PLANTINUM GRAPHITE INTERNATIONAL.

LIMITED

BUSINESS PLAN FOR GRAPHITE PRODUCTION PLANT

MERERANI MINES AT SIMANJIRO DISTRICT, MANYARA

APRIL, 2023

1. INTRODUCTION:

1.1 Company Description

M/s permanent minerals co. Limited is a 'Dealer in Mining and Trading of Industrial Minerals'. The company was founded by local citizens of Tanzania and registered with the Business Registration and Licensing Authority (BRELA). The Directors who found the company, Mr. LAN XIANGPING and Mr. WANG SHAOMING and GAO DE GUO are foreign investors from China. Both directors have extensive experience in mining and mineral trading within and out of the country. The company has capital, technology, expertise and marketing network to deal with a wide range of industrial minerals and minerals such as coal, graphite, manganese, iron ore and copper as well as industrial mineral products found in Tanzania.

1.2 VISION STATEMENT:

To become a leading producer and exporter of industrial minerals and a hub for adding value to locally mined minerals in the country.

1.3 MISSION STATEMENT:

To produce and process high quality industrial minerals as to meet growing market demands in the far eastern countries and thereby transforming the mining sub-sector to a significant contributor to individuals and national gain.

1.4 CORE VALUES:

Our core values are to produce tirelessly from our mines and processing plants, high quality minerals and mineral products while maintaining internationally accepted industrial mineral standards for public and private consumers.

1.5 APPROACH:

Permanent Minerals co. Limited believes in expert and professionally led mining practice through which customers can select from a wide range of industrial minerals and mineral products handled in compliance to international standards and ethics with

fine touch works of value addition done in the country where necessary. Our role is to do mining, mineral processing, grading and packing for both local markets and export. The dealer undertakes to replicate its products throughout both local and international markets by actively delivering customized products while maintaining internationally accepted industrial mineral standards.

2. BUSINESS DESCRIPTION (GRAPHITE):

2.1 Product Description:

Graphite is a versatile industrial mineral with unique properties that have facilitated technological innovation for several centuries. The mineral is a soft, crystalline form of carbon, which is gray to black, opaque, and has a metallic luster. It is flexible but not elastic. Graphite occurs naturally in metamorphic rocks such as marble, schist, and gneiss. It exhibits the properties of a metal and a nonmetal, which make it suitable for many industrial applications. The metallic properties include thermal and electrical conductivity. The nonmetallic properties include inertness, high thermal resistance, and lubricity.

Some of the major end uses of graphite are in high-temperature industrial molds, high-temperature lubricants, brushes for electrical motors, anode component in lithium-ion batteries, friction materials and fuel cells. Battery anodes require coated spherical graphite at over 99.9% purity. Approximately 3 tonnes of natural graphite yield 1 tonne of spherical coated graphite, and 1 kg of spherical coated graphite is needed for 1 kWh of battery capacity. Growth of lithium-ion battery production as driven by electric-vehicle adoption will massively increase graphite demand over the next decade.

Alumina-graphite shapes are used as continuous casting ware, such as nozzles and troughs, to convey molten steel from ladle to mold, and carbon magnesite bricks line steel converters and electric-arc furnaces to withstand extreme temperatures. Graphite blocks are also used in parts of blast furnace linings where the high thermal conductivity of the graphite is critical. High-purity monolithics are often used as a continuous furnace lining instead of carbon-magnesite bricks.

Graphite is also flame retardant when treated with acid and heat. Graphite flakes split apart and increase in volume by up to 300 times. The "expandable graphite" can be pressed into sheets and used for heat and fire protection. New legislation

in China, the European Union, Japan and Korea has either required flame retardants in building codes and/or banned brominated and asbestos-based flame retardants.

2.2 Types of Graphite:

There are four major types of graphite, namely natural flake graphite, vein graphite, amorphous graphite and synthetic graphite.

2.2.1 Natural Flake:

Flake graphite is a naturally occurring form of graphite that is typically found as discrete flakes ranging in size from 50-800 micrometers in diameter and 1-150 micrometers thick. This form of graphite has a high degree of crystallinity, which equates to near theoretical true density, high thermal and electric conductivity, and low spring-back (excellent molding characteristics). Flake graphite is used in many applications including but not limited to powder metallurgy, fuel cell bi-polar plates, coatings, thermal materials, friction moderators, electrically conductive materials, refractories, general lubricant applications, pencils, gaskets, rubber compounds, and other advanced polymer systems.

2.2.2 Vein Graphite:

Vein graphite, also known as lump vein, crystalline vein graphite, Sri Lankan graphite, or Ceylon graphite, is a naturally occurring form of pyrolitic carbon (solid carbon deposited from a fluid phase). Vein graphite has a morphology that ranges from flake-like for fine particles, needle or acicular for medium sized particles, and grains or lumps for very coarse particles. As the name implies, this form of graphite occurs as a vein material. Vein fillings range in size from 1-150 cm. "As mined" material is available in sizes ranging from fine powder to 10 cm lumps. Many of the highest quality electrical motor brushes and other current-carrying carbons are based on formulations using vein graphite. Vein graphite is used in battery anodes, refractories, advanced brake and clutch applications, and lubricants.

2.2.3 Amorphous Graphite:

Amorphous graphite is a naturally occurring seam mineral that forms from the geologic metamorphism of anthracite coal. The term "amorphous" is applied to this form of natural graphite because the extremely small "crystallite" particles that make this material do not form crystal faces that are visible to the naked eye (anhedral opposed to euhedral). To the untrained eye, a piece of amorphous graphite simply looks amorphous, like a lump of anthracite coal. "As mined"

material is available in sizes ranging from mixed 1 cm and smaller particles to 10 cm lumps. Amorphous graphite is used in many lubricant products especially greases, forging lubricants, etc. In applications where higher ash contents are acceptable or preferred this type of graphite is a good choice.

2.2.4 Synthetic Graphite:

Synthetic graphite is a manufactured product made by high-temperature treatment of amorphous carbon materials. In the United States, the primary feedstock used for making synthetic graphite is calcined petroleum coke and coal tar pitch, both of which are composed of highly graphitizable forms of carbon. Synthetic graphite is used in many applications including but not limited to friction, foundry, electrical carbons, fuel cell bi-polar plates, coatings, electrolytic processes, corrosion products, conductive fillers, rubber and plastic compounds, and drilling applications.

2.3 Economic Use of Graphite:

Graphite is used in many industrial applications, both as additives in some product making as well as a major component in other products for weight reduction, high temperature resistance, improved electrical conductivity and improved strength. There are four major uses of graphite, namely refractories for cast wares, additive for and carbon raiser in steel, lithium ion batteries, and flame retardant.

2.3.1 Refractories:

Alumina-graphite shapes are used as continuous casting ware, such as nozzles and troughs, to convey molten steel from ladle to mold, and carbon magnesite bricks line steel converters and electric-arc furnaces to withstand extreme temperatures. Graphite blocks are also used in parts of blast furnace linings where the high thermal conductivity of the graphite is critical. The product will continue to facilitate technological innovations in many countries. Refractory applications of graphite, continues to lead the way in the western countries particularly in the United States of America whereby 39% of graphite goes for refractories; 14% in brake linings; lubricants, 6%; dressings and molds in foundry operations, 5%; and other uses making up the remaining 36%.

In addition to that, high-purity electro-graphite is used in large quantities for the manufacture of reflector components and moderator rods in nuclear reactors. Their suitability comes from their high thermal conductivity, low absorption of neutrons and high strength at higher temperatures.

2.3.2 Steel making:

Natural graphite in steelmaking mostly goes into raising the carbon content in molten steel, and can also be used to lubricate the dies used to extrude hot steel. A carbon raiser is added to increase the carbon content of the steel to the specified level. Graphite is extensively used as an engineering material across a range of applications such as piston rings, journal bearings, thrust bearings and vanes. Carbon-based seals are also employed the fuel pumps and shafts of a number of aircraft jet engines.

2.3.3 Lithium Ion Batteries:

Graphite is used as the anode component in lithium-ion batteries. There is far more graphite than lithium in a lithium-ion battery than lithium component. In lithium Ion batteries the cathode is nickel and the anode side is graphite with silicon oxide although there's a little bit of lithium in there, which carries the name. Thus, demand for this product will continue to grow as car markers shift their production plans to electric vehicles in the continents of Europe and Asia.

2.3.4 Flame Retardant:

When treated with acid and heat, graphite flakes split apart and increase in volume by up to 300 times. This "expandable graphite" can be pressed into sheets and used for heat and fire protection. New legislation in China, the European Union, Japan and Korea has either required flame retardants in building codes and/or banned brominated and asbestos-based flame retardants. Thus demand for this product will continue to grow as new building compliance and retrofitting of existing buildings becomes necessary over combustibility and safety concerns.

3. INDUSTRY OVERVIEW:

3.1 Global Market Trends:

Worldwide consumption of natural graphite steadily increased since 2013 and into 2017, to a total of 1.2 million tons. This increase resulted from the improvement of global economic conditions and its impact on industries that use graphite. Worldwide economically-recoverable reserves total 270 million tons and inferred resources are estimated at 800 million tons.

World natural graphite demand is directly linked to industrial applications, including refractories, automotive, batteries and lubricants. Refractories for the steel industry remain the dominant market for natural graphite consumption and graphite production has tended to follow global steel production, although hi-tech applications such as battery anodes are increasingly driving demand for the mineral. This is potentially one of graphite's fastest growing markets due to interest in electric vehicles, portable electronics and large-scale domestic and commercial energy storage, for example in Tesla's Powerwall Batteries. Another example is in Johnson Controls Power Solutions, a global diversified technology and multi-industrial leader making batteries in China. The company, already has production capacity for 16 million batteries a year, from a factory in **CHONGQING** and one in **ZHEJIANG**, and is looking to invest $250 million in a new plant that could produce up to 7.5 million units a year in **SHANDONG** from 2019. The company has also unveiled proposals for construction of two Chinese plants with a combined annual capacity of 13.5 million batteries. The increased capacity is aimed at satisfying growing demand from the start-stop engine market. Bloomberg reports that global battery-making capacity is set to more than double by 2021, topping 278 gigawatt-hours a year compared to 103 gigawatt-hours at present.

In other parts of the world Interest in flake graphite increased dramatically with the rise of lithium-ion batteries. For example, Tesla's new "Giga Factory" for lithium-ion batteries, begun U.S. production in 2017, and has significantly boost natural graphite demand. If run at full capacity, the plant will require about 100,000 metric tons of flake graphite annually. Tesla's Giga-factory 1, when completed in 2020, will require 93,000 tonnes of flake graphite annually to produce 35,000 tonnes of spherical graphite for use as anode material forlithium-ion batteries. Tesla also has plans for at least two more such Giga- factories, one in the US and another in Europe.

Another, fast growing market is predicted to be expandable graphite for foil, insulation and fire retardant products. The major primary producing and exporting countries are China, North Korea and Brazil. Importing countries include the US, China (from Korea), Germany, Japan and India which accounted for approximately 250,000 tpa of global trade in 2014. China has consistently been the leading global exporter, while the US has consistently been the leading global importer, sourcing 50,000-70,000 tpa over the past 15 years.

Sri Lanka has exported about 4,000 tpa of **vein graphite** in recent years at prices in excess of $US1,600/t according to UN trade data. **Flake graphite**

prices remained relatively steady for many years. As a rule of thumb, the larger and purer the graphite flake size, the higher the price. Prices range from about $US500/t (cost, insurance and freight) for minus 75 micron product to approximately $US2,000/t for jumbo flakes greater than 300 micron diameter and greater than 94% carbon content.

World demand for natural and synthetic graphite, including carbon fiber, is forecast to expand 5.8% per year to reach over 4.2 million metric tons by end of 2019, with a market value of nearly $30 billion. Further, an overall strengthening of the global economy will bode well for all forms of graphite, say analysts at The Freedonia Group Inc., Cleveland, in their new study, World Graphite (Natural, Synthetic & Carbon Fiber).

Due to its large manufacturing economy, China is the leading consumer of synthetic and natural graphite, using nearly 1.1 million metric tons in 2013, one-third of global sales. Among other major consumers are the U.S., Japan, India, South Korea, Germany, and Russia. Battery production for portable electronics began driving a continuous increase in graphite demand, and low labour costs and rapid industrialization caused China's share of natural graphite production to increase from 10% in the 1970s to 66% by 2015. Today, continuing increase in battery demand by mass proliferation of consumer electronics and the nascent electric vehicle industry, combined with tightening environmental and export restrictions in China, create opportunities for non-Chinese producers to take advantage of the resulting supply gap.

3.2 Global Production of Graphite:

Graphite production has risen more than tenfold, from a base of 100,000 tpa in the early 1900s to an estimated 1.2 mtpa in 2014 at a compound annual growth rate (CAGR) of just over 2%. China is the world's leading supplier of natural graphite (flake and amorphous) with approximately 67% of global production according to the USGS, **(Exhibit 1)** somewhat lower than Industrial Minerals Research's estimated 74%.

China's production has grown rapidly since 1998 and overtook the rest of the world in 2000. India, Brazil, Canada and North Korea probably account for a further 20-27% of global production. Sri Lanka is a relatively small producer (about 0.5% of global production. Brazil is the world's number two producer, contributing about 90,000 tpa of flake graphite. Indian production numbers have been debated for some time; output was 170,000t of flake graphite in 2014

according to the USGS, whereas other estimates put this number closer to 25,000 tpa of flake graphite. During 2017, China produced two-thirds of the world's natural graphite. Approximately 70% of production in China is amorphous graphite and about 30% is flake.

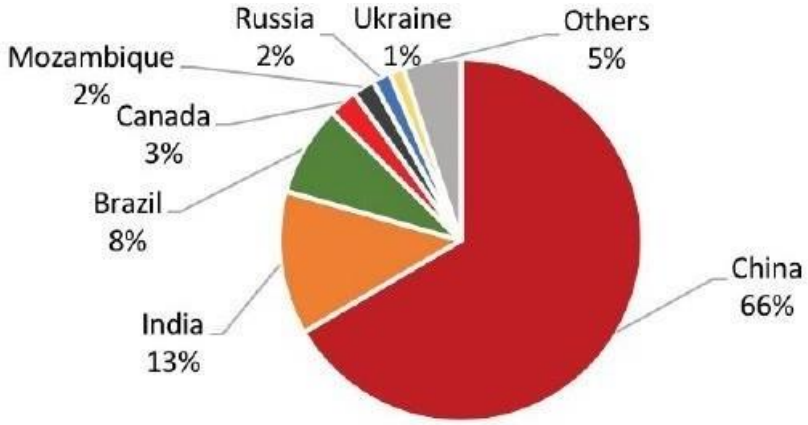


Exhibit 1: Natural Global Graphite Production for the Year 2017

However, China's current dominance in natural graphite supply is declining mainly due to its high-cost profile arising from tax enforcement of environmental regulations. This has resulted in negative consequences for villages surrounding graphite mines. For example, graphite dust is carried by wind and blankets surrounding villages, destroying crops, spreading foul odours, and covering homes and belongings in soot. Moreover, chemicals used during production are directly discharged into local waters. This results in the water becoming undrinkable and poisoning crops. This has led to China's increasing environmental crackdown on mining companies, including graphite miners, calling into question the ability of Chinese supply to satisfy future battery-graphite demand. New deposits are being developed in Madagascar, Mozambique, Namibia, and Tanzania, and mines are projected to begin production in the near future. During 2017, some of the mines in Mozambique and Tanzania began producing graphite.

Annual supply of synthetic graphite is approximately 1.5 million tonnes, with the majority also originating from China. Synthetic graphite competes with natural graphite for use in lithium-ion battery anodes. However, this comes at an extremely high cost (as much as $20,000/tonne). Battery makers are therefore turning to upgraded natural graphite, which also has a high production cost, but is still more competitive than synthetic, at $5,000/tonne. As such, synthetic

graphite will be less favoured for use in battery applications unless there is a shortage in natural graphite.

3.3 Graphite Reserve and Exploration in Tanzania:

The geology of Tanzania is renowned for hosting various kinds of minerals ranging from semi-precious and precious stones to the most lucrative industrial minerals available on earth. Tanzania is estimated to host about 6% of the world graphite reserves **(Exhibit 2)**. Recently mining industry has become an integral part of the growing economy in the country, and the government has been promising to support more investments in the sector.

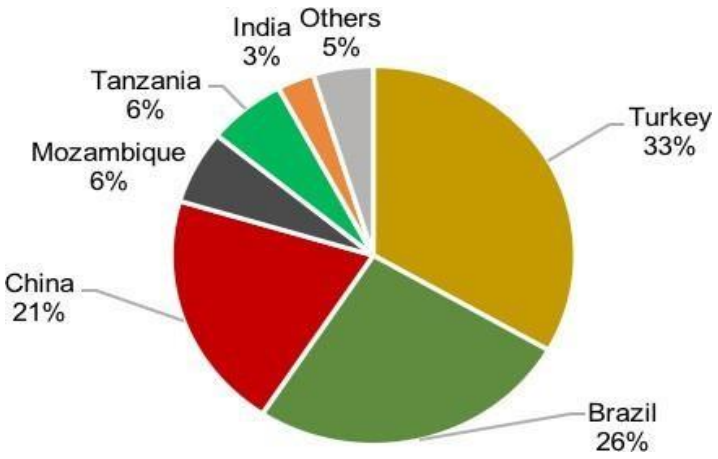


Exhibit 2: Natural Graphite Reserves

Graphite has recently been the focus of numerous exploration companies, particularly due to developments in battery technologies related to the emerging electric vehicle and green energy market. Consequently, the race has been on to report large tonnage exploration targets and mineral resources, with certain projects being described, for example, as "world-class", "biggest" or "highest grade", with perhaps hundreds of millions of tonnes containing a certain percentage of graphite.

Graphite exploration projects may be ranked according to factors such as i) deposit size, contained graphite and enterprise value/ tonne of contained graphite (EV/t); ii) location (country risk) and logistics; iii) flake size distribution; iv) product purity; v) off-take agreements; and vi) timeframe to production. Drivers for success include having a sufficiently high-grade flake graphite deposit with low stripping ratio and, in addition, jurisdiction, logistics, timeframe to

production and last but not least, off-take agreements must be taken into consideration.

3.4 Company's Current Status:

PLANTINUM GRAPHITE INTERNATIONAL COMPANY LIMITED intends to produce a high quality of industrial minerals and towards that end it has applied for and obtained several mineral rights in accordance to the Mining Act, 2010 of the laws of Tanzania. The company expects to become successful on its efforts to enter into the graphite extraction industry as well as to maintain a set of steadily improved product quality for its customers. The company has also commissioned for laboratory test of the mineral ore found on its mineral rights land to be conducted by relevant authority in the country. With mineral rights located along the best graphite reserve zones in the country, the company expects to produce high quality graphite product for many years to come.

According to geological analysis report of the graphite mineral ore obtained from the laboratories of (GST) Geological Survey of Tanzania, which is located at Dodoma the company's graphite reserve samples shows that geology of the area predominantly contains total graphitic carbon (total carbon – (organic + carbonate carbon) of 180 to 300 micron disseminated in metamorphosed sedimentary gneiss or schist rocks with distinct high grade flake graphite which ranges several meters in length of high chemical purity. (Please see Annexure I).

Apart from these successes recorded by the company during its initial stage, there also had been some challenges encountered over the first period. The most significant challenge encountered is lack of machines and adequate funding. Another challenge is related to lack of expertise as compared to dominant market players against and the few nearby competitors. In order to resolve these, business challenges the company is willing and expects to invite foreign investors, to import cutting edge graphite extraction machines/ technology especially from China and to maintain acceptable international standards. The company will also set up an increasing budget for research and explorations as a means for acquiring better reserves and improving the production of industrial minerals.

3.5 Goal and Objectives:

The main objective of PLANTINUM GRAPHITE INTERNATIONAL COMPANY LIMITED is to start and expand the business of graphite extraction and to improve the quality of industrial mineral extracted in the country through addition of capital investment as well as taking

the advantage of transfer of technology from China to Tanzania for development of the sub-sector. The Company has already acquired a significant land for mines and plant construction within easily reachable proximity from Moshi-Arusha highway in Tanzania. Efforts shall now be directed towards engagement in joint venture agreements with interested parties from within and out of the country.

3.6 Critical Success Factors:

Graphite consumption per tonne of steel is projected to decrease, as refractory consumption efficiencies improve in China and as global steel production slows. Graphite demand linked to growth in electric vehicles, domestic and commercial power storage could be impacted by alternative battery technology such as aluminium-titanium "yolk-shell" nanoparticle anodes which are likely to use less graphite. If the manufacture of such nanoparticles becomes feasible and economic, the life time of batteries may be significantly extended which would reduce spherical graphite consumption and production. Another risky is associated with overproduction of flake graphite in China, in addition to proposed production by existing producers in other countries and global graphite explorers, which collectively poses a risk to supply-demand balance.

To make this graphite extraction business a success the company needs to input adequate funding for investing activities, to outsource qualified experts as well as to import cutting edge graphite purification technology in order to increase the quality of produce. Availability of a long term residence permits and some other investment incentives for PLANTINUM GRAPHITE INTERNATIONAL COMPANY LIMITED are among critical factors that may have an immediate and direct impact in this case. Acquisition of residence permits (Both class 'A' and class 'B' as appropriate) will enable the company to accomplish both its business start-up and expansion strategies through resettlement of investor directors as well as foreign experts. The company, with incentives for investment expects to be able to import more machines, equipment, tools, to undertake construction of premises as well as to finance strategies for more penetration to the market and thereby increasing market share.

3.7 Exit Strategy:

The Company currently has no any exit strategy in place, except that it may dispose-off the mineral right assets for sale if there happen to be the need. However, in that case shareholders will be given priority in any event of a sale or merger of the company or its assets for reasons of recovering at such time any money which was earlier invested in this business.

4. JUSTIFICATION OF THE PROJECT:

4.1 Accessibility and Infrastructure:

The Mererani mines are located at Simanjiro district, Manyara Region if a few kilometers from Kilimanjaro international air port . The road to the area is passable throughout the year, and water is available seasonally and at times the area is time andagain affected by water shortages but drilling of deep well is a solution to the problem, there is electricity line nearby the area, and mobile phone networks partly reachable.

4.2 The Mining Policy:

The mineral policy of 2009 was formulated within framework of the Tanzania Development Vision 2015. Among others the policy has created a Vision and Mission statement which target in the next 25 to 30 years for country to have a strong, vibrant, well organized private sector led by, large and small scales of mining industry which will be conducted in a safe and environmentally sound manner. According to the policy, mineral industry when improved is expected to contribute in excess of 10% of the GDP. The policy also pointed out that mining must prove dependable employment to Tanzania is achieved. However, records and statistics show that the mineral sector in Tanzania has been beset today by a number of constraints inter Alia that of:

- Late recognition of the sector's role in revamping the economy given the changing economic environment.
- Lack of adequate capital resources and,
- Limited use of appropriate and advanced technologies.

Now that the changes in socioeconomic and political environment is in place under the sixth president of Tanzania, Samia Suluhu Hassan, the function of government today in the sector is focused in doing the following:-

- Developing and enabling legal, regulatory fiscal and institutional environment for private sector investment in Mining.
- To guide investors towards sustainable exploitation of mineral resources of Tanzania in a win-win manner.
- Strengthening the ability of the state to effectively carry out its regulatory, promoters and to support marketing of mined minerals.
- Establish environmental health and safety guidelines and enduring compliance.

- Carrying out basic geological mapping, maintaining up to date mineral resources data and promoting the development of the country's mineral potential.

This project is in line with the mineral policy as provision of both safety and environmental management measures have been taken into consideration. Invitation of foreign investors to work jointly with local investors falls within the realm of the Tanzanian mineral policy. The use of professionals (Geologists and Engineers) in the project is another added advantage to this fact which justifies compliance to the policy particularly during implementation.

4.3 The Mining Act and Subsequent Mining Legislation:

Tanzania has a competitive and investor-friendly legal regime. Applicable legislations in the mineral sector are the Mining Act 2010, and the Explosives Act, 1963. The Mining Act, 2010 guarantees investors' security o tenure, repatriation of capital and profits, and transparency in the issuance and administration of mineral rights. Among others the mining act insists that mining companies should do business of mining in Tanzania but must abide and comply with the following:-

- To have all legal and administrative document as per checklist from the commissioner of mines.
- To use professionals in all day to day management of the mines.
- To have well maintained safety measures at the site of mining.
- To keep records of all their activities and make sure that the Government taxes are paid in time and in full.

M/s Permanent Minerals co. Limited is able, willing and ready to operate according to the Mining Act and in compliance to the mineral policy. This fact justifies the implementation of this project

4.4 The Environment Policy:

Environment conservation is the key issue in any investment in Tanzania. The directors have budgeted small percentage of profits accrued from the mining investment to be used for enabling sustainable Environment programmers. The company however, will be required to commission an environmental consultant to conduct a study on Environmental Impact Assessment (EIA) in respect to the project as a mandatory condition for all mineral extraction projects in the country.

4.5 The Political Goodwill and Other Social Issues:

Any project which involves transfer of technology, and which creates employment and intends to pay taxes to the Government receives a lot of political goodwill from current government and welcoming sentiments from the people surrounding the area. The project has additional advantages as it will also create a lot of positive social impact and as a result a lot of people will directly or indirectly benefit once this project comes to implementation. All in all, the expected political goodwill and its related social support justify the implementation of this project.

4.6 Key Data & Statistics:

When calculating the cost and revenues connected to this project we were properly guided by the following key data / statistics.

- Basic economic statistics – Tanzania mainland.
- Records and mineral production in Tanzania 2013 – 2018
- Records of mineral exports 2013 – 2018 and percentage contribution of exports.
- Sectorial contribution to overall GDP at factor cost at current prices.
- Pie chart showing sectorial contribution to gross domestic product 2018 at constant 2015 prices.
- Sectorial contribution to gross domestic product 2018 at constant 2015 prices.
- Gross domestic product on monetary and non-monetary.
- GDP growth 2010 – 2018 and trade of external trade 2010 – 2018.
- Trends of inflation in Tanzania.
- Pie chart showing percentage of export 2017/2018 – Tanzania mainland.
- Real GDP growth at 2015 constant prices.

All these Statistical data proves that there is still room for growth in this sector – this fact also justifies implementation of this project.

4.7 Economic Appraisal:

The use of key data and statistics has enabled us to analyze and reach the following basic facts:

Project priority: High

Employment: Over 150 direct jobs at an investment of 200,000/= per job at an average

The overleaf figures have made us to make the following observations, conclusion and recommendations:-

- The project falls within the scope of both mining policy and act.
- The project is technically feasible, financially viable and economically desirable as it has acceptable financial and economic rate of returns.
- The key financial ratios are acceptable.
- The project will create a pool of skilled personnel which will be useful for the future development of mining industry.
- The project will contribute substantially to the Government revenue and hence strengthen the external revenue position of the government.
- The project will form nucleus of development in remote rural areas (Simanjiro) and thereby stimulate development process.

4.8 Research and Development:

A research and development department did not exist for the business over the past period but with increase in competition within mining sector in the country in general the company intends to introduce a new desk for that purpose. Officer who will serve the research and development desk shall also work on marketing activities for the business as well as to organize various promotional events within and out of the country. Research on products to be produced, dropped or introduced will depend on a prior agreed set of criteria. The main guiding criteria for decisions on what products will be carried forward or to be introduced in the future will base on such product being with potentials for positive return in shorter time. Focus of the business will be much more placed to ensure that international and local standards as set by Tanzania Bureau of Standards are achieved and maintained at the mines.

5. FACTORY DEVELOPMENT:

5.1 Development Strategy:

The strategy for development of Permanent Minerals co. Limited will be very much determined by the availability of foreign investors and residence permits for the necessary experts and availability of conducive investment climate in the countryon timely basis. Development of a mine and plant operation lines on the site will be a priority and most desirable for intended expansion. In the plant developments will involve landscaping and building of some small structures in order to facilitate for workshop processes, system designs and fixing of appropriate machines and equipment, construction of storage facilities as well as acquisition of truck for transportation of mineral ore to the plant. In order to achieve that, a number of factors must come together, such as building materials, machines, equipment, tools, manpower and some technical knowhow. These factors can always be pulled together if investment allows more funding to be outsourced on time. In order to mitigate the risks that threaten successful implementation of this business development plan and proper agreements will be entered with interested parties.

5.2 Development Timeline:

The time table for full establishment of the mines and construction of the factory, together with all associated minor works in construction is estimated to be done within the ongoing one year. That is to say, new products at the company's factory will be in full swing just before the end of October this year, ready to receive some customers in search for graphite and other industrial minerals. Production program at the mines will be closely supervised by trained geologists and engineers who will be supported by locally recruited staff but at the end of the day, the whole process will follow key chain of command as narrated in details under chapter 7 in this business plan.

5.3 Implementation Program:

The life span of this project has been projected to take twenty years, with separate implementation programs of four years each. The Directors expects that the implementation sub-programs will look as under:

DETAILS	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Documentation of legal documents, Memorandum and Articles of Association, Conversion of Primary Mining Licenses to larger Mining License (ML), NEMC Certification, Fire Regulatory Certificate, OSHA Certificate, work permits and other issues of compliance.				
Preparation of geological reports, demarcation of coordinates and analysis of sample from the mines.				
Documentation of procurement details of capital goods application of exemption to TIC,TRA, importation of machines and other issues of implementation.				
Phase one starts - recruitment of geologists/ engineers and other experts, extraction of graphite and marketing.				
Phase two starts – Exploration of other types of Industrial Minerals and selection of other projects to undertake.				
Business Expansion and Heavy Investment – Procurement of heavy plant and machinery, recruitment of additional geologists/ engineers, experts and support staff.				

5.4 Development Expenses:

It is estimated that all these developments will require about TZS. 24,000,000,000.00 for the investment. This budget will also cover other costs like fixtures and fittings in the factory, machines buying and installation in workshops, utilities such as power supply and acquisition of other support facilities.

6. MARKETING STRATEGIES:

6.1 Marketing Plan:

The market plan for Permanent Minerals co. Limited aims at production of high quality graphite and other industrial minerals in Tanzania and selling a wide range of mineral products to a range of customers spanning from companies, public entities, to international corporations. To get through this after full establishment of the mines and construction of processing plants, the business will also increase the percentage of its spending set for advertisements and promotions from below 1% of revenue per annum to at least 3% per annum. Return On Investment (ROI) following improvement and expansion of company's mines is expected to quadruple within the next four years period.

6.2 Positioning strategy:

The company, will selected and gradually implement a pattern of market concentration with customers, business people and industries, then ensuring that all customers are afforded maximum access the products at customized freight deliveries. This positioning strategy was chosen because it is considered to attract a sufficient size of the market segment with potential for further growth in future. The set of industrial mineral products will be improved accordingly to meet demands of such market segments internationally.

6.3 Product Strategy:

All products at Permanent Minerals co. Limited will be extracted, sorted and properly purified to meet the best standards and needs of the targeted customers. These processes will involve the use of modern technology together with expertise in observance of acceptable standards. The company will produce high quality and diversified products, and use customized distribution channels in which customers can make orders of their preference in advance with friendly andtimely delivery after order. Customers to the company will also have opportunity to choose products from a wide range of industrial mineral deliverables.

6.4 Pricing Strategy:

The pricing strategy which will be employed in this business shall generally base on choosing low prices that are acceptable to a wide range of customers. All pricing will be based on a gross profit margin of 20% plus the compulsory taxes to start with, although in future some additional charges will be introduced to compensate for differentiated products as well as to produce a net margin desired for each category of product.

6.4.1 Project Market and Prices:

The project locality	-	Mererani, Simanjiro, Manyara Region
Claim Area	-	5 claims = (1.5SQ km) total approximately 50 acres.
Mineral Of Interest	-	Graphite during Phase I later other Industrial Minerals.
Project life	-	Twenty years
Total Revenue	-	The deposit has been evaluated by digging two pits (average depth 5m) and four trenches (15 – 20m long) about 50 kilograms of flake graphite of connecting values was produced (This is according to the geological report enclosed).
Power supply	-	Electricity from Tanesco is accessible from a nearby power line & Diesel operated generators will be used to complement during power cut offs.
Water	-	Available but not reliable and therefore the company will drill at least four deep boreholes in the area.
Employment	-	125 skilled and non-skilled staff.
Availability of skills	-	Local personnel, with foreign expatriate assistance is envisaged for first three years.

Plant and Machinery -	All major equipment for the project with actual specifications and designs are as listed under factory machines and tools.
Market -	Will be mainly in China and India. In China Companies such as Tesla's Powerwall Batteries, Johnson Controls Power Solutions, and Qingdao Lyanyou Graphite Co. Limited are prospective buyers for good quality graphite. Other market players will also be contacted for market expansion.
Prices -	The market of Graphite will be determined by the availability of demands and capacity of supply and the world market prices.

6.5 Sales Arrangement:

This project is expected to grow quickly and therefore official arrangements with buyers especially from United States, China, India, etc., should be done once the project starts. Please note that no allowance has been made to sell their graphite locally – due to this fact we expect that all the business to be transacted in foreign currency.

6.6 Promotion and Advertising Strategy:

Knowing that having good products and poor advertising is like not having a business at all, then Permanent Minerals co. Limited shall set up funds for production of casual and graphic advertisements to be aired on international newspapers as well as on international TV stations. Some funds will also be allocated to design, upload and to host a website for the company. Through this website customers will be able to access basic information concerning the company as well as to make orders at their own convenience.

Promotions for any special industrial mineral product that will be introduced at the company will be advertised in a manner considered expedient and effective

to cover the relevant segment of the market internationally. In that case therefore marketing officers may be hired occasionally for short term assignments. The company will also be issuing brochures, flyers, and leaflets as well as buying off columns in print media like in daily newspapers. In order to administer and supervise all activities under marketing department qualified personnel will be employed by the company.

7. MANAGEMENT AND OPERATIONS:

7.1 Company Organization:

The management of affairs and conduct of the business of the company is vested in the Board of Directors. The Board of Directors is responsible for the overall governance of the economic entity including its strategic direction, establishing goals for management team and monitoring of goals achievement. The Board meets regularly in order to retain full and effective control over the Company and to monitor the performance of executive management. The board comprise of two directors with a range of experience encompassing the current and future activities of the Company.

7.2 Personnel management:

Structure of management at company/ factory level will not basically differ much from the one documented in the Articles of Association for the business entity. The mining industry falls under category of businesses which needs to be guided with professionals, and due to this basic fact, this company is expected to be headed by a general manager who will function under Executive Director and the overall control of the board of Directors of the company. As a general practice, the general manager may be a mine engineer (superintendent) or holder of an MBA degree. The mine manager will have under him the mine engineer to look after mini planning and day to day underground operations. The mine engineer will be assisted by other professionals, four for every shift – all these will have under them a professional surveyor and a geologist. The skilled and semi – skilled workers underground will be supervised by the foremen – the official

administrative and operational chain of command will be prepared by the board of directors.

Besides the mine manger, Geologists, and Surveyors the General Manager will also be assisted by the chief accountant who will look after proper maintenance of books of accounts and financial management of the company. Personnel and administration manager, medical officer, and safety manager will also be directly reporting to the general manager. It is better to note also that the organization structure as proposed above and illustrated in the aforementioned paragraphs more or less follow the standard pattern which is allowed in the mines world over. As the time passes, modification for improvement can be effected where necessary if so required due to local circumstances.

The management structure for the business will include the General Manager (One post), Plant Manager (One posts), Sales personnel/ Accountant (One posts), Marketing Manager (One post), Housekeepers (Two posts), Factory technician (One post), factory attendants (Four posts), Security guards (Twelve posts) and other workers (One Hundred posts).

7.2.1 Duties and responsibilities:

A/ The Managing Director:

This will be the executive officer of the business. Other duties include, taking care of properties and funds of the company and maintaining good order between factory and the surrounding community, to employ and terminate employees, provided that he takes consideration of legal requirements as per labor laws of the country. He will also have the following responsibilities:

a) Final decision making.
b) To receive and act on monthly, semi-annual and annual reports of the company.
c) To receive and review regular financial statements.

B/ The General manager:

He/she will be answerable to the managing director of the company and responsible for day to day activities and management of the business. Other duties include, keeping the office, to take care of properties and funds of the company. He/she will assist the Managing Director in marketing industrial mineral products, seeking more opportunities for capturing large market segment and advertising products to the customers. Also will undertake any

other daily activities and facilitate for smooth and profitable running of the business, through marketing of its products. He must possess adequate knowledge in marketing and skills in the field of management. A suitable candidate should possess a well-established knowledge in the discipline of business administration, self-motivated and well energized, and should mortgage a non-movable property of the desired value to the company.

C/ Other employees:

There shall be other employees such as sales personnel (Accountant), Mine Engineer, Geologist, Marketing Manager, Factory technician, Mine workers, Plant attendants, Housekeepers and Security guards as will be determined by the Managing Director after being advised by the General Manager.

7.2.2 Salary schedule/remuneration:

A/ Salaries:

Terms of remuneration and salaries shall be negotiable between the employer and each employee. However, consideration shall be made to the merits of particular applicants as well as to particular job specifications of employee under consideration.

7.3 Financial management:

An account for the company will be maintained at a nearest Bank branch of choice as determined by the Managing Director and approved by the board of directors, and will be used for daily or regular transactions. Signatory to the account will be the Managing director and the General Manager.

The managing director and or the general manager will be responsible to make deposit of cash collected from sales of the day and submit the bank slips to the company accountant who shall also withdraw any money needed to effect payment at a reasonable hour of the day. The reasonable hour shall be determined upon the matter of adequate security.

8. BUSINESS FINANCE AND BUDGET PROJECTIONS:

8.1 START-UP FINANCE:

The amount of costs associated with activities for starting and expanding a graphite extraction plant at Mererani are estimated at about Seven Billion and Six Hundred Million shillings (TZS. 7,591,871,686.00). These costs will cover aspects like premises construction, factory machines, heavy earth moving machines, heavy weight trucks, Office furniture, Equipment, boreholes, constructions of a water pipeline and reserve tanks, personnel (costs prior and after opening), supplies, licensing and professional service fees.

The company's directors are willing to join efforts with interested foreign investors in order to raise the funding, technology, expertise and access to foreign markets. This willingness can only become a reality upon obtaining appropriate licenses and working permits as well as maintaining conducive investment climate in the country. The management has already applied and obtained mining rights and licenses from authorities in Tanzania.

8.2 BUSINESS INVESTMENT:

Premises and factory construction costs will involve staff houses, office building, plant lots and stores, buying and fixing of machines and equipment, and acquiring the necessary furniture. Other costs will involve employee selection, recruitment and remuneration, importation of raw materials, mining (earth moving) machines, supplies and trucks for transporting graphite mine-ore to the plant. The task of factory construction shall also include land scalping and survey; construction of buildings; to supply and fix various fittings, construction of fence walls, construction of small structures in the yard, installation of electricity and water supply systems into the factory compound; and all other related works.

A/ Factory construction expenses:

The rates quoted here are as per unit cost analysis that was compiled by quantity surveyors of the company on July 25th, 2021.

S/No.	DETAIL S	QUANTITY	AMOUNT
1	Main building construction works:		
	- Warehouse	1	60,000,000.00
	- Office	1	40,000,000.00
	- Staff houses	6	180,000,000.00
	- Outside toilet	4	20,000,000.00
	- Dormitories	2	100,000,000.00
	- Armory	1	20,000,000.00
	- Store rooms	4	240,000,000.00
2	Work shop structures construction works	2	100,500,000.00
3	Fence construction works	1	80,000,000.00
4	Boreholes drilling and fixtures	2	200,000,000.00
	Sub total		**1,040,500,000.00**

Table 1: Factory Construction Expense

B/ Factory Machines and Tools:

There will be a number of machines and tools to be acquired for the factory.

S/No.	DETAILS	QUANTITY	UNIT COST	TOTAL COST
1	Caterpillars (Bulldozer)	2	374,164,000.00	748,328,000.00
2	Wheel loaders	2	150,075,000.00	300,150,000.00
3	Excavators	2	270,860,000.00	541,720,000.00
4	Trucks – 30 tones	6	160,000,000.00	960,000,000.00

5	Crusher machines: 2 Harmer crushers, 1 Jaw crusher	2	80,000,000.00 66,066,080.00	160,000,000.00 66,066,080.00
6	Graves collection tank	1	8,500,000.00	8,500,000.00
7	Water Pipeline	1	350,000,000.00	350,000,000.00
8	Ball Mills	2	71,141,800.00	142,283,600.00
9	Steel Balls	70 Bags	1,014,690.00	71,028,300.00
10	Porcelain Balls	30 Bags	522,100.00	15,663,000.00
11	Separator/ Sand Remove floatation machines	2	32,500,000.00	32,500,000.00
12	Separator/ Graphite floatation machines	6	56,082,620.00	336,495,720.00
13	Press Filtering Machines	2	32,188,600.00	64,377,200.00
14	Drying machines	2	25,500,000.00	51,000,000.00
15	Coal Furnace	2	10,200,000.00	20,400,000.00
16	Generators	2	100,050,000.00	200,100,000.00
17	Conveyor belts	100mts	6,670.00	667,000.00
18	Sunshine plate m^2	1440	3,339.00	4,808,160.00
19	Vertical water pumps (500weight)	8	995,022.00	7,960,176.00
20	Vertical water pump 3600 weight	2	1,328,922.00	2,657,844.00
21	Trailing pumps (1420w)	2	2,671,200.00	5,342,400.00
22	Blowers – 5	5	170,000.00	850,000.00
23	Diggers – 5	5	5,400,000.00	27,000,000.00
24	Focal Lift	1	25,927,000.00	25,927,000.00

25	Iron Plate (30 Tonnes)	1	35,429,706.00	35,429,706.00
26	Concrete Mixer	1	500,000.00	500,000.00
27	Compressors	2	200,100,000.00	400,200,000.00
28	Mining Equipment	Collection	44,000,000.00	44,000,000.00
29	Mine Truck (Pickup)	1	120,000,000.00	120,000,000.00
Sub Total				**4,743,954,186.00**

Table 2: Machines and Tools Expense

C/ Furniture and equipment:

There will be a number of fixed assets, Furniture and Equipment to be acquired for the factory.

S/No.	DETAILS	QUANTITY	UNIT COST	TOTAL COST
1	Electricity connection	1	60,000,000.00	60,000,000.00
2	TV Sets	4	2,000,000.00	8,000,000.00
3	Telephone sets	3	200,000.00	600,000.00
4	Personal Computer	6 Sets	200,000.00	1,200,000.00
5	Printer	6 Sets	450,000.00	2,700,000.00
6	Modems for networking	1	50,000.00	50,000.00
7	UPS (Uninterruptible)	6	1,200,000.00	7,200,000.00
8	Cleaning equipment sets	6	55,000.00	330,000.00
9	Gas cookers	6	100,000.00	600,000.00

10	Deep fridge	3	1,650,000.00	4,950,000.00
11	Water reserve tanks	2	1,200,000.00	2,400,000.00
12	EFD Machine	1	750,000.00	750,000.00
13	Furniture			15,000,000.00
Sub Total				**103,780,000.00**

Table 3: Furniture, Fixtures and Equipment Expense

D/ Factory Raw materials:

a) There will be a number of raw materials to be acquired for the factory:

S/No.	DETAILS	QUANTITY	UNIT COST	TOTAL COST
1	Chemicals (Lts)	1000	8,363.75	83,637,500.00
2	Coal/ Source of energy	24	1,000,000.00	24,000,000.00
Sub Total				**107,637,500.00**

Table 4: Stock/ Raw materials costs

E/ Administrative costs and Overheads:

a) Salary estimates per year, PLANTINUM GRAPHITE INTERNATIONAL COMPANY LIMITED:

TITLE/ JOB POSITION	NUMBER OF WORKERS	SALARY PER MONTH	TOTAL SALARY PER ANNUM
General Manager	1	1,200,000.00	14,400,000.00
Plant Manager	1	1,200,000.00	14,400,000.00
Mine Engineer	1	1,000,000.00	12,000,000.00
Geologist	1	1,000,000.00	12,000,000.00
Surveyor	1	1,000,000.00	12,000,000.00
Accountant	1	1,000,000.00	12,000,000.00

Marketing Officer	1	950,000.00	11,400,000.00
Plant technicians	4	950,000.00	11,400,000.00
Plant attendants	4	450,000.00	21,600,000.00
Security Guards	12	260,000.00	23,040,000.00
Miners	80	350,000.00	336,000,000.00
Drivers	10	200,000.00	24,000,000.00
Cleaner/House Keeper	8	160,000.00	15,360,000.00
TOTAL			**519,600,000.00**

b) Estimates for other overheads, PLANTINUM GRAPHITE INTERNATIONAL COMPANY LIMITED:

S/No.	DETAILS	RATE PER MONTH	TOTAL PER ANNUM
1.	Electricity utility	12,000,000.00	144,000,000.00
2.	Fuel	62,100,000.00	745,200,000.00
3.	Water utility	8,000,000.00	96,000,000.00
4.	Cleaning equipment set/ service	1,000,000.00	12,000,000.00
5.	Disinfectants	100,000.00	1,200,000.00
6.	Internet service charges	3,000,000.00	36,000,000.00
7.	Telephone charges	1,000,000.00	12,000,000.00
8.	Provisions for minor repairs	2,500,000.00	30,000,000.00
9.	Depreciation		659,535,573.25
TOTAL COSTS			**1,735,935,573.25**

NB: Depreciation charge per year was computed over fixed assets based on acceptable rates set in accordance to Income Tax Act, 2008 RE 2019 of the laws of Tanzania

8.3 FORECASTED OPERATIONS BUDGET FOR THE PROJECT

Computation of cash in inlay and outlay in this project documents has been projected to reach US Dollars 3,300,813.78 (TZS. 7,591,871,686.00) out all this 78% i.e TZS. 5,924,134,186.00 will be used for fixed asset expenditure. The rest i.e 22% TZS. 1,667,737,500.00 will be directed for operational expenditure per year. As far as the expectation of return on investment is concerned, the project is estimated to produce (extract) at least 100 Tonnes of Graphite per day when it comes to full-swing hence a total of 30,000 Tonnes per year. The cost of production per Tonne is estimated at TZS. 113,455.77 and export charges (Taxation and freight charges) is expected at TZS. 150,000.00. Thus, total cost of production and distribution/ freight cost to the market is estimated to be TZS. 263,355.77 thus with addition of TZS. 100,000.00 as markup for profit the company expects to get about TZS. 3,000,000,000.00 per year as net profit.

8.3.1 CAPITAL COSTS:

The project can be streamlined to a lesser startup capital on one side with lower targets of production per day depending on the availability of capital. On the other side it may as well be replicated many times through establishment of several sets of graphite mine-plant sites as much as practicable. In view of the above separate both operations and strategic plans need to be prepared after attainment of prospective investors to work with in joint venture.

8.3.2 FINANCING PLAN (PHASE ONE):

Total investment cost has been projected to cost US Dollar 3,300,813.78 at the beginning, although this may be reviewed as the need to do so emerge.

8.3.3 INVESTMENT AND RE-INVESTMENT:

The Directors of this company have resolved to capitalize whatever profits which will be generated from the business at least for the first three years. Due to this fact we expect the working capital to double after every two calendar years.

8.3.4 COST OF PRODUCTION AND PROFIT ABILITY:

Computations connected to the profit and loss statement of the company shows favorable trend of growth.

8.3.5 THE CASH FLOW:

Computations in the annexed cash flow proves beyond reasonable doubt that the project will be able to meet its day to day operational costs and at the same time support the day to day mining operational costs.

8.3.6 LOAN AND REPAYMENT:

The project is expected to be fundable through loan facility at least after initial set up and start of operations. Computations of loan repayment schedule prove the capability of the project in paying the term loan, plus interest connected to it.

8.3.7 PROJECTED PROFIT & LOSS A/C:

The projected profit and loss statement annexed together with this business plan proves that the project will make profit throughout its life span, even for the first year, despite of heavy initial investment connected to the nature of mining projects.

8.3.8 PROJECTED BALANCE SHEET:

The projected balance sheet for this company shows very positive liquidity ratio of the entire project – this fact proves the viability of the entire project.

8.3.9 PROJECT DEPRECIATION SCHEDULE:

Computation of depreciation of fixed assets has been done in order to enable management of the Company to plan how to replenish plant and equipment.

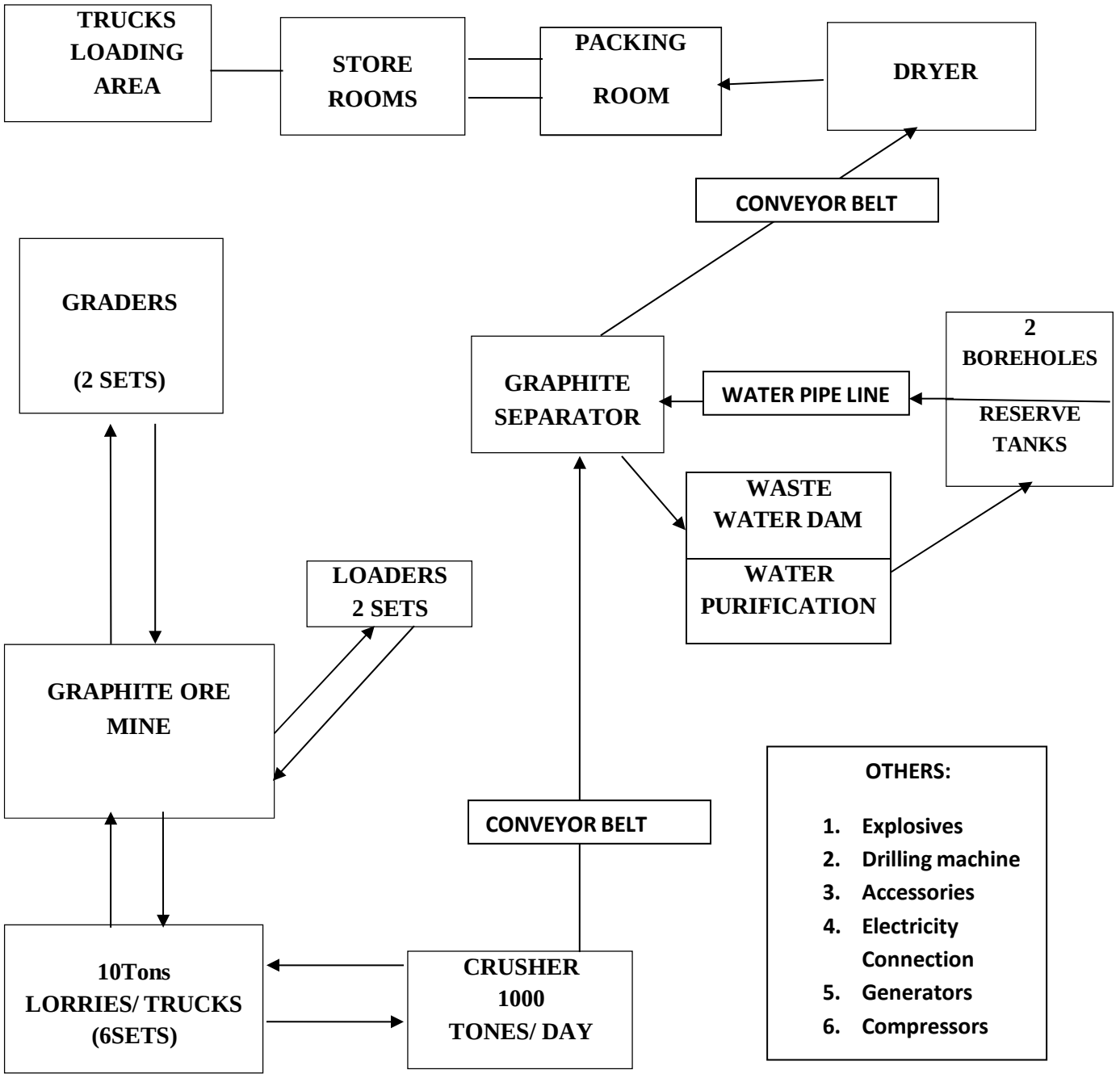
8.3.10 KEY RATIOS:

Almost all key ratios connected to this project have proved to be positive – this fact proves the viability of the entire project. All ratios in this business plan i.e. debt service ratios overage security cover, debt equity ratios show that every year the available cash is at least 2.6 times the debt obligation of the project and that the value of net fixed assets at any point will be at least 3 times the amount of outstanding liabilities (security cover) it is a fact therefore that the debt equity ratio is more favorable – All key ratios are thus favorable and are at acceptable levels.

8.3.11 FINANCIAL (AFTER TAX) RATE OF RETURN:

Computation of financial rate of return has been computed at the rate of 23.3% to us this ration is acceptable taking into consideration that this is a mining project.

GRAPHITE PRODUCTION PLANT SYSTEM



BUILDINGS TO CONSTRUCT

MAGAZINE	OFFICE	DOMITORY	TOILETS	GENERAL STORE

Harmer Crusher

Jow Crusher

Ball Mill

Rock/Graphite Separator

Final Graphite Separators

Graphite Dryer Machine