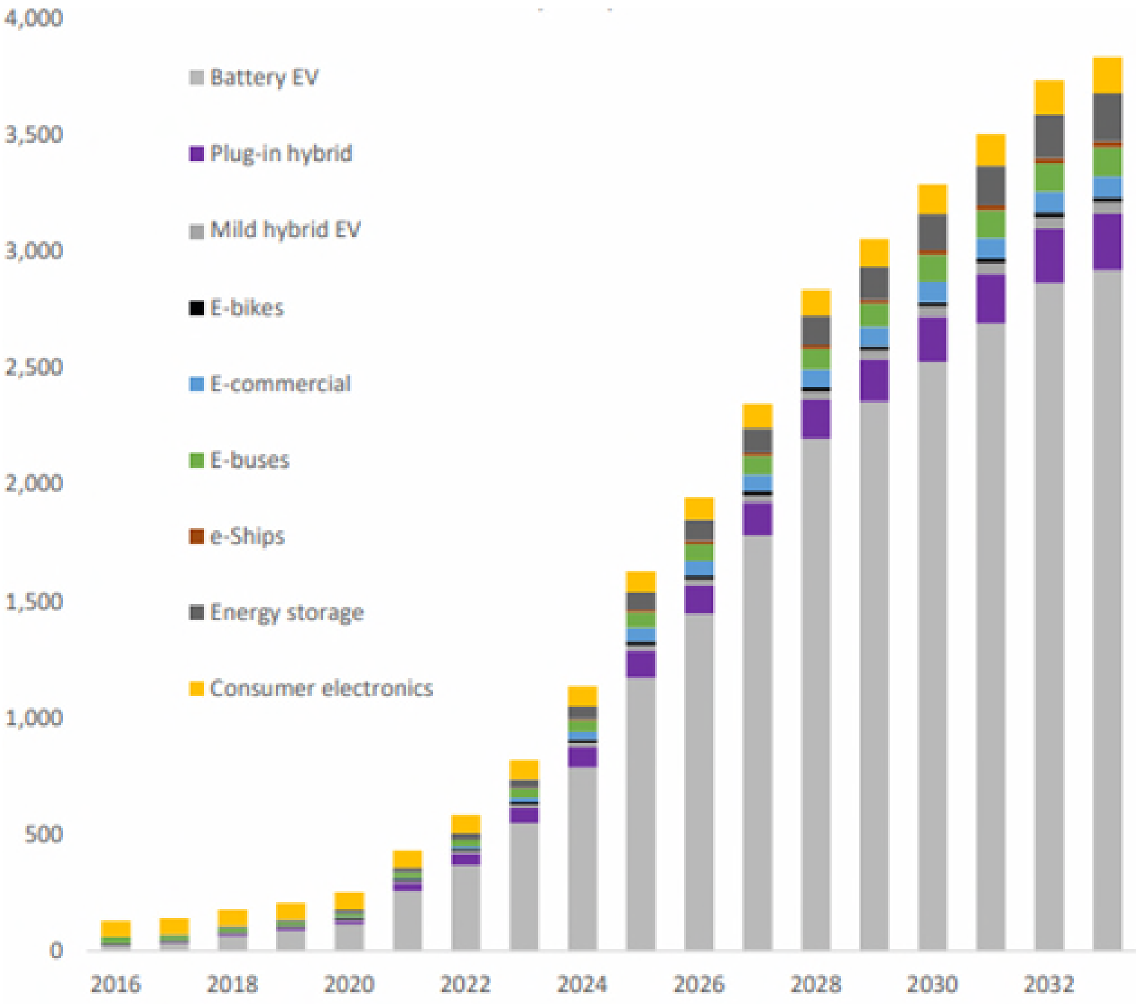
1.18 The Graphite Market

Graphite is an industrial mineral with a wide range of traditional end uses. Historically, the dominant end use for graphite was in the steel industry. While the steel industry remains an important end market, the fastest growing use of the graphite is in lithium-ion batteries in anodes. Lithium-ion batteries are expected to become the dominant end use for graphite by 2025, primarily driven by growing demand for electric vehicles.



Source: Fastmarkets

Figure 15 Natural Graphite Demand by Application

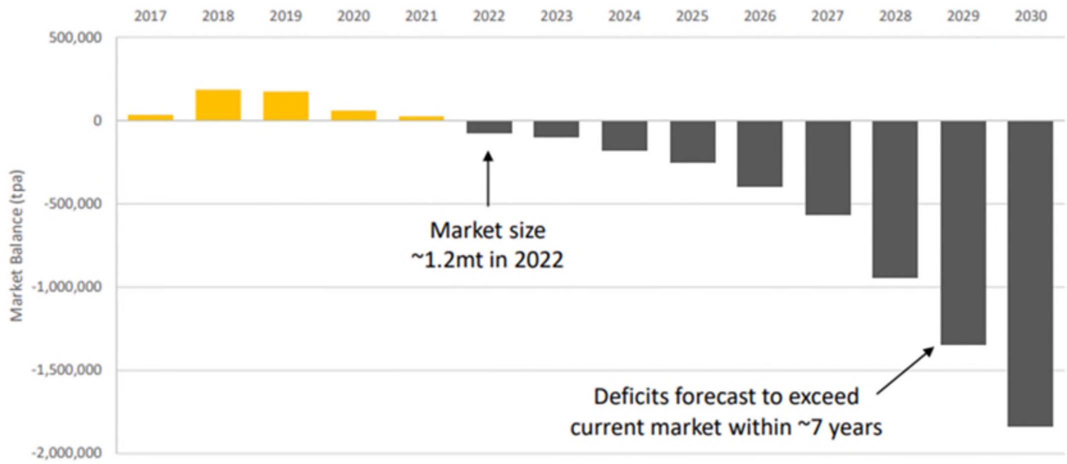


Source: Fastmarkets

Figure 16 Forecast Demand for Battery Capacity by Application (GWh)

On average, lithium-ion batteries contain 7-10x more graphite than lithium by volume and as the mainstream adoption of electric vehicles gathers pace, several experts are forecasting substantial deficits in graphite markets.

The size of the natural flake graphite market in 2022 is a relatively modest ~1.2mt and Benchmark Mineral Intelligence expects substantial graphite supply deficits over the next few years which provides a very promising outlook for graphite prices. By 2029, Benchmark expects the market deficits to exceed the entire graphite supply today, as highlights in Figure 17 below:

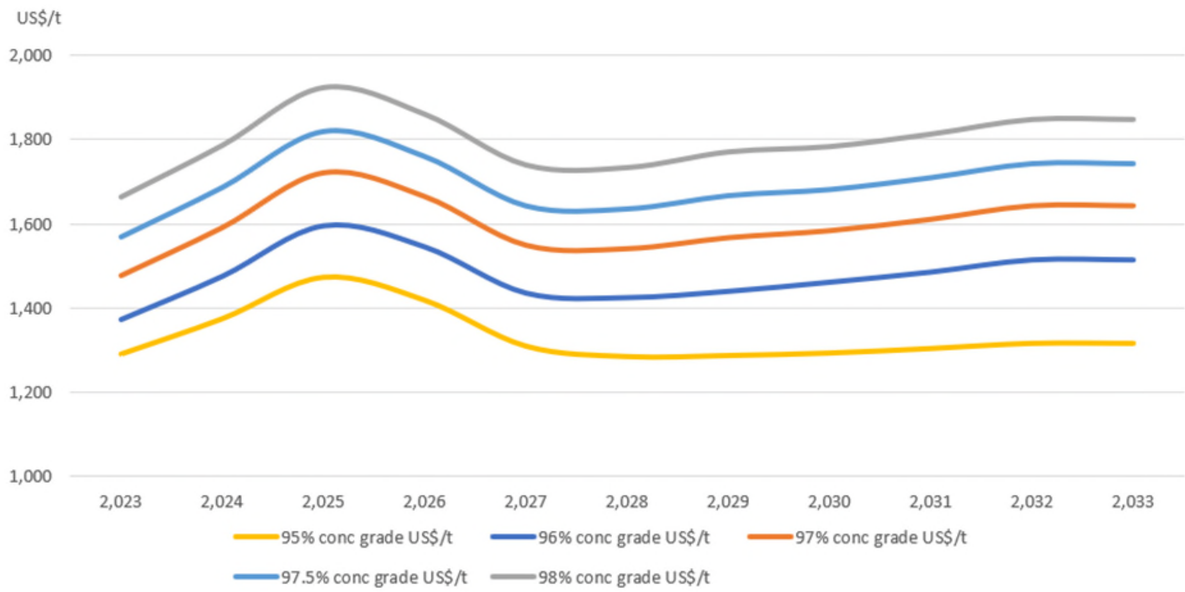


Sources: Public releases, Benchmark Mineral Intelligence, Black Rock Mining

Figure 17 Structural Deficits in Natural Graphite Predicted from 2022

Fastmarkets is expecting natural graphite demand to outstrip supply and effectively forecasting a basket price for Mahenge's graphite products of US$2,563/t over the first 10 years of production, which compares to a current basket price of ~US$1,200/t.

Black Rock has utilised graphite price forecasts based on the average graphite price forecasts provided by Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie (**Expert Consensus**). The chart below provides a summary of Expert Consensus pricing for Mahenge's basket of graphite products at a range of concentrate purities. Through the largest volume pilot plant program in the industry which processed over 600t of ore, Black Rock has demonstrated the ability to produce graphite concentrates up to 97-98%.



Source: Expert Consensus comprises average graphite forecast prices provided by Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie

Figure 18 Expert Consensus Graphite Price Forecast for Mahenge Basket

1.19 Marketing and offtake strategy

1.19.1 Graphite sales objectives

Black Rock's overall objective is to secure binding sales contracts on appropriate terms covering most of the Project's annual revenue. Black Rock is in discussion with a number of parties about further offtake.

Contract volumes are assessed with the following in mind:

- Black Rock's corporate objective to deliver value; and
- Project ramp-up and production timing.

Remaining volume will be sold into the market on a short-term / spot basis to test new market opportunities and enable price discovery.

1.19.2 Marketing and sales strategy

Black Rock's marketing strategy is informed by market development activities conducted since 2015, including:

- Extensive engagement with customers;
- Technical / testing activities;
- Competitor analysis;
- Advice and reports from industry and market experts; and
- Engagement with industry and trade organisations.

Black Rock's marketing strategy takes into account a number of market characteristics including in particular the technical nature of the marketing process and the need to determine / negotiate pricing directly with customers rather than relying on a deep spot and forward delivery contract market such as exists for exchange traded products.

1.19.3 Product Acceptance and Qualification Process

Graphite is not traded as a fungible commodity. Marketing is conducted on a peer-to-peer basis with customers needing to validate product performance prior to accepting product into their supply chain. This process is described as qualification.

Qualification essentially stems from a requirement of a manufacturer to be able to warrant product performance in the absence of standardised performance parameters for raw materials. For example, a battery manufacturer issuing a performance warranty of chargeability after say 1,000 charging cycles will need to determine if the graphite used in the anode has properties suitable for that application.

In many cases an individual customer may be required to physically modify their production process to accommodate the unique properties of an individual brand of flake. This acts as a significant barrier to entry.

Qualification sampling protocols need to ensure that volumes provided are representative of the overall orebody and not simply the easiest to access or highest grade. In the last round of qualification, the 500-tonne sample provided by Black Rock was composed of 18 bulk samples representing the first 10 years of Project life.

Qualification for the battery market is typically taken over four stages.

- The first stage involves a smaller volume of material of up to 5 kg to determine whether on a macro scale the flake supplied has suitable properties. For battery grade graphite deleterious elements such as vanadium, uranium and tungsten are tested. Physical properties such as Tap Density are also considered. Rarely are batteries made at this stage;
- The second stage will involve battery construction and will require samples of up to several hundred kilograms;
- Third, testing will involve up to 20 tonnes of material with product being tested with batteries supplied to end users; and
- If needed a final qualification round of up to 100 tonnes per product grade may be required.

Qualification in the large flake market follows a similar pathway with up to four stages of qualification prior to contracted deliveries. Sample volumes for qualification in large flake can be particularly challenging. Up to 100 tonnes per flake size may be required by an individual customer to qualify a brand. Black Rock's approach has been to secure initial acceptance by the customer and defer full volume qualification until Module 1 is commissioned. Some large flake will be sold on spot markets during the qualification process and switched to contracted deliveries post qualification. This process is expected to take approximately 6 months once the mill is operating in steady state.

Access to capital and the time delays associated with qualification are significant barriers to entry to the market.

1.19.4 Mahenge graphite: superior quality, de-risked

From an offtaker perspective the advantages of Mahenge graphite include the following:

- Mahenge graphite has low deleterious impurities and favourable metallurgy, meaning the Project is able to produce up to 99% TGC concentrate purity, solely with conventional flotation processing. Similarly, should the Project's customers elect to take the concentrate at a lower purity, they will be able to upgrade it easily and at low cost (reagents, power);
- For the battery market: higher spheronisation yield than typical industry average;
- ESG advantages – ability to upgrade to 99% TGC without chemical or thermal processing, and use of Tanzania's hydro grid power, make Mahenge graphite more environmentally-friendly than competing products; and
- De-risked: the Project flowsheet has been extensively tested via a sector-leading pilot program (610 tons of ore processed in total); the battery-grade Mahenge product has been extensively tested and fully qualified by POSCO; and other grades have been tested by customers and confirmed as meeting performance requirements.

Black Rock has conducted significant qualification work with its potential offtakers and this work is ongoing. Black Rock has progressively validated the quality of Mahenge material via extensive studies, trials, pilot plant campaigns and investigations. This has significantly de-risked the Project in relation to market acceptance, and also highlighted the superior qualities of Mahenge graphite.

1.19.5 Module 1 Offtake

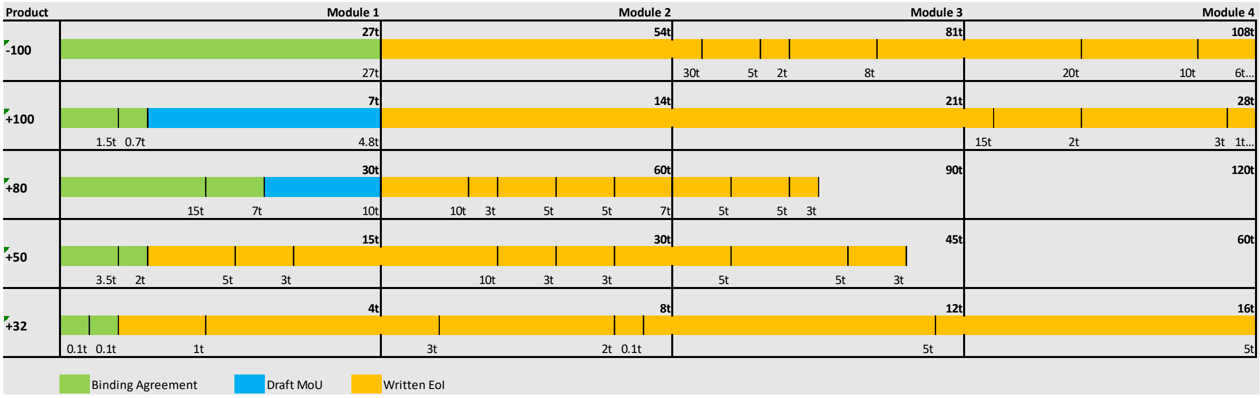
Black Rock's offtake plan for Module 1 of the Project is summarised as follows:

- POSCO (Sth Korea): 32% of total volume, 100% of sub 100#, for the Life of Mine;
- Taihe Soar (Dalian) Supply Chain Management Co Consortium (China): estimated annual volume 20ktpa, 22% of total volume, +100# +80# +50# +32#, 3yrs (initial term) plus an option for an additional 10ktpa over this same initial term; and

- Qingdao Yujinxi New Material Co Ltd (China): estimated annual volume 10ktpa, 11% of total volume, +100# +80# +50# +32#, 3yrs (initial term) plus an option for an additional 5ktpa over this same initial term.

1.19.6 Black Rock's 4-stage strategy

Black Rock's strategy is to expand over 4 stages (4 modules) to produce steady state production of 347ktpa. Black Rock's 4-stage offtake plan is outlined below. Should any of the Module 1 offtakers fail to perform, there would be an opportunity to bring the Module 2-4 offtakers forward to fill any gap.



1.20 Financial

The financial analysis indicates a net present value (NPV) at a 10% nominal discount rate (post tax, ungeared after 16% free carry) of US$1,376M for the base case production profile and price assumptions, which provide for an internal rate of return (IRR) of 36% (post tax, ungeared after 16% free carry).

The financial performance of the Project is summarised in Table 10.

Table 10 Financial Performance Summary

Financial Performance Summary	Unit	LOM
Project Life	Years	27.5
Operating Life	Years	26.0
Total LOM Net Revenue	US$M, real	11,782
Graphite Price (Real) based on Expert Consensus pricing	US$/t	1,731
Initial Development Capital Costs	US$M	182
C1 Cost over first 10 years: Real (including withholding tax)	US$/t	466
All-in Sustaining Cost over first 10 years: Real (including withholding tax)	US$/t	518
Stable State EBITDA (after year 5)	US$M, real	364
Project NPV @10.0% Nominal - Post Tax, Ungeared after 16% Free Carry	US$M, real	1,376
Project IRR – Post Tax, Ungeared after 16% Free Carry	%	36

1The financial analysis indicates the Project is financially viable and results in strong financial returns. With a short payback period of 3.8 years from first ore processed, the Project has relatively low exposure to the key risk factor of long term commodity prices, mitigating exposure to the financial risk associated with the Project's capital funding requirements. The strong financial returns under the base case assumptions provide a positive risk versus reward assessment.

1.20.1 Key Financial Assumptions

The key financial assumptions are:

- All amounts have been modelled in US$;
- The financial model is built using real inputs in 2022 dollars. Commodity prices, operating and capital costs are escalated within the cashflows to nominal values by using a general 2% US$ inflation rate to correctly calculate depreciation, corporate taxation and working capital. For valuation purposes resultant nominal cashflows are deflated to real cashflows using the same 2% general US$ inflation rate and the resultant real cashflow is discounted by a real discount rate, which is the equivalent of a 10% nominal discount rate, i.e.:

$$Real\ discount\ rate = \frac{(1 + nominal\ discount\ rate)}{(1 + inflation\ rate)} - 1 = \sim 7.84\%\ real$$

- The financial model is built in quarters and real and nominal cashflows are assumed to occur at period end. Resultant real cashflows are discounted using mid-point discounting to adjust the valuation to simulate the effect of running a monthly model;
- Pre- and post-production capital and capitalised operating costs are depreciated for tax purposes on a 20% per year straight line basis. The costs of mining pre-production are part of capitalised pre-production operating costs and ore is not carried separately as mining inventory. The resultant tax treatment is conservative;
- Pre- and post-production capital and capitalised operating costs are depreciated for accounting purposes over the LOM. There is no residual value;
- No end of LOM rehabilitation costs, mine closure costs or Project residual values have been assumed. Operating costs allow for progressive rehabilitation of land throughout the Project life and for land to be returned to traditional uses as quickly as possible post mining. The mill residue dry stack operating costs include for progressive rehabilitation which is a requirement for operation of the dry stack;
- Financial analysis is provided at the level of ungeared project cashflows. Analysis is based both on 100% project equity and 84% Black Rock equity after government free carried interest of 16% is deducted. In the context of this financial analysis free carried interest means that Black Rock will pay for initial capital investment before the Project generates positive revenues and will also make up the shortfall in its entirety for the construction and financing of future Project stages if insufficient funds have been retained in the Project company. Dividend payout ratios are adjusted to ensure that (to the extent possible) the Project company first meets the needs of financing future stages before paying a dividend. Dividends are then paid to government (16%) and Black Rock (84%) in line with the government's free carried interest proportion;
- Basket pricing of US$1,731/t finished product has been applied. Pricing is FOB Dar es Salaam;
- Taxation inputs for the financial model are based on professional advice from Ernst & Young (Tanzania) and judgements by Black Rock:
  - Corporate income tax of 30.0% is applied to earnings before tax, with the assumption that government royalties are tax deductible for corporate tax purposes;
  - Royalties of 3.0% are applied to gross FOB revenue;
  - Withholding tax is assumed to be paid at 5% of gross (5.26% of net) capital and operating costs; and
  - Carried forward tax losses of US$10.8M are assumed at the Project level. Tax losses incurred during the Project are carried forward indefinitely and can be applied to reduce profit before tax in future periods.

- Working capital assumptions are:
  - Finished goods inventory is assumed to be 30 days (production to sale at Dar es Salaam port on embarkation);
  - Creditors: 30 days except for royalties and salaries (which are assumed payable immediately). Capital costs are provided as cash S-curve and assumed payable as incurred;
  - Debtors: 30 days; and
  - VAT is assumed to be incurred at 18% on ~60% of capital costs and 20% of operating costs. VAT is recouped only in periods when there is tax payable.

1.20.2 Production Profile

Project revenue is derived from the sale of graphite product alone. Average graphite pricing of US$1,731/t finished product has been applied. Pricing is based on FOB Dar es Salaam.

1.20.3 Sensitivity Analysis

The sensitivity of the financial performance of the Project is detailed in Table 11.

Table 11 Project Sensitivity to Graphite Prices

Graphite Price US$/t	Price Change %	NPV* US$M	NPV Change %	IRR** %	IRR Change %
1,385	(20%)	835	(39%)	27%	(26%)
1,558	(10%)	1,106	(20%)	32%	(13%)
1,731***	-	1,376	-	36%	-
1,904	10%	1,645	20%	41%	12%
2,077	20%	1,914	39%	45%	23%

* Unlevered NPV post-tax, post free carry at 10% nominal discount rate, based on all 4 Modules.

** Unlevered IRR post-tax, post free carry.

*** Expert Consensus based on the life of mine average forecast prices from Benchmark Mineral Intelligence, Fastmarkets and Wood Mackenzie.

Appendix 2. JORC Code, 2012 Edition Table 1.

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• *The Company has taken all care to ensure no material containing additional carbon has contaminated the samples.* • *The trenches were sampled using 2m composites with samples taken from in situ oxide, transition or fresh rock as a continuous chip channel across the trench walls or along a clean exposed trench floor* • *The pit samples were taken as individual point samples at the base of the pit.* • *All samples are individually labelled and logged.* • *Diamond drill sampling consisted of quarter core sampling of HQ diamond core or a sliver (~1/5th) of PQ diamond core, on a 2m sample interval.* • *RC samples were riffle split on an individual 1m interval then composited as two x 1m samples which were submitted to the laboratory.* • *The company maintains a secure storage area for all samples and core held on site.*
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• *Both diamond core (HQ and PQ single tube) and reverse circulation (6" face sampling) drilling methods have been used. All core is oriented using a spear or ACT back-end orientation device.*

Criteria	JORC Code explanation	Commentary
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• *Diamond drill sample recoveries have been measured for all holes and found to be acceptable. Method was linear metre core recovery for every metre drilled.* • *RC recoveries were estimated by measuring the weight of every 1m interval. Grade /recovery correlation was found to be acceptable.* • *Twin hole comparison of RC vs Diamond indicates that no sample bias has occurred for graphite.*
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• *Pits and trenches were logged for geology and structures, and photographs were also recorded for the trench samples.* • *All drill holes have been comprehensively logged for lithology, mineralisation, recoveries, orientation, structure and RQD (core). All drill holes have been photographed. Sawn diamond core has been retained for a record in core trays. RC chips stored in both chip trays and 1-3kg individual metre samples as a record.*

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• *The pit and trench samples were not sub sampled.* • *For the pre-2017 diamond drilling, HQ diamond core samples were halved with one half then quartered. A quarter core sample was taken for laboratory analysis. The remaining quarter core sample is retained for a record and a half core sample retained for metallurgical test work. PQ diamond core was slivered with a core saw and the sliver (~20%) taken for laboratory analysis. The remaining core was retained for metallurgical test work and for a record.* • *For the 2017/18 diamond drilling, whole core samples were packaged as 2m composite samples on site and then transported in drums from Tanzania to Canada to SGS Lakefield.* • *RC samples were collected for every down-hole metre in a separate RC bag. Each metre sample was split through a three-tier riffle splitter and a 1.5kg sample taken of each metre. Two one-metre samples, totalling 3kg in weight were composited for assay submission. Field duplicates were taken to test precision up to the compositing and splitting stage.* • *Sample sizes for all medium (i.e. trenches, pits, DD and RC drilling) were appropriate for this style of graphite mineralisation.*

Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• *The majority of samples were sent to Mwanza in Tanzania for preparation and pulps were then sent to Brisbane for carbon analysis: Total Graphitic Carbon (TGC) C-IR18 LECO Total Carbon.* • *Graphitic C is determined by digesting sample in 50% HCl to evolve carbonate as CO_2. Residue is filtered, washed, dried and then roasted at 425°C. The roasted residue is analysed for carbon by high temperature Leco furnace with infra-red detection. Method Precision: ± 15%. Reporting Limit:0.02 – 100 %.* • *Some of the samples were analysed for Multi-elements using ME-ICP81 sodium peroxide fusion and dissolution with elements determined by ICP.* • *Some of the samples were analysed for Multi-elements using ME-MS61 for 48 elements using a HF-HNO3-HClO4 acid digestion, HCl leach followed by ICP-AES and ICP-MS analysis.* • *Some of the samples were analysed for Multi-elements using ME-MS81 using lithium borate fusion and ICP-MS determination for 38 elements.* • *All analysis prior to 2021 has been carried out by certified laboratory – ALS Global. TGC is the most appropriate method to analyse for graphitic carbon and it is a total analysis. ALS Global inserted its own standards and blanks and completed its own QAQC for each batch of samples. No failures were noted.* • *In 2021, drill core samples were assayed at SGS Lakefield (Ontario, Canada) and SGS Burnaby (Vancouver, BC, Canada)* • *Sample preparation at the SGS laboratory includes drying, crushing to 75% passing 2mm, splitting, and then pulverising to 85% passing 75 microns. The sample pulps were then analysed at SGS Lakefield for carbon analysis (Total Graphitic Carbon - TGC) using method GE CSA05V. Pulps were subsequently sent to SGS Burnaby for multielement analysis using method GE_ICP21B20 which is a 51 element package utilising an Aqua Regia digest, ICP-AES/MS.*

Criteria	JORC Code explanation	Commentary
		• *BKT inserted certified standard material, a blank or a duplicate at a rate of one in twenty samples.* • *Approximately 1/40 sample pulps from the 2015 drilling were re-submitted from the primary Laboratory (ALS Global) to a secondary Laboratory (SGS) in Johannesburg, South Africa. No bias or issues with accuracy or precision were observed between the two data sets.* • *Based on the QA/QC strategy employed by BKT for the duration of the exploration programs at Mahenge BKT is satisfied the TGC results are accurate and precise and no systematic bias has been introduced.*

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• *The data has been manually updated into a master spreadsheet and a GIS database, considered to be appropriate for this exploration program.* • *Samples and assays were also imported to a SQL drilling database, and were subject to validation on import.* • *Drill intersections have been checked by a consultant geologist as part of the data validation process and errors corrected prior to resource estimation.* • *Twin holes were used to compare diamond vs RC drilling. Correlation of results was excellent.* • *There has been no adjustment of assay data.*
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• *A handheld GPS was used to identify the positions of the pits in the field.* • *The handheld GPS has an accuracy of +/- 5m.* • *The datum used is: WGS84, zone 37 south.* • *Drill collars have been surveyed with a DGPS for sub-metre accuracy for the X, Y and Z components and the Ulanzi, Cascade and Epanko North prospects have been surveyed with a high resolution aerial drone to generate an accurate contour map and high resolution photo image. The Z component has also been checked by draping the collar position over a high quality digital terrain model and comparing to the DGPS Z reading.* • *The locations and RLs of the trenches have been checked using the detailed aerial/topo survey and modified accordingly for both x/y and z components.* • *BKT is satisfied the location of trenches, pits and drill holes have been located with a high degree of accuracy.*

Criteria	JORC Code explanation	Commentary
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• *Data spacing and distribution is considered to be appropriate for the estimation of a Mineral Resource.* • *The company has used 100 x 100m or 100 x 50m or 50 x 50m grid spacing, with some selected infill, which has been sufficient to show geological and grade continuity.* • *The drill spacing is appropriate for Resource Estimation.* • *No further sample compositing has been applied post the sub-sampling stage.*
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• *Drilling is oriented perpendicular to mineralisation or as close to perpendicular to mineralisation as possible.* • *The orientation of the drill direction has not introduced a sample bias.*

Criteria	JORC Code explanation	Commentary
Sample security	• *The measures taken to ensure sample security.*	• *The samples were taken under the supervision of an experienced geologist employed as a consultant to BKT.* • *The samples were transferred under BKT supervision from site to the local town of Mahenge where the samples were then transported from Mahenge to Dar es Salaam, and then transported to Mwanza where they were inspected and then delivered directly to the ALS Global process facility.* • *Chain of custody protocols were observed to ensure the samples were not tampered with post-sampling and until delivery to the laboratory for preparation and analysis.* • *Tamper proof plastic security tags were fastened to the samples bags. No evidence of sample tampering was reported by the receiving laboratory.* • *Transport of the pulps from Tanzania to Australia was under the supervision of ALS Global.* • *For the recent diamond core drilling for use for metallurgical testwork, samples were couriered via international courier company from Tanzania to SG Lakefield in drums.*
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• *Trenching and drilling information collected by BKT has been evaluated for sampling techniques, appropriateness of methods and data accuracy by an external geological consultant.*

Section 2 Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• *The sampling was undertaken on granted license PL 11486/2020.* • *It has an area of 118.37km^2.* • *The license is 100% owned by BKT.* • *Landowners of nearby villages are supportive of the sampling and exploration program.*
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• *Previous explorers completed some limited RC drilling and rockchip sampling but the original data has not been located apart from what has been announced via ASX releases by Kibaran Resources during 2011 and 2013.*
Geology	• *Deposit type, geological setting and style of mineralisation.*	• *The deposit type is described as schist hosted flaky graphite.* • *The mineralisation is hosted within upper amphibolite facies gneiss of the Mozambique Mobile Belt.* • *Over 95% of the exposures within the tenement comprise 3 main rock types that include alternating sequences of:* • *Graphitic schist – feldspar and quartz rich varieties.* • *Marble and,* • *Biotite and hornblende granulites.* • *Less common rock types include quartzite.*
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*	• *A summary of all material drill intervals is provided in Appendix 1.*

Criteria	JORC Code explanation	Commentary
	o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• *Exploration results have been reported as weighted averages allowing up to 2m of internal waste and minimum grades at 5% TGC.* • *No maximum or top- cutting was applied during the calculation of drill holes intersects.* • *Drill intervals are provided in Appendix 1.*
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• *Drill hole results are reported as down-hole metres.* • *Sufficient drilling, mapping and trenching has been completed at the main prospects to understand the orientation of mineralised lodes. A range of drill holes angles were used during the exploration program with the majority drilled at -60˚ (refer to Appendix 1).*
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• *Figures show plan location of drill holes, appropriately scaled and referenced.* • *Refer to images in the main body of the text*

Criteria	JORC Code explanation	Commentary
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• *All drill holes have been reported in their entirety.* • *All drilling results have been reported in past Exploration announcements.*
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• *1 in 10 samples from the first drill programme were assayed for deleterious elements using a 40 element ICP method. No deleterious elements were observed, with background (low) levels of uranium and thorium.* • *1,078 bulk density measurements using the water displacement method from the oxide (limited) transitional and fresh zones.* • *The samples for the bulk density measurements were taken from diamond drill core.* • *Every diamond hole drilled used in this Resource Estimate has had intervals tested for bulk density generating a high quality dataset.*
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• *Ongoing metallurgical test work – flotation and particle size optimization.* • *Additional bulk density test work is planned, particularly focused on the oxide and transition material.*

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	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• *The drillhole database was compiled by BKT as Excel spreadsheets.* • *Maps, lithology, drill holes, trenches and test pit samples were also supplied for use in GIS format (MapInfo/Discover) and Excel spreadsheets.* • *The data have then been imported into a relational SQL Server database using DataShed™ (industry standard drillhole database management software).* • *The data are constantly audited and any discrepancies checked by BKT personnel before being updated in the database.* • *Normal data validation checks were completed on import to the SQL database and when viewing in Surpac and Leapfrog.*
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• *Prisin Moshi, Competent Person, is based on site and domiciled at the local Mahenge village and has supervised all onsite field work.*
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• *The confidence in the geological interpretation is considered robust for the purposes of reporting Measured, Indicated and Inferred Resources. Graphite is hosted within graphitic gneisses of the Mahenge Scarp. These graphite rich zones generally strike N-S and dip to the east at 60-80° and are interpreted to originate from graphitic sedimentary units of the Mahenge Scarp.* • *The geological interpretation is supported by geological mapping and drill hole logging and mineralogical studies completed on drill programmes.*

		• *Weathered zones (oxide and transition) were interpreted based on the geological logs and coded into the block model.* • *No alternative interpretations have been considered at this stage.* • *The graphitic gneiss units are known to be continuous in strike length for up to 22km.*
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• *The modelled mineralized zone for Ulanzi has dimensions of 2,500m (surface trace striking 020°) with four zones averaging in thickness of between 50-60m and ranging between 400m and 760m RL (AMSL).* • *The modelled mineralized zone for Epanko has dimensions of 1,025m (surface trace striking 000°) averaging in thickness of between 55-80m and ranging between 640m and 1,025m RL (AMSL).* • *The modelled mineralized zone for Cascade has dimensions of 900m (surface trace striking 020°) averaging in thickness 70m and ranging between 560m and 900m RL (AMSL).*
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.*	• *Grade estimation using Ordinary Kriging (OK) was completed using Geovia Surpac™ software for TGC (%).* • *Drill spacing typically ranges from 50m to 100m.* • *Drillhole samples were flagged with wireframed domain codes. Sample data was composited for TGC to 2m using a best fit method with a minimum of 50% of the required interval to make a composite. These were combined with 2m spaced trench samples plus individual 50m by 50m spaced base of test pit assays.* • *Potential influences of extreme sample distribution outliers were investigated to determine whether they needed to be reduced by top-cutting on a domain basis. The investigation used a combination of methods including grade histograms, log probability plots and statistical tools. Based on this, it was*

	• *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	*determined that some top cuts were required. The four Ulanzi domains were top-cut between 16.0% and 17.6% TGC. No top-cuts were required at Cascade.* • *Directional variograms were modelled by domain using traditional variograms. Nugget values for TGC are low to moderate (around 15 to 30%) and structure ranges up to 270m.* • *Block model was constructed with parent blocks of 10m (E) by 25m (N) by 10m (RL) and sub-blocked to 5m (E) by 12.5m (N) by 5m (RL). All estimation was completed to the parent cell size. Discretisation was set to 5 by 5 by 2 for all domains.*
		• *Three estimation passes were used with differing distances at Epanko vs. Ulanzi and Cascade. This was done due to a tighter drill spacing at Epanko and Cascade. At Ulanzi the first pass had a limit of 150m, the second pass 300m and the third pass searching a large distance to fill the blocks within the wireframed zones. At Epanko and Cascade, the first pass had a limit of 75m, the second pass 150m and the third pass searching a large distance to fill the blocks within the wireframed zones. Each pass used a maximum of 24 samples, a minimum of 8 samples and maximum per hole of 5 samples.* • *Search ellipse sizes were based primarily on a combination of the variography and the trends of the wireframed mineralized zones. Hard boundaries were applied between all estimation domains.* • *Validation of the block model included a volumetric comparison of the resource wireframes to the block model volumes. Validation of the grade estimate included comparison of block model grades to the declustered input composite grades plus swath plot comparison by easting, northing and elevation. Visual comparisons of input composite grades vs. block model grades were also completed.*

Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• *Tonnes are estimated on a dry basis.*
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• *Grade envelopes have been wireframed to an approximate 4 to 5% TGC cut-off allowing for continuity of the mineralised zones. Based on visual and statistical analysis of the drilling results and geological logging of the graphite rich zones, this cut-off tends to be a natural geological change and coincides with the contact between the graphite rich gneiss and the other adjacent country rocks (i.e. garnet gneisses and occasional marbles).*
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• *As graphite mineralisation is consistent along strike, has consistent widths and outcrops on steep ridges or ridge slopes (indicating low strip ratios), open pit mining methods have been adopted.*
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• *The Pre-Feasibility Study included a suite of comprehensive metallurgical test work programmes conducted by Bureau Veritas of Perth. Rock types sampled consist of oxide and primary mineralisation at Epanko North and Ulanzi plus oxide mineralisation at Cascades. Cascades primary mineralisation is being tested. These samples (taken as surface outcrop and diamond core) are considered to be representative of the mineralised zones.* • *A pilot plant consisting of 50 tonnes of Cascades and 40 tonnes of Ulanzi was conducted at SGS Lakefield Laboratory, Ontario Canada in April 2018. Ore types consisted of a mix of fresh drill core and surface sampled oxides from Ulanzi and Cascades. An extensive metallurgical test work program has been conducted*

		as part of Definitive Feasibility Study, extending the work previously conducted in the PFS. The DFS program supported recovery and flake size estimates developed in PFS including grind and polishing performance. • A variability metallurgical program was completed on 17 Oxide bulk surface samples and 14 variability domain representative samples of the first 10 years of the mine plan where selected from the 1,800m metallurgical drill program. The fourteen domain composites were generated by combining a predetermined mass from several 2m drill core intervals to form Oxide, Transition, and Fresh composites. The variability composites included Oxide, Transition, and Fresh mineralisation. The oxide bulk samples were representative splits from the larger the 500t pilot plant bulk sample that was stored at the SGS Lakefield site. The flowsheet and conditions were confirmed in the metallurgical program and most composites produced graphite concentrates well above the 95% TGC grade target. • A 500t bulk samples obtained in early 2018 as part of a metallurgical drill program and representing the first 10 years of mining at Ulanzi, was sent through a 500t large scale processing plant campaign in Shandong, China for customer qualification works. The campaign was completed successfully in December 2021.
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	• Environmental licence EC/EIA/2018/0352 has been granted for all PL's in the Mahenge project area on 29 August 2018. No conditions are attached to the licences.

Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• *The Company has completed specific gravity test work on 1,078 drill core samples across the Mahenge Project using Hydrostatic Weighing (uncoated).* • *For the July 2017 resource, of these 1,078 samples, 587 are from within the modelled mineralised domains, primarily from fresh material (556 samples) and transition (37 samples).* • *Statistical analysis of the samples and comparison against depth and TGC grade identified a subjective relationship between bulk density (BD) and TGC grade. As such, the BD used for fresh material was the average for the deposits (90% confidence interval) at 2.73 g/cm3 and 2.74 g/cm3 at Cascade (with a standard deviation of 0.05).* • *For the modelled oxide/transition zone, there were only 37 samples available. Whilst the analysis of these samples produced the same BD as the fresh material, it was decided to use a slightly reduced BD of 2.6 g/cm3 at Ulanzi and 2.5 g/cm3 at Cascade. It is planned to increase the number of measurements on transition material samples in the next phase of work.* • *For the modelled oxide zone, there were 2 BD measurements completed to date. It is planned to complete a representative number of measurements on oxide material samples in the next phase of work using appropriate measuring techniques for the material type. For this resource, an oxide BD of 1.9 g/cm3 has been assumed.* • *For this update to Ulanzi only, of the 230 samples from within the modelled mineralised domains, the vast majority are from fresh material (182 samples) and only a limited number from the oxide/transition zones (48 samples) including 21 from completely to highly weathered and 27 from moderately to slightly weathered. Revised averages for these zones are 2.0 g/cm3 for strongly oxidised, 2.5 g/cm3 for transition and 2.71 g/cm3 for fresh.*

Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• *The Mineral Resource has been classified on the basis of confidence in the geological model, continuity of mineralised zones, drilling density, confidence in the underlying database and the available bulk density information. Maximum drill spacing for Measured Resource classification is 50m (northing) by 50m (easting) with some selected infill. Indicated Resource classification is 100m (northing) by 50-75m (easting). Wider drill spacing is categorised into the Inferred Resources.* • *All factors considered; the resource estimate has in part been assigned to Measured and Indicated with the remainder as Inferred Resources.* • *The result reflects the Competent Person's view of the deposit.*
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• *Whilst Mr. Barnes (Competent Person) is considered Independent of the Company, no third party review has been conducted.*
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• *The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resources as per the guidelines of the 2012 JORC Code.* • *The statement relates to global estimates of tonnes and grade.*

Table 1 – JORC

Section 4 Estimation and Reporting of Ore Reserves

Criteria	Explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	*The Mahenge Project includes the Ulanzi, Cascades and Epanko North deposits. Resource estimate updates for Ulanzi (November 2021), Cascades (July 2017) and Epanko North (September 2016) were prepared by Mr Lauritz Barnes (Trepanier Pty Ltd) the competent person for these resource estimations.* *At a cut-off grade of 3% Total Graphitic Carbon (TGC), the Ulanzi resource contains 114.5Mt of Measured, Indicated and Inferred materials with an average grade of 8.1% TGC.* *At a cut-off grade of 3% TGC, Cascades contains 60.0Mt of Measured, Indicated and Inferred materials with an average grade of 8.1% TGC.* *At a cut-off grade of 3% TGC, Epanko North contains 38.4Mt of Measured, Indicated and Inferred materials with an average grade of 6.1% TGC.* *Only the Measured and Indicated proportions of the Ulanzi and Cascades were used as a basis for the conversion to the Ore Reserve.* *Epanko North resource is included in the enhanced Definitive Feasibility Study (eDFS) and sequenced as the last resource to be mined. Epanko North is not represented in the Reserve estimate.*
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	*The Mineral Resources are reported inclusive of the Ore Reserves.*

Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	*The Competent Person (Mr John de Vries) first visited the proposed mining site of the project in February 2017 and on numerous occasions throughout 2018 to 2021.* *The following observations are made:* • *The mining area is located near the town of Mahenge, Ulanga province Tanzania. The site is 480km south west of the capital Dar Es Salaam.* • *The site is connected by road to Dar Es Salaam. A rail connection (between Ifakara and Dar Es Salaam) is 70km from the project site. Travel time by road to Dar Es Salaam is 12 hrs, travel time to Ifakara is 2 hrs.* • *The port of Dar Es Salaam is the fourth largest Indian Ocean port in Africa, is has facilities suitable for export of containerised graphite concentrate.* • *Population density of the site area is relatively low without any substantial communities. The nearest town, Mahenge (population 8,000) is approximately 5 km to the east.* • *There is no power or water supply on site. Power supply to the town of Mahenge is inadequate to operate a processing plant, although 220kV national grid connections are available at Ifakara 70km away. TANESCO, the national electric company of Tanzania, have completed line upgrade studies and are planning to upgrade the power supply to Mahenge which will also supply the site with grid power.* • *The nearest railway line to site offering both freight and passenger transportation is a bi-national railway linking Zambia and Tanzania operated by TAZARA (Tanzania and Zambia Railway Authority). TAZARA has a railway terminal and rail siding facility at Ifakara.* • *The mining area is in rugged terrain with hills and valleys, there are few flat spots. The deposits occur along the ridges and substantial pioneering will be required to establish the mining areas.* • *Oxidised rock outcrops occur on the ridges while the valleys are covered with highly weathered transported materials. Some of the highly weathered materials appear to be "free dig" without the need for drilling and blasting.*

		• *Diamond drill core indicates competent (fresh) rock conditions with high RQD values. This is favourable for pit walls and unfavourable for blasting.* • *There is a presence of sulphides, visible in the drill core. These may have an adverse impact of acid mine drainage (AMD).* • *The project area lies in a strongly defined wet and dry season climate. A net positive rainfall balance exists.* • *The site is positioned within the headwaters of the Kilombero River which is part of the Rufiji catchment basin. The water is used for agricultural and village drinking water.* • *There are creeks providing for local drainage. These can flow during the wet season which lasts from December to April.* • *While contour mining takes place (before the pit goes below the natural topography) free drainage is available with no risk of flooding. After this adequate pit dewatering will have to be established but no hydrological information is available to establish these dewatering needs. Weather stations and stream gauges have been set up at Ulanzi and Cascades since 2019 to collect baseline data and establish seasonal fluctuations on site.* • *Water diversion works will be required during operation as the Mbaha river cuts across the Ulanzi pit.*

Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.*	*The eDFS (enhanced Definitive Feasibility Study) for the Mahenge Graphite Project is the basis for conversion of Resources to Reserves. The study was compiled by CPC Engineering in July 2019.*
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	*The eDFS was underpinned by a mine plan detailing mining locations, ore and waste quantities, mill feed quantities, and mill head grades. Scheduling is reported in monthly, quarterly and semi-annual periods for the first five years then annually for the rest of life of mine (LoM).* *Mine planning activities included pit optimisation, interim staged and final pit designs, mine and waste disposal scheduling, concentrate production estimation, and mining cost estimation.* *Modifying factors considered during the mine planning process included slope design criteria, mining dilution and ore loss, process plant recoveries, processing costs, general and administration costs, concentrate price and royalties, land access and permitting.* *For tailings management, the eDFS has adopted dry stack tailings disposal system. Black Rock believes this disposal system offers a superior solution for tailings management and lowers project risk for a site located in a net positive rainfall environment and within the headwaters region of the large Rufiji catchment basin.* *The results of the eDFS support the results from the DFS and PFS Optimisation Studies and demonstrate that the Mahenge Graphite Project is technically achievable and economically viable.*

Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	*The mine plan adopted a processing plant feed grade of 8.75% TGC. To achieve this target, cut-off grades of 7.0% TGC were applied for Ulanzi and Epanko North and 3.8% TGC for Cascades. These grades are designed to deliver the maximum NPV at the NPV max LoM planned grade of 8.75%.* *The mine plan is based on Measured, Indicated and Inferred resource materials however only the Measured and Indicated materials were converted to Ore Reserves. All Inferred material with the pit design has been treated at zero value.* *No other quality parameters were applied during the reserve determination.*
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).*	*The pit optimisation and pit design work from the PFS Optimisation Study (completed August 2017) form the basis of the eDFS. Pit inventory reported within the interim staged and final pit designs were used to develop a mining schedule which incorporates Ulanzi, Cascades and Epanko North.* *Factors such as slope design criteria, mining dilution and ore loss, processing recoveries, processing costs, general and administration costs, concentrate price and royalties were applied as part of the pit optimisation process. These have not materially changed during the eDFS.*

	The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.	*A conventional open pit mining method using proven technology was chosen as the basis for the eDFS due to the near surface and outcropping presentation of the graphite mineralisation, the relatively low stripping ratio and availability of land required to support the selected mining method.* *This method is suitable as it is well proved with standard off-the-shelf equipment (i.e. low risk) and, due to the low population density, the presence of mine infrastructure such as pits and waste dumps will have limited negative land use impact on the local population.* *Mine design criteria include minimum mining width, ramp width and gradient, pit exit location and slope design parameters.* *The mining fleet consisting of 45t excavators matched with 20t 6x4 mine tipper trucks was selected to initially develop site access, site establishment works and subsequent development of mining areas including the requirement to excavate highly weathered materials, high in clay content. Following the pioneering activities, a fleet of 55t articulated dump trucks and 90t excavators are used to take advantage of improved mining conditions where higher productivity and lower mining cost can be obtained with the larger units.* *In October 2021, the site topography was discovered to have been impacted by elevation measurement differences in historical and recent drillhole collars from various GPS campaigns. These adjustments, which added an extra 20-25mRL, were included as part of the November 2021 Ulanzi resource model update. The eDFS Ulanzi pit design was adjusted by 20mRL. The Ulanzi pit inventory from the updated Ulanzi resource model with eDFS defined scheduled block, is used for this ore reserve declaration.*

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	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	*The geotechnical parameters from the PFS Optimisation Study form the basis of the eDFS. A high level geotechnical assessment was undertaken by geotechnical consultants Peter O'Bryan and Associates resulting in pit slope design guidelines. These guidelines, which vary with weathering classification appear appropriate and had been applied in the pit optimisation and pit design activities. The final pit designs were then validated by Peter O'Bryan and Associates for adherence to the design guidelines.*

Ulanzi pit slope parameters:

Eastern Wall	*0-30m below surface*	*30-40m below surface*	*>40m below surface*
Face Height	*5m*	*10m*	*20m*
Face Angle	*60 deg*	*60 deg*	*70 deg*
Berm Width	*4.5m every 5m*	*7m*	*7m*

Western Wall	*0-30m below surface*	*30-40m below surface*	*>40m below surface*
Face Height	*5m*	*10m*	*20m*
Face Angle	*60 deg*	*60 deg*	*65 deg*
Berm Width	*4.5m every 5m*	*7m*	*7m*

End Walls	*0-30m below surface*	*30-40m below surface*	*>40m below surface*
Face Height	*5m*	*10m*	*20m*
Face Angle	*60 deg*	*60 deg*	*75 deg*
Berm Width	*4.5m every 5m*	*7m*	*7m*

Cascades pit slope parameters:

	Completely to Highly Weathered	*Moderate to Slightly Weathered*	*Moderate to Slightly Weathered*
Face Height	*5m*	*10m*	*20m*
Face Angle	*60 deg*	*60 deg*	*70 deg*
Berm Width	*4.5m*	*5m*	*7m*

		There are no recommended pit slope parameters available for Epanko North. However due to the shallow nature of the potential pit, the Ulanzi pit slope parameters were adopted for Epanko North. *A geostatistical study to simulate grade control drill hole spacing was conducted by Trepanier Pty Ltd for potential grade control patterns applicable to the initial mining areas at Ulanzi. Based on the various combinations, a 15m (across strike) x 30m (along strike) drill pattern was selected as the initial drillhole pattern. Drill holes will be drilled at 60 degree inclination at 30m passes, overlapping at each bench and providing minimal disruption to the mining operation.* *Drill hole cuttings will be sampled manually at every 1m interval using a three-tier riffle splitter for grade control then combined to form 2m composites. Grade control samples will be analysed at an onsite lab facility to be established next to the process plant. Assaying cost has been obtained from Bureau Veritas Perth to establish this facility. The grade control drill pattern will be optimised at operational phase when further data becomes available.*
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	*The Mineral Resource models used as a basis for pit optimisation and subsequently the Ore Reserve, were the Ulanzi October 2016 resource model (bkt_mahenge_2016_09_v1) and the Cascades July 2017 resource model (bkt_mahenge_cascade_2017_03_v1). The Mineral Resource model for Ulanzi was recently updated with the Ulanzi November 2021 resource model (bkt_ulanzi_2021_11_v1). No engineering work had been undertaken however validation was performed to assess the impact of model update and in determining its appropriateness for Ore Reserve declaration.* *Pit slope design criteria and processing recoveries were applied in the pit optimisation process together with mining, processing, "General & Administration" and concentrate transport cost estimates, concentrator performance, including recovery and concentrate grade predictions, and revenue projections.*

	The mining dilution factors used.	*To allow for the effects of material mixing during blasting and the effects of ore-waste delineation inaccuracies in the pit, the resource models were reblocked with smoothing to model mixing of materials and by applying dilution and ore loss to edge blocks.* *For Ulanzi, the process was applied to Measured and Indicated resource materials. For Cascades, it was applied to Measured, Indicated and Inferred materials.* *This method reduces the Ulanzi Measured and Indicated resource materials from 46.5Mt @ 8.7%TGC to 46.5Mt @ 8.4%TGC (at 7% TGC cut-off grade) and the Cascades Measured, Indicated and Inferred resource materials from 28.8Mt @ 8.9%TGC to 28.8Mt @ 8.6%TGC (at 3.8% TGC cut-off grade). These reductions are a combination of dilution and recovery.*
	The mining recovery factors used.	*See above.*
	Any minimum mining widths used.	*Ulanzi and Epanko North:* *Dual lane ramps: 18m wide road surface, 10% gradient max.* *Single lane ramps: 13m wide road surface, 10% gradient max.* *Minimum mining width 30m, 20m in final bench and good-bye cuts.* *Cascades:* *Dual lane ramps: 22m wide road surface, 10% gradient max.* *Single lane ramps: 16m wide road surface, 10% gradient max.* *Minimum mining width 30m, 20m in final 2 benches and good-bye cuts.* *Pit staging sequence and cutbacks are based on pit designs from the PFS Optimisation Study and repeated for the eDFS.*

	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	*No Inferred resource materials have been included in the Ore Reserve estimate.* *The milling schedule includes Inferred resource materials. The Others material category consist of Inferred, Unclassified and Mineralised Waste materials.* *The percentage of Others materials processed is nil during the first 2 years and 10% the following 9 years. Thereafter from Year 12, it gradually increases.* *The risk of including Inferred materials in the processing schedule is low as:* • *The volumes during the first 12 years are low.* • *Further refinements in scheduling may reduce the dependency on Inferred materials during the earlier years.* • *A budget allowance to upgrade the Inferred materials to Indicated level has been included in the project cost estimate (from Year 13 onwards).*
	The infrastructure requirements of the selected mining methods.	*The infrastructure for mining includes fuel & oil storage facilities, fuel bay, workshops, wash bay, magazines, bulk emulsion storage facility, offices, lunch and ablution facilities, and a first aid room.*

Metallurgical factors or assumptions	*The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	*The concentrator plant utilises crushing, grinding and flotation technology to produce a minimum graphite concentrate grade of 95% TGC. Additional circuits have been designed and costed to produce graphite concentrate grades of 97.5% and 99%. The concentrate will be transported in loose 1t Bulka bags which will be trucked offsite and containerised at Ifakara.* *The initial concentrator proposed at Ulanzi has a nameplate capacity of 1Mtpa of ore with a feed grade of 8.75% TGC. In Year 2, a second module is commissioned doubling total capacity with ore processed at a rate of 2Mtpa. In Year 3, a second concentrator is proposed at Cascades together with an additional module to triple the original ore process throughput rate to 3Mtpa. In Year 4, the final module is commissioned quadrupling total site capacity to 4Mtpa of ore processed.* *Each concentrator process was designed and costed by CPC Engineering to achieve a graphite recovery of 93%.* *Production ramps to full production over the first three quarters of operation for each module of the four modules.* *Production Ramp-up:*

Period	*Plant Throughput*	*Plant Recovery*
1st quarter	*80%*	*85%*
2nd quarter	*87.5%*	*87.5%*
3rd quarter	*95%*	*90%*
4th quarter	*100%*	*93%*

	Whether the metallurgical process is well-tested technology or novel in nature.	*The concentrator flowsheet is common for the treatment of graphitic carbon ores and metallurgical laboratory test work undertaken by SGS at Lakefield (Canada) has been used as a basis for the plant design. A total of 90t of drill cores and surface bulk sample was run through a pilot plant an initial phase of testing in early 2018. This testwork underpins the confidence that the plant is to meet expectations for throughput, recovery, concentrate grade and concentrate flake size.* *A further 500t of drill cores and bulk samples obtained in early 2018 as part of a metallurgical drill program and representing the first 10 years of mining at Ulanzi, was sent through a 500t large scale processing plant campaign in Shandong, China for customer qualification works. The campaign was completed successfully in December 2021.*

	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	*Metallurgical test work was carried out by SGS in Lakefield (Canada). Flowsheet selection was based on results of numerous flotation/attrition tests undertaken on a bulk composite which provided high recoveries and high graphite purity.* *Variability follow up work was conducted on several drill hole samples and fresh and oxide ores to ensure the results were repeatable along strike and down dip in the significant mineralized zones.* *When the samples were subjected to the same flowsheet, consistent and repeatable results were obtained suggesting low variability with regard to recovery outcomes while targeting high concentrate grade.* *Pit optimisations are sensitive to concentrate pricing, and by definition flake size distribution and purity. Pricing assumptions used in the pit optimisation are based on Chinese export pricing 2015, 2016 and 2017 as supplied by Benchmark Minerals March 2016. Subsequent marketing work during the DFS has indicated potentially higher prices as realisable. These higher prices have not been considered in the ore reserve price assessment.* *Black Rock have strategically moved towards a more transparent platform for graphite pricing with its customers under long term offtake contracts since 2020. The binding offtake with POSCO in December 2020 is to be determined from the Asian Metals Flake Graphite Index while the binding offtakes with two existing Chinese offtake customers in August 2021 will be price referenced from published Asian based indices, RefWin and ICCSino.* *For mine planning purposes an assumption of a homogenous distribution of flake distribution has been made. Short term variance in performance is managed by finger chevron feed strategy on the ROM.*
	Any assumptions or allowances made for deleterious elements.	*Metallurgical testwork had not identified any deleterious or radioisotopes. During the reserve estimation, no allowances have been made for deleterious elements.*

	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole	*No further testwork was carried out beyond the batch testing outlined above.*
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet specifications?	*Not applicable.*
Environmental	*The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	*An Environmental Impact Assessment was completed between December 2016 and January 2017. The assessment did not indicate any contra indications for the project. Subsequent to, the EIA, an Environmental Impact Study (EIS) process commenced in February 2017. However a review and resulting changes to the Tanzanian Mining Law during the second half of 2017 resulted in the withholding of the EIS application.* *The project was designated Application Reference Number (ARN) 6259 by the National Environmental Council of Tanzania. An environmental licence EC/EIA/2018/0352 for the project was granted on 29 August 2018.* *Late 2018, Black Rock applied for two mining licenses covering the Mahenge Graphite Project. The two Mining Licences ML611/2019 and ML612/2019 covering Ulanzi, Cascades and Epanko North were subsequently granted in February 2019.* *In December 2021, the Government of Tanzania has agreed to merge existing Mining licences and transfer the environmental licence to a single Special Mining Licence.* *The presence of sulphides has been observed in the drill cores. Mill tailings from earlier pilot plant testwork have undergone long term stability testing at Graeme Campbell and Associates laboratory in Bridgetown WA. Sulphides will be subject to a scavenger float process and high sulphur concentrate will be disposed in a manner to ensure no AMD.*

Infrastructure	*The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	*The project is located 3km from the Mahenge access road.* *The project assumes on site power will be provided through grid power at project commencement. Black Rock has also made provision for diesel generators to be available to ensure availability of power at project commencement.* *Grid power cost assumptions are based industry standard costs and quotes from TANESCO (Tanzania national power authority).* *Onsite water treatment and an onsite accommodation (120 man camp) are considered as part of the project. In line with Black Rock policy and meeting the Local Content requirements of the updated Mining Law, a majority of personnel will be sourced locally.* *Land for development of pits, plant and tailings storage facilitates is present within the project area. A well-defined process exists within Tanzania for land access for mining projects with a quantifiable pathway for determining compensation for loss of amenity or relocation. The close proximity of the scattered settlement to the revised plant site will require relocation of this village. Provision for compensation has been included in the capital estimate.* *Transportation of concentrates will be via Ifakara to the port of Dar Es Salaam. The concentrates will be hauled from site in bulka bags to Ifakara. Black Rock will construct and operate a new rail siding at Ifakara. Each bulka bag will be customs cleared before loaded into 40' sea containers prior to railing by TAZARA to the port of Dar Es Salaam.*

Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.* *The methodology used to estimate operating costs.*	*Mining costs were estimated from first principles for an owner operator scenario. Basis for the estimate are the mining schedule, haulage profiles and productivity assumptions, to estimate the resources for the activities (Clearing, Topsoil removal, Haulroad construction, Grade control drilling, Drilling, Blasting, Loading, Hauling, Rehandle) required to meet the schedule.* *Mining capital costs were estimated from the initial equipment requirements and their replacement costs during the life of the operation using March-June 2018 equipment prices.* *Mining operating costs include equipment maintenance and operating costs such as personnel, fuel, tyres, explosives, ground engaging tools.* *Capital and operating costs for milling and onsite infrastructure have been obtained from vendor pricing and estimated from a first principals' basis where necessary. Vendor pricing forms greater than 80% of the estimated capital costs for the concentrator. In addition, Black Rock has formed a strategic agreement with Yantai Jinyuan Mining Machinery Ltd (Yantai), a major graphite process plant engineering company based in China's Shandong Province, to supply process plant machinery for the project.* *Freight estimates are based on firm quotes from reputable, in country logistics suppliers and TAZARA (Tanzania Zambia Railway Authority) a bi-national railway freight provider using standard rates.*
	Allowances made for the content of deleterious elements.	*Metallurgical testwork had not identified any deleterious elements or radioisotopes.* *No allowances have been made for deleterious elements during the Reserve estimation.*

	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.	*Product sales are by long term contracts, on a peer to peer basis. Public price data is considered competitive industry intelligence with little disclosure of long term pricing, other than through third party consulting organisations.* *Graphite basket pricing used in this Reserve estimate has referenced natural graphite flake pricing sourced from Roskill 2018. Market pricing is forecast price FOB China. This is considered as spot pricing. Basket prices used in reserve assessment is based on sub baskets of flake of different sizes and composited to form a weighted average price for each deposit. Basket pricing in USD is set out below for 97.5% product.*

Mesh	*95% Segment FOB Dar*	*97.5% Segment FOB Dar*	*99% Segment FOB Dar*
32	*1,230*	*1,467*	*1,705*
50	*1,106*	*1,343*	*1,581*
80	*1,101*	*1,339*	*1,576*
100	*1,039*	*1,277*	*1,514*
-100	*977*	*1,215*	*1,452*
Weighted Ave.	*1,063*	*1,301*	*1,538*

		Black Rock has entered into a non-binding Term Sheet for Life of Mine contract for sales of -#100 mesh concentrate to POSCO International. A total of 30,000 tonnes (plus 15,000 tonnes of volume at sellers options) of large flake is allocated under binding Term Sheets to two Chinese customers.
	Derivation of transportation charges.	*These have been accounted in derivation of price FOB Dar Es Salaam.*
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	*Pricing basis is FOB Dar es Salaam. See above for derivation of graphite basket price.*
	The allowances made for royalties payable, both Government and private.	*All royalties, a 16% free carried interest and taxes have been considered in the assessment. VAT is assumed to be fully refunded on export of product.*

Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.*	*A premium of 2.5% has been applied to account for the increased purity (98%-99%) of Black Rock's product relative to the reference Chinese basket of 94% - 95%. A further adjustment was made to equalise freight between China and Dar es Salaam to ensure pricing is based on equivalent basis.* *Pricing basis is FOB Dar es Salaam.* *Marketing and realisation costs have been considered as part of the operating cost.*
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	*For the eDFS, company specific price estimates vary from external industry sourced data, however for external public reporting of valuation, referenced public data has been selected.* *Pricing has been referenced Roskill Natural and Synthetic Graphite: Global Industry, Markets and Outlook, 2018 © Roskill, 2018. Roskill estimates have been modified by Black Rock to account for targeted grades not being reported, and for flake sizing not considered by Roskill.* *Time periods have been averaged over time to generate a real price for project start date.* *FOB realized pricing has been generated by removing an evenly weighing for freight between Tanjin, Tokyo and Busan from prices FOB China. Nominal frictional costs for agency, long term contract discounts of 2.5% each are then added to generate prices FOB Dar es Salaam.* *China has a dominant position in the global supply of graphite. Recent product prices from published Asian based indices, RefWin and ICCSino were used to compare and validate the basket prices from the eDFS. The prices used in the study were found to be relevant and current.*

Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.*	*Graphite flake is an internationally traded industrial mineral concentrate. Traditional uses include refractory, lubrication and expanded flake for insulation. Significant growth in the Lithium Ion Battery sector, of which graphite is a key input, battery anode precursor, is widely forecast to increase volumes in the near term.*
	A customer and competitor analysis along with the identification of likely market windows for the product.	*Chinese production currently dominates freely traded graphite production and is considered to form spot pricing. The discovery of the East African graphite province has led to a number of projects being identified. Development of all projects will exceed current projection for demand. Mahenge's staged development strategy is designed to ensure market shocks associated with significant increases in available volume are managed.* *Mahenge's product profile is for 70% flake and 30% fines. The flake market is already in deficit and subject to successful pre-qualification market is assumed to support volume and pricing.*

	Price and volume forecasts and the basis for these forecasts.	*Graphite is sold by contract based on the performance of market samples provided to customers.* *Current graphite market volumes are estimated at 800kt, with most production being of Chinese origin. Industry analyst Roskill estimate that by 2025, the global volume will rise to 1.6Mt. Existing mine closure of 0.4Mt indicate new production of 1.2Mt will be needed by 2025.* *Black Rock's product of above average industry purity is well suited for the energy storage market and other high end industrial applications (eg. fire cladding material).* *In December 2020, Black Rock successfully secured POSCO as a cornerstone investor and a 100% supply 25-30ktpa of LOM fines (<100 mesh) from the first module.* *In August 2021, Black Rock successfully transited two of its existing Chinese offtake customers to binding offtakes for 30ktpa of large flakes (>+100 mesh) with options for a further 15ktpa from the first module. Product pricing is indexed to published Asian based indices, RefWin and ICCSino.* *In the absence of binding pricing and contracted volumes, the Reserve is considered to be of a Probable level of confidence.*

Economic	*The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.*	*The project economic analysis has been performed by PCC on behalf of CPC Engineering and Black Rock. The assumptions used in the Ore Reserve analysis are as follows:* • *Inferred material was assigned zero value and assumed to be waste* • *10% discount real* • *LoM Cash costs $397/t USD* • *Payback Period 3.8 years from first production* • *NPV $1,712M USD Real before tax* • *NPV $1,162M USD Real after tax* • *IRR 53.6% Real before tax* • *IRR 42.9% Real after tax* • *Capital stage 1 - $115.6M USD for 1Mtpa throughput* • *Capital stage 2 – $69.5M USD* • *Capital stage 3 – $85.3M USD* • *Capital stage 4 - $67.1M USD*
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	*The project is relatively insensitive to capital and operating costs. However it is sensitive to product grade and price obtained. A 10% change in grade impacts NPV by 17%, and a 10% change in price impacts NPV by 18%.*

Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	*The EIS process commenced in February 2017. The EIS process was withheld due to changes in the Tanzanian Mining Law during the second half of 2017.* *The EIS and environmental licence was granted in 2018. Licence will be transferred into a Special Mining Licence which will be granted as part of the Free Carried Interest Framework Agreement agreed with the Government of Tanzania on 13th of December 2021.* *The Resettlement Action Plan consisting identifying villagers impacted, village land use plan and the resettlement site plan were completed over 2021. The compensation and physical resettlement of villagers will as part of the implementation of the FCI framework agreement completed with the Government of Tanzania on 13th December 2021.*
Other ***To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves.***	*Any identified material naturally occurring risks.*	*A risk analysis was undertaken and summarised by CPC Engineering. Four key risks were identified:* • *Delays to the project would result in the project missing the anticipated capital and offtake market windows.* • *Risk of funding not being available to fund the project to construction and full operation.* • *Risk that Black Rock is not able to achieve full pricing for it's product.* • *COVID induced supply chain disruption impacting capital costs and logistics availability*

	The status of material legal agreements and marketing arrangements.	*An Environmental Impact Assessment Certificate for the project was issued by the National Environment Management Council of Tanzania (NEMC) in September 2018.* *In December 2020, POSCO became a cornerstone investor and offtaker after entering into a Strategic Alliance and Development Memorandum of Understanding in June 2020 and committed to the development of the Mahenge Graphite project.* *In August 2021, Black Rock successfully transited two of its existing Chinese offtake customers to binding offtakes for 30ktpa of large flakes (>+100 mesh) with options for a further 15ktpa from the first module. Product pricing is indexed to published China sourced indices, RefWin and ICCSino. This raises total commitments up to 60ktpa (or 70%of product) expected from the first module.* *In December 2021, Black Rock have completed a large qualification pilot plant processing campaign of 500t and the graphite concentrate post qualification has commenced. Final basket pricing can be expected post qualification. Black Rock is pursuing a strategy of locking up a significant portion of product from the first module under long term offtake contracts.* *As part of the Strategic Alliance and Development MOU, Black Rock is progressing discussions with POSCO of an Offtake Agreement which includes a prepayment facility of up to US$20m. In December 2021, a term sheet with POSCO had been agreed for product prepayment of US$10m and a 100% of fines from the first module. The term sheet is a precursor to a binding offtake agreement to be finalised in early 2022.*

	The status of government agreements and approvals critical to the viability of the project, such as mineral tenement status and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third part on which extraction of the reserve is contingent.	*Two contiguous mining licences covering Ulanzi, Cascades and Epanko North, ML 611/2019 and ML 612/2019 were granted in February 2019.* *The 16% Free Carried Interest (FCI) framework agreement for the project with the Government of Tanzania was reached and formally signed in December 2021. A joint venture company, Faru Graphite Corporation (Faru) has been established as part of the FCI framework agreement. The Government of Tanzania will own a 16% shareholding in Faru while Mahenge Resources Limited (UK), a 100% subsidiary of Black Rock, will own the remaining 84%.* *A Special Mining License can be expected and granted in due course, in pursuit of FCI framework agreement, to unify the two mining licenses and part of prospecting lease PL 13752/2019.*
	The basis for the classification of the Ore Reserves into varying confidence categories. Whether the result appropriately reflects the Competent Person's view of the deposit. The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	*Because there is no certainty that all assumptions will materialise the Measured and Indicated materials within the schedule have been converted to the Probable reserve category.*

Classification	*The results of any audits or reviews of Ore Reserve estimates.*	*An external technical review of the eDFS was undertaken and completed by SRK Consulting (Australia) in November 2020 as part of POSCO's due diligence process for investing US$7.5m to acquire 15% of Black Rock. SRK Consulting had made the following recommendations:* • *Prepare a final consolidated eDFS report with reference documents able to support an external funding review;* • *Revise capital and operating costs to based upon formal contractor quotation pricing;* • *Foundation investigation, characterisation and stability analysis checks required where structures are situation on sloping ground (waste dumps and waste rock embankments);* • *Carry out residue filtration testing to define target moisture content of the dry stack tailings;* • *Confirm via MOU the process and cost of a power transmission line to site to provide a definitive capital cost baseline.*
Audits or reviews	*Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.*	*The modifying factors for the Reserve is based on the eDFS completed in July 2019. Economic assumptions are based on pricing as at September 2018 and continue to remain current under existing economic conditions.* *The Resource estimate was completed in September 2016, July 2017 and November 2021. Statistical investigations have been undertaken on 2m composites within the mineralised domains (zones), as applied to an Ordinary Kriged grade estimate. The relative precision of an estimate is consistent with the JORC classification methodology.* *A very small volume of non-classified material is processed for the first 20 years of the mine schedule with increasing volumes thereafter. A large portion of resource is classified as Measured in the production schedule.* *All Ore Reserve estimates are classified as Probable due to marketing considerations and securing favourable funding terms for the project.*

Discussion of relative accuracy/ confidence	*The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	*The resource, and hence the associated reserve, relate to global estimates.*
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	*The project has advanced past study stage and is at pre-construction/early works stage. Continued advancement through pilot plant, Front End Engineering Design Study and change to a contract mining model will reduce risk to the invest cost and operating parameters of the project. This will be expressed as a reduction of contingency applied to the capital estimate, EPC estimate and operating cost estimate.* *Irrespective of reduced contingency as a consequence improved study precision, the Reserve will continue to be classified as Probable until there is enforceable offtake agreement for an economically important volume of production.*
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	*Project has completed a Definitive Feasibility Study in October 2018 and a subsequent update enhanced Definitive Feasibility Study in July 2019. An absence of production data precludes further comment.*