

**H & S MINERALS LIMITED**  
**P.O. BOX 218, SHINYANGA**

**TECHNICAL REPORT FOR THE DEVELOPMENT OF  
GRAPHITE PROJECT AT KANDASIKIRA VILLAGE IN  
SIMANJIRO DISTRICT**

**SUBMITTED TO:**

**THE TANZANIA MINERALS COMMISSION  
*FOR PARTIAL FULFILMENT OF THE APPLICATION FOR  
MINING LICENSE UNDER DIVISION B***

**July, 2025**

## EXECUTIVE SUMMARY

This study is the conceptual plan to execute activities for the development of **H & S Minerals Limited's** medium-sized open pits graphite mine and processing of flake graphite at Kandasikira village, Shambarai Ward, in Simanjiro District Council - Manyara Region. It is considered to directly implement the mine development based on the exploration information from past experience, during which prospecting was conducted in a group of 24PMLS. These are PML 00105-00114SMN; PML 001119SMN; PML 00145SMN; PML 00174-175SMN; PML001757-180SMN; PML 000590-595SMN of a total area of 192.6. The PMLs are jointly owned by the shareholders individually.

**Hectares or 1.926 square kilometers.** It is a partial fulfillment of the application of mineral rights under Division B (Special Mining License or Mining License). The report serves as fulfillment in MRF 3 Section 7. All fiscal and legal requirements with respect to health, safety and environmental, taxes, and fees considerations have been taken into account and incorporated into the feasibility designs and relevant cost estimates. In addition, the designs take into account the geological location of the Project.

The project is accessed by a 24km tarmac road from Kilimanjaro International Airport via Mirerani township to Kandasikira followed by a 6km very rough road to Kiserian hamlet. It is on the footwall of Lalatema hills. It is easily accessible from Moshi or Arusha town by road. It is 50 km southeast of Arusha, Tanzania's 3rd largest city, and 30 km southwest of the town of Moshi. The project is well-positioned with respect to key forms of infrastructure, including a nearby railway that connects directly to the port of Tanga. Kilimanjaro International Airport is just 25 km away. A 66KV power line is about 7km west of the project.

Reserve estimation is based on the data collected from past exploration and geological studies conducted in 2024. Earlier, the resources were identified as 300million? tonnes at 18% TGC insitu. The drilling data are shown based on a maximum drill depth of 51m. For calculation purposes, the drill is taken at a depth of 50m. The reserves are divided into three zones, namely Zone-1 west, Zone-2 Central, and Zone-3 East in accordance with their location in the area. The thickness of graphite mineralization varied to a maximum of 310m in the central zones. The same ore strike extends to the other properties being mined on the southwest of the property. The measured density of the material is taken as 1800 kilograms per cubic meter. The Total resource is calculated Resources Estimation on the group of PMLs, indicating a total resource of 60.966 million tons at an average of 12%TGC grade. The average minable grade is taken as 10% C.

Hilal Project intends the operation to produce 45,000 tons of flake graphite with at least 95% TGC to end market. The produced graphite will be an Anode raw material for lithium-ion batteries. About 450,000 tons of graphite ore will be mined annually with an average grade of 10% Carbon. At depths between the surface to 30m, it is estimated that 260,000 tons of waste rock will be mined and dumped at the waste rock dump to be constructed.

To process this amount of ore, 200,000 cubic meters of water will be required on a daily basis, of which 80% of the water will be recycled through the retention pond at the site.

Domestic water is expected to be 15 cubic meters per day. Water will be pumped from a well to be drilled at Merelani village. The land requirement for the project is 500 acres. Energy requirement for the project is 3Mww to be connected to the National grid with 2 standby generators of 500KVA each. The project will have its own accommodation and offices on site to accommodate 200 personnel. The life of the mine at the proposed mining trend is more than 50 years.

Mining will be conducted in a bench design of 3-6m deep. Drilling for blasting will be done by a drilling wagon of a 90-120mm diameter rig. The most popular drill pattern is 2.5 to 3m Explosives will be placed in each hole. An explosive charge of a detonator and booster will be lowered into the hole and then charged by ANFO (Ammonium Nitrate Fuel Oil). The amount of ANFO design will depend on the rock strength and fragmentation requirements. All this blasting work will be done by an authorized person with a blasting certificate. Explosives will be stored in an explosive store or magazines, depending on the amount required per unit time. An explosives storage license will be sought from the Ministry of Minerals. After the blast, the excavator will be used to load the loose material onto the ROM pad and waste rock onto the dump area

Metallurgical tests revealed the possibility of recovering flake graphite to 90% Carbon using the froth flotation method. Flotation beneficiation test work, completed in 2015, showed the ability to produce high-grade graphite concentrates above 90% C content. The highest concentrate grade, 93.6% Cg, was observed for the largest flake size concentrate (+48 mesh, 300 microns), which comprised 18.6% of the concentrate total mass produced. The fine fraction assayed 91.7% C. A Cutoff grade of 2% was considered.

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. The NPV value of the project is calculated with an initial capital of US\$4,534,500, a discount rate of 10%, and the cash flow of the first eight years shows a positive NPV of **US\$45,723,669.56**.

The internal rate of return (IRR) is a metric used in capital budgeting to estimate the return of potential investments. In this project 10% internal rate of return was used. Testing the higher values of 25% NPV is found to be a positive value of US\$27,960,555.51. The ultimate 35% gives an NPV of US\$21,198,205.00.

## **Foreword**

Profitable mining demands an independent, experienced, long-term perspective that gives real clarity. Whether it's advice on project feasibility, property acquisitions/disposals, financing, geotechnical stability, sustainability, or mine closure, The Information in this report has been assembled as received from the proponent, reflecting the intention of the project execution.

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## ACRONYMS

DD	Diamond Drill
DD_M	Diamond Drilling in Metres
EIS	Environmental Impact Statement
EM	Electromagnetic
FFS	Full Feasibility Study
IRR	Internal Rate of Return
JV	Joint Venture
LHD	Load Haul Dump
ML	Mining License
MoM	Ministry of Minerals
NEMC	National Environmental Management Council
NGO	Non-Governmental Organizations
NPV	Net Present Value
OK	Ordinary Kriging
PFS	Pre-Feasibility Study
PL	Prospecting License
QDS	Quarter Degree Sheets
RAB	Rotary Air Blast
RC	Reverse Circulation
RL_M	Reduced Level in metres/ Elevation
RMR	Rock Mass Rating
ROM	Run of Mine
RQD	Rock Quality Designation
SHE	Safety Health and Environment
TD_M	Total Depth in Metres
TOR	Terms of Reference
TTCL	Tanzania Telecommunication Company Limited
URT	United Republic of Tanzania
VTEM	Versatile Time Electromagnetic
WRS	Waste Rock Storage

## CHAPTER ONE

### 1 PROJECT DESCRIPTION

#### 1.1 Introduction

This study is the conceptual plan to execute activities for the development of a medium-sized open-pit graphite mine and processing of flake graphite at Kandasikira village, Shambarai Ward in Simanjiro District Council - Manyara Region. It is considered to directly implement the mine development based on the exploration information from experience, during which prospecting was conducted in a group of 24PMLS. These are **PML 00105-00114SMN; PML 001119SMN; PML 00145SMN; PML 00174-175SMN; PML001757-180SMN; PML 000590-595SMN** of a total area of 192.6 Hectares or 1.926 square kilometers. Copy of PML **attached as Annex 2**. The PMLs are jointly owned by the shareholders individually. More information is being gathered in an ongoing study to refine the day-to-day activities of the project. It is a partial fulfillment of the application of mineral rights under Division B (Special Mining License or Mining License).

This project is owned and implemented by **H & S Minerals Limited**, which is a private company incorporated under the laws of the United Republic of Tanzania. The company was duly **registered in July 2020** and operates under registration number 142247143. **Its Taxpayer Identification Number (TIN) is also 142247143.** The company's **head office is located in Shinyanga town, Tanzania.**

#### Ownership and Governance

H & S Mineral Limited has an authorized share capital of **Tanzania Shillings One Billion (TZS 1,000,000,000)** divided into **10,000 ordinary shares** of **TZS 100,000 each**. The shareholding structure is as follows:

- **Mr. Hilal Soud Ahmed** – 5,100 shares (51%)
- **Mr. Hamed Hilal Soud** – 4,900 shares (49%)

Both shareholders also serve as the **Company Directors**, thereby actively participating in the governance and strategic oversight of the business. The company intend to invest..... as capital whereby 20% Equity of ..... and 80% loan of ..... o be used in acquisition of machineries and equipment, working capital and procurement for the project

#### Nature of Business

H & S Mineral Limited is engaged in the exploration, extraction, and trade of minerals in Tanzania. The company is focused on responsible and sustainable mining practices, with a commitment to contributing to local development while delivering value to its stakeholders. The company intends to invest in modern mineral processing and trading operations aimed at meeting domestic demand and facilitating exports in line with Tanzania's mining policy framework.

**SUMMARY OF OWNERSHIP AND INVESTMENT**

S/N	ITEMS	DETAILS			
1	Company Name	H&S MINERALS LIMITED			
2	COI No.	142247143			
3	Company Reg. Date	27 <sup>th</sup> JULY 2020			
4	Company Location	PLOT No 1, INDEPENDENCE STRET, SHINYANGA			
5	TIN/VRN No.	<b>TIN</b>		<b>VRN</b>	
		142-247-143		N/A	
6	Company Shareholding	<b>Shareholder</b>	<b>Nationality</b>	<b>Shares Taken</b>	<b>% Share</b>
	a.	Hilal Soud	Tanzania	5,100	51%
	b.	Hamed Hilal Soud	Tanzania	4,900	49%
	<b>TOTAL</b>			<b>10000</b>	<b>100%</b>
7	Project Location	Kindasikira, Mererani, Arusha			
8	Project Business	Graphite mining and processing			
9	JOBS	<b>LOCAL</b>		<b>FOREIGN</b>	
		<b>(M)</b>	<b>(F)</b>	<b>(M)</b>	<b>(F)</b>
		<b>162</b>	<b>78</b>	<b>8</b>	<b>2</b>
	<b>TOTAL JOBS (L &amp; FOREIGN)</b>				<b>200</b>
10	Project Capacity (MT p.a.)				<b>450,000</b>
11	<b>Project Funding</b>				
	<i>Local Equity</i>				<b>906,900</b>
	<i>Local Loan</i>				-
	<i>Foreign Equity</i>				-
	<i>Foreign Loan</i>				-
	<b>Total Funding</b>				
12	<b>Financing of Items</b>				
	<i>Fixed Capital</i>				<b>4,184,500</b>
	<i>Working Capital</i>				<b>350,000</b>
	<b>Total Financing</b>				<b>4,534,500</b>

<b>INVESTMENT BREAKDOWN</b>	
<b>ITEM</b>	<b>AMOUNT IN USD</b>
Land & Buildings	324,000
Plant	3,564,500
Vehicles	242,000
Furniture & Fittings	17,000
Pre Expenses	25,000
Others	12,000
Working Capital	350,000
<b>TOTAL</b>	<b>4,534,500</b>

This is Investment costs for which the client intend to put into implementation. The breakdown is as above potrayed, This includes plant and other field working machines plus the investment ammenitie

The project is accessed by a 24km tarmac road from Kilimanjaro International Airport via Mirerani township to Kandasikira followed by a 6km very rough road to Kiserian hamlet. It is on the footwall of Lalatema hills. It is easily accessible from Moshi or Arusha town by road. It is 50 km southeast of Arusha, Tanzania's 3rd largest city, and 30 km southwest of the town of Moshi. The project is well-positioned with respect to key forms of infrastructure, including a nearby railway that connects directly to the port of Tanga. Kilimanjaro International Airport is just 25 km away. A 66KV power line is about 7km west of the project. The nearest residential houses are located 7km away at Maendeleo hamlet. Table 1.1 is the corner coordinates of the PML that will be applied for the mining license.

Table 1-1: Corner coordinates for a group of 24 PMLS (Map datum-Arc 1960)

NO.	DEG	MIN	SEC		DEG	MIN	SEC	
1	03°	36'	15.13"	S	036°	58'	32.76"	E
2	03°	36'	25.25"	S	036°	58'	45.91"	E
3	03°	36'	16.44"	S	036°	58'	49.99"	E
4	03°	36'	20.67"	S	036°	58'	54.91"	E
5	03°	36'	07.09"	S	036°	59'	04.79"	E
6	03°	36'	11.13"	S	036°	59'	09.76"	E
7	03°	36'	04.36"	S	036°	59'	14.64"	E
8	03°	36'	08.02"	S	036°	59'	18.83"	E
9	03°	36'	27.36"	S	036°	59'	05.49"	E
10	03°	36'	23.98"	S	036°	59'	01.61"	E
11	03°	36'	33.97"	S	036°	58'	57.30"	E
12	03°	36'	29.56"	S	036°	58'	51.59"	E

13	03°	36'	34.30"	S	036°	58'	47.74"	E
14	03°	36'	38.91"	S	036°	58'	53.42"	E
15	03°	37'	00.49"	S	036°	58'	36.31"	E
16	03°	36'	42.36"	S	036°	58'	12.94"	E

Source: Tanzania Mining Cadastre Map, 2023

Figure 1-1 is the Map of Tanzania showing the project location. Figure 1-2 is the Map of Manyara showing Simanjiro District. Figure 1-3 is the Topographic Map of Lossoito showing shape and location of the project in Kandasikira Village.

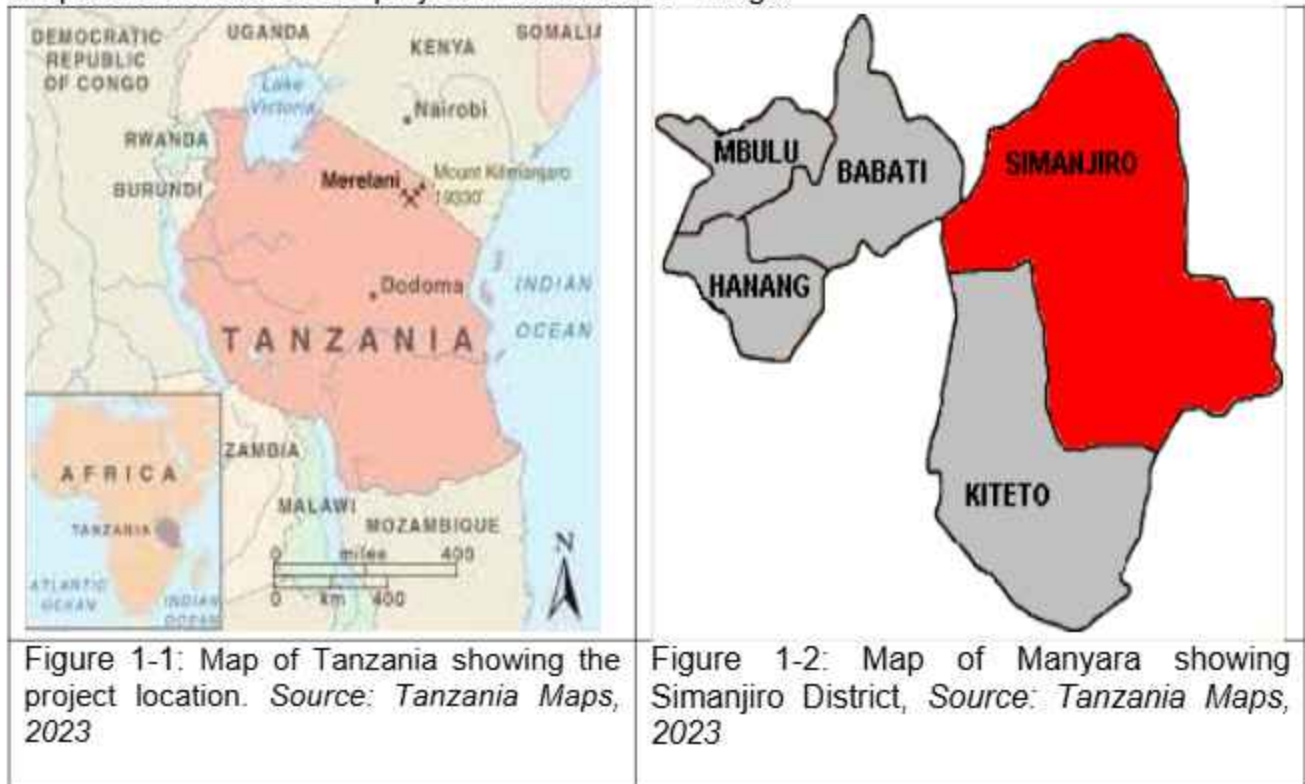
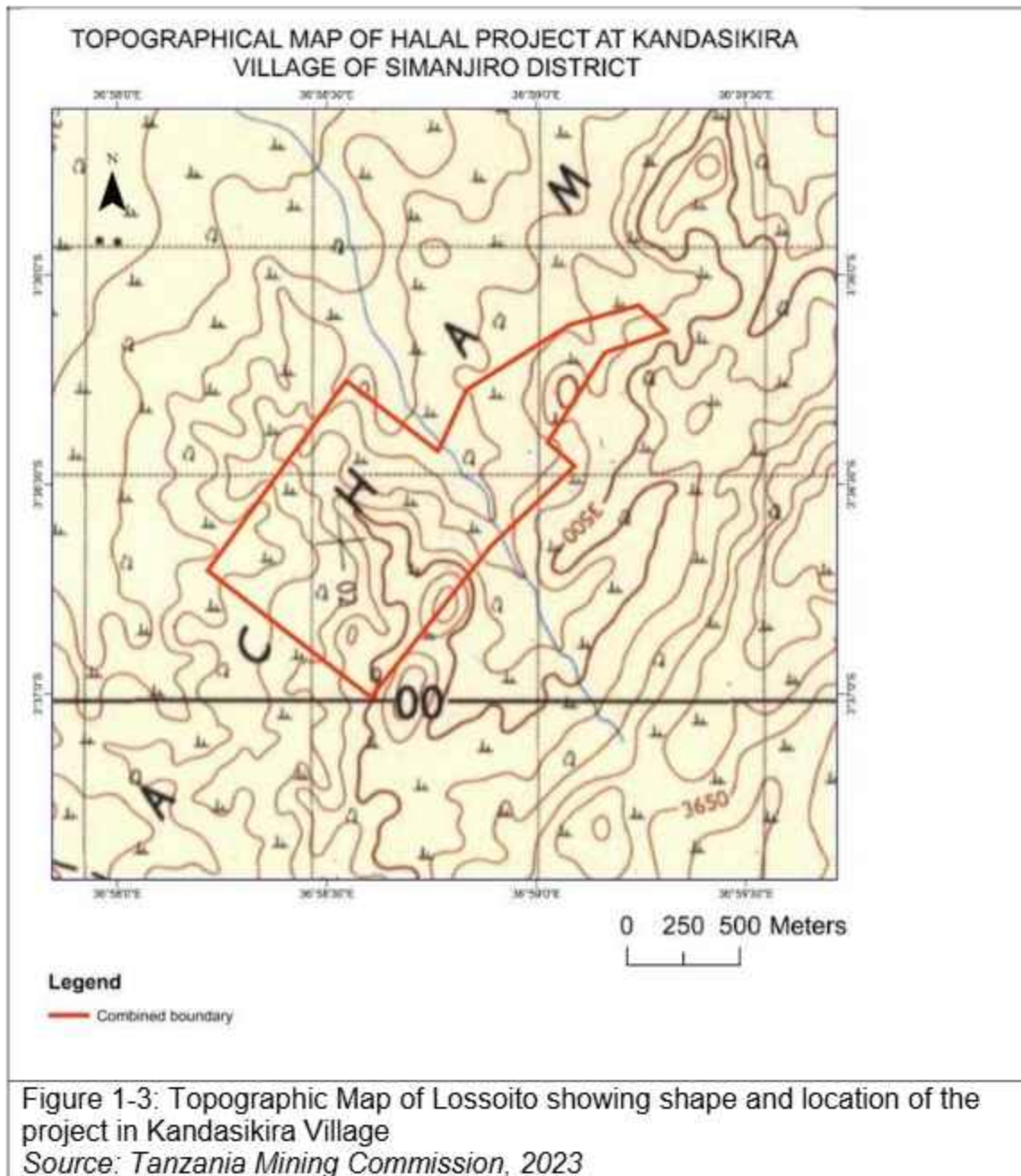


Figure 1-1: Map of Tanzania showing the project location. Source: Tanzania Maps, 2023

Figure 1-2: Map of Manyara showing Simanjiro District, Source: Tanzania Maps, 2023

### 1.2.1 Land for the Project

The project requires only 160 acres of and for its executions. About 178 acres of land has been acquired from the land owners. This land has been compensated and the documentation for the land acquisition is attached as annex 3.



### 1.3 Project History

Historically, there was small scale mining activities especially tanzanite and other gemstones that has been there for decades around Mirerani area. Graphitan Limited focused on mining graphite at Mirerani block C in 1996. Currently, there are many graphite projects under development near Mirerani with a strike length of 30km with consolidated resource potential over 1 billion tons of graphite. Figure 1-4 is the sketch map showing the Lalatema antiform that contains graphite over the length of 30km.

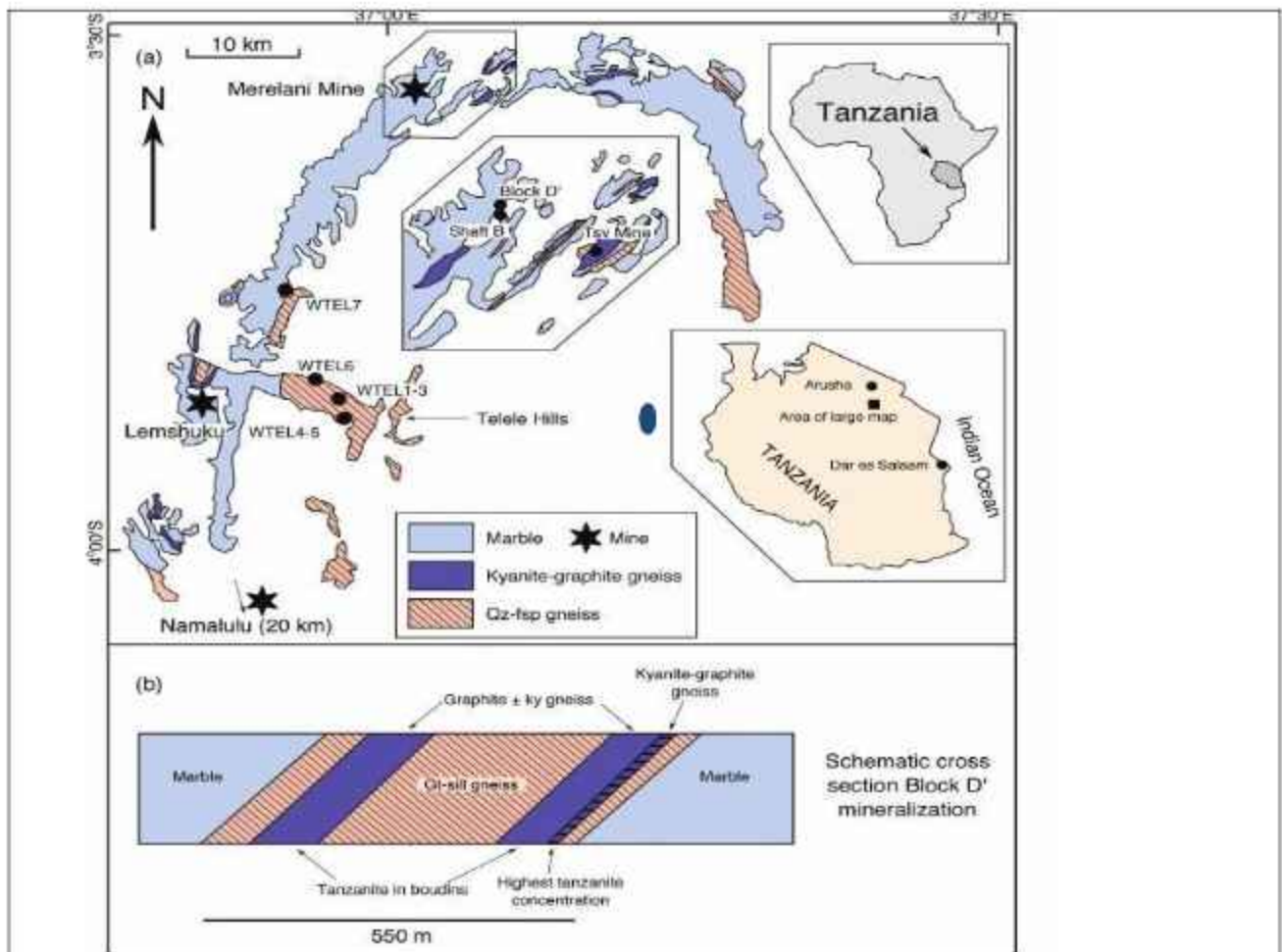


Figure 1-4: Sketch map of the Lalatema antiform based on the maps of Grainger (1964), Macfarlane (1965), Fritz et al. (2009). The inset maps show the location of the area in Tanzania and Africa. Areas of gemstone mining at Merelani, Lemshuku and Namalulu are indicated. Note some geological units have been omitted for clarity.

### 1.3.1 Other Similar Graphite Projects Near the Proposed One

Ever since the mining activities started around Merelani and along Lalatema hills, exploration increase to discoveries of different minerals including graphite. Currently, there are many graphite projects under development near Merelani with a strike length of 30km with consolidated resource potential over 1 billion tons of graphite. All graphite discoveries are along the hills on the same strike. The Location of the project with respect to Merelani township and ownership are shown on table 1.-2.

Table 1-2: Other Graphite projects around Merelani Tanzanite Mines

Project Name	Ownership	Distance from Mirerani	Status
Endiyamtu Graphite Project size 2.44 sqkm	CNBN Mining Investment Tanzania Limited	4km south west of Merelani township-Endiyamtu village-Shambarai ward	Mining License 667/2022 operated to Jan, 2023 then stopped
Platinum Graphite project size 0.94 sqkm	Platinum Graphite International Company Limited	5km south west of Merelani township-Endiyamtu village-Shambarai ward	ML664/2022 granted April 2022 now under construction
Naepo Graphite Project size 0.4 sqkm	Dayou Graphite Mining Company Limited	8km east of Merelanitown-Naepo village Naisinyai ward	ML 622/2019 construction completed work not started
Nduoni Graphite project PL 12142/2023 Size 4.73 sqkm	Permanent Minerals Co Limited	8km south west of Mirerani-Kandasikira village Shambarai ward	ML application recommended
Emishiye Graphite project size 1.74 sq km	Permanent Minerals Co Limited	8km south of Merelani town Lossoito village-Naisinyai ward	12142/2023 Prospecting and Environmental approval
Lossoito Graphite project size 12.21sqkm	Lindi Jumbo Limited	13km south east of Mirerani- Lossoito village-Naisinyai ward	PL 11119/2017 Exploration
Kimwengani graphite project Size 2.74sqk	Permanent Minerals Co Limited	15km southwest of Merelani at Lossoito village-Naisinyai ward	PL application recommended
Olbil Graphite project	Ace Graphite Company Limited	17km south of Merelani at Olbil	PL12595/2023 environmental approval

Source: Tanzania Mining Commission, 2023

#### 1.4 Physiography

Simanjiro is one of the 5 districts of the Manyara Region of Tanzania. It is bordered to the north by Arusha Region, to the north east by Kilimanjaro Region, to the south east by Tanga Region, to the south by Kiteto District, to the south west by Dodoma Region, and the west by Babati District. The project area is about 1310m above mean sea level. It is a semi-arid area with the main activities being grazing and mining, especially artisanal mining. Most of the areas the vegetation are small bushes due to tree cutting by charcoal burners. The project area is predominantly inhabited by Maasai pastoralists, who, in recent decades, have been diversifying their livelihoods through increased participation in agriculture and wage labor

(Little et al., 2001).

#### **1.4.1 Vegetation**

The grassland is the major vegetation type of the Simanjiro plains, unlike the project area, where the land is covered by thick bushes. These bushes include acacia thorn bush, *Balanites aegyptiaca*, *Adansonia digitata*, *Maerua triphylla*, and *Grewia* spp. And *Commiphora* spp. tree species on the ridges (Van de vijver, 1999). Others include Knob wood (*Zanthoxylum chalybeum* - Rutaceae), which is a medicinal plant species.

## **1.4.2 Climate**

The Tanzania climate is generally tropical in most areas, while temperate climate is experienced in the highlands of forests to the east north. The climate does not favour agriculture here. An analysis of long-term rainfall patterns shows severe drought one year out of three, though not in a predictable fashion (Msoffe, et al. in prep, unpublished data). The climate is warm and temperate in Merelani and Naisinyai are higher in general. The rainfall here averages 902 mm.

## **1.4.3 Drainage System**

Water is a primary concern for Maasai pastoralists living in Simanjiro during drought and non-drought years. Streams and rivers are widely used water sources, particularly during times of water scarcity when boreholes break or become crowded, and dams dry up. When surface water is no longer available in rivers, hand-dug wells are used to access water for livestock, households, and even schools. In the project area, there are no water sources available. Nearby residential center of Emishie hamlets gets its water pumped from a borehole located 6km at Merelani (near the west Merelani mines wall).

## **1.5 Socio-Economic Situation**

### **1.5.1 Economic Activities**

Economic activities of Kandasikira village are mainly livestock keeping. Most of the residents are pastoralists with small areas cultivated for food during the rainy seasons. Farming at the lower land area includes the production of food crops (maize, beans, vegetables and sweet potatoes). Other activities include petty business, employment in Tanzanite Mines, mining and mining. Most of the residents are involved in mineral brokers, especially tanzanite in Mirerani. There are many artisanal and small-scale mining activities around the project area. Other minerals being mined include limestone, dolomite, green garnet, and a variety of tourmalines and Rhodolite.

### **1.5.2 Social Services**

According to the 2022 Tanzania National Census, the population of the Simanjiro District is 178,693. The Simanjiro District is administratively divided into 17 wards. Reports from Village Executive Director show that in the 2022 census, Kandasikira village had 2541 persons. There is one primary school. No health centre and only one private secondary school. The telecommunication networks are available through mobile company providers, including Vodacom, Airtel, tigo TTCL and halotel.

### **1.5.3 Infrastructures**

The project is well-connected with the road and rail network. A railway line is available at 25km north of the project, connecting the project to the port of Tanga or Dar es Salaam. A tarmac road connects the project to Arusha and Moshi via Merelani town and Kilimanjaro International Airport. Access road to most of the village area is through the access road made by the project during the exploration period.

## CHAPTER TWO

### 2 GEOLOGICAL SETTING

#### 2.1 General Geology

Precambrian rocks underlie most of central and western Tanzania. Archean granite and greenstone rock assemblages form the central nucleus of the country, the Tanzania Craton. The craton is surrounded by Proterozoic belts: The Paleoproterozoic Usagaran-Ubendian belt and the Mesoproterozoic Kibaran (Karagwe-Akolean). The Neoproterozoic Mozambique Belt occurs in the eastern part of the country. Parts of the Usagaran-Ubendian belt were rejuvenated during the Neoproterozoic to early Cambrian Pan- African thermo-tectonic event (Gabert 1984). Shallow water sediments of the Neoproterozoic (900-800 million years) Malaragazi Super group underlie parts of western Tanzania (Halligan 1962). The Karoo basin crosses southern Tanzania in a north-easterly direction. Mesozoic and younger marine sediments occur along the coast of Tanzania. The Tertiary to Recent Eastern Rift Valley reaches into Tanzania from Kenya in the north. Lake Tanganyika and Lake Nyassa (Lake Malawi) form part of the Western Rift of Tanzania. Volcanic and carbonatites are associated with both the Eastern and the Western Rift. Lacustrine sediments fill large parts of the rift valleys.

#### 2.2 Regional Geology

East Africa has been the subject of formal geologic mapping and exploration projects since the late 1800s. Several major geologic environments have been identified: An Archean craton, orogenic mobile belts, coastal marine sedimentary deposits, rift valleys of various ages, recent (Tertiary) volcanism, and various types of surface deposits. Several of these environments contain gem occurrences.

The main geologic divisions in Tanzania are on the west, the Tanzanian craton, which is of Archean age (2,500-3,000 my million years); and on the east, the Mozambique Orogenic Belt (1,200-450 my). A craton is an ancient stable part of a continent that is composed of igneous and metamorphic rocks as shown on fig 2-1. The Tanzanian craton is surrounded by Middle-to-Late proterozoic (1,600-800 my) mobile Belts, which are long, narrow crustal regions subjected to geologic forces that resulted in processes such as folding and mountain building. These belts include the Ubendian to the southwest, the Karagwe-Ankolean to the northwest and the Usagaran to the east. The Usagaran is the Tanzanian portion of the much larger Pan African Mozambique Orogenic Belt (orogenic belts are those that were mobile during their formative stages), which extends under most of East Africa. It is about 250 km wide and runs for about 5,000 km from Madagascar and Mozambique in the south to Ethiopia and Sudan in the north. The rocks in this belt have undergone extensive metamorphism, plutonism, folding and faulting.

East of the Mozambique belt lies the coastal plain of Tanzania, which is underlain by Mesozoic (225-65 my) and more recent sediments. The formation of granulites in association with major tectonic events is particularly important, because a wide range of minerals were subjected to heat, pressure and hot fluids. During such geologic processes, not only are new minerals formed, but also Graphite original mineral hosts formed as shown in Fig.2-2.

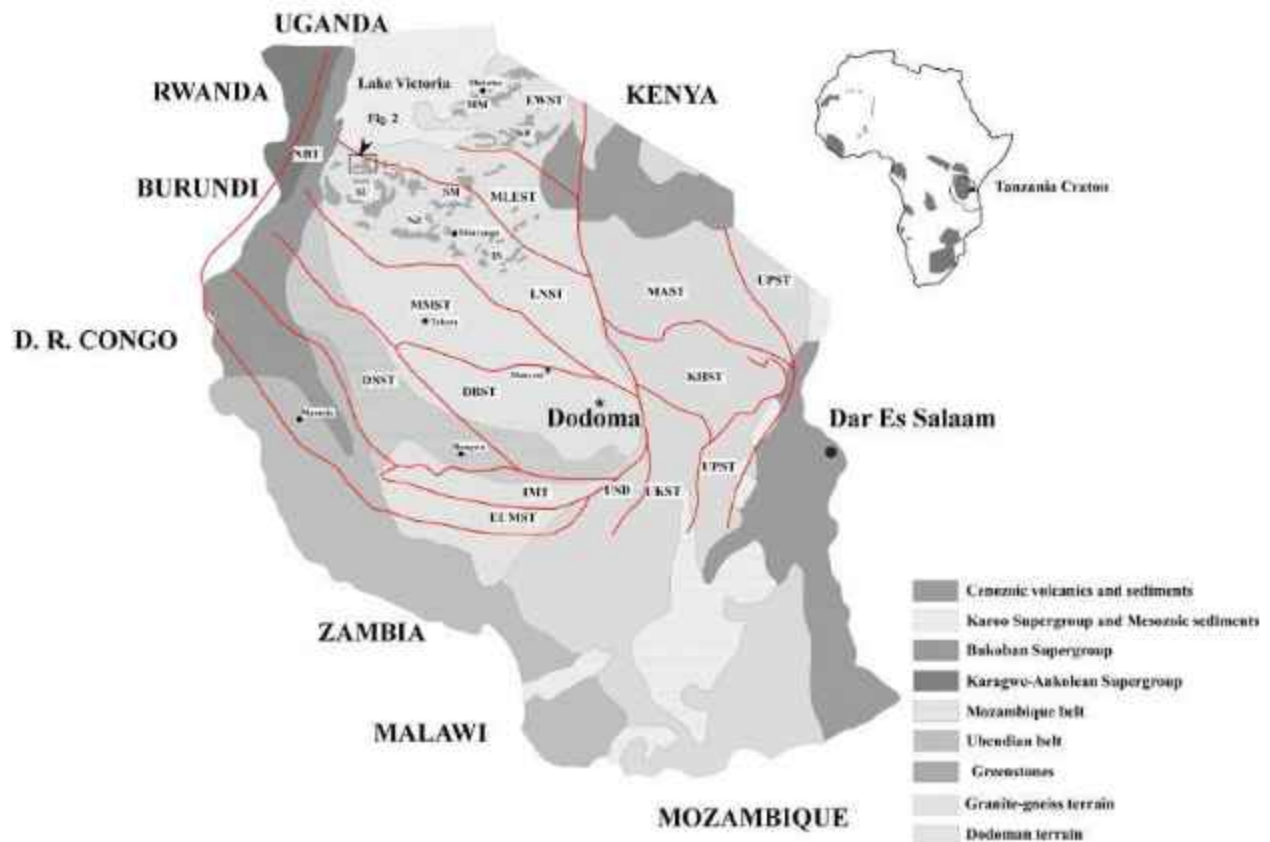


Figure 2-1: showing craton with all belts and supergroup terranes

Mineralisation at Lalatema hills is hosted within upper amphibolite facies gneiss of the Mozambique Mobile Belt. More than 75% of the exposures within the tenement comprise three main rock types-alternating sequences of graphitic schist, Dolomitic marble and Kyanitic gneisses (shown on fig 2-1).

The major top cover part of the area is covered with graphitic rocks and calcrete overburden, particularly the North, west and southeastern portions of our property. Exposure in the area is irregular due to the variable amount of weathering and alteration within the property. Graphite gneisses show greater than 20% beneath the top cover soil in the area. Other lithologies include Marbles, silicified grey-green metamorphosed graphitic rock with or without Garnet, and quartz-feldspathic gneisses.

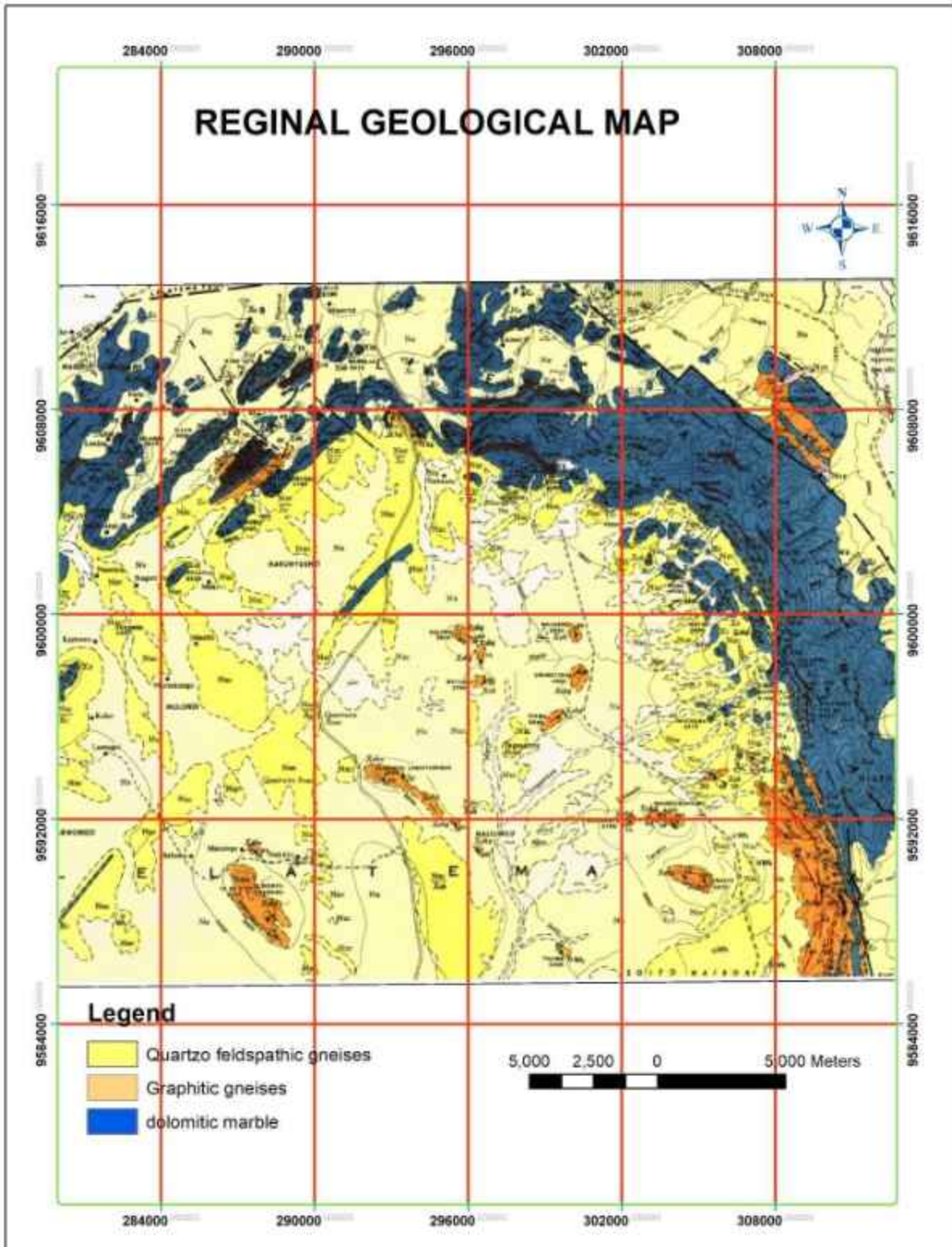


Figure 2-2: Geological map of Lalatema hills showing rock type and mineral type

## 2.3 Graphite Mineralization Trends

### 2.3.1 Graphite Mineralization in Mirerani

The graphitic schist is a potentially economical source of graphite in the project area. It is mineralogically defined as Quartz-Feldspar-Carbonate-Graphite. It is believed that Merelani East graphite mineralization is the result of contact metamorphism during regional shear events, which was later overprinted by contact metamorphism due to a voluminous late volcanic event within the area. The second contact metamorphism event triggered graphite remobilization and recrystallization and hence led to larger graphite flake sizes, which can be seen today within the project area.

### 2.3.2 Lithological Characteristic

The major rock-forming minerals in these rocks are feldspars, quartz, muscovite and biotite, with the latter two occurring in minor amounts. These rock units are sometimes associated with garnet and sillimanite. However, they are chiefly deprived of graphite flakes. Biotite gneiss is the second most dominant unit in the area, forming the footwall and the hanging wall of the graphitic gneiss. This rock is black to grey colored, strongly foliated with medium to coarse-grained Kfeldspar, plagioclase, muscovite and biotite ± garnet. Lalatema mountains are defined by Lalatema fault system, which cuts the Maasai steppe, generally tilting slightly towards the south East but with localized tilting towards Merelani area to the north. Lalatema mountains consists of varying layers of gneisses, schists, calc-silicate and dolomitic marble. The gneisses and schists are metamorphosed shelf-type sediments.

The graphite in the vein-type have flakes that fill in the fractures and pore spaces of the host lithology, while the graphite in the flake type have flakes in the matrix co-existing with the silicate minerals of the host lithology. The rock occurs in hill flanks and rarely on tops. Amphibolite, encountered in the central part of the area with limited exposure are black to grey with hornblende and plagioclase feldspars as the major rock-forming minerals, whereas green diopside occurs as a minor constituent. Diopside sometimes shows the pity weathering on the rock surface. The rock sequence at the project site is shown on the table 2.-1 below.

Table 2-1: Lalatema Lithology Characterization

Rock type	Description
<b>Dolomitic Marble</b>	Dolomitic marble in Lalatema mountains create a NE-SW trending depression towards Merelani tanzanite deposits. In the lower horizon of a small dolomitic marble is located with coarse grained and white in color type of rock. This dolomitic marble extends tens of kilometers and represents the main rock type in Lalatema mountains. Dolomitic marble extends as deep as 150m.
<b>Garnet sillimanate-Biotite gneiss</b>	The garnet sillimanate biotite occurs as a thick central unit between the upper and lower horizon in contact with dolomitic marble. This can extend as deep as 90m as witnessed in tanzanite mines.

<b>Graphite plagioclase gneiss</b>	Graphite plagioclase gneiss occurs at the footwall alteration which at the Kandasikira site hosts green garnet minerals that were being mined in the past.
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*Source: Olivier, Bernard, 2006*

### **2.3.3 Local Geology**

The project areas lie within Lalatema hills classified as a schist-hosted flaky graphite deposit and is hosted within the Proterozoic Mozambique Orogenic Belt. Multiple deformed metamorphic geology hosts the graphite mineralization. The project area consists of Neogen-Quaternary volcanic formation, Neoproterozoic marble, Neoproterozoic metasedimentary (Para gneiss, marble, quartzite, and schist), orthogenesis, migmatite, amphibolite's and granite. Through Geological mapping and reverse circulation (RC) drilling the local geology of the property has been defined as gneiss, marble, graphitic marble, graphitic schist, late volcanic units and late quartz-feldspar-carbonate veining. As shown on figure 2-3.

### **2.3.4 Trenching**

Between 2005 and 2008 TanzaniteOne conducted an extensive exploration for green garnet on the area. On the PML area, a total of 9 trenches with a cumulative length of 1095m as shown on Fig 2-3 were excavated across the strike to understand the subsoil lithology, structure and nature of mineralization. Samples were collected and analyzed for ore thickness and grade. During exploration in the same area, the same trenches were redug and sampled out.

Based on trenching results, the RC drilling was planned along to intersect the vein and deep the ore on a vertical depth of 51m.

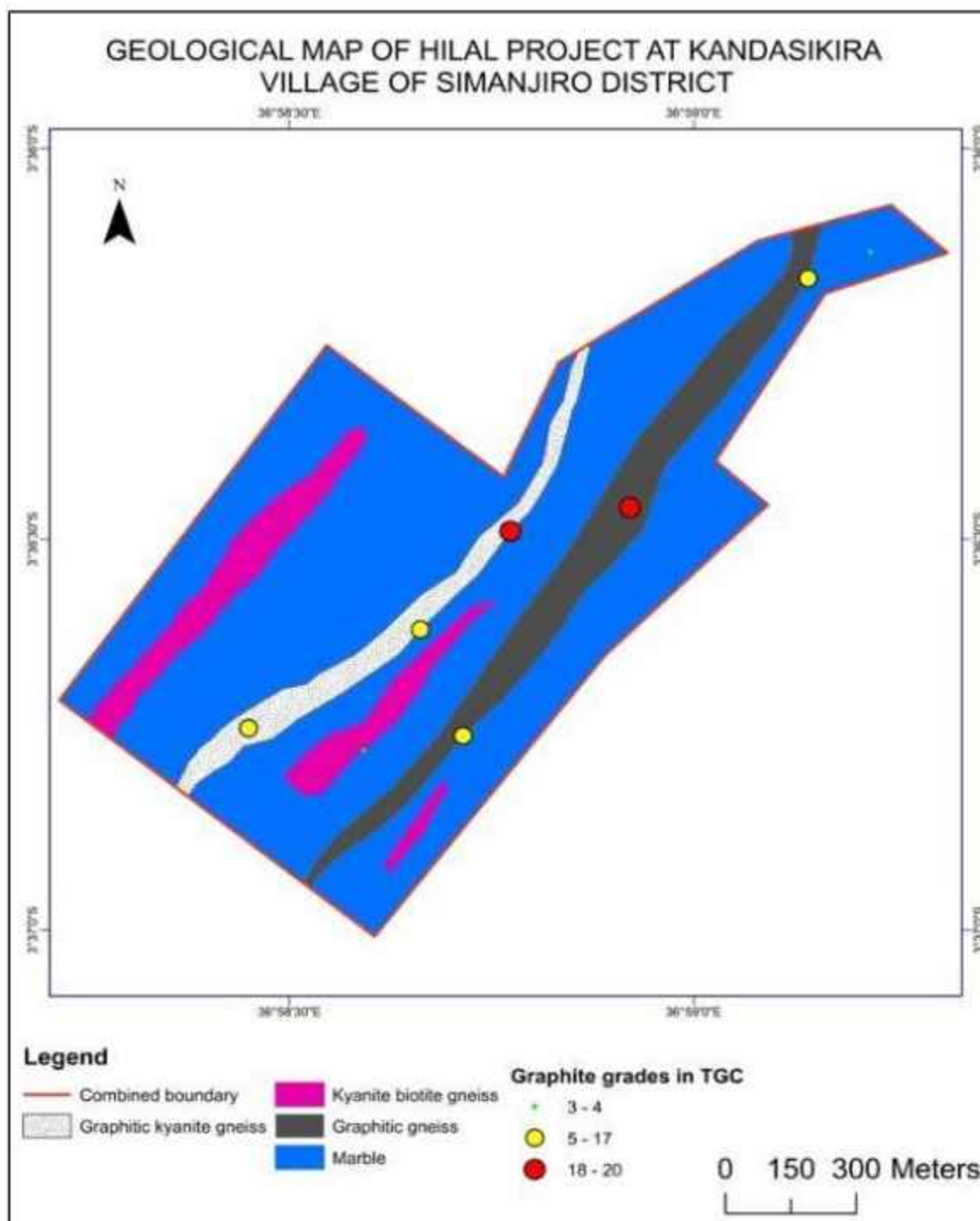


Figure 2-3: Geological map of the Hilal Graphite project  
 Source: Hilal Project, 2054.

### 2.3.5 Ore Mineral Composition

Most graphite deposits in Tanzania have mineral compounds associated with the ore by weight approximately as: Quartz (24.18%); Feldspars (1.44%); Phyllosilicates (0.88%); Fe\_sulphates (0.82%); and Fe oxide (0.19%). In some areas, the following minerals are also found in addition to the aforementioned: Plagioclase (1.12%); Chlorite (0.04%); Muscovite

(0.08%); Biotite (0.03%); Kaolinite (0.36%); Pyrite (0.07%); Apatite (0.01%); Zircon (0.01%); Jarosite (1.91%); Rutile (0.08%); and Sillimanite (0.66%).

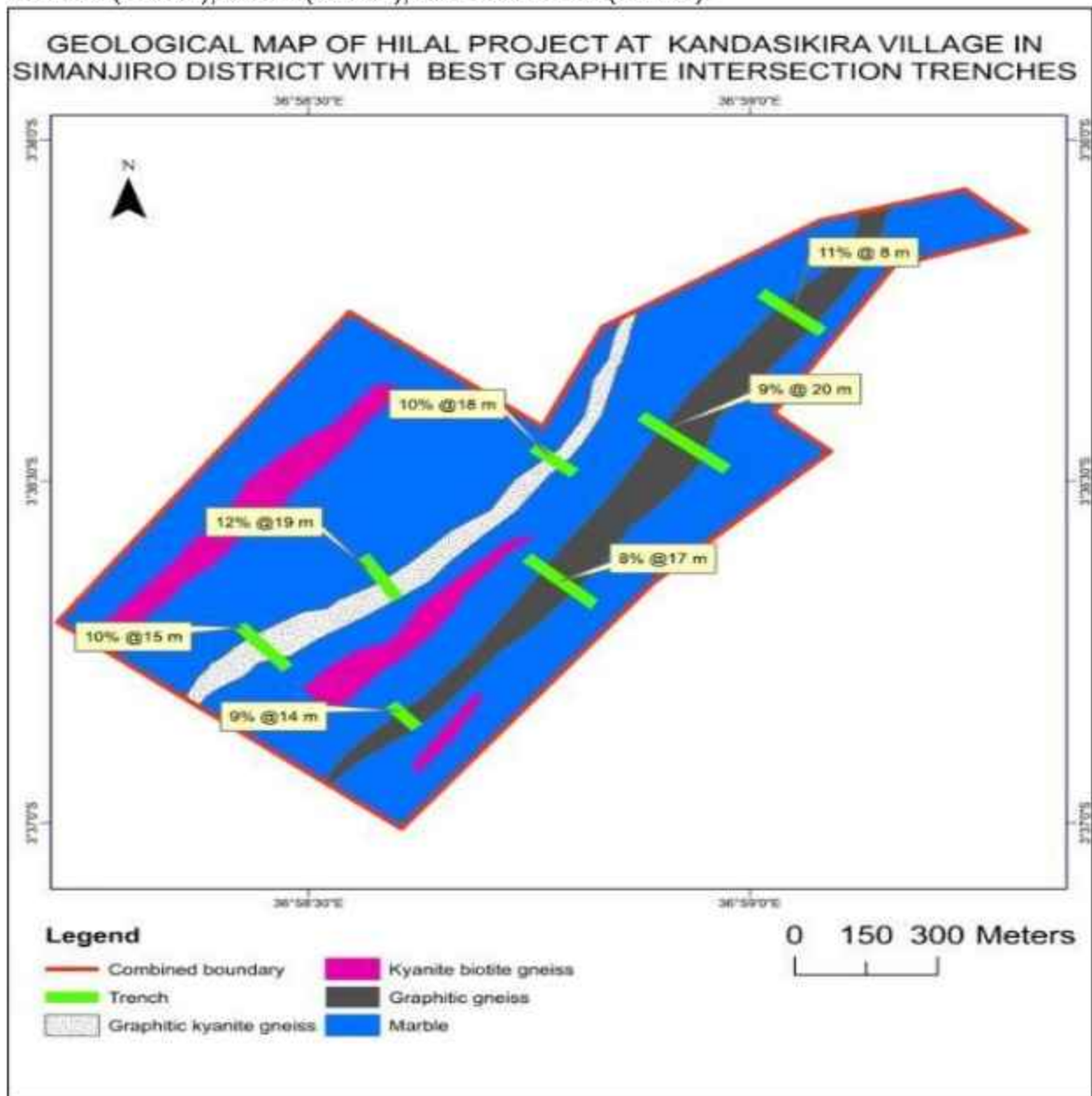


Figure 2-4: Trenching works on Hilal Main Graphite ore with corresponding assays.  
 Source: H & S Minerals Limited, 2025.

### 2.3.6 RC Drilling

RC drill was done to confirm the vertical continuation of the graphite mineralisation intersected in the trenches. RC Drill holes were planned considering the dip direction of the graphite zone in the vicinity trench. 6 holes were drilled to 51 m level to confirm the continuity of the orebody as shown on figure 2.-5.

**GEOLOGICAL MAP OF HILA PROJECT AT KANDASIKIRA VILLAGE WITH DRILL HOLES SHOWING THE BEST GRAPHITE INTERSECTION**

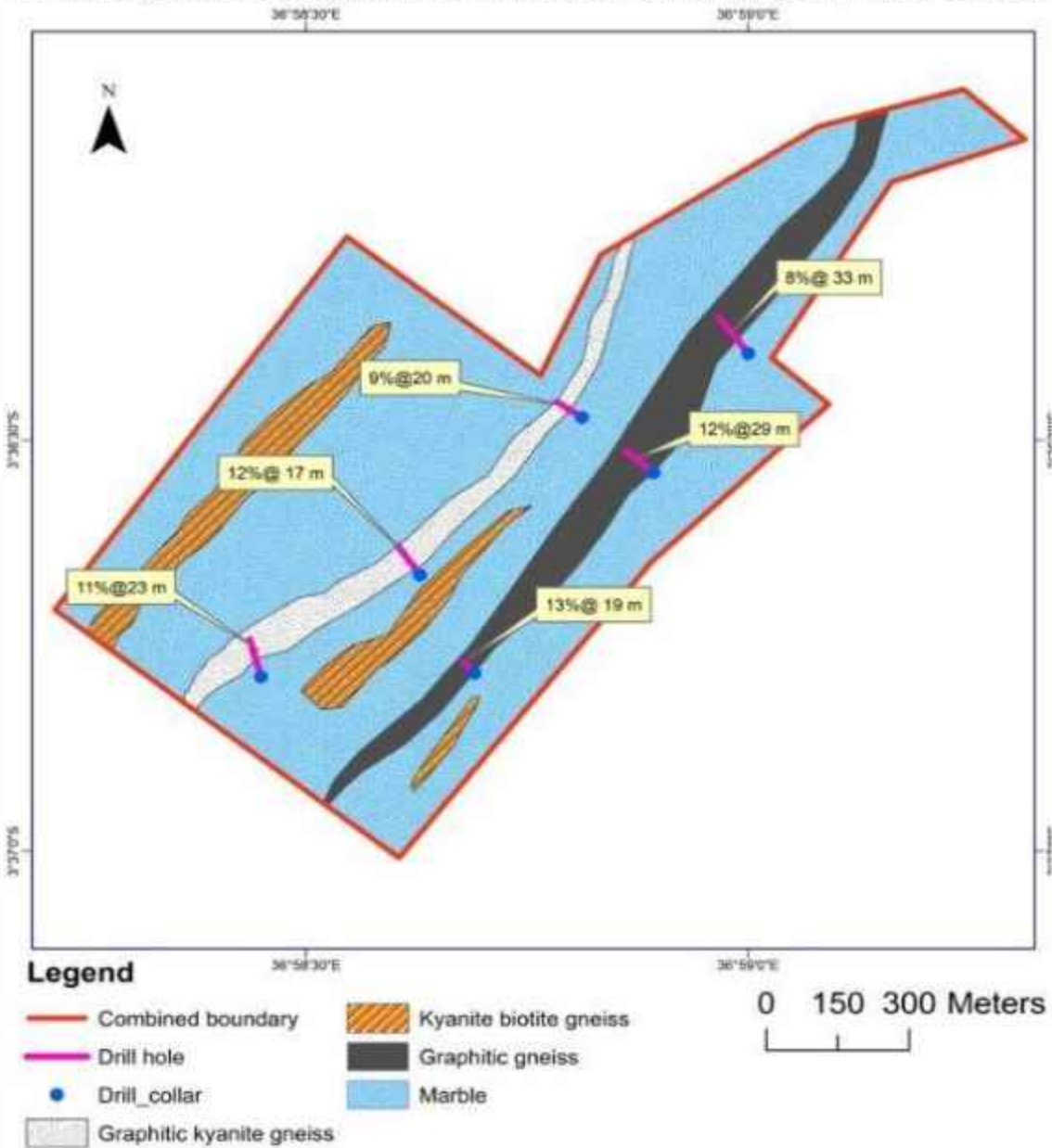


Figure 2-5: Assay location and results from the RC drilling on the *H & S Minerals Limited* Project  
 Source: *H & S Minerals Limited, 2025*

**2.4 Ore Reserve Estimation**

Reserve estimation is based on the data collected from past exploration and geological studies conducted in 2024. Earlier, the resources were identified as 300m tones at 18% TGC insitu. The drilling data are shown based on a maximum drill depth 51m. For calculation purpose the drill is taken at a depth of 50m. The reserves are divided into three zones namely Zone -1 west, Zone-2 Central and Zone -3 East in accordance with their location on the area. The thickness of graphite mineralization varied to a maximum of 310m on the central zones.

The same ore strike extends to the other properties being mined on the south west of the property. The measured density of the material is taken as 1800 kilograms per cubic meter. The Total resource is calculated. Resources Estimation PML's indicated a total resource of **60.966 million tons at an average of 12% TGC grade**. The average minable grade is taken as 10% C. The indicated reserve estimation is shown on table 2-2.

Table 2-2: Resource Estimation for Hilal Graphite Project

Ore Zone	Length (m)	Width (m)	Depth (m)	Volume Million m <sup>3</sup>	Tones millions	in	Average Grade %TGC
Zone -1 West	1150	160	50	10	18		12
Zone 2 Central	1180	310	50	18.29	32.922		12
Zone -3 East	620	180	50	5.58	10.044		13
Total				33.870	60.966		12

Source: H & S Minerals Limited, 2024

## CHAPTER THREE

### 3. MINING

#### 3.1. Mining Design

In designing the open pit for the project, even though on a small scale, mining, the general expected pit design parameters by material type and geotechnical domain were considered, including the following:

- Berm width
- Safety Berm width and placement intervals
- Batter angle (bench face angle)
- Bench Height
- Overall slope angle limits
- Ramp width
- Ramp gradient
- Minimum Radius for Curves
- Drainage planning needs, including drainage gradients

for benches and berms

- Preferred effective bench mining width and
- Safety Features.

The definition of some items is shown on Figure 3.1-1 of the pit design terminology.

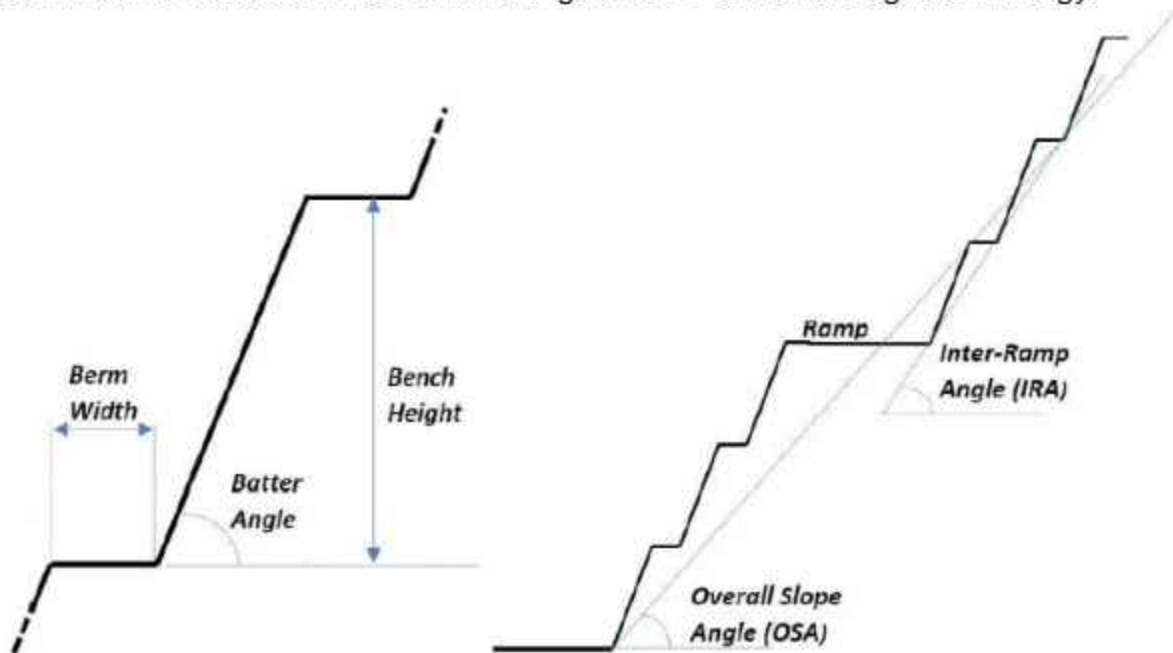


Figure 3.1-1: Pit Design Terminology

Source: Hilal Project,2025

Mining will be conducted in an open pit with excavator with and 30-ton trucks. The design parameters of the pit are shown on table 3.1-1. These will include benches of 5m wide and 15m high. The minimum mining width is designed to be 20m.

Table 3.1-1: Pit Design Parameters

Items	Capacity
Fleet Type	Trucks 30 tones
Excavator	CAT350
Bottom of pit design	100m
Top of pit design	0m
Minimum mining width	20m
Overall slope angle	60°
Batter angle	75°
Ramp grade	1 in 10
Ramp width	26 m & 16 m (double and single lane)
Bench height	15 m
Berm width	5 m

Source: *H & S Minerals Limited, 2025*

### 3.1.1. Mining Ramp

A ramp has will be made at a width of 26m and 16m double lane 10m and gradient of 1:10 to access all the working area. Pit will be extended as shown on the design on annex 4. The ramp access is about 100m from the waste dump and about 1.5km from the first crusher. The design of pit extension with computer-aided pit design, and the inclusion of the ramp in that design. It does not deal with details of the construction, maintenance and operation of a ramp. In the design, different colors and line types are used for crest lines, toe lines, mid-wall lines, survey actual lines (topography), and ramp edge lines. Weak shear zones with a high risk of failure are avoided on the design of the ramp. The site layout showing the arrangements of the structure is shown on annex 5.

### 3.1.2. Pit Wall Angles and Bench Widths

The wall of the open pit wall design consists of a series of stacked benches. As the design considers the pit maximum of 100m, determination of the toe-to-toe slope angle or inter-ramp angle is important, as shown on figure 3.1.3-1 below. The inter-ramp angle design considered the bench height ("BH") of 15m, bench face angle of 75 degrees, and berm width of 5m.

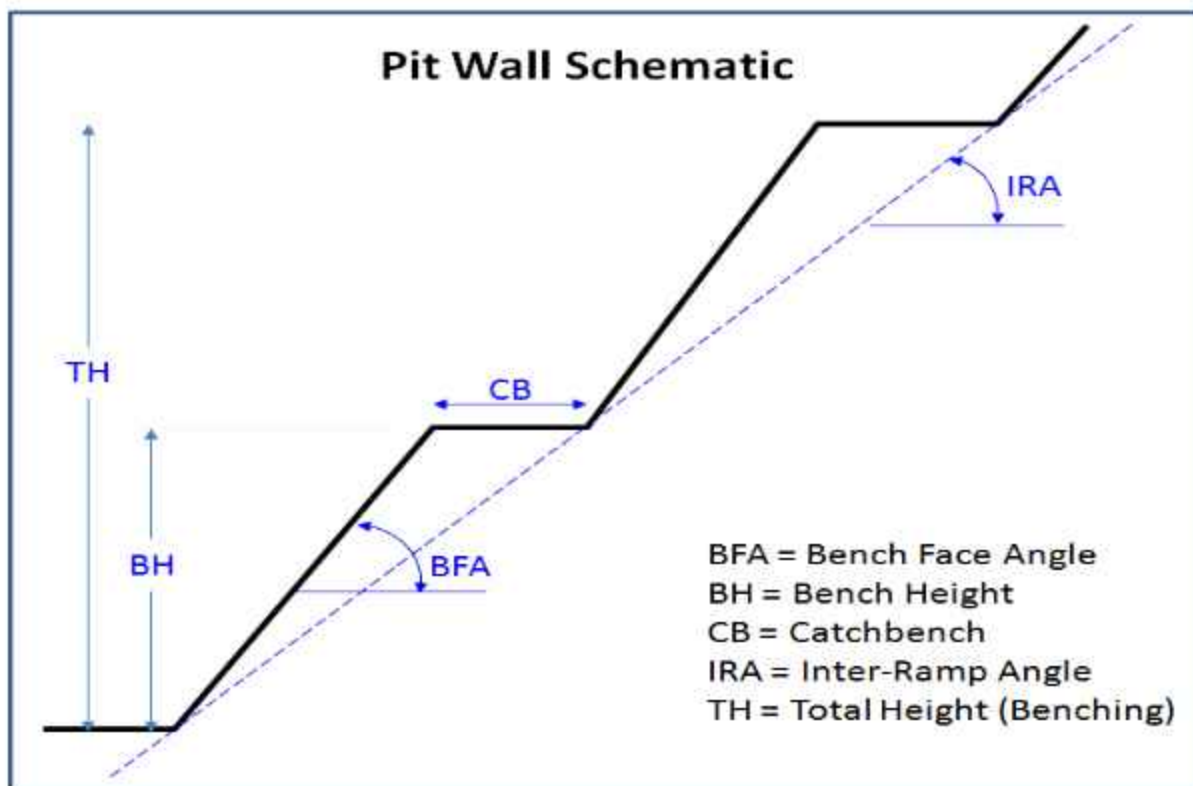


Figure 3.1.2-1: The Design of the Pit wall angle and bench width  
 Source: H & S Minerals Limited, 2025

### 3.1.3. Bench Slope

The pit slope geometries for each design sector have been determined based on minimum acceptable criteria for each of these design methods. The bench slope design has been based on the minimum allowable bench width of 5 metres for a final 15-metre high single bench configuration. For graphitic schist rock, overburden bench face angles of 1:10 have been incorporated to allow a 45-degree inter-ramp slope angle for the 5-metre wide benches. A bench face angle of 75 degrees is recommended for the bedrock slopes. A double bench configuration (30-metre high) can be applied for the generally competent rock below the oxide ore. The waste dump design is shown on [annex 6](#).

### 3.1.4. Drilling and Blasting

Drilling and blasting will be conducted to loosen up the materials. Mining is conducted in a bench design of 3m deep. Drilling for blasting will be done by a drilling wagon of 90-120mm diameter rig. The most popular drill pattern is 2.5 to 3m. A surface drill rig shown on plate 3.1.3-2 is used to drill blast holes. This type of drilling wagon, the KYCY-550/13 (425CFM @ 10BAR) Diesel portable air compressor, features Tier 3 engines, higher emission standards, energy savings, and environmental protection. Ammonium Nitrate Fuel Oil (ANFO) is now used with an emulsion cartridge of 32mm is used as boosters. These boosters have an approximate specific charge of between 0.30 kg/m<sup>3</sup> to 0.40 kg/m<sup>3</sup> as commonly being V6 from Sasol of South Africa. Long delay fuses are used as initiation devices while blasting cord is often to complement the charging and firing systems. The Long delay fuse (LP) are of 17ms to 45ms delay timings. The blasting cord used is 10g/m. The powder factor is currently calculated as 0.77. This is obtained by the observation that 1kg of ANFO is used to blast 1.3 tons of material. Timing is highly used to control the fly rocks and fragmentation.

### 3.1.5. Material Hauling

The purpose of the loading and hauling stage is to move the material previously fragmented by the drilling and blasting process. The first step in this process consists of loading the material from the bench or working face of the mine into trucks. An excavator with 2.78 cubic meter bucket is used to load 30-ton trucks. These trucks will be loaded with approximately 30 tons on a trip of either ore to the crusher/rom pad or to the waste dump. Cycle time is not calculated, but the target per shift of eight hours is 20 trips.

### 3.1.6. Dewatering and Drainage

Inclined benches and inclined berms are included in the pit extension design to enable dewatering of the pit. A 3% incline is used, and sumps and drains are located at the end of the drain to allow safe access to that sump for pump maintenance.

### 3.1.7. Grade control drilling

Grade control drilling will be done in close proximity to the ore body. This allows the geologists to determine the ore grade and its changes as well as helping locate the boundaries of the mine pits where it intersects waste rock. Reverse Circulation is used drilling method used for grade control for the project. Grade control is used to define the ore grades and ore blocks in the pit and also provides knowledge for mine planning and blasting.

## 3.2. Mining Operations

Mining operations will be undertaken by our own fleet and hired mining engineers who will be responsible for site preparation haul road construction and maintenance, excavation and haulage of ore to the crusher and waste to the waste dumps, oversize breakage and equipment, consisting of hydraulic excavators (nominally in a backhoe configuration) loading into off-highway rear dump trucks.

### 3.2.1. Drilling and Blasting Requirements

Drilling wagon, tire mounted, will be used to drill blast holes. This will have a separate compressor unit for air supply with 450 cubic feet per minute capacity 15 bars pressure. Specification for the drilling wagon is shown on Table 3.2.1-1. Explosives will be stored in a licensed explosive storage magazine.

Table 3.2.1-1: Specification for drilling wagon

Item	Description
Type of Drilling	DTH Method
Drill Rod Size	64 mm dia
Pull up Force	2200 kg
Mast Suitable to handle	3 m
Pull up Speed	15 m/min
Drilling Capacity	Dia85 mm)
Maximum depth	125 ft (26 m.)
Maximum Rotation Speed	50 rpm
Maximum Torque	1125 Nm
Propulsion Speed	1.5 mph
Height of the mast raised	3.6 m
Height of the mast lowered	9.0m
Mast lateral swivel	+/- 15 deg
Width	1.8m

### 3.2.2. Blast Hole Design and Drilling Equipment

The bulk explosive to be used for blasting for the H & S Minerals Limited project is mainly Ammonium Nitrate Fuel Oil (ANFO). This will be used with high explosive (cartridge) as primers, an approximate specific charge of between 0.30 kg/m<sup>3</sup> to 0.40 kg/m<sup>3</sup> as a charging booster.

- i. Total tonnage to be mined is estimated to be 600,000 of ore tons, assuming a stripping ratio of 2:1; and 1,200,000 of waste per annum. In total, 1,800,000 tones. The material is graphitic schist.
- ii. A drilling pattern, 90mm holes 15 m deep, will be 2.0 m x 2.0m spacing;
- iii. Weight of ANFO in each hole =  $3.14 \times 0.12m \times 0.12m / 4 \times 2.5m \text{ deep} \times 1,400\text{kg/cubic meter} = 39.56\text{kg}$ ;
- iv. With a specific charge of 0.30kg/cubic meters, each hole will give  $39.56 / 0.3 \times 2 = 263.7$  tones;
- v. A machine will be able to drill 160m per day shift.
- vi. With a rock specific gravity of 2; depth of 15m, the surface area per year is calculated as  $1,800,000 / 2 / 15 = 60,000$  square meters. For calculation purposes, 60,000 square meter may be taken as 600m length to 100 m width with a drilling pattern of 2 by 2 giving 1,581 holes of 15m deep each. This is equivalent of 23,715m of drilling. The machine will therefore be able to drill all the holes in 149 days.

### 3.2.3. Drilling and Blasting Cost Estimates

The calculations for the amount and cost of the production drill have been shown below in Table 3.2.3-1.

Table 3.2.3-1: Drill and Blast Cost Estimates

Blast Parameters	units	Ore	Waste
Bench Height	m	3	3
Hole diameter	mm	85	85
Sub Drill	m	0.2	0.2
Stemming	m	1	1
Total Hole Length	m	3.2	3.2
Charge hole Length	m	2.2	2.2
Bulk density of rock	g/cm <sup>3</sup>	2.0	2.3
Bulk Density Explosive (ANFO)	Kg/m <sup>3</sup>	850	850
Bulk Density Explosive (EMULSION)	Kg/m <sup>3</sup>	1,200	1,200
Percentage Dry Holes	%	80	80
Explosive Column Rise	Cu.m/m	0.01	0.01
Explosive Charge	Kg/m	5.55	5.55
Explosive Charge	Kg/hole	10.44	10.44
Pattern Size Burden	m	5	5
Pattern Size Spacing	m	5	5
Pattern Size Area	Sq.m	25	25
Quantity Blasted per Hole	kg	2,200	2,200
Quantity Blasted per Hole	Bcm/hole	100	100

<b>Powder Factor</b>	<b>Kg/bcm</b>	<b>0.17</b>	<b>0.17</b>
<b>Powder Factor</b>	<b>Kg/kg</b>	<b>0.08</b>	<b>0.08</b>
<b>Drill productivity factor</b>	%	80	<b>80</b>
<b>Bcm blasted per hole</b>	Cu.m	23.8	<b>23.8</b>
<b>Drilling Productivity</b>	Mt/yr	2.3	<b>2.3</b>
<b>Buck ANFO cost</b>	\$/t	1,200	<b>1,200</b>
<b>Packaged Emulsion</b>	\$/t	1,800	<b>1,800</b>
<b>DTH service cost</b>	\$/yr	100,000	<b>100,000</b>
<b>Cost per hole explosive</b>	\$/hole	34	<b>34</b>
<b>Cost explosive per year</b>	\$/yr	181,000	<b>181,000</b>
<b>Drilling cost per hole</b>	\$/hole	187	<b>187</b>
<b>Drilling cost</b>	<b>\$/yr</b>	<b>63,000</b>	<b>127,900</b>

Source: H & S Minerals Limited, 2025.

### 3.2.4. Selected Mining Equipment

The graphite processing machinery/plant plus with some selected mining equipment that has been acquired is shown on Table 3.2.4-1.

Table 3.2.4-1: Project Selected equipment

S/N	Description of the Equipment	Quantity
1.	crawler Drilling wagon	1
2.	Grade control Drilling machine	1
3	RH 14 Grader	1
4.	Heavy duty water pumps	3
5.	Mine Lighting Equipment	1
6	Wheel loader,	2
7	Dump trucks 30 t capacity	6
8	Water boozer 20,000 liters	1
9	Diesel boozer 10000 liters	1
10	Excavator	2
11	Charging and blasting equipment	1
12	Diesel Power Generator, KVA 400	1
13	Bull dozer D10 with shanks	1
14	Light Truck Vehicle	5
15	Vibrator roller 145hp	1
16	Solar system with accessories	4

### **3.2.5. Rom Ore Stockpile**

A stockpile of ROM ore will be maintained close to the crusher. A minimal stock of 14,000t will be kept to allow for ore blending and provide a production buffer against major equipment breakdown or production stoppages. Crusher feed will be done from the ROM stockpile utilizing a wheel loader. This unit could also be utilized for pit operations when required.

The ROM tip area will comprise a concrete pad and wing aprons with rail reinforcing for wear protection from the loading equipment. The ore will be fed via an apron feeder to the movable

primary and secondary crushers in open circuit and then to the agglomerating drum. The feeder and crusher types have been chosen to cope with the potentially sticky ore type.

### **3.3. Waste Rock Dump Design**

The proposed area of waste dumping is selected and digitized in a computer program for track and excavator simulation. Dump design is made for every stage of the project keeping the dump deck height at 30m, dump slopes at 28 degrees and berm width as 30m to allow safe transport. There will be three raises in each waste dumps. The design of WRD is shown on annex 6.

#### **3.3.1. Mine Waste Storage Engineering Criteria**

Numerous criteria were considered when estimating the amount of mine waste generated and waste storage site geometry—the amount of development tonnage (preproduction stripping), variations in the waste-to-ore ratio, production and mine life, and waste rock volume and compaction, which is determined by the size distribution of the waste; the angle of repose, or slope angle; and the moisture content.

The diversion of a portion of the waste rock for uses at the mine facilities for embankments, fill construction, impoundments, and road base and off-site sales for such uses as aggregate for concrete, rail ballast, and road base would reduce the waste storage requirements. The use of waste rock to fill open pit mines as part of a reclamation plan is not included.

#### **3.3.2. Swell and Compaction Factors**

For this analysis, a swell factor of 35 percent, which is a widely accepted average for waste derived from a blasted open pit mine in the mining industry, was selected. Loose material will compact to some degree after placement on the dump. Compaction results from mechanical compaction by equipment, decomposition, and natural compaction over time. The degree of compaction depends on the disposal method, elapsed time, the height of the dump, the moisture content, the size distribution, and the type of material.

The compaction factor is the expanded volume of the rock divided by the compacted volume of the rock. Common total compaction estimates range from 5 to 15 percent. For this study, 10 percent was selected.

#### **3.3.3. Active Dump Angle of Repose**

The stability of the slope of the waste storage facility is critical to determining the area of the site. The high shear strength (the maximum stress that a material can withstand before failure in shear) of dry waste rock contributes to high bearing stability and a high angle of repose that ranges from 34 degrees (°) to 37 °. A conservative angle of repose of 34° (a run to rise of 1.5 horizontal to 1 vertical) was selected for the hypothetical model. The remediated angle of repose used in this study is 27° (a run to rise of 2 horizontals to 1 vertical). The lower angle of repose is attained by using earth-moving equipment to push material down along the margins of the waste dump, which results in essentially no change in overall height. Keeping the height constant, the material removed from the margins at the top of the waste dump to lower the slope angle will result in a decrease in the area of the top and an increase in the basal area of the site. The lower angle generally ensures long-term stability, minimizes erosion, and provides surfaces suitable for re-vegetation for use as wildlife habitat and other purposes.

### **3.3.4. Dump Raise Height**

For the base model, a final height of 30 meters (m) for the mine waste storage facility was selected. Some waste rock storage sites can significantly exceed 100m in height, but they are usually favored by topography. An ultimate height of 30 m was selected for the 3 raises frustum-shaped upstream tailings embankment model. Actual heights vary depending on the nature and amount of tailings and site-specific criteria. The angle of repose of the tailings impoundment used in the model was 22° or a run to rise of 2.5:1.

### **3.3.5. Geometry**

A frustum, or truncated cone, at selected radii was used to model the shape of the mine waste pile. The use of a frustum for model development is an acceptable engineering method. The geometry of a tailings impoundment facility is dependent on numerous factors such as topography, moisture content, climate, geology, seismicity, the type of dam selected, and regulations. A flat depositional surface was selected for the base model, and the shape was assumed to be a frustum at selected radii at the base (400 m) and top (360m). Using a frustum for model development is an acceptable engineering method.

### **3.4. Tailings Storage Facility**

The geochemical characterization indicated the tailings can be classified as non-acid forming, due to the low potential to generate acid in quantities which would impact on the overall site water quality (i.e. sulphide content < 0.3% wt.). Samples were collected for the rock and soil for the TSF construction. The final design of the TSF will be done once the mining license is issued. The preliminary TSF design for the project is shown in **Annex 7**.

## CHAPTER FOUR

### 4. ORE PROCESSING

A plant with a capacity to process 700,000 per annum will be installed at the site. Flake graphite production is achieved by crushing and grinding ore then beneficiating by flotation. In the process, ore is fed into the primary crusher by front front-end loader then into the secondary crusher to reduce the size further. In the milling process, the incoming graphite concentrate is ground before being classified (sized or screened), with the coarser flake size fractions (below 8 mesh, 8-20 mesh, 20-50 mesh. All the output from the ball mill goes to the spiral classifier, which is for classifying the output to less than 0.074mm(200mesh); the output of the smaller ones from the spiral classifier goes to the agitation tank. The bigger particles go back to the grinding mill again.

In the agitator tank, no 2 oil is mixed and the material is sent in a spiral separator. The concentrates from the flotation will go to the pump pond and pump to hydro cyclone via a slurry pump. The underflow of hydro cyclone goes to the second stage ball mill to grind them into small fine again, to better release the inside ore. The overflow of hydro cyclone goes to second stage flotation (including 6 times fine flotation).

During the process, dry tailings sand will be produced, estimated to be 600,000 tons per annum. This dry tailing will be stack on a pad to be constructed onsite and disposed to block makers and road construction projects.

Graphite beneficiation with Pneumatic Flotation Technology will be adopted. Wet screening process is proposed for efficient classification of different products for better value addition; and major equipment like Receiving hopper, Belt conveyor, Ball mill, Belt weight feeder,

The flowsheet shown in Figure 5-1 below was developed for rougher flotation, two liberation stages, cleaner flotation, dewatering, drying and screening prior to bagging for export.

Froth flotation is a process for selectively separating hydrophobic materials from hydrophilic. This is used in several processing industries. Graphite is generally concentrated from crushed rock by froth flotation. Graphite is a naturally hydrophobic mineral and floats with little encouragement. The separation of feldspar, quartz, mica, and carbonate gangue is normally improved by the addition of reagents such as kerosene (which coats graphite) and pine oil (which stabilizes the froth). Selectivity may be improved by adjusting the pH with caustic soda to the 7.5-8.5 range. Agitator, Slurry pump box, Hydro cyclone, Column cell, Vacuum filter, Fluidized bed dryer, Bucket elevator, Pulveriser, Wet vibrating screen etc. will be used in the process.

#### 4.1. Size Reduction Circuit

The primary crushing circuit is a single-stage open-circuit system capable of being fed by a front-end loader. Ample bin and wing wall clearance for machines and loading has been allowed.

The primary crusher is an MMD size with 10mm roll centres and double case length. The crusher will discharge onto a 50mm wide conveyor that carries the ore directly to the agglomeration drum.

The plant has been designed for a capacity of 200 tons per hour (tph) (dry). It is anticipated that the crusher has a throughput capability considerably above this nominal maximum figure: however, some variability in the product size can be expected due to the nature of the open circuit configuration.

The controlled additions of ore will be facilitated by a ration control system that varies the auger speed of the one silo feeding the agglomerate feed conveyor. The silo will be equipped with a bin activator to minimize blockages. The silo will be loaded by a robust and fast lifting electric hoist via a 25mm aperture static trash screen. A lid will be fitted to protect the silo from rain ingress when not in use. The loading area at the top of the silo will be protected from rain by roofing.

#### **4.2. Graphite Flotation Process**

The Main reagents in graphite flotation of common collectors are kerosene, diesel, and foaming agent for the No. two oils, four oil, and an adjusting agent for lime, sodium carbonate, and an inhibitor for water glass.

Flake graphite from KISH can be economically upgraded to 99%+ graphitic carbon content with an acceptable rate of recovery and minimal destruction of flake size. The process describes the method of recovering high purity flake graphite from KISH, comprising first forming a concentrate, screening said KISH graphite concentrate to preferably retain about a +200 mesh fraction, light milling and mixing fraction in a dilute acid to form a weakly acidic pulp, subjecting the graphite pulp to attrition, neutralizing acidic pulp and recovering graphite by flotation. The essential steps involve treatment with a dilute acid followed by attrition milling. Other steps in the process include concentration, flotation, and the use of pebble milling. However, the ability to obtain high-purity KISH graphite is by combining a dilute acid solution with KISH graphite and then subjecting the same to attrition. This facilitates the preparation of coarse, high-purity flake graphite while overcoming the disposal problems of concentrated acid.

An important feature of the process is that the acid need not be concentrated and, in fact, can be very dilute, at a concentration on the order of less than about 7.5%. It is preferred to use hydrochloric acid because of its ease of handling and lower cost. While not completely understood, it is believed that the weak acid functions simply to soften the cement-like bonds of the oxides attached to the graphite flakes. The term "attrition" means a rubbing or abrasive action created by the individual graphite flakes or flakes and attractants impinging and rubbing against each other in an agitated aqueous pulp with sufficient force to physically dislodge the surface impurities. As previously noted, an attrition adjuvant 28 is preferably utilized to facilitate attrition, thereby minimizing the time required to liberate the flakes to 99+ wt. % purity with only minimal size reduction of coarse flakes.

#### **4.3. Process Plant**

The process plant will be centrally located so as to process ores from two blocks. The processing plant with wet beneficiation process and Pneumatic Flotation Technology will be adopted. The advantages of this technology are as follows: -

- For efficient product recovery tailing recovery system is proposed in the process;
- Wet screening process is proposed for efficient classification of different products for better value addition.
- Major equipment's like Receiving hopper, Belt conveyor, Ball mill, Belt weight feeder, Agitator, Slurry pump box, Hydro cyclone, Column cell, Vacuum filter, Fluidized bed dryer, Bucket elevator, Pulverizer, Wet vibrating screen etc. will be used in the process.

## CHAPTER SEVEN

### 7 TECHNICAL AND ECONOMIC FACTORS

#### 7.1 Proposed project Needs and Revenues

The project is expected to be an open pit mine. The inputs are as follows.

- Annual ore tonnage 700,000 tones;
- Calculated Mining Depth 50m;
- The average grade of 10%C.
- The estimated resources amount to 60.96 million tones.
- Cutoff grade 3%;
- Estimated plant recovery 90%;
- Estimated production tonnage per year (t/y) considering 70,000 tons of high quality flake graphite;
- Annual waste rock is estimated to around 400,000 tons;
- Estimated flake graphite 95% TGC is US\$ 800.00
- Mining operations will be in 340 days a year one shift of 10hr;
- Exchange rate 1USD =2590 TZs
- Revenue before taxes is calculated as 70,000\*800= **USD 56.0m.**

#### 7.2 Projects Costs

##### 7.2.1 Capital Cost

Capital mining cost includes purchasing of graphite processing plant with accessories, the construction of the open cast mine; ore haulage system to the central processing plant; and auxiliary equipment and tools; tailing dam and accommodation sites construction as shown on table 7-1.

Table 7-1: List of Open pit equipment and their costs

Item	Number		
Excavator	5		
Dump truck	8		
Dozer	2		
Grade	2		
Drill rig (crawler mounted)	10		
Water Cart	6		
Wheel loader	5		
Solar system complete	4		

Vibrator roller	2	50,000	100,000.00
Water pumps	10		
Generator	2		
Fuel facility	1		
Pick up 4wD	5		
Explosive Magazine	3		
Communication radio sys	15		
Access road construction	1		
Tailings Dam construction & water circulation	1		
Computers/Software	1		
Various Permits	1		
Land Issues	1		
Complete process Plant	1		
others and miscellaneous	1		

Source: H & S Minerals Limited, 2025

### 7.2.2 Operating Costs

Operating costs estimates for the Project include all costs for the purchase of consumables, labor and all supplies for the mining project. Processing cost has been calculated on the tonnage throughput on the plant. Yearly consumption of these consumables is estimated based on existing prices of commodities in Dar Es Salaam, import from China.

Mining operation costs have been sourced from the same type of project currently under operation. The following facts are considered in estimating the costs of the project: -

- Mining and processing costs USD 470/ ton exclusive of taxes,
- General administration cost, Transport and freight, Marketing and contingency of ore processed is USD 22/ton of ore processed.
- Total operational cost is USD 492/ tone of processed flake graphite.
- Estimated annual operational costs  $USD 512 \times 70,000 = USD 34.44m$

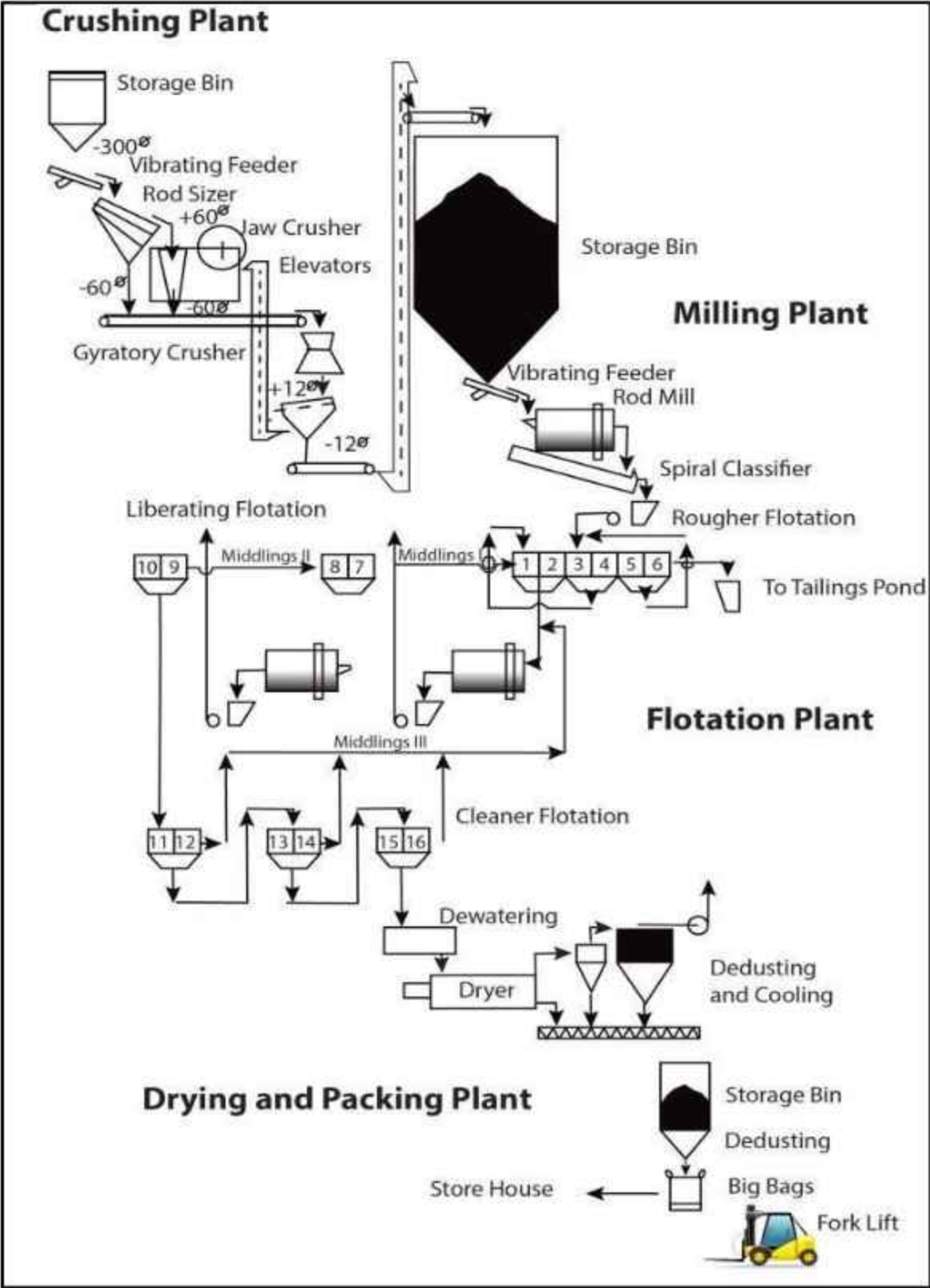


Figure 4.3-1: Proposed Schematic Graphite Process flow sheet  
 Sources: *Graphite Beneficiation Plant Design, 2022*

#### 4.4. Graphite Drying

Several methods exist for drying the produced graphite to remove moisture before transportation. These include the following:

- 1) Sun Drying- The produced material is kept spread on the floor of the transparent roof to dry by the effect of the sun. The process is slow and inefficient as required.
- 2) Use of Firewood- Wood is burnt in a kiln to give the same effect as coal. Wood is cheap but availability of wood is another challenge plus the environmental considerations in cutting out trees.
- 3) Coal drying Kiln- the most effective kiln in drying graphite is the use of coal. Coal is available in Tanzania

Most possible method to be adopted is coal which is available in Tanzania.

One tone of coal is used dry 20 tons of graphite. For the 70,000 tons of graphite 3,500 tons of coal will be used. A ton of coal produces 130kg of ash. In total about 455 tons of coal ash will be produced per annum.

The conceptual design is shown on figure 4-2. It dries the slurry that contains moisture between from 20% to 30%. It is a rotary drum dryer with capacity of drying 2000 tons per day. Average heat is 750°C. The main body of roller drum dryer is a cylinder at a certain gradient with horizon. The cylinder is drove by -gear at a speed of 2-6r/min. The general gradient of cylinder is about 1°-5°. Materials enter cylinder by the upper end. As the cylinder rotates, materials flow to the lower end under gravity and get discharged. During this period, materials get thorough contact with hot air, moisture inside gets vaporized. Due to dehydrating machine operates under negative pressure, the inlet and outlet both adopt sealing device to avoid air leakage.

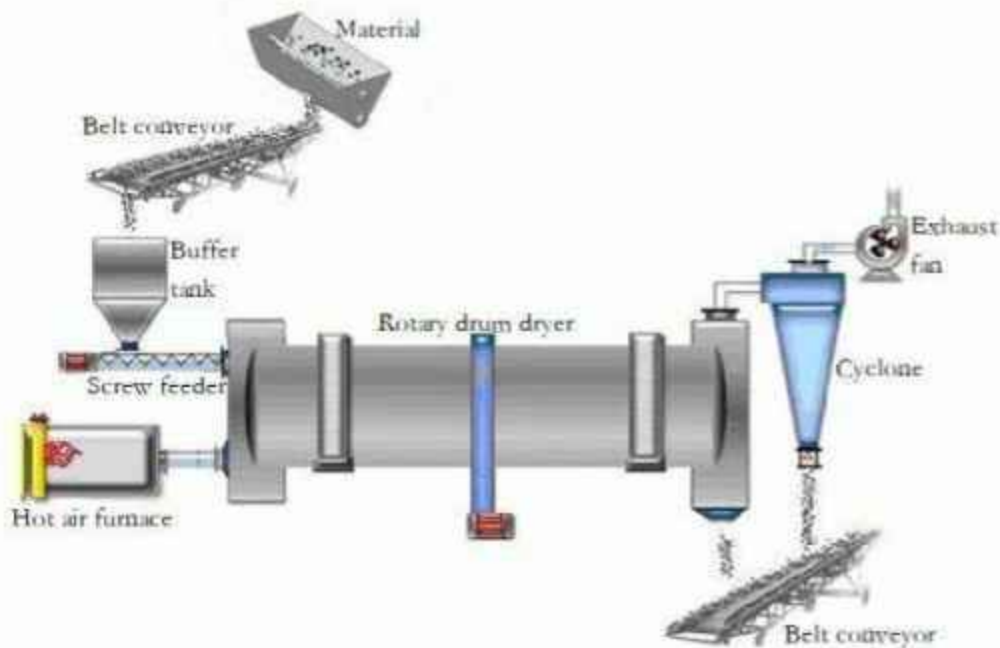


Figure 4.4-1: Conceptual Design of the Graphite Drum Drying Machine / Rotary Kiln Dryer  
Rotary Drum Dryer -

Source: <https://welldone-machinery.en.made-in-china.com/>

#### **4.5. Management of Chemicals**

Chemicals that will be used include no. 2 oil and caustic soda. The no 2 oil is health hazards and requires precautionary measures. Management involve usage with adequate ventilation, avoiding contact with eyes, skin and clothing. Not to taste or swallow and should be washed thoroughly after handling. Caustic soda is hazardous, corrosive to metals, causes severe skin burns and eye damage and one should read label before use.

## CHAPTER FIVE

### 5 SITE FACILITIES AND UTILITIES

The criteria used to select the location of the site facilities, including the processing plant include:

- Good position to access road for consumable deliveries etc;
- Central infrastructure to serve the activities mines from all mining blocks;
- Ground conditions are appropriate for building requirements.
- Drainage from plant site away from main project facilities and easily diverted to the stormwater management pond.

#### 5.1 Transport Plan

The project operation is anticipated to be small to medium one that do not require a complicated model for transportation but only a logical and technical process. The process uses the analysis of quantitative data to decide how to best invest to transport goods from suppliers such as equipment. An investigation has been done to predicted transportation and logistics costs, and its availability.

- Most of the goods will be transported from Dar es salaam. The route will be Dar es Salaam-Segera Moshi Kia Mirerani to site. This trip will take about 10 hrs for a truck.
- Trucks of 20 tones will be hired to ferry the goods such as tires spare parts.
- Access to various areas of the mine will be done by light vehicles;
- Workers from Mirerani township and nearby villages will be transported by hired buses.

#### 5.2 Fuel Supply Alternatives

The mining and mobile equipment fleet will be powered using diesel. The fuel consumption per day is estimated to be 3,000 litres will be stored on site in 2 tanks of 20,000 litres each. Supply options for both diesel and lubricants include the following: -

- Local supply from Mirerani town;
- Purchase from Dar es Salaam

Local supplier from Mirerani is the preferred option for the reason of creating an economic link to the community and easy supply.

#### 5.3 Power Source Alternative

Power requirement at the workshop and domestic use on site is estimated to be 200Kw. Two Options exist.

- The project is located about 4km form the HT 66KV power line at Mirerani power line.
- 2- 500Kva Diesel generators.

The project will be connected to National grid at Mirerani high tension about 6km from the site.

#### 5.4 Mobilization and Construction Phase

This stage will involve development activities that will facilitate a proposed mine to operate. Construction of the mine will entail vegetation clearing and overburden removal.

These activities include the following: -

- Site clearing and levelling for construction of the various project facilities such as mined ore stockpile, rock waste dumps, top soil stockpile, etc.;

- Rehabilitation access roads from the Maendeleo hamlet area to center of operation and construction of earth road to various areas of the project. This will earth road for haulage routes within the project area amounting to about 8.5 km;
- Processing plant buildings and foundations that will accommodate process plant machinery such as crushers, ball mills, floatation and agitator tanks, graphite drying machines etc;
- Water recycle ponds and dry tailings stacking area;
- Drilling for fresh water boreholes;
- Workshop and machines parking areas;
- Accommodation, offices and recreational facilities.

## **5.5 SHE Issues**

### **5.5.1 Fire Protection**

Water for fire protection will be drawn from the storage tank for the potable water treatment plant. The power station, substations and plant buildings will be equipped with a fire detection system linked to the main alarm panel within the administration and/or security office. Fire extinguishers will be installed in plant buildings. Fire alarms will be located in the following locations: -

- Wet plant main control room;
- Power station main control room;
- Main control room;
- Plant office;
- Ablutions, crib, first aid station;
- Administration building; and
- Laboratory.

Heat and/or smoke detectors will be located in each building.

### **5.5.2 Securities**

Access to the mine site will be controlled by a 2.5-m high razor wire fence enclosing a total project area. The fence will encompass all mining associated facilities. The fence will be installed in a clear corridor about 6 m wide. A closed-circuit television system will be installed for site security.

### **5.5.3 Safety and Warning Systems**

Fire warning systems will be installed on site during construction and operation to alert workers escape before a fire spreads. Other danger warning signals will be erected as working area. These warning signs will clearly visible, and recognized by all the people on site.

### **5.5.4 Labor and Leave Roster**

During construction, it is estimated that there will be maximum of 10 skilled labor and 200 general workers. During operation skilled labor that includes truck drivers and machine operators is estimated to be 250. There will be only one-day shift of 8 hrs. The leave roster will be 6 weeks in 2 weeks out. A camp will be set for workshop, ablution, HSE for workers and accommodation. The project management will comprise of the following: -

- Managing Director;

- Finance Director;
- Operations manager; and
- Security Manager

## 5.6 Waste Generation and Management

### 5.6.1 Hydrocarbons Wastes and Spills

Mine operation will involve the use of machines and automobiles of different sizes and capacities. All these facilities need fuels and lubricants to operate. The plant will use no 2 oil which is hydrocarbon for floatation process. Most spills will occur on cleared areas associated with mining, plant or workshop areas and as such pose no immediate risk to the surrounding environment. Incorrect management of the spill may result in contamination of subsoils and groundwater.

#### Management of Hydrocarbon Wastes-

- Bunds will be designed to contain spills as they are easy to clean up. Spills outside of bunds are more serious and will often require more effort in clean up;
- Control borehole will be constructed both up flow and down flow of the pits as well as down flow of the process plant (checking for hydrocarbon contamination);
- There will be no dewatering bores installed as dewatering will be adequately handled by in pit sump pumps;
- Used Oils, Lubricating Fluids and Cooling Fluids will be collected for recycling. This includes: motor oil, transmission fluid, lubricating oil, cutting oil, hydraulic oil, and mineral oil. This waste stream is nonhazardous if it is recycled. Used oil recycling is the most environmentally friendly way of disposing used oil.

Other ways of disposing used oils are:

- Incineration of used oil at high temperatures, e.g. cement and lime kilns;
- Burning untreated used oil; and
- Blending used oil and fuel oil.

Incineration is most effective at destroying the used oil - but it adds the least value. Burning untreated used oil merely dilutes the harmful components into the environment.

### 5.6.2 Contaminated Debris from Work Places

This includes gloves, paper, plastic, and other inert debris contaminated with hazardous chemicals. In some cases, it is not prudent to dispose of nonhazardous waste into the dumpster.

**Management of Contaminated Debris-** Contaminated solid debris is best disposed of by incineration. In general, any waste contaminated with trace levels of a poison or biological wastes should be collected for incineration.

### 5.6.3 Solid Wastes and Garbage

The type, amount, and properties of mine waste produced at different mines vary depending on the resource being mined, process technology used, and geology at the mine site. Types of mine waste include Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes. Solid wastes will be classified as follows:

- Garbage: decomposable wastes from food;

- Rubbish: non-decomposable wastes, either combustible (such as paper, wood, and cloth) or noncombustible (such as metal, glass, and ceramics);
- Ashes: residues of the combustion of solid fuels;
- Large wastes: demolition and construction debris and trees;
- Sewage-treatment solids: material retained on sewage-treatment screens, settled solids, and biomass sludge;
- Industrial wastes: such materials as chemicals, paints, and sand;
- Mining wastes: stored sands.

**Management of Solid Wastes**-Solid wastes will be sorted before disposal. Most of the solid wastes will be on land fill. Other wastes will be incinerated or recycled. Disposal on the landfill- a refuse will be spread in thin layers, each of which is compacted by a bulldozer before the next is spread. When about 3 m of refuse has been laid down, it will be covered by a thin layer of clean earth, which also is compacted. Pollution of surface and groundwater will be minimized by lining and contouring the fill, compacting and planting the cover, selecting proper soil, diverting upland drainage, and placing wastes in sites not subject to flooding or high groundwater levels.

#### **5.6.4 Liquid Wastes**

Liquid wastes will include sewage or wastewater from domestic water use and waste water from the plant.

Sewage will be piped to soak-away tanks. Soak away tank is a pits typically filled with hardcore, into which wastewater is piped so that it drains slowly out into the surrounding soil.

#### **Permits for Water Use and Discharged**

Permits to drill wells, permits for water use and permit for water discharge will be applied for to the Ministry of Water and Livestock at the Pangani Basin Office before the actual operation.

**Management of Liquid Wastes**-Waste water will be directed into water recycling pond. Recycled water will account for 80% of the water used in the plant.

## **6 ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS**

EIA been conducted on the entire project that includes all mining blocks. The EIA issues associated with development of the of the project are addressed in the following documents:

- The Environmental Impact Assessment (EIA) was prepared and submitted to NEMC (National Environmental Management Council), and issued a certificate (copy attached as a mandatory document for ML application);
- The Environmental Management Plan (EMP) for the project;

### **6.1 Project Details**

The scope of work for the EIA was based on the Terms of Reference approved by NEMC, and included the following principal work areas:

- Detailed project description;
- Review of regulatory framework;
- Environmental baseline studies (physical and biological environment);
- Socio-economic baseline studies;
- Public consultation;
- Impact assessment;
- Compensation and Relocation;
- Cumulative Impact Assessment; and
- Impact mitigation, monitoring and management.

### **6.2 Environmental Policies**

The company is committed to sound environmental management. The Mining (Environmental Management and Protection) Regulations 2010 will provide the environmental regulatory framework for future mining operations in Tanzania. The Project will be constructed and operated, and the site reclaimed after mining and processing operations cease, in a manner that minimizes potential environmental impacts. Specifically, the project will undertake to:-

Comply with relevant legislation and adhere to standards of responsible environmental practice for the mining industry;

- Maintain a monitoring and audit program to ensure ongoing environmental management, compliance with corporate policy and with government laws and regulations;
- Reclaim disturbed areas in accordance with site-specific criteria and applicable regulations and permits;
- Provide employees with a safe and healthy work environment in accordance with mining industry practice;
- Cooperate with governments and other stakeholders in connection with the formulation of environmental laws, regulations and standards affecting the mining industry;
- Support industry associations which promote good environmental practices and which advance environmental protection in mining and mineral processing;
- Communicate this policy to employees, the public, government agencies, suppliers and customers;

- Conduct periodic audits and reviews to guide its environmental management programs;
- Design, construct and operate exploration, mining and processing facilities to mitigate environmental impacts to the extent technically and economically feasible;
- Monitoring of surface water, groundwater, and wildlife and air quality will be undertaken during all phases of the project, i.e., construction, operations and closure, in order to ensure that significant environmental impacts are avoided; and
- TGL is also committed to the process of consultation and disclosure. Regular meetings will be held, particularly at the local level, throughout the development, operation and reclamation phases.

### **6.3 Mitigation of Impacts**

#### **• Support to community development.**

As a result of this project the company is committed to support the community surrounding on different areas that include, improving the education and health sector, improvement of public roads, establish community-based water wells for supplying drinking water and support environmental conservation programmes over the area. There will be a community department led by a qualified senior community officer reporting to the Human Resources and Community Development Department Manager, a comprehensive report detailing social-economic management will be produced annually.

#### **• Accidents to Humans and animals**

During the construction stage, increased project activities will increase the traffic movements over the existing public road. The impact is moderately significant, to mitigate the impact it is proposed that since the access road is expected to be an improved earth road, speed restraining humps will be established at all potential black spots, especially at all approaches to settlements, school children crossings and corners.

#### **• Spread of Sexually Transmitted Disease**

Taking into consideration of the number of people who will be working at coal mining, the social interaction may be of high significance; some interactions may be of intimate nature, resulting in contracting of sexually transmitted diseases such as HIV/AIDS the nature of spread of this disease contributes to the pandemic. The following measures will be taken by Project.

- The project proprietor will devote time in raising awareness of the dangers of STDs and HIV/AIDS;
- Infected workers will be encouraged and cared;
- The project proprietor will liaise with relevant organs to ensure availability of antiretroviral drugs to improve health and survival of people living with HIV infection;
- Provide diagnosis and treatment for tuberculosis and STDs that are common among people with HIV; and
- Support voluntary HIV counselling and testing.

#### **• Integrating HIV and Gender-Related Issues in Project**

The prevalence of HIV in eastern and southern Africa remains at unacceptably high levels. There are many reasons for this, but one relates particularly to the influx of workers

associated with the construction and subsequent operation of large capital projects – typically those projects which are classified as Category A in terms of World Bank and International Finance Corporation definitions. Opportunity exists to strengthen the EIA process to better predict and manage the long-term impacts of these projects on health, particularly with reference to HIV in the workforce and affected communities.

#### • **Spills Containment**

Spilled fuel and any collected rainwater within the diesel fuel storage area will be pumped through a separator with the oil fraction reporting to a storage tank and the water fraction directed to the storm water management pond. A similar unit will be installed in the mine contractor's wash down bay and workshop area. All reagent tanks are contained within concrete bunds capable of containing 100% of the largest tank volume and conform to the code for containment.

#### • **Sewage and Waste Disposal**

Sewage from the accommodation camps and plant facilities will be processed through a rotary biological contactor (RBC) or an equivalent disposal system, combined with an aseptic field. The system will be selected to handle the project workforce during the construction and operating phases. Dedicated septic systems will be used for outlying facilities. A small licensed landfill will be constructed within the project site, in order to receive on-hazardous solid wastes such as:

- Domestic wastes from living quarters, offices and cafeteria;
- Packaging materials and scrap that cannot be recycled (cardboard, lumber, cleaned steel drums, piping);
- Sewage; and
- Non-contaminated debris from the demolition of structures at closure.

### **6.4 Landfill**

The solid, non-hazardous waste landfill will remain in operation as long as the accommodation camp is occupied. If or when it becomes redundant, the landfill will be closed according to a decommissioning plan and applicable regulations. Final closure will entail grading the top surface for drainage, capping with a low-permeability saporlite cover and re-vegetating.

#### **6.4.1 Site Re-Vegetation**

Re-vegetation of disturbed areas will be required in order to prevent soil erosion and to establish conditions similar to the pre-development environment on-site given the sandy superficial soils and seasonally dry climate. Re-vegetation will be required in the areas listed below. Processing facilities including:

- All areas associated with the process plant buildings and ROM stockpile;
- Waste management facilities including;
- The non-hazardous waste landfill;
- Area of the breached water storage dam;
- The top and sides slopes of the tailings storage facility (herbaceous plants only);
- Top and sides slopes of the waste rock dump; and
- Area of the stormwater management pond once it has been breached.

Infrastructure areas including:

- Truck scale;
- Trailer park;
- Power supply system;
- Explosive storage facility;
- Fuel and lube management facilities;
- Laboratories;
- Mine contractor's yard and workshop; and
- Redundant internal site roads.

#### **6.4.2 Post-Closure Monitoring**

Physical monitoring of the Project will include periodic visual inspection of the following:

- The integrity of the fencing around the pits;
- The health of the vegetation in re-vegetated areas; and
- The stability and management of abandoned infrastructures.

#### **6.5 Decommissioning and Closure**

The principal closure objectives for the Project are the following:

- To the extent practicable, progressive closure activities will be undertaken during operations;
- Closure activities that yield a rapid, walk-away outcome are preferred over solutions that require long term passive care (maintenance) or active care (treatment).
- Components of the closure plan are;
- Maintenance of fencing around the dangerous areas in order to prevent inadvertent entry by terrestrial wildlife or unauthorized persons;
- Re-contouring of the waste rock dump slopes, as necessary, in order to facilitate re-vegetation;
- Monitoring, management and (if necessary) treatment of water in the open pond;
- Re-establishment of site drainage patterns by modifying ditches, removing redundant culverts and similar activities;
- Removal of the plant equipment and structures to their foundations and the areas backfilled covered and contoured with native materials. A short list of structures and infrastructure will be provided to the local governing agency for its ongoing use;
- Re-vegetation of disturbed areas using local species in order to deter erosion and restore terrestrial habitat; and
- Verification that the project has not had an impact on the aquatic environment near Lake Victoria.

##### **6.5.1 Petroleum Products, Machinery, Equipment, Chemicals and Waste**

An inventory will be made of equipment that can be reused. Equipment that can be sold will be cleaned and prepared for shipment. Metal goods that cannot be sold for re-use will be recovered and sold for scrap. Non-hazardous materials that do not have scrap value will be dismantled and placed in the on-site landfill. Small inventories will be maintained of those chemicals, such as water-treatment reagents, that will be required for post-closure use. To the extent possible, inventories of petroleum products and other chemicals will be consumed prior to shutdown, returned to the supplier or sold. Non-reusable chemicals will be disposed of in the appropriate manner. Combustible materials will be incinerated on site where it is safe to do so.

Solid, non-hazardous chemicals will be placed in the on-site landfill. Any hazardous materials will be disposed of in the appropriate manner.

### **6.5.2 Buildings and Other Facilities**

All buildings and other infrastructure facilities will be decommissioned and demolished, with the exception of the following:

- Well water supply system.
- Accommodation camp.
- Sewage treatment system.
- Security fences and a gatehouse.
- Recreational area.

Demolition will include the removal of the building superstructures. Concrete floor slabs will be broken up. The resulting rubble will be covered with 500 mm or more of soil and re-vegetated.

### **6.5.3 Site Re-vegetation**

Re-vegetation of disturbed areas will be required in order to prevent soil erosion and to establish conditions similar to the pre-development environment on-site given the sandy superficial soils and seasonally dry climate. Revegetation will be required in the areas listed below.

Processing facilities, including all areas associated with the process plant buildings and ROM stockpile.

Waste management facilities including:

- The non-hazardous waste landfill;
- Area of the breached water storage dam; and
- Area of the storm water management pond once it has been breached.

Infrastructure areas including:

- Truck scale;
- Trailer park;
- Power supply system;
- Fuel and lube management facilities;
- Laboratories;
- Mine contractor's yard and workshop; and
- Redundant internal site roads.

## CHAPTER SEVEN

### 7 TECHNICAL AND ECONOMIC FACTORS

#### 7.1 Proposed project Needs and Revenues

The project is expected to be an open pit mine. The inputs are as follows.

- Annual ore tonnage 700,000 tones;
- Calculated Mining Depth 50m;
- The average grade of 10%C.
- The estimated resources amount to 60.96 million tones.
- Cutoff grade 3%;
- Estimated plant recovery 90%;
- Estimated production tonnage per year (t/y) considering 70,000 tons of high quality flake graphite;
- Annual waste rock is estimated to around 400,000 tons;
- Estimated flake graphite 95% TGC is US\$ 800.00
- Mining operations will be in 340 days a year one shift of 10hr;
- Exchange rate 1USD =2590 TZs
- Revenue before taxes is calculated as  $70,000 \times 800 =$  **USD 56.0m.**

#### 7.2 Projects Costs

##### 7.2.1 Capital Cost

Capital mining cost includes purchasing of equipment for the construction of the open cast mine; ore haulage system to the central processing plant; and auxiliary equipment and tools; tailing dam and accommodation sites construction as shown on table 7-1.

Table 7-1: List of Open pit equipment and their costs

### 7.2.3 Project Cash Flow

Project cash flow is forecasted on Table 7-2.

Table 7-2: Indicative Cash Flow Projections for the first 8 years.

YEAR	0	1	2	3	4	5	6	7	8
	2027	2028	2029	2030	2031	2032	2033	2034	2035
Graphite Mines in (t)/annum(000)	0	300	300	300	300	300	300	300	300
Flake graphite 95%C produces in tones per annum	0	42.8	42.8	42.8	42.8	42.8	42.8	42.8	42.8
Yearly sales Flake graphite 95% C US\$ 000	0	34,240	34,240	34,240	34,240	34,240	34,240	34,240	34,240
Less:									
Royalty (3%) and service 1%US\$ Local Gove 0.3% (000)	0	1472.32	1472.32	1472.32	1472.32	1472.32	1472.32	1472.32	1472.32
Operating Costs (US\$) (000)	0	21,890	21,890	21,890	21,890	21,890	21,890	21,890	21,890
Less:									
Principal Amount US\$ (000)	937	187.4	187.4	187.4	187.4	187.4	187.4	187.4	187.4
Gross income (000)	-937	10,690	10,690	10,690	10,690	10,690	10,690	10,690	10,690
Loan and interest Deduction US\$ (000):	0	187	187	187	187	187	187	187	187
Taxable Income US\$ (000)	-937	10,503	10,503	10,503	10,503	10,503	10,503	10,503	10,503
Taxes (30%)US\$ '000'	0	3,151	3,151	3,151	3,151	3,151	3,151	3,151	3,151
After-Tax-Income US\$ 000	0	7,352	7,352	7,352	7,352	7,352	7,352	7,352	7,352
Less Depreciation US\$ (000) 5%	0	93.7	42.0	18.7	18.7	18.7	18.7	18.7	18.7
Profit (000)	0	7,258	7,310	7,334	7,334	7,334	7,334	7,334	7,334
Less 16% Government shares USD (000)	0	1161.3	1169.6	1173.4	1173.4	1173.4	1173.4	1173.4	1173.4
Total Profit USD (000)	0	6,097.0	6,140.6	6,160.2	6,160.2	6,160.2	6,160.2	6,160.2	6,160.2

Source: H & S Minerals Limited, 2025

### 7.2.4 NPV and IRR

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. The NPV value of the project is calculated with an initial capital of US\$4,534,500, a discount rate of 10%, and the cash flow of the first eight years shows a positive NPV of **US\$45,723,669.56**.

The internal rate of return (IRR) is a metric used in capital budgeting to estimate the return of potential investments. In this project 10% internal rate of return was used. Testing the higher values of 25% NPV is found to be a positive value of US\$27,960,555.51. The ultimate 35% gives an NPV of US\$21,198,205.00.

### 7.2.5 Risk Management

Project risk is an uncertain event or condition that, if it occurs, has positive or negative effects on at least one project objective, such as time, cost, scope or quality. Implementing an RM process earlier in the project life cycle is useful if it is done effectively, which includes the following set of processes: -

- Risk identification – the process of determining risks that may affect the project.
- Risk analysis – process of assessing risks 'probability of occurrence and impact on project success;
- Risk evaluation – process of prioritizing risks based on the probability of occurrence and impact on project success;
- Risk mitigation – process of developing actions to reduce the occurrence and/or impact of the negative risks.
- Risk monitoring – process of implementing risk mitigation plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating overall risk management process effectiveness throughout the project.

### 7.2.6 Risk mitigation

Risk mitigation actions will be done to respond to various risks that threatens the project objectives. This process follows the risk evaluation process so that the risk mitigation is concentrated on the most significant risks in the higher priority. Possible risks and their mitigation are shown on shown on table 6-8

Table 7-3: Possible Risk and Mitigation

Na.	Possible Risk	Mitigation
1	Incorrect Mineral resources calculation (negative case)	Re-calculate mineral resources and carryout due diligence on detailed exploration
2	Changes in Laws and Regulation to affect profit	Sign long term Mineral Development agreement and or reduce operating cost
3	Graphite Price fluctuation (negative case)	Re-calculate the breakeven price and reduce production cost
4	Owners Financial difficulties	Invite Joint venture agreement
5	Energy (Diesel) price fluctuation (negative case only) due to power outage	Explore alternative power source, eg. Use of heavy fuel for power generation
6	Government Bureaucracy in obtaining various licenses	Create liaison person between project and Government
7	Mine intruders affecting production operation	Improve security and involve community in various CSR projects
8	Irresponsibility of worker	Motivate workers
9	Workers strike	Motivate workers
10	Poor Management	Recruit appropriate management

Source: H & S Minerals Limited, 2025

### 7.3 Concluding Remarks

Hilal project represents a small-medium sized open-cast graphite mining project owned 100% by local Tanzanians. It provides a reasonable return on investment given the technical and economic assumptions presented in this study. The areas require more exploration work to be undertaken to increase confidence level in resources. The conservative approach has been taken where uncertainties exist, aiming at optimizing the project cash flow projections compared to those given here. The owner considers, for example, that there remains potential

to locate further resources and reserves deeper and on the small veins outcrop of less than 10m wide. The infrastructure around the project, gives a coincidence and competitive advantage

## 8 REFERENCE

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5. Littleton, CO, Society for Mining, Metallurgy, and Exploration, Inc., p. 565-583.
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12. Winter J.D., 2001, An Introduction to Igneous and Metamorphic Petrology, Prentice-Hall C.U. Mining Engineering Department, Sivas, Turkey. † Chief Mining Engineer, Dedeman Pinarbasi Madencilik, Kayseri, Turkey

# Annexes

## Annex 1: Proponent Tax Payer Identification Number

## Annex 2: copies of PML

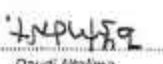
**THE UNITED REPUBLIC OF TANZANIA**  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

**THE MINING (MINERAL RIGHTS) REGULATIONS, 2018**  
**PRIMARY MINING LICENCE PML00105SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro** District, QDS **71/2** over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

  
 Daudi Ntalima  
 For: **EXECUTIVE SECRETARY**


PML00105SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro** District, QDS **71/2** defined by the following corner co-ordinates (Arc 1960):






Corner	Latitude	Longitude
1	0° 31' 00.00" S	33° 00' 00.00" E
2	0° 31' 00.00" S	33° 00' 00.00" E
3	0° 31' 00.00" S	33° 00' 00.00" E
4	0° 31' 00.00" S	33° 00' 00.00" E



Legend	
Licensee area	
License Number	<b>PML00105SMN</b>
District	Simanjiro
District	

An area of approximately 3.87 Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TZS)	Date	Signature & Stamp
2019/2020	25334722	138,086.00	01/12/2019	
2020/2021	19215600/40349	118,800.00	01/12/2020	
2021/2022	18,809,763,600	124,150.00	16/03/2021	
2022/2023	19,209,150,000/4	134,150.00	08/04/2022	
2023/2024	19,209,150,000/4	134,150.00	01/11/2023	
5.				
6.				

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 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00106SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
 David Kalima  
 For: EXECUTIVE SECRETARY

PML00106SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at Mirerani Block II area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc. 1960):

Corner	Latitude	Longitude
1	03 deg 36 min 24.00 sec	35 deg 38 min 1.82 sec
2	03 deg 36 min 24.10 sec	35 deg 38 min 1.82 sec
3	03 deg 36 min 30.00 sec	35 deg 38 min 25.10 sec
4	03 deg 36 min 18.00 sec	35 deg 38 min 50.70 sec
5	03 deg 36 min 18.10 sec	35 deg 38 min 4.94 sec



Legend	
Licensed area	[Symbol]
License Number	PML00106SMN
District	Simanjiro
Direction	N

An area of approximately 4.70 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	200,000.00	200,000.00	03/12/2019	[Signature]
2020/2021	200,000.00	200,000.00	01/02/2020	[Signature]
2021/2022	215,500.00	215,500.00	24/02/2022	[Signature]
2022/2023	216,000.00	216,000.00	08/02/2023	[Signature]
2023/2024	215,500.00	215,500.00	21/11/2023	[Signature]

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 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00107SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
 David Kalima  
 For: EXECUTIVE SECRETARY

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at Mirerani Block II area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc. 1960):

Corner	Latitude	Longitude
1	03 deg 36 min 17.15 sec	35 deg 38 min 4.70 sec
2	03 deg 36 min 17.00 sec	35 deg 38 min 4.00 sec
3	03 deg 36 min 17.35 sec	35 deg 38 min 4.70 sec
4	03 deg 36 min 12.00 sec	35 deg 38 min 28.00 sec



Legend	
Licensed area	[Symbol]
License Number	PML00107SMN
District	Simanjiro
Direction	N

An area of approximately 5.07 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	200,000.00	200,000.00	03/12/2019	[Signature]
2020/2021	200,000.00	200,000.00	01/02/2020	[Signature]
2021/2022	200,000.00	200,000.00	08/02/2022	[Signature]
2022/2023	200,000.00	200,000.00	08/02/2023	[Signature]
2023/2024	200,000.00	200,000.00	21/11/2023	[Signature]

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 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00108SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **MS Hial Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2** over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

  
 David Mwakwa  
 For: EXECUTIVE SECRETARY

PML00108SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District, QDS 71/2** defined by the following corner co-ordinates (Arc 1960):

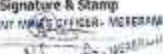




Corner	Latitude	Longitude
1	03 deg. 29 min. 11.11 sec.	33 deg. 40 min. 4.95 sec.
2	03 deg. 29 min. 14.87 sec.	34 deg. 00 min. 14.27 sec.
3	03 deg. 29 min. 17.01 sec.	33 deg. 26 min. 1.85 sec.
4	03 deg. 29 min. 17.96 sec.	34 deg. 58 min. 4.70 sec.



Locality	
Locality area	
Licence Number	<b>PML00108SMN</b>
District	Simanjiro
Division	

An area of approximately **4.63** hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TSh.)	Date	Signature & Stamp
2019/2020	2536464	21,308,976/-	22/12/2019	
2020/2021	26123401531742	21,827,740/-	22/12/2020	
2021/2022	26982305056500	22,635,500/-	22/12/2021	
2022/2023	278412091547614	23,443,264/-	22/12/2022	
2023/2024	28700113222559713	24,251,028/-	22/12/2023	

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MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML00109SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QOS 71/2 over an area described *overleaf* (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
David Msimba  
For: EXECUTIVE SECRETARY

PML00109SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QOS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg 38 min 50.07 sec	35 deg 58 min 18.00 sec
2	03 deg 38 min 14.37 sec	35 deg 58 min 14.38 sec
3	03 deg 38 min 11.17 sec	35 deg 58 min 5.68 sec
4	03 deg 38 min 4.43 sec	35 deg 58 min 14.00 sec



Licence	
Licensed area	[Diagram showing a rectangular area]
License Number	<b>PML00109SMN</b>
District	<b>Simanjiro</b>
Direction	[North arrow pointing up]

An area of approximately **4.27** Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	2553463	196,495.00	27/12/2019	[Signature]
2020/2021	2616800000	197,300/-	01/12/2020	[Signature]
2021/2022	2620500000000	192,150/-	04/12/2021	[Signature]
2022/2023	2620391500014	192,120/-	08/12/22	[Signature]
2023/2024	262039122225191	192,100/-	01/12/2024	[Signature]

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MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML00110SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QOS 71/2 over an area described *overleaf* (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
David Msimba  
For: EXECUTIVE SECRETARY

PML00110SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QOS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg 38 min 34.97 sec	36 deg 58 min 18.07 sec
2	03 deg 38 min 38.35 sec	36 deg 58 min 18.38 sec
3	03 deg 38 min 42.21 sec	36 deg 58 min 18.21 sec
4	03 deg 38 min 43.44 sec	36 deg 58 min 12.54 sec



Licence	
Licensed area	[Diagram showing a rectangular area]
License Number	<b>PML00110SMN</b>
District	<b>Simanjiro</b>
Direction	[North arrow pointing up]

An area of approximately **7.12** Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	2633460	202,640.00	27/12/2019	[Signature]
2020/2021	2626000000000	327,000/-	01/12/2020	[Signature]
2021/2022	2620500000000	320,400/-	04/12/2021	[Signature]
2022/2023	26204100000014	320,400/-	08/12/2022	[Signature]
2023/2024	262041000000014	320,400/-	01/12/2024	[Signature]

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00111SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QOS 71/2 over an area described overleaf (Annex A).

This licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
 David Malina  
 For: EXECUTIVE SECRETARY

PML00111SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QOS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg. 36 min. 28.95 sec.	30 deg. 56 min. 42.00 sec.
2	03 deg. 36 min. 34.32 sec.	30 deg. 56 min. 47.75 sec.
3	03 deg. 36 min. 41.93 sec.	30 deg. 56 min. 42.00 sec.
4	03 deg. 36 min. 27.14 sec.	30 deg. 56 min. 36.25 sec.



Licence	
Licensed area	[Diagram of a rectangular area]
License Number	<b>PML00111SMN</b>
District	Simanjiro
Direction	[North arrow symbol]

An area of approximately **6.29** Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	20334.61	237,448.19	07/12/2019	[Signature]
2020/2021	902660204078	290,600	21/11/2020	[Signature]
2021/2022	90265215556300	282,500	24/10/2021	[Signature]
2022/2023	90263915707014	283,500	08/10/2022	[Signature]
2023/2024	9026252229511	283,500	31/12/2023	[Signature]

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00112SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QOS 71/2 over an area described overleaf (Annex A).

This licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

[Signature]  
 David Malina  
 For: EXECUTIVE SECRETARY

PML00112SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QOS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg. 36 min. 27.31 sec.	30 deg. 56 min. 23.77 sec.
2	03 deg. 36 min. 26.71 sec.	30 deg. 56 min. 28.60 sec.
3	03 deg. 36 min. 25.58 sec.	30 deg. 56 min. 34.00 sec.
4	03 deg. 36 min. 32.69 sec.	30 deg. 56 min. 38.60 sec.



Licence	
Licensed area	[Diagram of a rectangular area]
License Number	<b>PML00112SMN</b>
District	Simanjiro
Direction	[North arrow symbol]

An area of approximately **7.30** Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	25334.58	33,972.54	07/12/2019	[Signature]
2020/2021	902660204078	337,500	21/11/2020	[Signature]
2021/2022	90265215556300	309,500	24/10/2021	[Signature]
2022/2023	90263915707014	228,500	08/10/2022	[Signature]
2023/2024	9026252229511	228,500	31/12/2023	[Signature]

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00113SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QDS 71/2 over an area described overlaid (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

Hilal Soud Ahmed  
 David Mwaime  
 For: EXECUTIVE SECRETARY

PML00113SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg 30 min 27.91 sec	36 deg 00 min 22.77 sec
2	03 deg 30 min 30.98 sec	36 deg 00 min 35.84 sec
3	03 deg 30 min 34.05 sec	36 deg 00 min 48.91 sec
4	03 deg 30 min 34.91 sec	36 deg 00 min 48.91 sec



Legend	
Licensed area	[Yellow shaded area]
License Number	PML00113SMN
District	Simanjiro
Direction	[North arrow]

An area of approximately 7.45 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	2533459	3,42,828/-	09/12/2019	[Signature & Stamp]
2020/2021	2636000	3,44,000/-	01/01/2020	[Signature & Stamp]
2021/2022	2740000	3,46,100/-	24/01/2021	[Signature & Stamp]
2022/2023	2845000	3,48,200/-	02/02/2022	[Signature & Stamp]
2023/2024	2950000	3,50,300/-	01/02/2023	[Signature & Stamp]
2024/2025	3055000	3,52,400/-	01/02/2024	[Signature & Stamp]
6				
7				

PML00114SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg 30 min 18.10 sec	36 deg 00 min 22.84 sec
2	03 deg 30 min 27.88 sec	36 deg 00 min 35.91 sec
3	03 deg 30 min 27.22 sec	36 deg 00 min 49.04 sec
4	03 deg 30 min 24.02 sec	36 deg 00 min 35.91 sec



Legend	
Licensed area	[Yellow shaded area]
License Number	PML00114SMN
District	Simanjiro
Direction	[North arrow]

An area of approximately 3.36 hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2019/2020	2533459	10,45,17,39	07/12/2019	[Signature & Stamp]
2020/2021	2636000	1,50,200/-	01/01/2020	[Signature & Stamp]
2021/2022	2740000	1,50,200/-	24/01/2021	[Signature & Stamp]
2022/2023	2845000	1,50,200/-	02/02/2022	[Signature & Stamp]
2023/2024	2950000	1,50,200/-	01/02/2023	[Signature & Stamp]
2024/2025	3055000	1,50,200/-	01/02/2024	[Signature & Stamp]

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00114SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QDS 71/2 over an area described overlaid (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

Hilal Soud Ahmed  
 David Mwaime  
 For: EXECUTIVE SECRETARY

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00119SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed** of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 31<sup>st</sup> day of December 2019

*[Signature]*  
 David Abalwa  
 For: EXECUTIVE SECRETARY

PML00119SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QDS 71/2 defined by the following corner co-ordinates (A/C 1967):

Corner	Latitude	Longitude
1	05 deg. 33 min. 29.83 sec.	33 deg. 53 min. 54.27 sec.
2	05 deg. 30 min. 24.23 sec.	33 deg. 52 min. 1.17 sec.
3	05 deg. 33 min. 23.67 sec.	33 deg. 52 min. 07.17 sec.
4	05 deg. 34 min. 29.63 sec.	33 deg. 52 min. 01.27 sec.



An area of approximately 6.89 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TZS.)	Date	Signature & Stamp
2019/2020	25,234,182	31,705,984	01/12/2019	[Signature]
2020/2021	49,568,364	31,705,984	01/12/2020	[Signature]
2021/22	73,902,546	31,705,984	01/12/2021	[Signature]
2022/2023	98,236,728	31,705,984	01/12/2022	[Signature]
2023/2024	122,570,910	31,705,984	01/12/2023	[Signature]
2024/2025	146,905,092	31,705,984	01/12/2024	[Signature]

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00145SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed** of P.O. BOX 218, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for **Graphite**, at **Mirerani Block II**, in **Simanjiro District**, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 28<sup>th</sup> day of February 2020

*[Signature]*  
 David Abalwa  
 For: EXECUTIVE SECRETARY

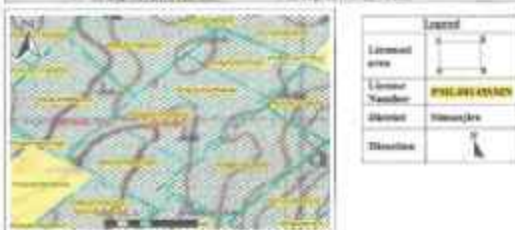
PML00145SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District**, QDS 71/2 defined by the following corner co-ordinates (A/C 1967):

Corner	Latitude	Longitude
1	05 deg. 30 min. 23.40 sec.	33 deg. 52 min. 12.40 sec.
2	05 deg. 30 min. 23.40 sec.	33 deg. 52 min. 12.40 sec.
3	05 deg. 30 min. 23.40 sec.	33 deg. 52 min. 12.40 sec.
4	05 deg. 30 min. 23.40 sec.	33 deg. 52 min. 12.40 sec.



An area of approximately 5.59 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TZS.)	Date	Signature & Stamp
2020/2021	25,234,182	2,576,006	16-06-2020	[Signature]
2021/2022	49,568,364	2,576,006	01/12/2021	[Signature]
2022/2023	73,902,546	2,576,006	01/12/2022	[Signature]
2023/2024	98,236,728	2,576,006	01/12/2023	[Signature]
2024/2025	122,570,910	2,576,006	01/12/2024	[Signature]

THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML00174SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O.BOX 218, Shinyanga (hereinafter called the Licensee), to prospect and mine for Graphite, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 01<sup>st</sup> day of JULY, 2020

  
Hamid S. Kamendo  
For: EXECUTIVE SECRETARY

PML00174SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):



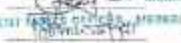


Corner	Latitude	Longitude
1	03 deg 30 min 25.00 sec	35 deg 58 min 45.00 sec
2	03 deg 30 min 55.00 sec	35 deg 58 min 25.00 sec
3	03 deg 30 min 24.00 sec	36 deg 00 min 31.00 sec
4	03 deg 30 min 25.00 sec	36 deg 00 min 25.00 sec



Licence	
Licensed area	
Licence Number	PML00174SMN
District	Simanjiro
Division	

An area of approximately 4.27 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TSh.)	Date	Signature & Stamp
20/2021	7261600000000000	176,000/-	16/08/2021	
01/2022	7261600000000000	177,000/-	01/08/2022	
01/2023	7261600000000000	178,150/-	01/08/2023	
01/2024	7261600000000000	179,150/-	01/08/2024	
01/2025	7261600000000000	180,150/-	01/08/2025	
6.				

THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML00175SMN  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O.BOX 218, Shinyanga (hereinafter called the Licensee), to prospect and mine for Graphite, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 01<sup>st</sup> day of JULY, 2020

  
Hamid S. Kamendo  
For: EXECUTIVE SECRETARY

PML00175SMN


ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):






Corner	Latitude	Longitude
1	03 deg 30 min 30.00 sec	36 deg 00 min 30.00 sec
2	03 deg 30 min 00.00 sec	36 deg 00 min 00.00 sec
3	03 deg 30 min 30.00 sec	36 deg 00 min 00.00 sec
4	03 deg 30 min 30.00 sec	36 deg 00 min 30.00 sec



Licence	
Licensed area	
Licence Number	PML00175SMN
District	Simanjiro
Division	

An area of approximately 6.33 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TSh.)	Date	Signature & Stamp
10/2/2021	7261600000000000	211,000/-	16/08/2021	
01/2022	7261600000000000	212,000/-	01/08/2022	
01/2023	7261600000000000	213,000/-	01/08/2023	
01/2024	7261600000000000	214,000/-	01/08/2024	
2021/2025	7261600000000000	215,000/-	01/08/2025	
6.				

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00177SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O.BOX 218, Shinyanga (hereinafter called the Licensee), to prospect and mine for Graphite, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 01<sup>st</sup> day of JULY, 2020

  
 Herms S. Kamando  
 For: EXECUTIVE SECRETARY

PML00177SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	02 deg. 20 min. 28.90 sec.	36 deg. 58 min. 55.95 sec.
2	02 deg. 20 min. 45.00 sec.	36 deg. 58 min. 47.95 sec.
3	02 deg. 30 min. 41.00 sec.	36 deg. 58 min. 52.95 sec.
4	02 deg. 30 min. 34.00 sec.	36 deg. 58 min. 47.95 sec.



Licence	
Licensed area	
License Number	PML00177SMN
District	Simanjiro
Direction	

An area of approximately 0.06 Square Kilometres.  
 6-20/14

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2020/2021	Herms S. Kamando	207,255/-	16/07/2020	
2021/2022	Herms S. Kamando	207,255/-	01/08/2021	
2022/2023	Herms S. Kamando	207,255/-	24/07/22	
2023/2024	Herms S. Kamando	207,255/-	08/02/2024	
2024/2025	Herms S. Kamando	207,255/-	01/07/2024	
6.				

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00178SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O.BOX 218, Shinyanga (hereinafter called the Licensee), to prospect and mine for Graphite, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 01<sup>st</sup> day of JULY, 2020

  
 Herms S. Kamando  
 For: EXECUTIVE SECRETARY

PML00178SMN

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	02 deg. 30 min. 41.00 sec.	36 deg. 58 min. 43.95 sec.
2	02 deg. 30 min. 46.00 sec.	36 deg. 58 min. 47.95 sec.
3	02 deg. 30 min. 52.00 sec.	36 deg. 58 min. 42.95 sec.
4	02 deg. 30 min. 38.00 sec.	36 deg. 58 min. 38.95 sec.



Licence	
Licensed area	
License Number	PML00178SMN
District	Simanjiro
Direction	

An area of approximately 0.06 Square Kilometres.  
 6-24/14

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2020/2021	Herms S. Kamando	207,255/-	16/07/2020	
2021/2022	Herms S. Kamando	207,255/-	01/08/2021	
2022/2023	Herms S. Kamando	207,255/-	24/07/22	
2023/2024	Herms S. Kamando	207,255/-	08/02/2024	
2024/2025	Herms S. Kamando	207,255/-	01/07/2024	
6.				
7.				



THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML005905MM  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
Fabian L. Mshai  
For: EXECUTIVE SECRETARY

PML005905MM

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at Mirerani Block II area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Avc 1960):

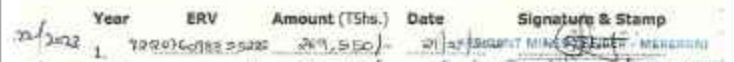
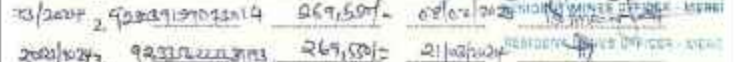

Corner	Latitude	Longitude
1	03 deg. 58 min. 38.41 sec.	36 deg. 58 min. 50.07 sec.
2	03 deg. 58 min. 38.58 sec.	36 deg. 58 min. 54.97 sec.
3	03 deg. 59 min. 29.53 sec.	36 deg. 58 min. 51.97 sec.
4	03 deg. 59 min. 25.38 sec.	36 deg. 58 min. 48.00 sec.



Licence	
Licensed area	
License Number	PML005905MM
District	Simanjiro
Direction	

An area of approximately 5.99 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TSh.)	Date	Signature & Stamp
2021/2022	782076038235220	269,500/-	21/03/2022	
2022/2023	9232919703214	269,500/-	01/04/2022	
2023/2024	9232919703214	269,500/-	21/03/2022	
4.				

THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF MINERALS

MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
PRIMARY MINING LICENCE PML005915MM  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
Fabian L. Mshai  
For: EXECUTIVE SECRETARY

PML005915MM

ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at Mirerani Block II area in Simanjiro District, QDS 71/2 defined by the following corner co-ordinates (Avc 1960):

Corner	Latitude	Longitude
1	04 deg. 39 min. 25.90 sec.	36 deg. 53 min. 36.30 sec.
2	04 deg. 39 min. 29.95 sec.	36 deg. 53 min. 42.04 sec.
3	04 deg. 39 min. 37.14 sec.	36 deg. 53 min. 36.30 sec.
4	04 deg. 39 min. 32.00 sec.	36 deg. 53 min. 36.30 sec.



Licence	
Licensed area	
License Number	PML005915MM
District	Simanjiro
Direction	

An area of approximately 6.27 Hectares.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TSh.)	Date	Signature & Stamp
2021/2022	782076038235220	269,500/-	21/03/2022	
2022/2023	9232919703214	269,500/-	01/04/2022	
2023/2024	9232919703214	269,500/-	21/03/2022	
4.				
5.				
6.				

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00592SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2** over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
 Fabian L. Mshali  
 For: EXECUTIVE SECRETARY

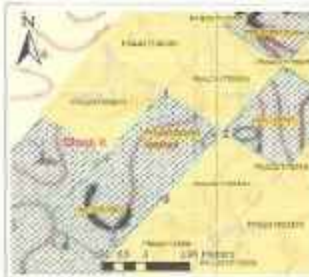
PML00592SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District, QDS 71/2** defined by the following corner co-ordinates (Arc 1960):




Corner	Latitude	Longitude
1	00 deg. 36 min. 24.63 sec.	38 deg. 53 min. 27.45 sec.
2	00 deg. 36 min. 44.43 sec.	38 deg. 53 min. 30.25 sec.
3	00 deg. 36 min. 51.50 sec.	38 deg. 53 min. 34.18 sec.
4	00 deg. 36 min. 47.21 sec.	38 deg. 53 min. 19.25 sec.



Licence	
Licensed area	
License Number	<b>PML00592SMN</b>
District	<b>Simanjiro</b>
Direction	

An area of approximately **6.33** Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2022	1	722036078205002	08/4/2022	
2024	2	962029159473214	28/4/2024	
2024	3	7283920242813	28/4/2024	

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00593SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2** over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
 Fabian L. Mshali  
 For: EXECUTIVE SECRETARY

PML00593SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District, QDS 71/2** defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	00 deg. 36 min. 44.43 sec.	38 deg. 53 min. 30.25 sec.
2	00 deg. 36 min. 52.14 sec.	38 deg. 53 min. 30.25 sec.
3	00 deg. 36 min. 41.58 sec.	38 deg. 53 min. 42.08 sec.
4	00 deg. 36 min. 42.84 sec.	38 deg. 53 min. 33.28 sec.



Licence	
Licensed area	
License Number	<b>PML00593SMN</b>
District	<b>Simanjiro</b>
Direction	

An area of approximately **6.33** Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
2022/2023	1	722036078205002	08/4/2022	
2023/2024	2	962029159473214	28/4/2024	
2024/2025	3	7283920242813	28/4/2024	

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00594SMN**  
*The Mining Act, Cap. 123*

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to **M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2** over an area described overleaf (Annex A).

This licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of **seven (7)** years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
 Fabian L. Mshai  
 For: **EXECUTIVE SECRETARY**

PNL00594SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District, QDS 71/2** defined by the following corner co-ordinates (Arc 1960):


Corner	Latitude	Longitude
1	03 deg 38 min 28.00 sec	30 deg 03 min 51.07 sec
2	03 deg 38 min 34.22 sec	30 deg 03 min 47.00 sec
3	03 deg 38 min 35.94 sec	30 deg 03 min 36.00 sec
4	03 deg 38 min 25.04 sec	30 deg 03 min 46.00 sec



Licence	
Licensed area	
License Number	<b>PML00594SMN</b>
District	Simanjiro
Division	

An area of approximately 8.45 Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
22/2022	4000269883004	380,250/-	21/03/22	
23/2024	92302915978014	380,250/-	08/12/2023	
2024/2025	92302915978014	380,250/-	21/03/2024	
4.				

THE UNITED REPUBLIC OF TANZANIA  
**MINISTRY OF MINERALS**  
**MINING COMMISSION**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
**PRIMARY MINING LICENCE PML00594SMN**  
*The Mining Act, Cap. 123*

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Granted this 21<sup>st</sup> day of MARCH 2022

  
 Fabian L. Mshai  
 For: **EXECUTIVE SECRETARY**

PNL00594SMN

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District, QDS 71/2** defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	03 deg 38 min 28.00 sec	30 deg 03 min 51.07 sec
2	03 deg 38 min 34.22 sec	30 deg 03 min 47.00 sec
3	03 deg 38 min 35.94 sec	30 deg 03 min 36.00 sec
4	03 deg 38 min 25.04 sec	30 deg 03 min 46.00 sec



Licence	
Licensed area	
License Number	<b>PML00594SMN</b>
District	Simanjiro
Division	

An area of approximately 8.45 Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
22/2022	4000269883004	380,250/-	21/03/22	
23/2024	92302915978014	380,250/-	08/12/2023	
2024/2025	92302915978014	380,250/-	21/03/2024	
4.				
5.				
6.				

THE UNITED REPUBLIC OF TANZANIA  
 MINISTRY OF MINERALS  
 MINING COMMISSION

THE MINING (MINERAL RIGHTS) REGULATIONS, 2018  
 PRIMARY MINING LICENCE PML00595SMN  
 The Mining Act, Cap. 123

The exclusive right, subject to the provisions of *The Mining Act, Cap. 123* and the regulations made thereunder or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S Hilal Soud Ahmed of P.O. BOX 218 Shinyanga Town, Shinyanga, Tanzania (hereinafter called the Licensee), to prospect and mine for Graphite, at Mirerani Block II, in Simanjiro District, QDS 71/2 over an area described overleaf (Annex A).

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of *The Mining Act, Cap. 123* shall be valid for a period of seven (7) years, effective from the date of grant.

Granted this 21<sup>st</sup> day of MARCH 2022

  
 Fabian L. Mshai  
 For: EXECUTIVE SECRETARY


ANNEX A

DESCRIPTION OF THE PRIMARY MINING LICENCE AREA

The Primary Mining Licence is at **Mirerani Block II** area in **Simanjiro District** QDS 71/2 defined by the following corner co-ordinates (Arc 1960):




Corner	Latitude	Longitude
1	- 03 deg 36 min 20.84 sec	36 deg 56 min 40.16 sec
2	- 03 deg 36 min 25.50 sec	36 deg 56 min 36.30 sec
3	- 03 deg 36 min 20.71 sec	36 deg 56 min 28.69 sec
4	- 03 deg 36 min 15.00 sec	36 deg 56 min 32.80 sec



Legend	
Licensed area	
License Number	PML00595SMN
District	Simanjiro
Direction	

An area of approximately **5.72 Hectares**.

ANNUAL RENT PAYMENTS

Year	ERV	Amount (TShs.)	Date	Signature
2022/2023	92207607885522	257,400/-	21/03/2022	
2023/2024	922079159023014	257,400/-	20/02/2023	
2024/2025	922350222289193	257,400/-	21/03/2024	
4.				

Annex 3: Land Ownership Documentation

**MKATABA WA MALIPO YA FIDIA YA SHAMBA**

**MAKUBALIANO KATI YA**

- 1. FAMILIA YA NDUGU/BW/BI JOEL NJARO JOEL  
SHAHIDI 1. MIKAEL JOEL  
2. REBEKA JOEL
- 2. FAMILIA YA NDUGU/BW/BI ABRAHAM MOSES  
SHAHIDI 1. MEJOSI MOSES  
2. MAGDALENA ABRAHAM
- 3. FAMILIA YA NDUGU/BW/BI ROMBO MEIBUKO R. Meibuko  
SHAHIDI 1. ELIZABETH ROMBO  
2. MOSES LORUNG'OTI

**KITU KINACHOFIDIWA**

Kilichofidiwa ni eneo la shamba lenye ukubwa wa heka 30.

Kwa kila familia umiliki wake ni heka 10 tu.

Kwa heka zote 30 zimelipwa Shilingi Milioni nne na laki tano tu. (Tshs 4,500,000/=)

Malipo yamefanyika leo tarehe 21/06/2025 na mfiduwa kwa hiari yake mwenyewe bila kushawishiwa na mtu, bali kwa kushirikiana na familia yake wamesaini hapo juu.

**Mwenyekiti wa Kijiji**

Jina R. Meibuko ALIAS ROMBO Saini



**Mwenyekiti wa Kitongoji**

Jina JOEL NJARO

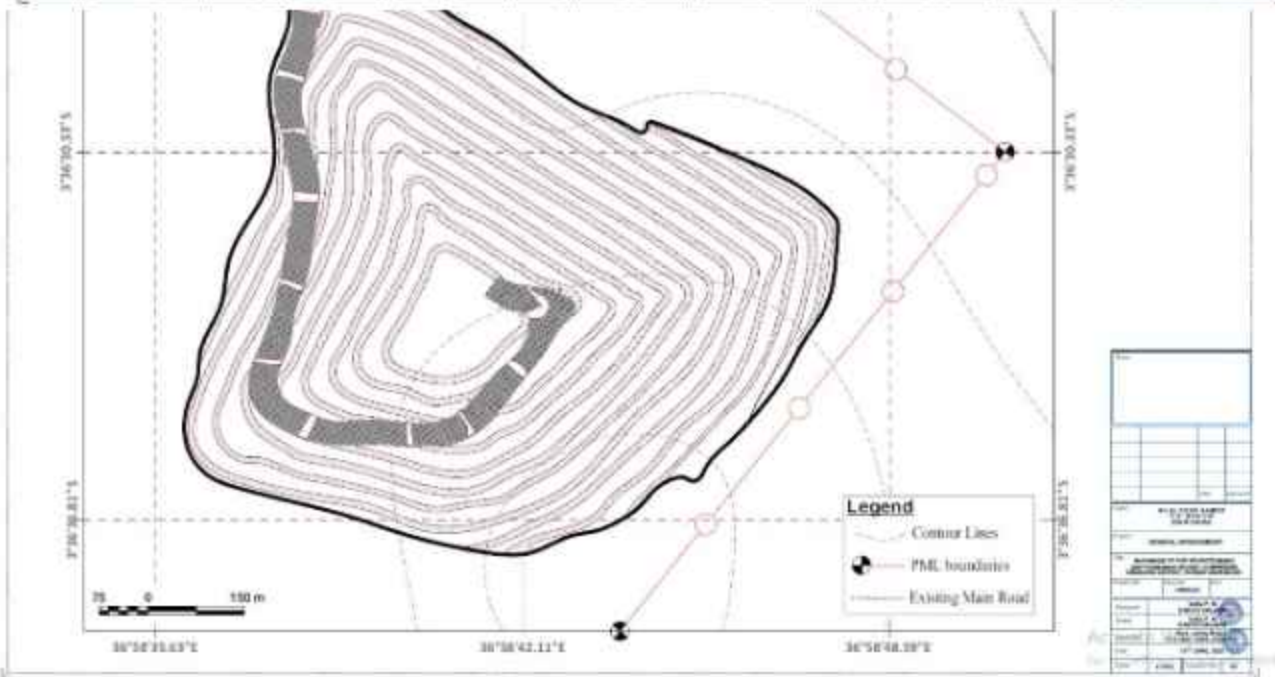
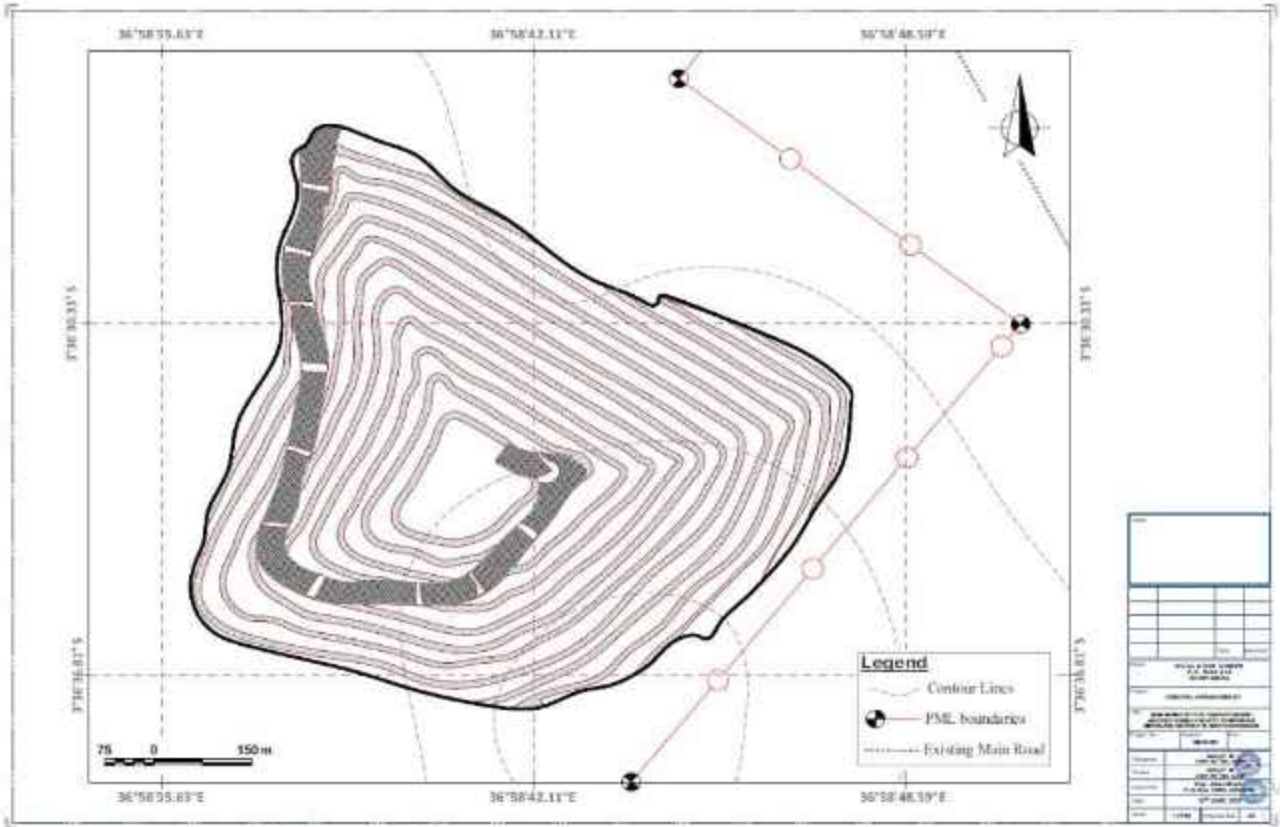
Saini JOEL

**Afisa Mtendaji wa Kijiji**

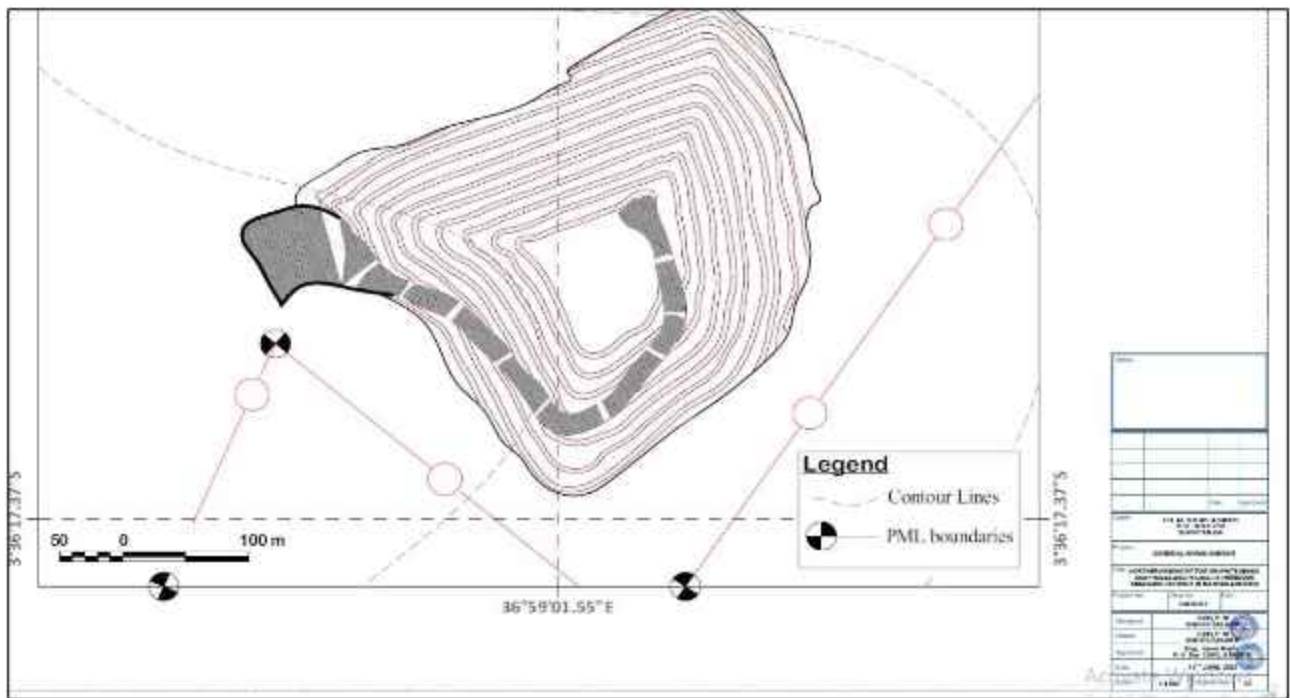
Jina Araba Nyan

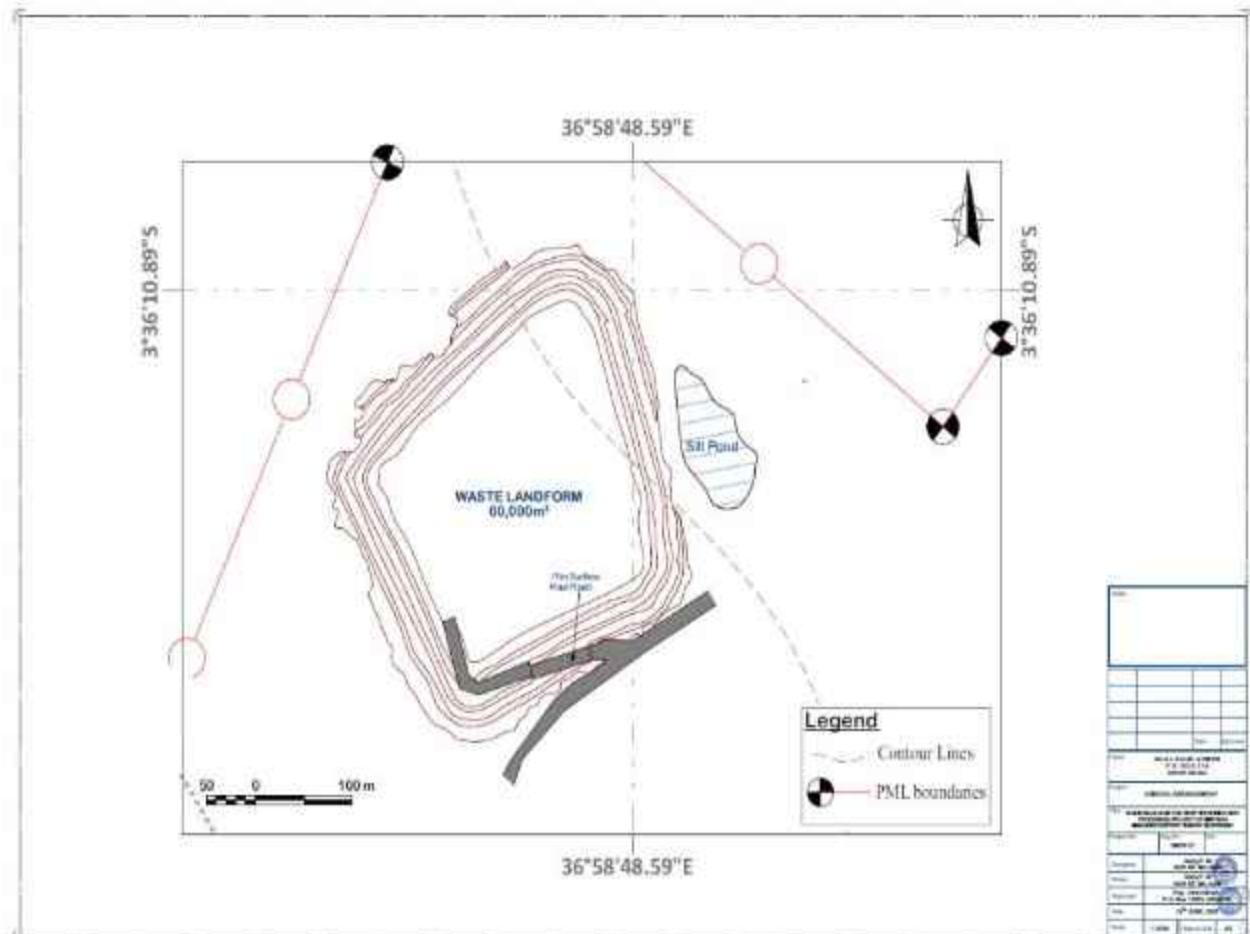
Saini Araba Nyan  
21/06/2025  
AFISA MTENDAJI WA KIJIKI  
CHA KANDA UCICIRA  
KWISI SHAMBA, HCU

# Annex 4: Preliminary Pit Design



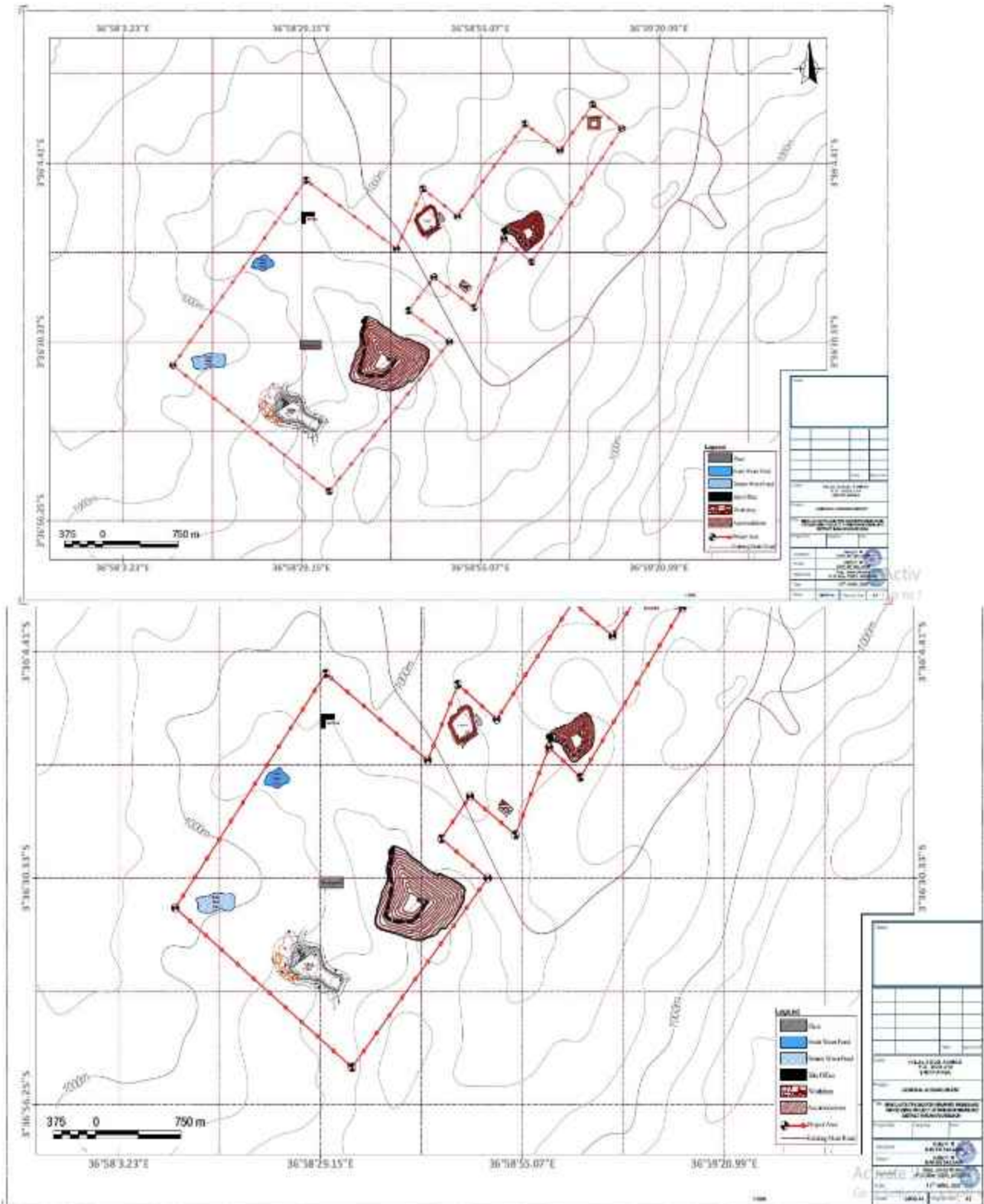


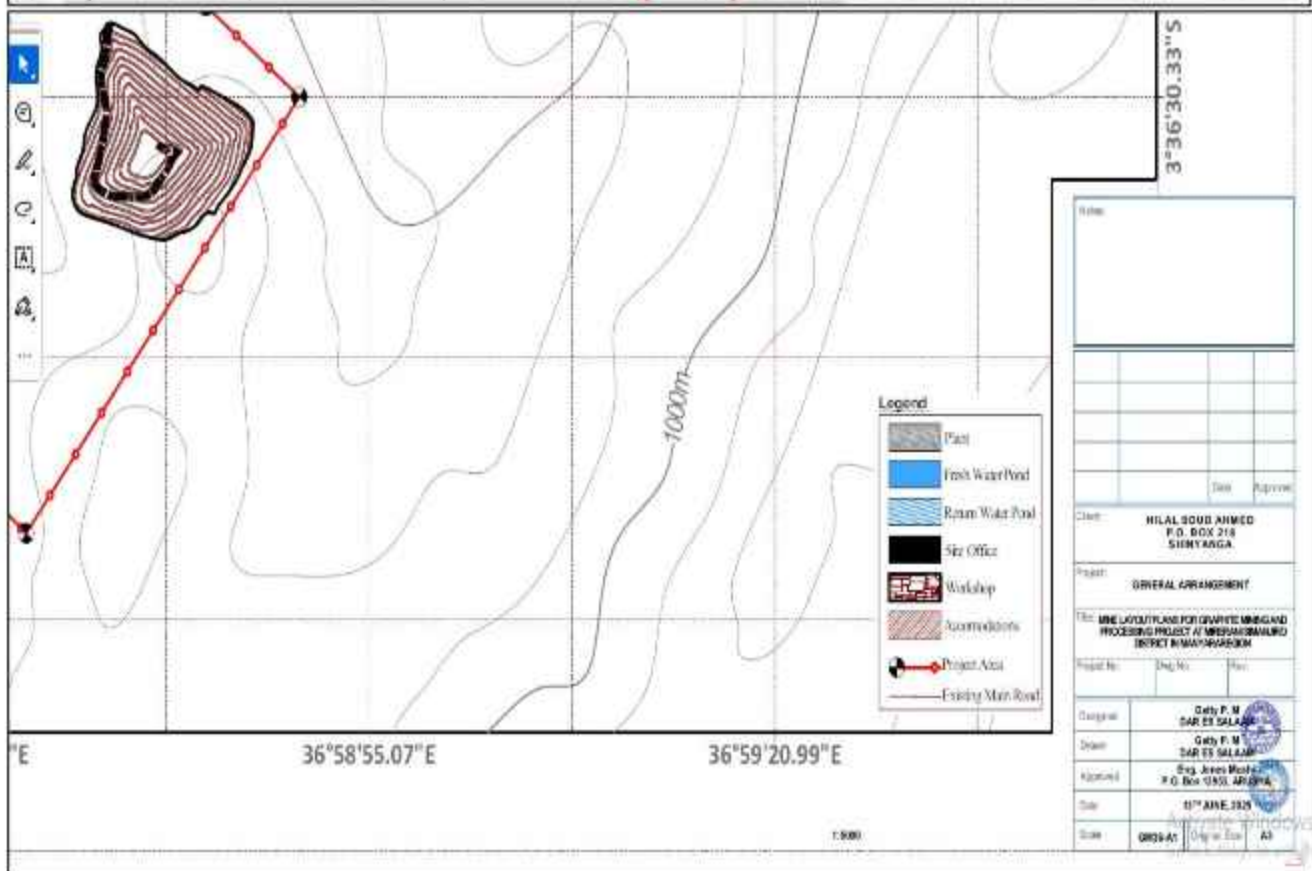
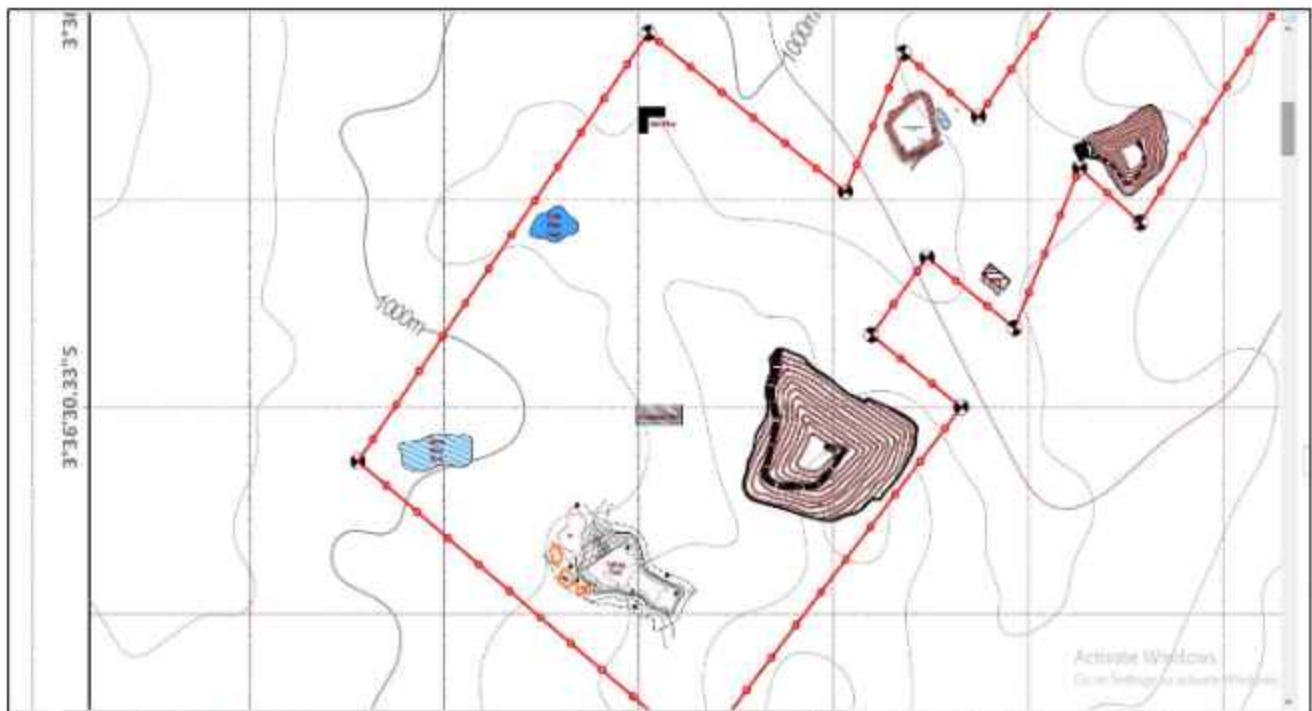




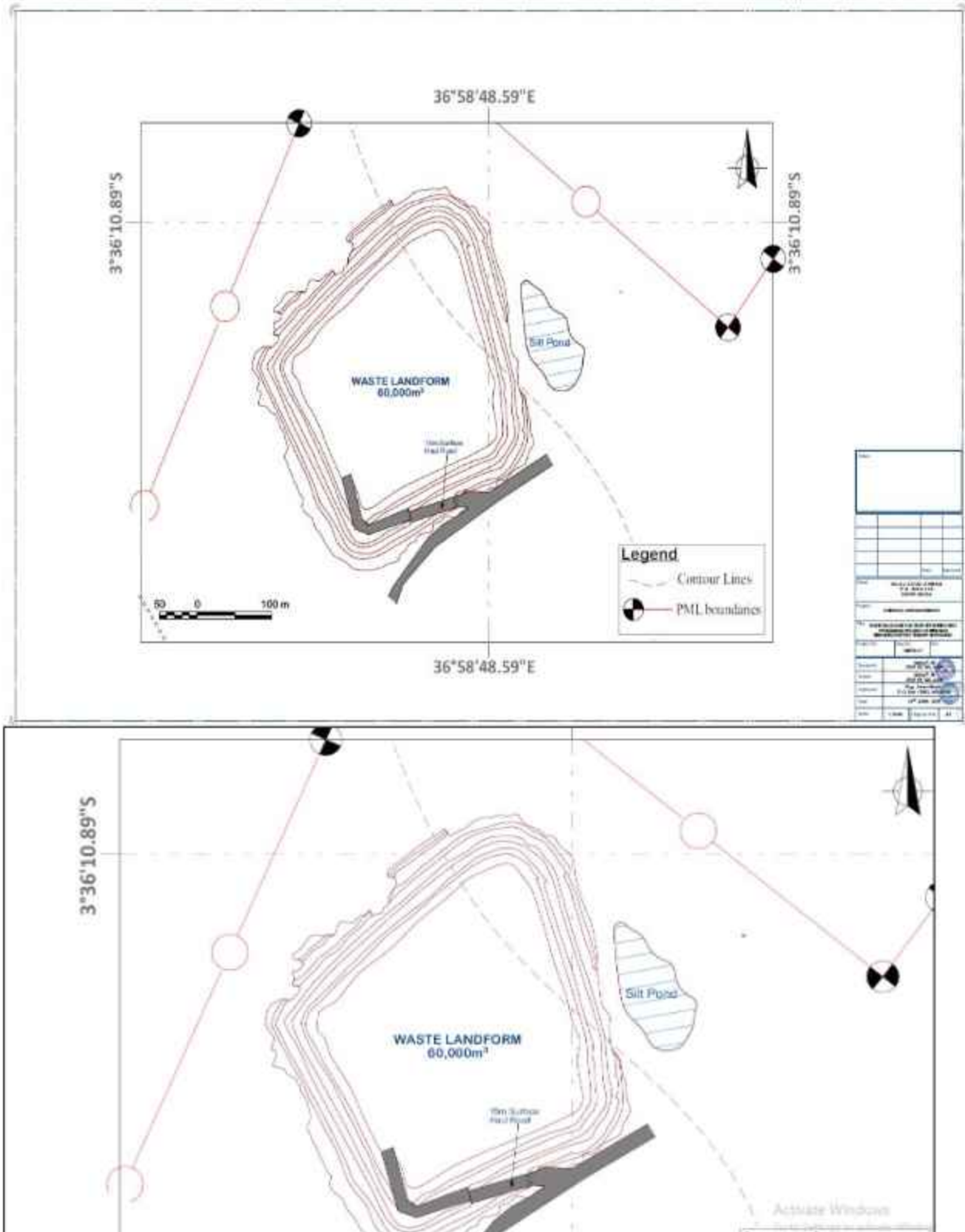


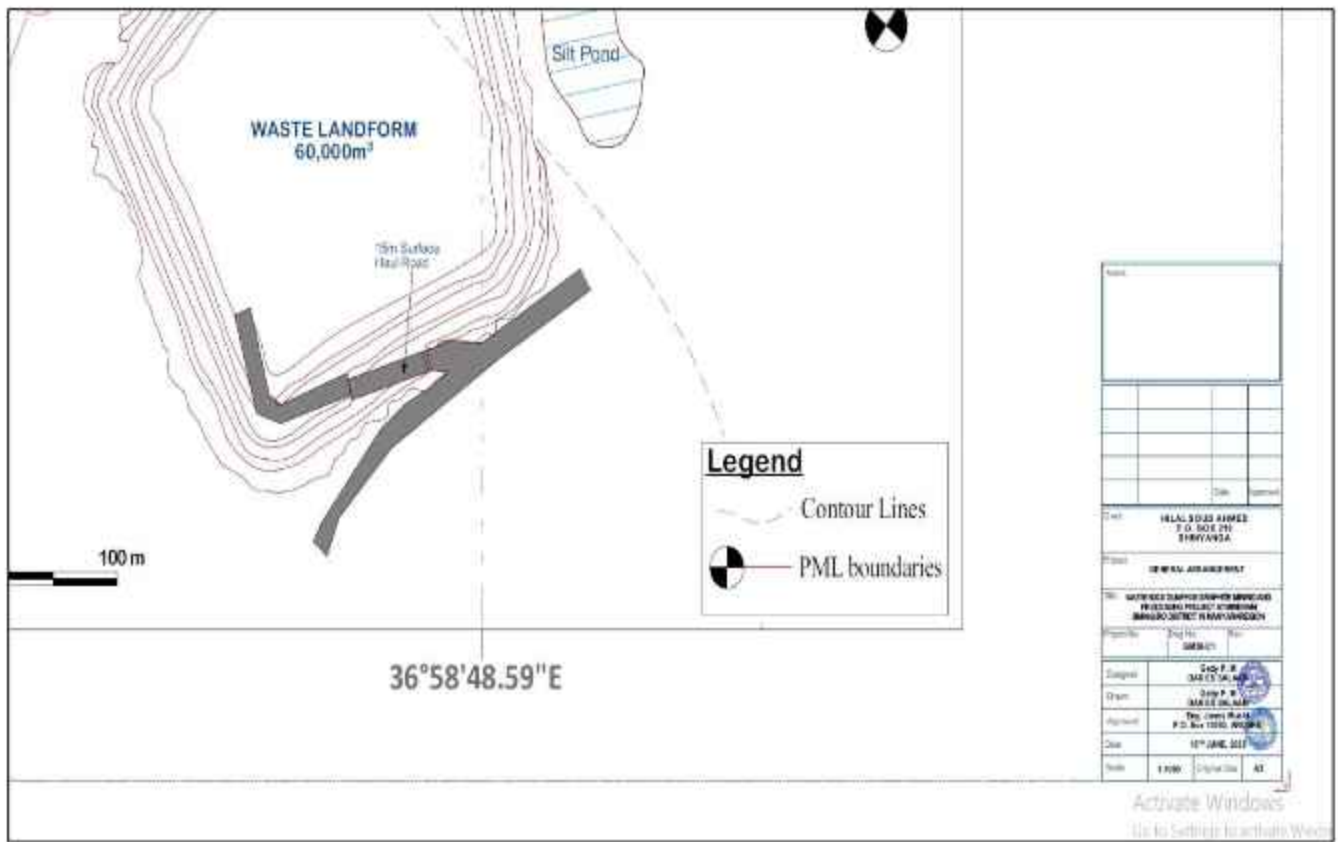
# Annex 5: Site Layout Plan



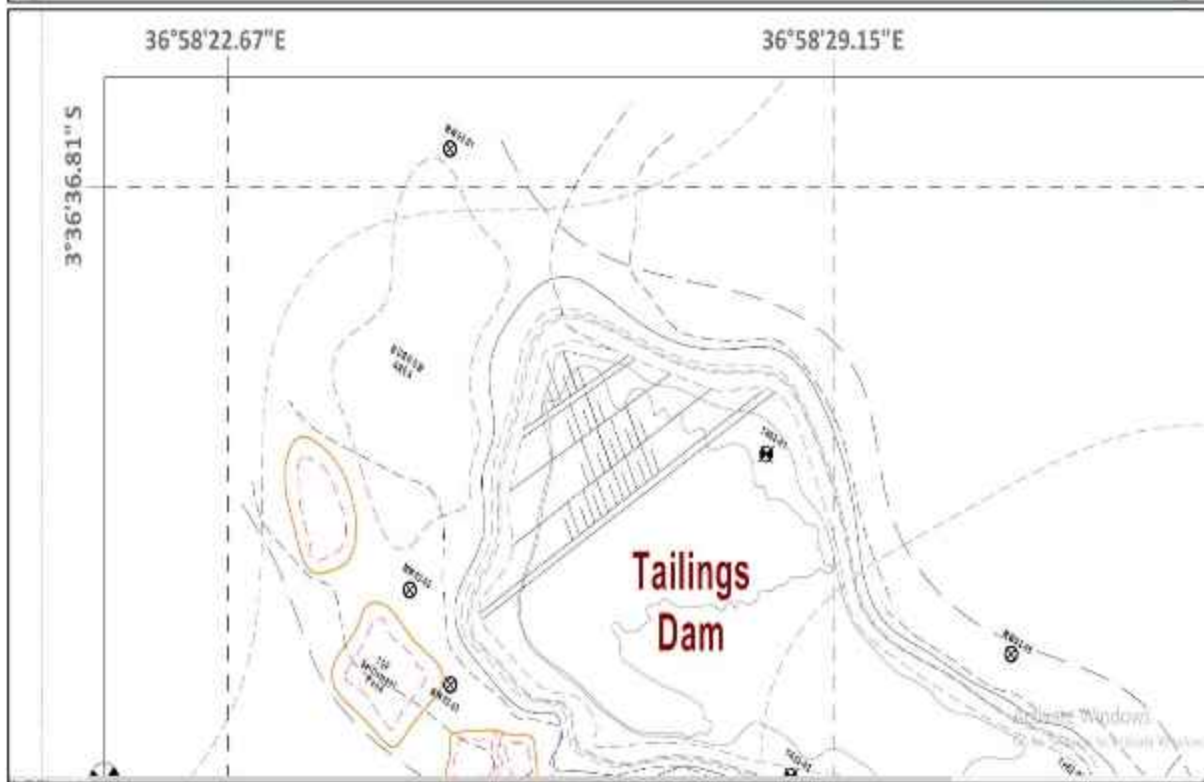
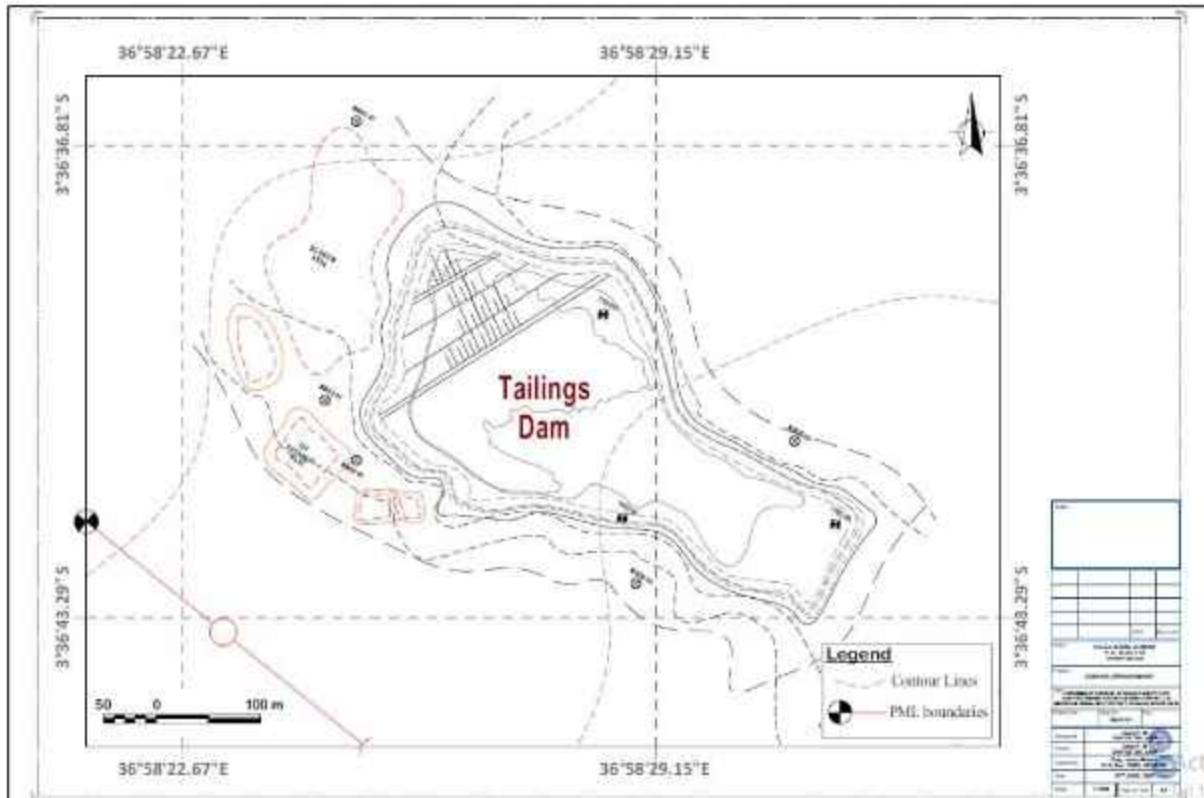


## Annex 6: Preliminary Design of the Waste Rock Dump





# Annex 7: Preliminary Design of the TSF





**H & S MINERALS LIMITED**  
**P.O. BOX 218, SHINYANGA**

**TECHNICAL REPORT FOR THE DEVELOPMENT OF  
GRAPHITE PROJECT AT KANDASIKIRA VILLAGE IN  
SIMANJIRO DISTRICT**

**SUBMITTED TO:**

**THE TANZANIA MINERALS COMMISSION  
*FOR PARTIAL FULFILMENT OF THE APPLICATION FOR  
MINING LICENSE UNDER DIVISION B***

**July, 2025**