



**BLACK ROCK**  
MINING LIMITED

**MAHENGE GRAPHITE  
BEST OF CLASS GRAPHITE PROJECT**

*Naturally Better Graphite*

**October 2018 Definitive Feasibility Study**



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## COMPETENT PERSONS

The information in this report that relates to Exploration Results and Mineral Resource Statements is based on information compiled by John de Vries, who is a member of the AusIMM. He is an employee of Black Rock. John de Vries has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 and 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

The information that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (Consultant with Trepanier Pty Ltd) and Mr Aidan Patel (Consultant with Patel Consulting Pty Ltd). Mr Barnes and Mr Patel are members of the Australian Institute of Mining and Metallurgy and have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Barnes, Mr Patel and Mr de Vries consent to the inclusion in this report of the matters based on their information in the form and context in which they appear.

The Ore Reserves have been compiled by Black Rock Mining, under the direction of Mr John de Vries, who is a Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy. Mr de Vries is a full-time employee of Black Rock Mining and holds performance rights in the company as part of his total remuneration package. Mr de Vries has sufficient experience in Ore Reserve estimation relevant to the style of mineralisation and type of deposit under consideration to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Mineral Resources and Ore Reserves".

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# 1. Black Rock Mining Summary

- **Mahenge Graphite Project** – Black Rock Mining (ASX:BKT) has a 100% interest in the Mahenge Graphite Project located in Tanzania.
- **Resource** – Mineral Resource Estimate of 212 Mt at 7.8% TGC for over 16 Mt of contained graphite. Proven high quality multi-generational Resource demonstrated to deliver the highest grade graphite concentrate available globally through a simple flowsheet, and a scalable business model.
- **DFS Delivers and De-Risks Best in Class Undeveloped Graphite Project** – Quality study completed by consultants and contractors with real graphite mine building and operations' experience.
- **Low Capex and High Margin** – Lowest peak capital expenditure per annual tonne of production of any development stage global graphite project coupled with highest margin due to very low relative costs to customers and best in class concentrate grade and flake size distribution.
- **Low Technical Risk** – Substantial pilot plant run of 90 tonnes has enabled a relatively simple flow sheet design due to quality of ore.
- **Product Flexibility** – Mine can produce three grades of product off the one process circuit to provide sales and marketing options.
- **Logistics** – Rail access to Port of Dar es Salaam delivers lowest cost logistics' solution and minimal working capital requirements given access to frequent shipping and containers.
- **Grid Power** – Allows for sustained lower cost operation.
- **Environmental Approval in Place** – Environmental approval received in August 2018 with mining licence application expected to be lodged and received in the short term.
- **Financing Options** – Strongest project metrics supported by largest pilot plant testwork deliver financing options including the vendor finance opportunity announced in September 2018.
- **Strong Management Capability** – Proven management team focused on finance and project execution.
- **Path to Market Established** – Real partners in place, 8 tonnes of concentrate produced, and 24 customers working with samples. Progressing with Offtake.

## 2. Black Rock Mining – Corporate

ASX Code	BKT
Share Price at 19 October 2018	A\$0.032
Shares on Issue	521.8M
Options	63.9M
Performance Rights	1M
Fully Diluted Market Capitalisation	A\$18.8M
Cash on hand as at 30 September 2018	A\$2.7M
<b>Top 20 Shareholders</b>	c.50%
<b>Major shareholders</b>	
Copulos Group	21.58%



### Key Management



#### JOHN DE VRIES CEO and Managing Director

Mining Engineer with over 35 years-experience in mine development and operations. Previously, General Manager Technical Services with St Barbara and integral in the 2014 turnaround. John has held positions at BHP Ni West, and was Global Business Manager, Advanced Mining Solutions with Orica Mining Services. John's geographic experience includes Africa, the Pacific, the FSU, North America and South America.



#### RAYMOND HEKIMA Vice President – Corporate (Tanzania)

Holding qualifications in Environmental Sciences and Management with over 13 years experience with Government and Corporate sectors. Raymond is responsible for overall business and operations in Tanzania and manages relationships and interactions with, National Government, Local Government, NGO's and Community relations.



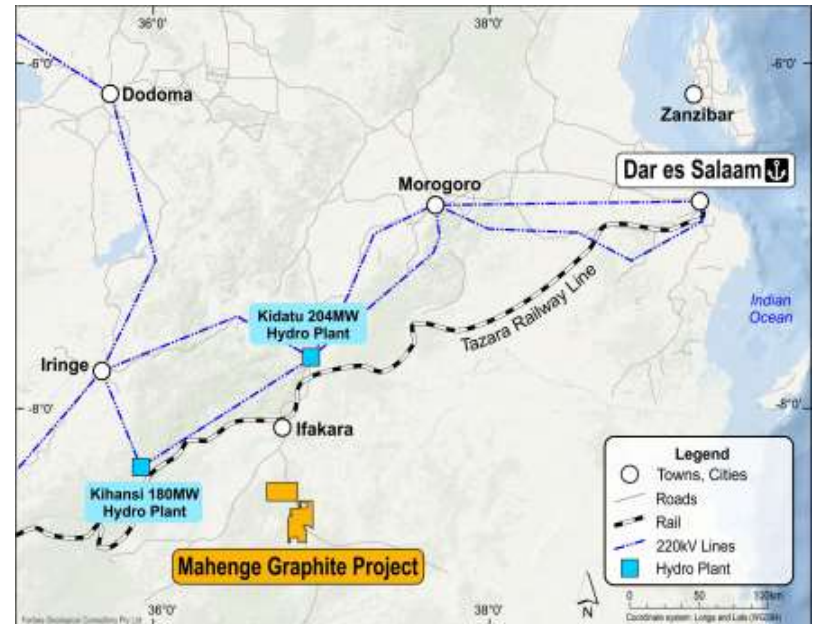
#### RICHARD CROOKES Non-Executive Chairman

A geologist with over 30 years executive experience in the resources and investments industry. He is currently an Investment Director of EMR Capital and was formerly a Director of Macquarie Bank's Metals Energy Capital Division and was Chief Geologist with Ernest Henry Mining.



## 2. Black Rock Mining – Mahenge Graphite Project

- **100% project ownership** – Black Rock Mining (ASX:BKT) has a 100% interest in the Mahenge Graphite Project located in Tanzania.
- **Quality** – Proven high quality Resource demonstrated to deliver highest grade concentrate available globally through a simple flowsheet and a scalable business model.
- **DFS delivers and de-risks best in class undeveloped graphite project** – Quality study completed by leading graphite consultants and contractors supported by experienced Chinese supply chain.
- **Experienced engineering** – CPC & Yantai have delivered five graphite projects globally in the last 10 years.
- **Flexibility** – Can produce three grades of product off one process plant circuit.
- **Logistics** – Rail access to Port of Dar es Salaam enables low cost haulage and ready access to shipping and containers
- **Grid power** – Reduced sensitivity to fuel price movements
- **Funding** – significant portion of funding potentially supported by vendor finance
- **Strong management capability** – Proven management team focused on finance and project execution
- **Path to market established** – Real partners in place and progressing with Offtake



Project Location Map with Grid Electricity Network, Rail and Port



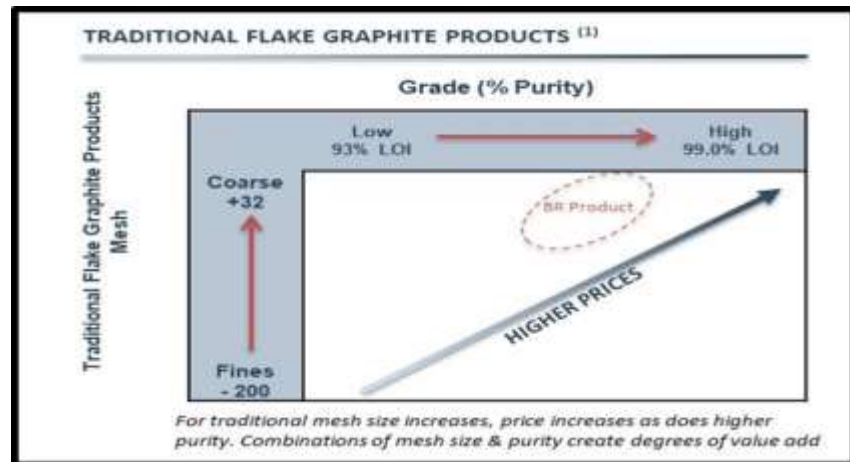
Mahenge Project Site

## 2. Black Rock Mining – Graphite Fundamentals

- **Market in transition** – Volume historically led by steel market and Chinese industrialisation. Lithium ion Batteries (LiB) reshaping product type and quality premiums.
- **Environmental premiums** – Significant footprint in refining for LiB has increased premiums for higher grade concentrates.
- **China low quality product** – Major supplier is dominated by small flake size and low grade products. Customers are seeking higher quality and prepared to pay given value in use upside.
- **Expanded graphite** – Significant and growing deficit in large high quality flake segment.
- **Pricing** – Pricing is a function of concentrate grade/purity and flake size. The higher the concentrate grade and the coarser the flake, the higher the price.

				
<b>THERMAL MANAGEMENT</b>  Geothermal Refractories Crucibles Hot Metal Toppings Foundry HMF- Dispersions Glass	<b>ENGINEERED PRODUCTS</b>  Friction Powder Metallurgy <b>*Graphite Foils</b> Agriculture Ceramics SiC Optics MIL-SPEC Carbon Brush Pencil	<b>LUBRICANTS</b>  <b>*Grease</b> Dry Powders Seed Lubes Rail Lubes Dispersions MIL-SPEC <b>*Drilling Fluids</b>	<b>ENERGY STORAGE</b>  Alkaline Batteries Lead Acid Batteries <b>*Li-Ion Batteries</b> Primary Lithium Super-Caps Fuel Cells DOD & DOE E-Bikes	<b>PLASTIC, POLYMERS, RUBBER</b>  Conductive Plastics Conductive Coatings & Paints <b>*Fire Retardants</b> Antistatic Flooring PEEK PTFE Rubber Electronics Packaging
<i>* Applications that are initial targets, are testing, or qualifying lab samples; next step commercial bulk samples (customer paid).</i>				

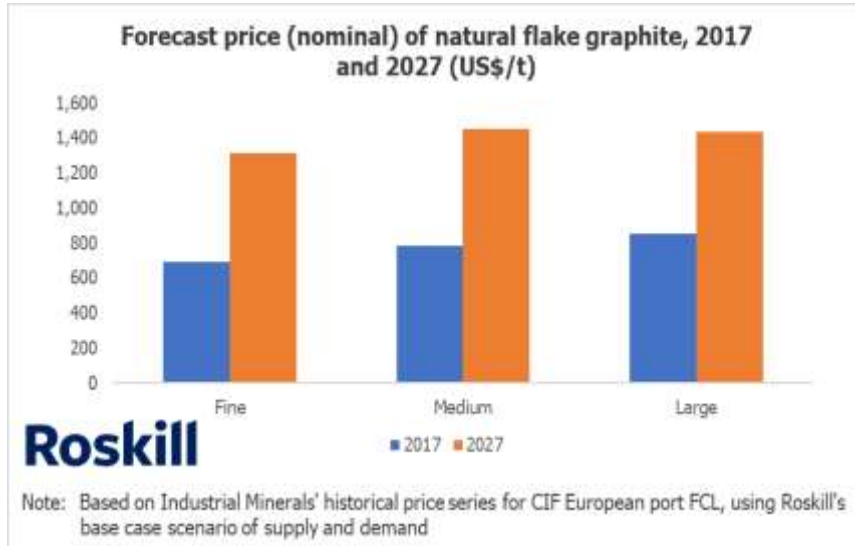
Uses for Graphite Concentrate



Pricing for Flake Size and Concentrate Grade

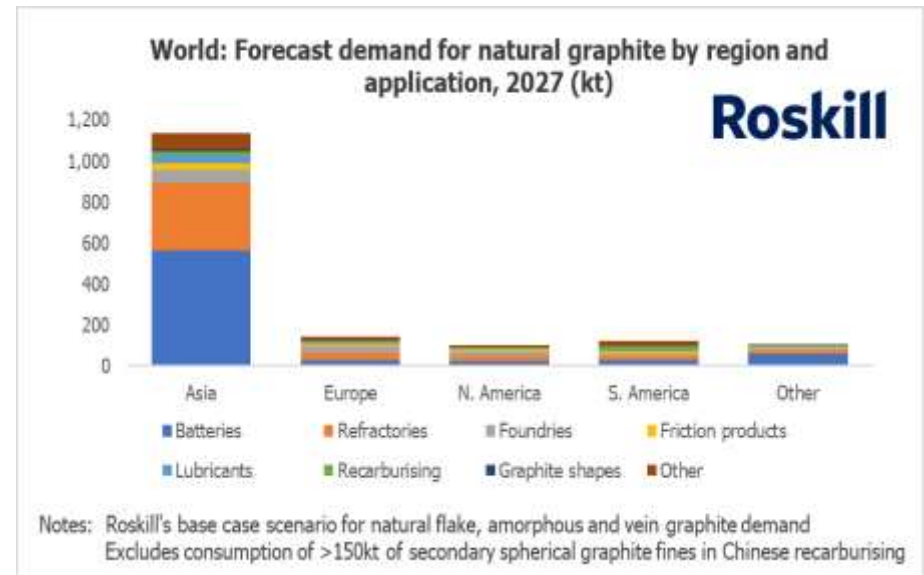
## 2. Black Rock Mining – Global Graphite Market

- **Demand** – Expected to double over next decade driven by batteries and expandable applications.
- **Supply** – Current Chinese supply under pressure with Chinese environmental targets driving mine closures. Supply expected to shift from China to Africa.
- **Pricing** – Forecast to nearly double between 2017 and 2027



**Roskill Estimates for Natural Flake Graphite Pricing to 2027<sup>1</sup>**

<sup>1</sup>Source: Roskill. Published in: *Natural and Synthetic Graphite: Global Industry, Markets and Outlook*, 2018 © Roskill, 2018



**Projected Demand by Region and Application in 2027<sup>1</sup>**

Application	Forecast Demand 2027 (kt)					Total
	Asia	Europe	North America	South America	Others	
Batteries	564	26	24	27	61	702
Refractories	329	40	23	21	16	429
Foundries	64	28	22	13	10	137
Friction Products	30	14	10	9	4	67
Lubricants	37	10	6	5	5	62
Recarburising	23	3	3	22	3	53
Graphite shapes	11	3	2	1	2	19
Other	78	17	13	22	7	137
<b>Total</b>	<b>1,134</b>	<b>141</b>	<b>104</b>	<b>120</b>	<b>108</b>	<b>1,607</b>

**Projected Natural Graphite Demand by Region and Application in 2027**



### 3. DFS Highlights

- **Annual Steady State Production** 240k tonnes per annum
- **Graphite Product** 97.5% LOI sized
- **Life of Mine** 32 years
- **Mine life under Reserve** 25 years
- **Ore Reserves** 70mt @ 8.5% TGC
- **Resources** 212mt @ 7.8%
- **Pre Production Capex \*\*** US\$115M
- **Capex for Stage Two** US\$69.5M
- **Capex for Stage Three** US\$84.2M
- **Steady State Opex** Mine Gate US\$321/tonne  
FOB Dar\*\*\* US\$397/tonne
- **Cumulative EBITDA first 3 years** US\$313M
- **Basket Price** FOB Dar US\$1,301/tonne
- **AISC Margin** 63.6%
- **NPV<sub>10</sub>** post tax, post FCI US\$895M
- **NPV<sub>8</sub>** US\$1,191M
- **IRR** post tax, post FCI 42.8%
- **Brook Hunt C1** US\$401/tonne
- **Brook Hunt C3** (incl Stage 2 & 3) US\$486/tonne

\*FCI= 16% Tanzanian Free Carried Interest  
 \*\*excludes \$10m power supply pre-payment  
 \*\*\*excludes withholding tax

Average Sales Price (US\$/t)	NPV10 All Equity Post Tax & FCI*	IRR (%)	Brook Hunt C1 Margin (%)
1,700	1,349	52.9%	78.1%
1,500	1,122	48.1%	73.1%
<b>1,301</b>	<b>895</b>	<b>42.8%</b>	<b>69.2%</b>
1,100	654	34.8%	63.7%
900	395	26.0%	55.9%
700	136	15.8%	43.5%

Mahenge Graphite Project Price Sensitivity



Graphic Showing 3D of Proposed Process Plant (Stage 1 Only)

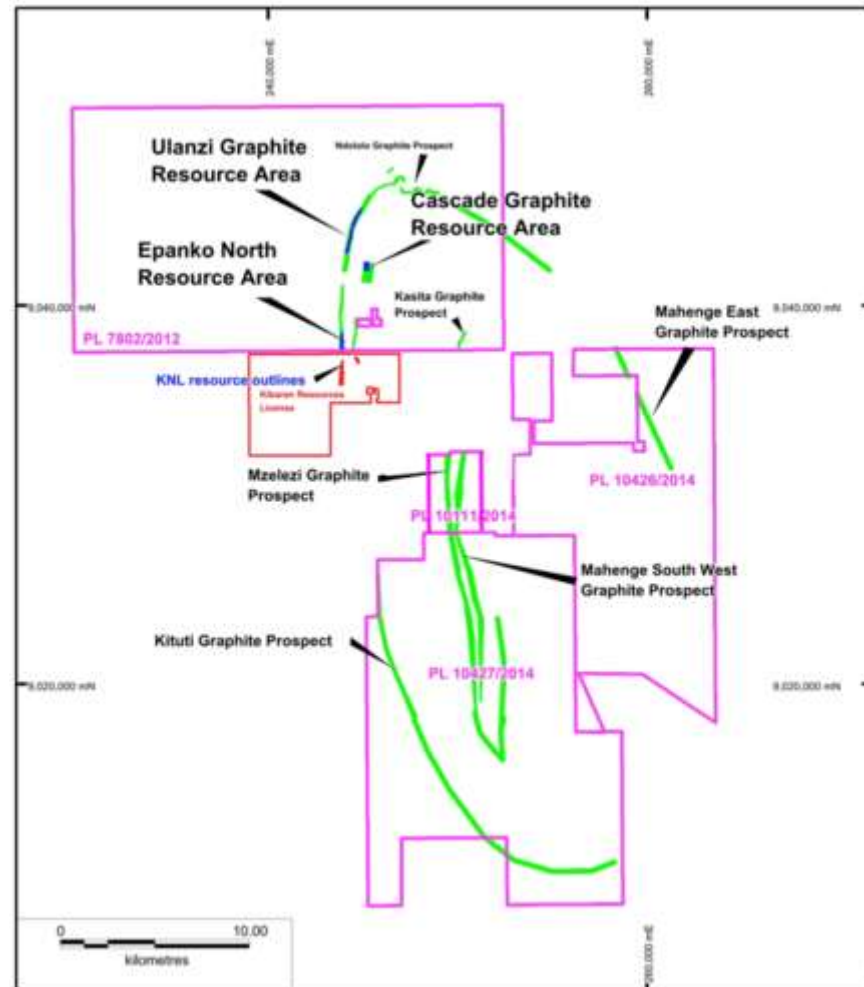
## 4. DFS Detail – The Resource and Reserves

- **Global Resource** – globally significant Mineral Resource Estimate (JORC compliant) with over 16Mt of contained graphite
  - Total area held under licence 519.8 km<sup>2</sup>
  - 175 RC holes for 15,166.7 m of drilling
  - 34 Diamond holes for 3,911 m
  - 31 PQ diamond holes for 1,900 m waiting on met test work

Category	Material (Mt)	TGC (%)	Contained TGC (Mt)
Measured	25.5	8.6%	2.2
Indicated	88.1	7.9%	6.9
Inferred	98.3	7.6%	7.4
<b>Total</b>	<b>211.9</b>	<b>7.8%</b>	<b>16.6</b>

- **DFS Ore Reserve** – Second largest global Reserve (JORC compliant) with 6Mt of contained graphite

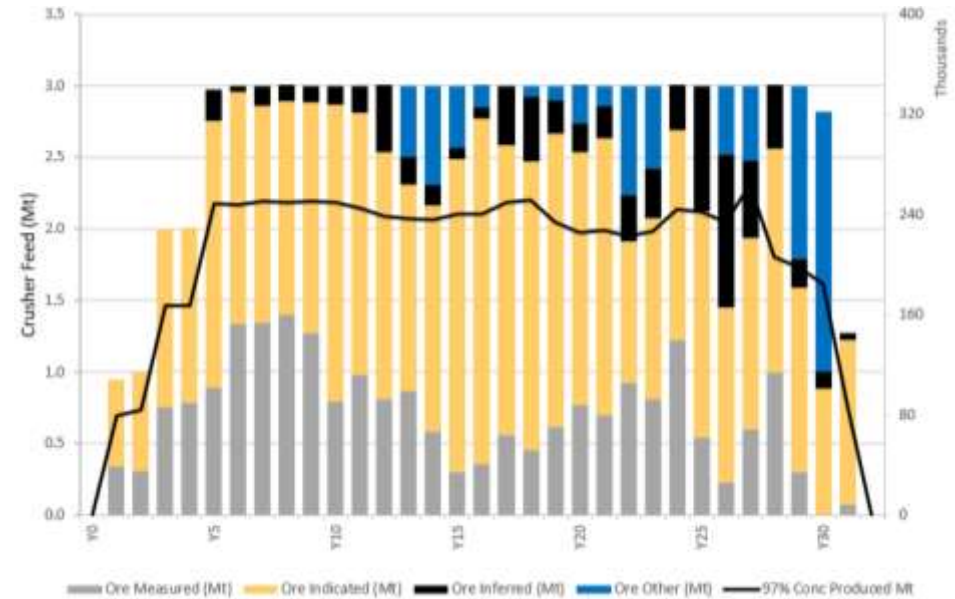
Category	Ulanzi		Cascade		Total	
	Mt	TGC %	Mt	TGC%	Mt	TGC %
Proven	0.0	-	0.0	-	0.0	-
Probable	46.5	8.4%	23.1	8.6%	69.6	8.5%



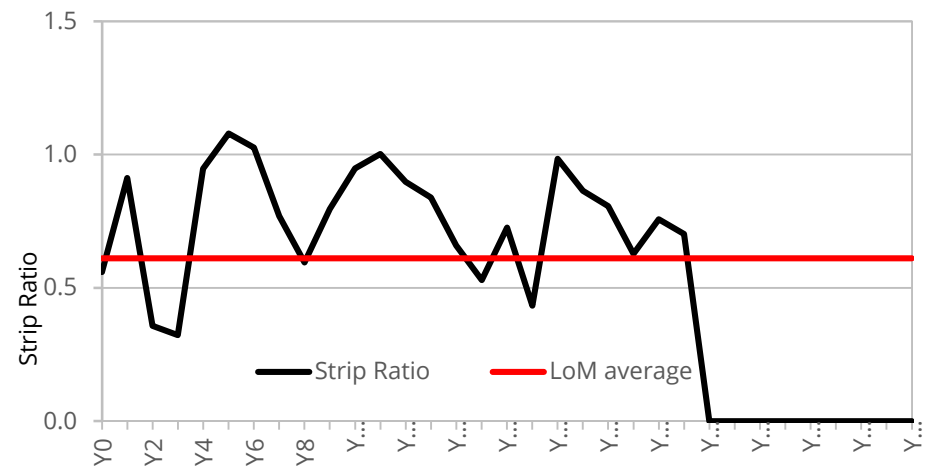
Mining Tenement Detail Map

## 4. DFS Detail – The Mine

- **Tonnes per annum** – Modest 1 Mt/y per stage module, with only 1.5 Mt of rock moved given exceptionally low strip ratio.
- **Low strip ratio** – Low life of mine S.R. is 0.6, but varies between 0.5 to 1.0 through pit cut backs.
- **Equipment** – Small equipment proposed consistent with what is currently available in Tanzania – simplifies training, parts and support:
  - 40 tonne class excavators
  - 20 tonne heavy duty trucks
  - Auxiliary fleet to match
- **Mining strategy** – Self perform given simplicity of the mine and increased flexibility, reduction in opex and employment benefits associated with Tanzanian Government employment strategy.
- **Grade control** – Mining all ore above cut off and reclaiming via blended ROM stockpiles, radically simplifies grade control strategy, lowers strip ratio, defers waste stripping and reduces short term variance in mill feed.



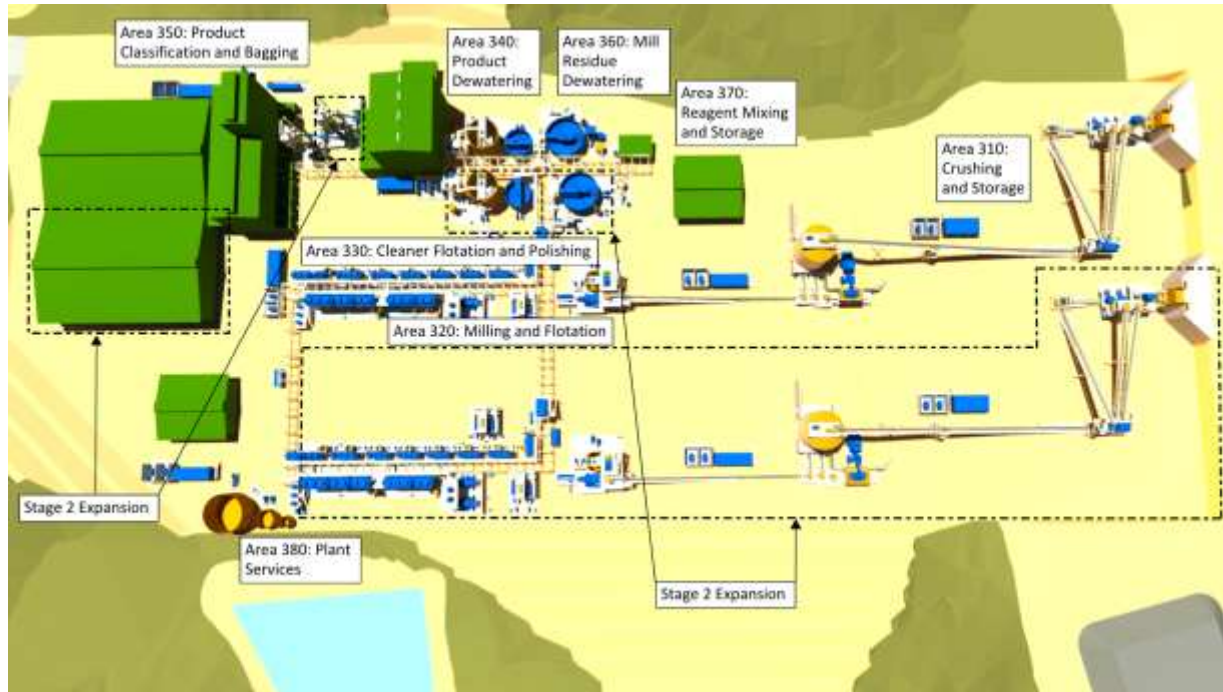
Life of Mine Mill Feed and Concentrate Production



Life of Mine Strip Ratio

## 4. DFS Detail – The Process Plant

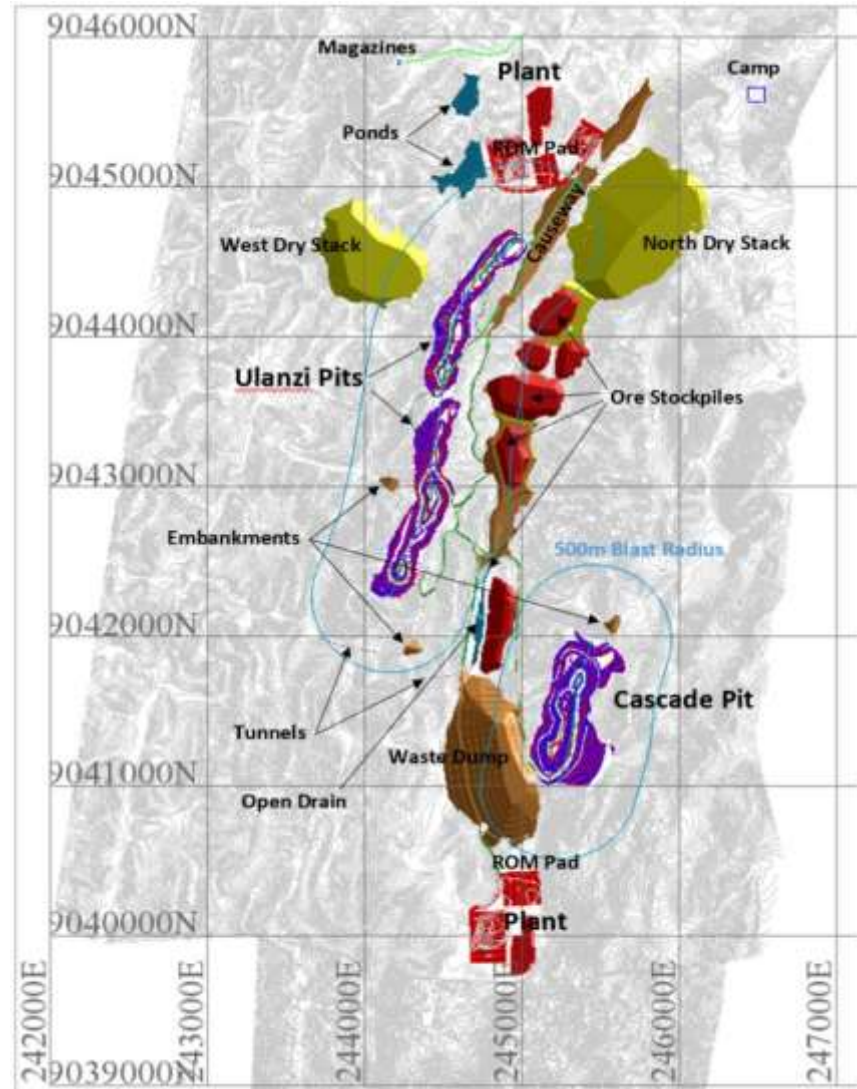
- **Pilot plant** – Design is based on data from 90 tonne pilot plant 15 circuit iterations.
- **Simple** – Single circuit eliminates intermediate screen – low technical risk coupled with capital and operating cost benefits.
- **Modular** – Equipment has been nominated as partly pre-assembled in sizes where possible suitable for containerised transport to minimise logistics costs, the risk of theft or damage in transit and to make site installation easier.
- **Flexible** – Three stage polishing produces range of products from 95% to +99% Mahenge ULTRA PURITY-FP™.
- **Blended** – Feed is reclaimed from blended fingers on the ore which reduces short term variability improves throughput and recovery.
- **Automation** – Relatively automated plant increases control and ability to produce to specification.
- **Lab** – Contract lab acts as independent surveyor for customs duty and export certification.



Process Plant Layout (Stage 1 and Stage 2)

## 4. DFS Detail – Site Masterplan

- **Light environmental touch**
  - No forest reserves
  - No commercial crops
  - No formal settlements
  - Small dump footprint
- **Dry stack mill residue**
  - No wet season decant
  - Dry season water balance
  - Effective AMD control
  - 70% reduction in foot print relative to wet dams
  - Simple progressive closure
- **Surface runoff**
  - Above valley floor for 10 years
  - After year 10, dam & use existing valley floor to divert water around pit
- **Site infrastructure**
  - Re-establish historical lower access road
  - Key infrastructure at end of road - secure

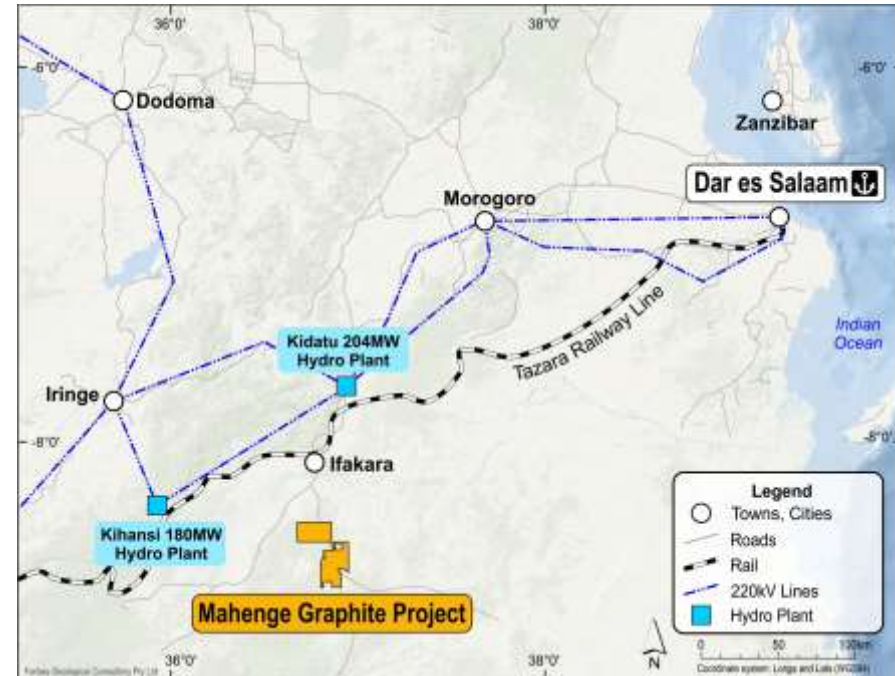


Map showing proposed masterplan for the mine



## 4. DFS Detail – Utilities and Logistics

- **Best in class utilities and logistics** – Access to grid power and rail to deep water port provide the Mahenge Graphite Project with best in class utilities and logistics
- **Power**
  - 60 km from 220 KV national grid
  - Hydro power
  - 8.1 cents/unit vs 32 cents/unit from diesel (DFS on site generation estimate)
- **Rail and dry port**
  - 10 days plant to port is reality. Greatly reduces working capital requirements and provides for simple spot sales
  - 60 km road haul to Ifakara
  - 340 km rail haul direct to port
  - Rail 6 cents/tkm vs road 30 cents/tkm
  - Customs clearance and export controls completed before dispatch
  - Warehousing and consignment build completed at Ifakara
  - Rail used for FIFO transfers and Dar based personal
  - Freight and weekly passenger service by “Mahenge Express” freight and passenger unit train



Map showing project location, relevant grid electricity network, rail and port

**Power and rail solutions significantly enhance logistics and underpins low, deliverable opex**  
(See Slide 29 in Appendix for Tanzanian Port Analysis)

## 4. DFS Detail – Capital Expenditure Estimate

**Realistic and deliverable capital expenditure based on substantial engineering test work.**

- **Accurate vendor pricing** – Over 90% of total capital estimated from direct vendor quotes.
- **Critical plant items** – Estimated from pilot plant or samples provided to vendors.
- **Modular strategy** – Mine built in three stages which reduces complexity and maximises ability to utilise in bound rail.
- **Experienced engineering** – CPC & Yantai have delivered five graphite projects globally in the last 10 years (including SYR's Balama Mine)
- **Single process plant vendor** – Yantai to construct entire process plant reducing design "gap" risk.
- **Targeting savings into detailed engineering** – Completion of further metallurgical testwork during the detailed engineering program expected to reduce capex.
- **Owners costs** – include lab commissioning, owners labour, store first fills, insurance spares, accommodation and catering and preproduction and commissioning.
- **Contingency** – 10% Stage 1, 15% for Stages 2 and 3.
- **Power** – Grid connection provision of US\$10M is reimbursable through reduced tariffs.

Area (WBS Level 1)	Stage 1	Stage 2	Stage 3
	US\$M	US\$M	US\$M
1 - Mining*	10.1	-	-
2 - Ifakara	1.4	1.0	0.7
4 - Infrastructure	14.3	3.3	4.7
3 - Process Plant	50.9	45.3	53.2
5 - Site Support (Temporary Services)	1.8	0.2	0.2
7 - Indirects	9.94	7.0	8.5
8 - Owners Costs	15.8	5.2	6.3
9 - Contingency	11.0	7.5	10.5
10 – Grid Connection**	10.0	-	-
<b>Total</b>	<b>125.2</b>	<b>69.5</b>	<b>84.2</b>

### Capital Expenditure Estimate for Three Stages of Construction

\* Mining for Stage 2 is achieved by increase in operating hours, Stage 3 is planned fleet change

\*\* Grid connection is a co payment to support capital for line extension. Cost is refunded through tariff offset until fully recovered

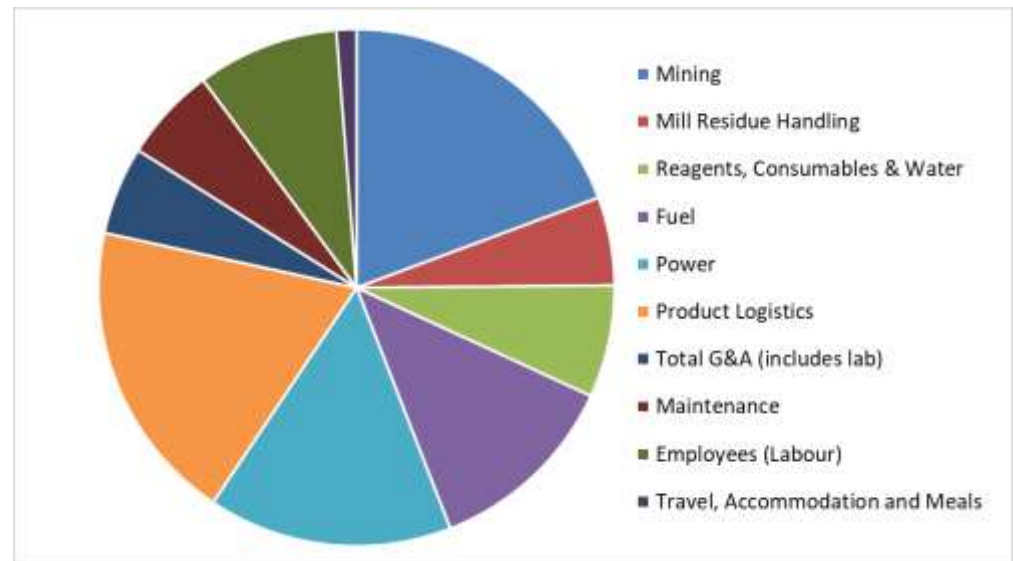
## 4. DFS Detail – Operational Expenditure Estimate

### Defendable and deliverable best-in-class operational expenditure

- **Mining** – Topographical advantage – deposit delivers low strip ratio driving low mining costs.
- **Labour** – Salaries and on-costs were provided by Mercer and include full on costs. Expat light as function of Operational Readiness
- **Power** – Estimated using TANESCO rates and tariffs and power draw from the site electrical load list.
- **Product logistics** – Self performed transport model utilising TAZARA rail and a port logistics provider.
- **Port of Dar es Salaam** - Deepwater port with container availability and year-round shipping unlike peers = **reduces working capital requirements and stock build up**
- **Reagents and consumables** – consumption from process design criteria and costs from local vendors
- **Process plant experience** – CPC and Yantai designed process plant optimises flow sheet to deliver consistent product efficiently.

	LOM Average US\$/t feed	LOM Average US\$/t concentrate
Mining	7.9	98.2
Processing	14.1	175.5
Administration	1.8	22.0
Logistics (Black Rock)	2.0	25.2
Transport and Freight	6.1	76.0
<b>Total</b>	<b>31.8</b>	<b>396.8</b>

Operational Expenditure by Ore and Concentrate



Operational Expenditure Breakdown by Area

## 4. DFS Detail – Project Execution Plan

- **Segmented approach** – Clear accountabilities with Company oversight improves control and quality.
- **Early civils** – Mining fleet completes early civil works with aggerate crusher relocated as stage one mill duty crusher.
- **EPCM strategy** – CPC to transition to owners’ team to validate design and manage onsite activities of the contractors.
- **Detailed engineering and plant construction** – Yantai to complete detailed engineering, modular offsite build, shipment to site and assembly on site.
- **Commissioning** – Yantai to commission plant and handover subject to acceptance testing to ensure plant operations are consistent with design parameters.
- **Labour** – Nearby town of Mahenge provides ready pool of labour and reduces camp size and cost.
- **Operational readiness** – Built into project delivery to ensure all systems are in place to avoid post commissioning issues.

Description	Q4 '18	Q1 '19	Q2 '19	Q3 '19	Q4 '19	Q1 '20	Q2 '20	Q3 '20	Q4 '20
<b>Milestones</b>									
DFS Complete	◆								
Approval of Funds for Early Works Engineering		◆							
Mining License Approved			◆						
Approval of Full Funding				◆					
Commence Construction					◆				
Temporary Construction Facilities Available						◆			
NPI Handover								◆	
Process Plant Load Commissioned									◆
Process Plant Handover / Practical Completion									◆
<b>Mobilisation</b>				▬					
<b>Engineering</b>			▬						
<b>Procurement</b>			▬						
<b>Construction</b>			▬						
<b>Commissioning Load Tested</b>							▬		
<b>Handover</b>									▬

# 4. DFS Detail – Timeline

- **Project development** – 18 months from board approval to introducing ore into the plant
- **Staged implementation** – Three modules to be constructed over five years

Description	2018	2019				2020				2021				2022				2023				2024				2025					
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
<b>Stage 1</b>	[Orange bar from Q4 2018 to Q4 2020]																														
DFS Complete	◆																														
Engineering			[Pink bar]																												
Permitting		◆																													
Approval of Full Funding			◆																												
Construction			[Pink bar]																												
Process Plant Load Commissioned/Handover									[Pink bar]																						
Production Ramp-up												[Green bar]																			
Full Production																															
<b>Stage 2</b>	[Orange bar from Q1 2021 to Q4 2022]																														
Permitting (Stage 3 Including)																															
DFS Complete													[Pink bar]																		
Engineering																															
Construction																															
Process Plant Load Commissioned/Handover																															
Production Ramp-up																															
Full Production																															
<b>Stage 3</b>	[Orange bar from Q1 2023 to Q4 2024]																														
DFS Complete																															
Engineering																															
Construction																															
Process Plant Load Commissioned/Handover																															
Production Ramp-up																															
Full Production																															

Implementation Schedule

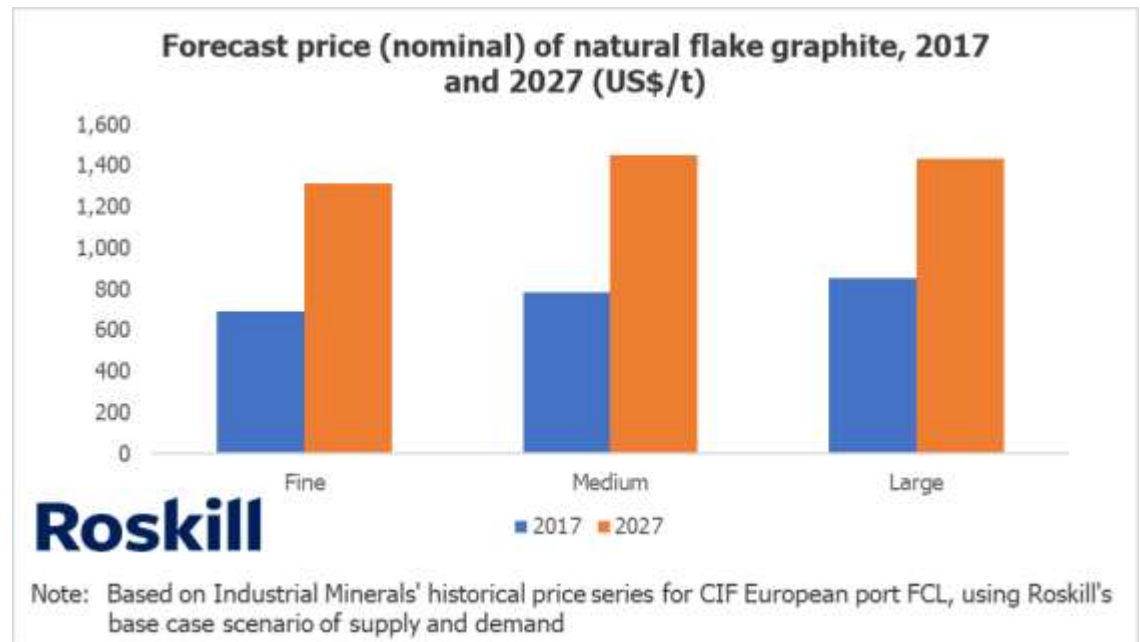


## 4. DFS Detail – Graphite Pricing Assumptions

- **Product quality** – Assumed average concentrate grade of 97.5% LOI with flake size distribution consistent with 90 tonne pilot plant.
- **Price deck build up** – data cross referenced from multiple sources Roskill, Benchmark Industrial Minerals, RefWin and independent market participants.
- **Price deck** – Averaged from Roskill prices for 2020 – 2027 with internally generated quality escalator to 97.5% and adjusted for mesh sizes.
- **Average price assumption** – LOM price US\$1,301/t FOB Dar es Salaam.
- **Shipping** – Average rates ex Dar es Salaam to Tanjin, Tokyo and Busan.
- **Channel and contracts** – Assumed 2.5% discount for marketing agent fees and discount to secure long term contracts.

Mesh #	Segment Pricing (US\$/t)	Basket Weight (%)	Shipping (US\$/t)	Channel & Agent (US\$/t)	Contract Discounts (US\$/t)	Basket (US\$/t)
+32	1,579	5	1.65	1.97	1.97	73
+50	1,449	18	5.96	6.52	6.52	242
+80	1,444	36	11.89	12.98	12.98	481
+100	1,379	9	3.06	3.19	3.19	118
-100	1,314	32	10.52	10.44	10.44	386
	<b>1,404</b>	<b>100</b>	<b>33.08</b>	<b>35.10</b>	<b>35.10</b>	<b>1301</b>

Graphite Pricing Used in Economic Model - FOB Dar es Salaam (97.5% LOI)



<sup>1</sup>Source: Roskill. Published in: Natural and Synthetic Graphite: Global Industry, Markets and Outlook, 2018 © Roskill, 2018

## 4. DFS Detail – Sales and Marketing

- **Products matched to markets –**  
Product has large flake bias and Ultra product has highest concentrate grade of any known natural flake graphite flotation concentrate. Strategy is to target products to markets as opposed to selling a bulk concentrate.
- **Flexibility –** Capacity to switch to higher quality product to achieve pricing premiums.
- **Pilot plant products with potential customers and partners –** 24 potential customers currently have samples from pilot plant with the largest sample size of 1,000 kgs. Samples were dispatched with certificates of analysis showing sizing, ph, density etc.
- **Large flakes and current market shortage –** large flakes are in current market shortage meaning this higher priced segment is a real focus for the Company.
- **Channels –** direct sales, agents and distributor network supports inventory management and identification of new opportunities.

		Mahenge Flake Graphite Suitability Targets					
		Products By Market / Application					
		+32	+50	+80	+100	-100	-200
<b>Thermal Management</b>	High End Refractory, Crucibles, Geothermal, HMF, HMT, Foundry, Upsetting		✓	✓	✓	✓	
<b>Engineered Products</b>	Friction, Ceramics, Pencil, Powdered Metal, Thermal Fluids, Carbon Brush, Foils, Seals, Graphene, Agriculture, Catalyst	✓	✓	✓	✓	✓	✓
<b>Lubricants</b>	Grease, Dry Lubricants, Dispersions, Coatings, Thread Compounds, Drilling Fluids, MIL-SPEC		✓	✓	✓	✓	✓
<b>Polymers &amp; Plastics</b>	Polymers, Plastics, PEEK, PTFE, Rubber, Fire Retardants, Coatings, Paints, Bearings, Inks		✓	✓	✓	✓	✓
<b>Energy Storage</b>	Li-Ion SPG Precursor, Alkaline, Fuel Cells					✓	

Market Segmentation for the Company's Product

## 4. DFS Detail – Permitting and Community

- **Environmental Permit** – Granted in August 2018.
- **Mining permit** – Application in train and expected to be lodged in October 2018 based on DFS (one version of the truth strategy).
- **Resettlement framework** – Complete and has appropriate community support.
- **Local labour focus** – Bulk of work where possible to be completed by Tanzanian based labour.
- **Corporate Responsibility** – Programs in train with real commitment by Company to deliver positive outcomes for local people.



Local Children from the Mahenge Township



Copy of the Positive Environmental Impact Assessment Certificate

## 4. DFS Detail – Financing

**Board has significant experience in financing and building multi-generational mines globally**

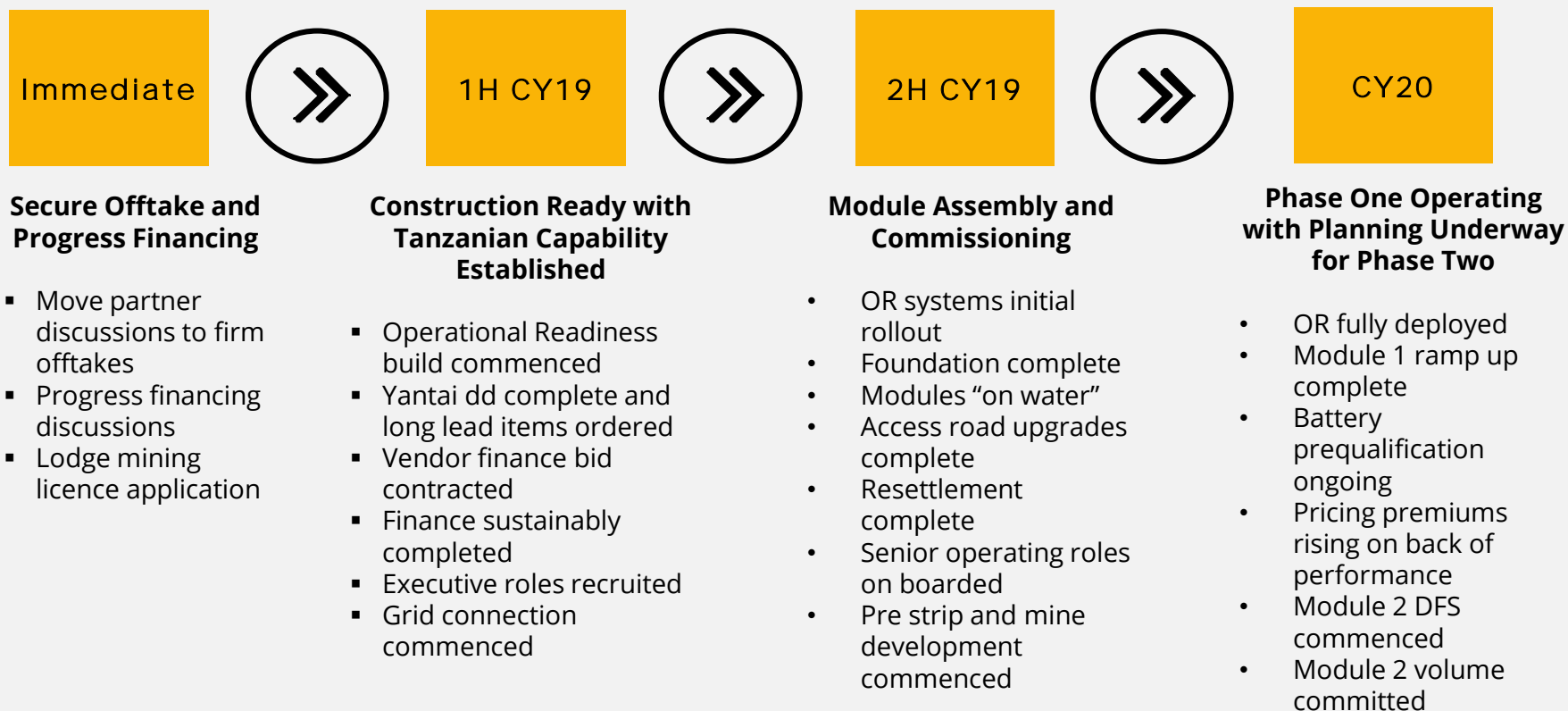
- **Financing strategy** – Multiple options being progressed with a focus on maximising share price and minimising dilution for existing shareholders.
- **Optionality** – Multiple funding pathways available to BKT to reduce financing execution risk
- **Quality study** – high quality DFS expected to stand up to detailed due diligence from financing providers.
- **Project metrics** – compelling project metrics make financing more attainable including:
  - Long “reserve tail” (reserves that exist post any debt period).
  - Low technical risk resulting from pilot plant operations and relatively simple flow sheet.
  - High margin resulting from lowest costs to customer and high concentrate grade.
- **Experienced board** – deep experience in mine building, operations and financing.
- **Aligned management** – Board and management are significant shareholders and are aligned with all shareholders to maximise share price

	BKT Debt	BKT Equity	Project/ MRL Equity	Project / MRL Sell Down	Project / MRL Debt
Tanzania	✗	✗	✓	✓	✓
Middle East	✓	✓	✓	✓	✗
China	✓	✓	✓	✓	✓
Rest of Asia	✓	✓	✓	✓	✓
Australia	✓	✓	✗	✗	✗
North America	✗	✓	✗	✓	✗
Existing Industry Participants	✗	✗	✓	✓	✗

**Potential Sources of Financing**

## 5. Next Steps

- **Construction focus** – Transition from “Study mode” to financing and construction ready
- **Tanzanian centric model** – Evolve Operational Readiness and commence recruitment of key national personal



*\*Timeline is subject to relevant Tanzanian regulatory approval and financing*



## 6. Why Black Rock

A uniquely favourable combination of geology and geography makes Mahenge uniquely competitive

### Geology

- **Large flake size** and industry leading concentrate grades produces a highly desirable product
- **Massive deposit** relatively under explored deposit able to support increased production
- **Geometry** results in low strip ratio – sustained low costs
- **Simple metallurgy** results in high value product, sustained low costs, and low technical risk
- **Product flexibility** – Mine can produce three grades of product off the one process circuit to provide sales and marketing options.

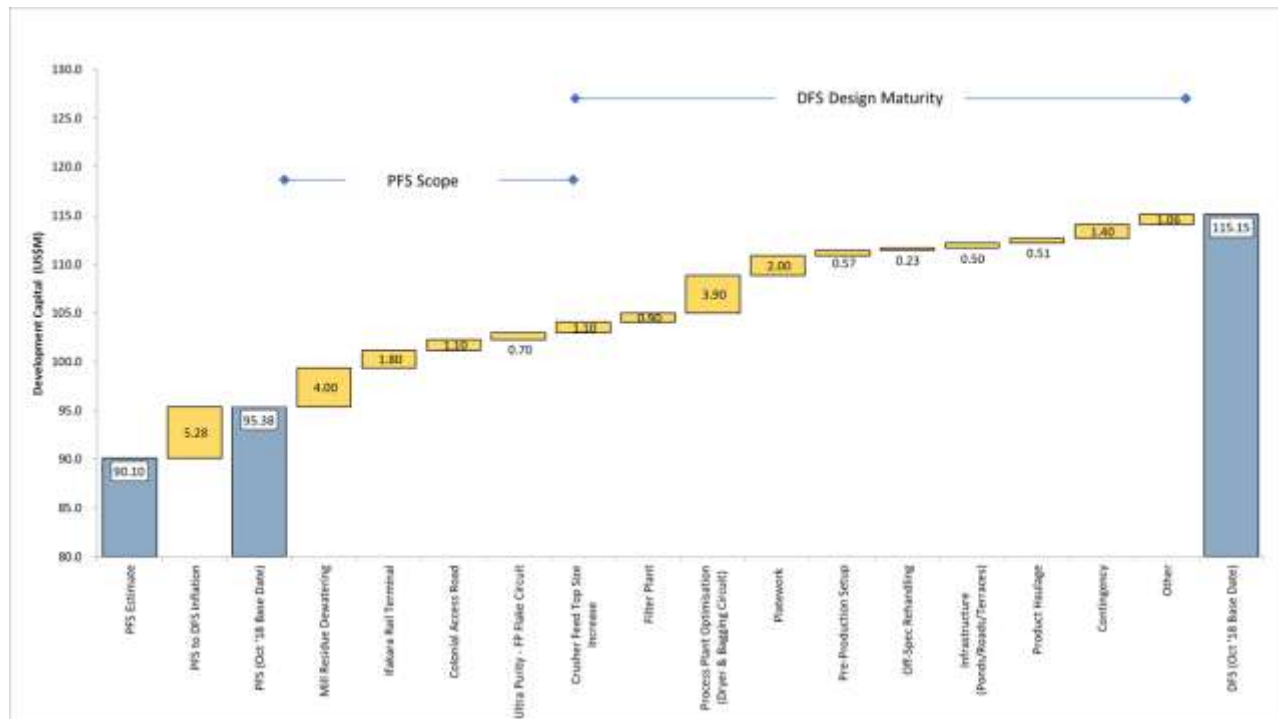
### Geography

- **Port of Dar es Salaam** – largest port in region
  - Large pool of empty containers minimises demurrage costs
  - Back load empty ships to Asian destinations minimises *Cost to Customer*
  - Direct shipping reduces working capital
- **Rail access** to Port of Dar es Salaam delivers lowest cost logistics' solution
  - Minimises working capital and accesses frequent shipping and containers
  - Rapid access to rail and port creates opportunities for spot sales
- **Grid Power** – Sustained low cost operation



# Appendix – PFS to DFS Capex

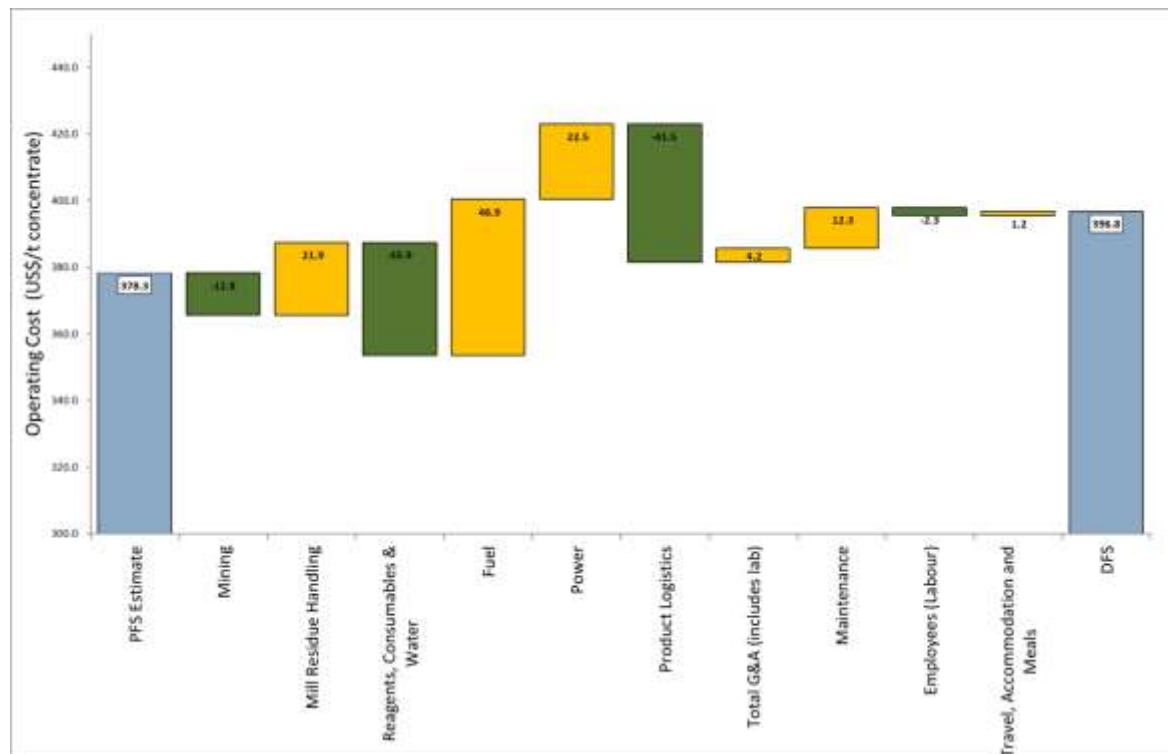
- **PFS** – Inflated at 4.0% for 18 months to bring PFS to DFS starting point
- **Scope changes**
  - Dry stacking - filter plant, electricals and piping – but offsets bore field costs
  - Ifakara rail siding, warehousing and reach stacker, self perform con haulage
  - Ultra circuit adds +99% con capability
  - Crusher upsized to 600 mm top feed size
  - Colonial road – bypasses mountain road and opens up resettlement lands
- **Design maturity**
  - Bag house - semi auto bagging
  - Reprocessing capability for offspec product



Capital Expenditure Estimate Changes between DFS and PFS

## Appendix – PFS to DFS Opex

- **Mining** - Schedule and bench optimisation
- **Dry stack** - Truck placed and rolled
- **Mill reagents** - Reclaim water from dry stack reduces bore field costs. Optimisation of plant consumption based on metallurgical testwork results
- **Fuel** - Self performed product haulage plus increased truck count in pit. Upgraded dryer sizing based on testwork and additional throughput compared to PFS
- **Power** - Increased load with estimate based on electrical load list not factors
- **Logistics** - Rail haulage for large portion of transport over trucking
- **Maintenance** - Based on % of installed plant and therefore direct increase with each additional stage development



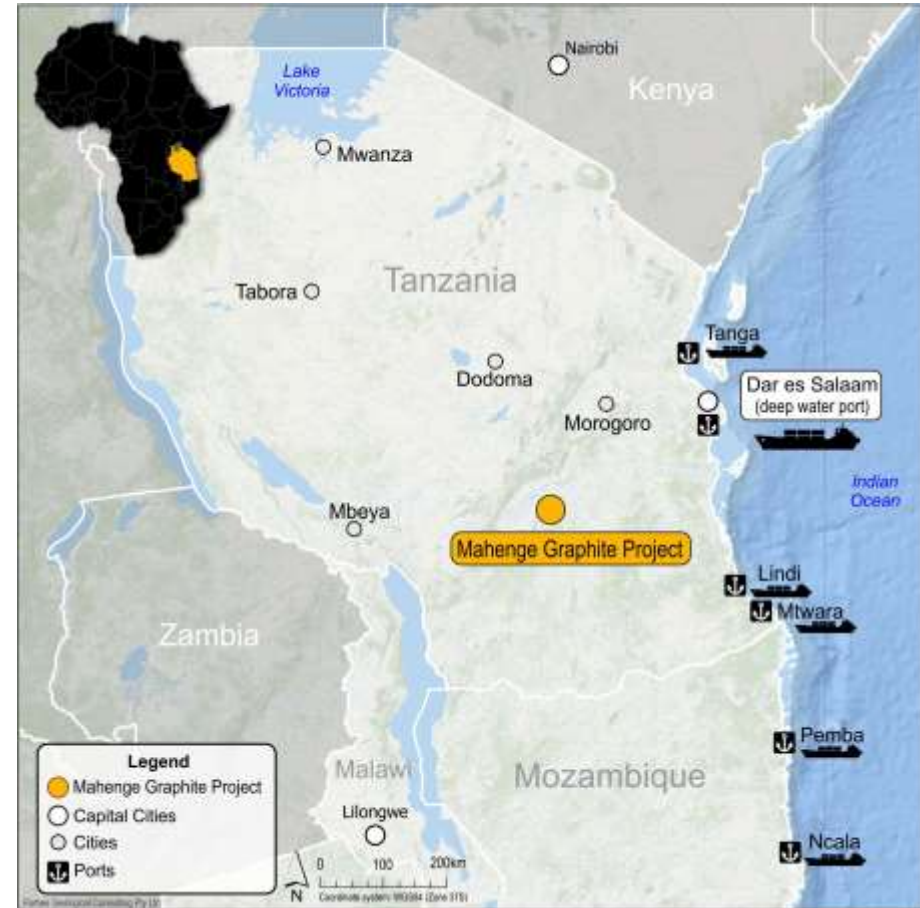
Operational Expenditure Estimate Changes between DFS and PFS

# Appendix – Port of Dar es Salaam

- **Port of Dar es Salaam** – Main deep water port for Tanzania, Zambia, DRC, Rwanda and Burundi.
- **Shipping frequency** – High frequency direct shipping to Asia with a sizeable number of empty container ships currently returning to Asia.
- **Not seasonal** – Consistent annual operations.
- **Empty containers** – Substantial supply of empty containers that will significantly reduce working capital.

Container exports TEU	Dar		Mtwara		Pemba		Nacala	
	Full	Empty	Full	Empty	Full	Empty	Full	Empty
2015	109,554	201,227	N/A	N/A	N/A	N/A	N/A	N/A
2016	99,640	139,447	N/A	N/A	N/A	N/A	N/A	N/A
2017	97,088	191,487	14,960	4,000	N/A	N/A	23,276	5,356
Nominal annual tonnage (mt dwt)	4.1		N/A		N/A		N/A	
Vessel arrivals (2017)	1,366		N/A		24		200	
Berth Length (m)	2,600		385		199		1,050	
Draft (m)	12		9.5		9		10 to 14	
Service Area	Tanzania, Malawi, Zambia, DRC, Burundi, Rwanda, Uganda		Regional port for oil & gas exploration and cashew export		Mozambique		Mozambique, Malawi, Zambia, Zimbabwe	
Seasonal	No		Yes		Yes		No	

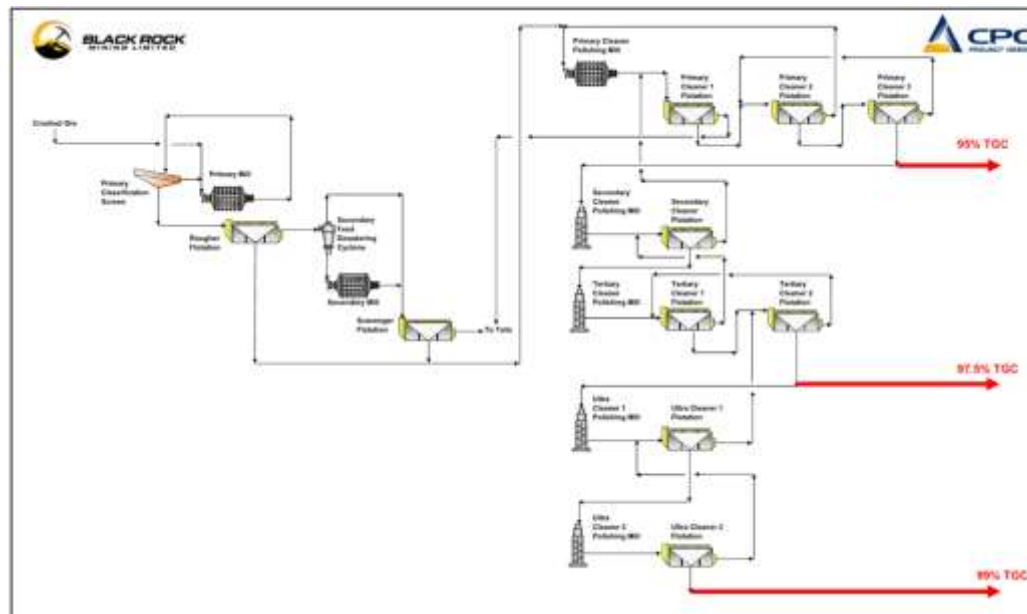
Exports for the Four Largest Tanzanian Ports in Years 2015 to 2017



Map of Dar es Salaam and Other Smaller Port Options

# Appendix – Pilot Plant and Flow Sheet

- **90 tonne pilot plant run completed** – Pilot plant testwork significantly reduce risk and increase financing options
- **Pilot plant key facts** – In addition to producing substantial volumes of product for customer testing the key facts are presented below
  - **Testwork completed by SGS** – Tier 1 laboratory transparent and credible results
  - **Volume** – 90 tonnes, 15 circuit configurations, three different product grades, 8 tonnes of concentrate
  - **Flowsheet** – simple and robust, validated by meaningful volume
  - **Product** – circuit delivers three product grades, from industry standard 95% to the worlds highest grade flotation concentrate +99%, *Mahenge ULTRA PURITY-FP™*
  - **Variability** – Range of fresh and oxide ores processed
  - **Simple** – unique flake reduces requirement for polishing stages, reduces flake degradation, simplifying mill control and operator training

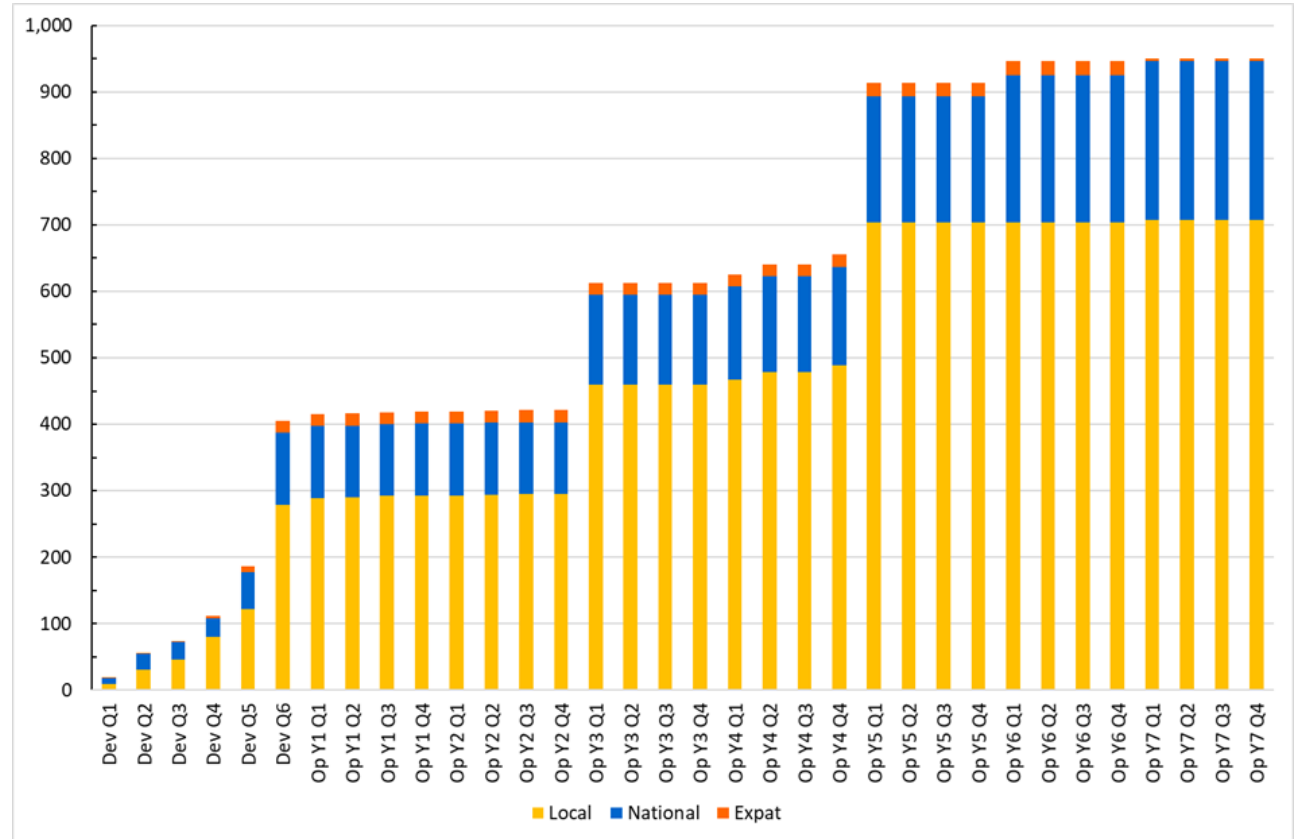


Simplified Process Flowsheet



# Appendix – Proposed Establishment Ramp up

- **Tanzanian centric operating model with Australian based governance** – Majority of organisation based in Tanzania with focus on local resources with Australian head office oversight
- **Clear business systems to support operational readiness** – Supportive of Tanzanian operating model expected to deliver lower cost structures with less risk
- **Business systems** – Extensive use of business systems reduces reliance on high cost expats for domain knowledge
- **ISO Certification** – Certification will be factored into operational readiness



Labour Ramp from Pre-production through 7 Years of Production

# Appendix – DFS Contributors

- **Over 25,000 hours using tier 1 global consultants and contractors** – the following significant studies contribute to the robustness of the DFS outcomes
  - **90 tonne Pilot Plant** – Largest pilot plant in class by a factor of 10
  - **Vendor testing** – materials handling, drying and screening performance validated by testing
  - **530 tonne rail shipment** – Proved 10 day Plant to Port is deliverable
  - **Dry stack** – Mill residue footprint reduced by over 70%, neutral water balance through dry season
  - **Operational readiness**– 86 Business systems, with 44 Standards to manage 400 risks
  - **Resettlement and EIS** – Supports Equator Principle standards and multilateral finance participation
  - **Product testing** – Samples shipped with Certificate of Analysis. 300 cycle battery test and expandability completed
  - **Marketing** – Aligned channel and product strategy to plant design to *make products customers want*



Organisations Involved in the completion of the DFS



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