Project Summary – Essequibo Quarry

Lakeram Harridat

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Summary

The Essequibo Quarry developer, Mr. Lakeram Harridat, recognises the demand for aggregate, the current limitations of supply and the anticipated increase in demand from the emerging oil and gas sector and the expanding civil works and construction sector; particularly, the Linden-Lethem road. As such the company seeks to obtain from the Guyana Geology and Mines Commission (GGMC) a Mining Permit to initiate the developing a modern, large-scale quarry to meet the existing and projected demand for aggregate and boulders.

The Essequibo Quarry project site is located on the left bank of the Essequibo River. The Essequibo Quarry project is centred at Grid Coordinates N 6.26450 W 58.58320 in the Mazaruni Mining District, north-central Guyana. The area is approximately 92Km south-west of the capital city of Georgetown and the closest town is Bartica, some 19 miles south, all distances along riverain routes. Parika is situated 38 miles east of the project area. This quarry has not been subject to any previous phase of operation. The quarry will produce one type of crushed rock, granite from one quarry pit on the site.

Essequibo Quarry is owned and operated by Lakeram S. Harridat. Lakeram S. Harridat is a lumber yard and sawmill developer who plans to diversify his business interests by developing a stone quarry. The total area of disturbance within the project area comprises less than 58 acres, including mining pit (11.46 acres), crushing and screening plant (0.5 acres), sedimentation pond (1 X 2 acres), overburden stockpile (4 acre), and product stockpile (1 acre), haul Truck park (5.7 acres), mechanical workshop (5.7 acres), fuel depot (0.01 acres), dwellings (3.5 acres) and office (1 acre). The remaining areas are for access roads and clearing trees to a suitable distance from structures for safety. The total disturbance of the area will be approximately 35 acres (not including access roads) which equals approximately 5.70% of the quarry permit.

The mining pit will extend to a depth of 18 m at the maximum and does not extend into the water table. The quarry will operate 5 days per week at single shifts of 8 hours to produce 260,000 - 300,000 tons of granite annually. Typical drill, blast, load and haul cycles will be used. The processing plant at Essequibo Quarry will consist of a three stage crushing and screening system. The process plant will remain unchanged during the Life of Mine (LOM). The quarry and process plant will operate on 1 eight-hour shift, five days a week. The mine will employ 32 persons, but other personnel will be contracted to complete medical and environmental tasks, and for security purposes. The staffing at the quarry will include one site manager, one engineer, one safety professional, four TSU Policemen, one plant foreman, three plant operators, one plant labourer and one scale operator. There will be one quarry

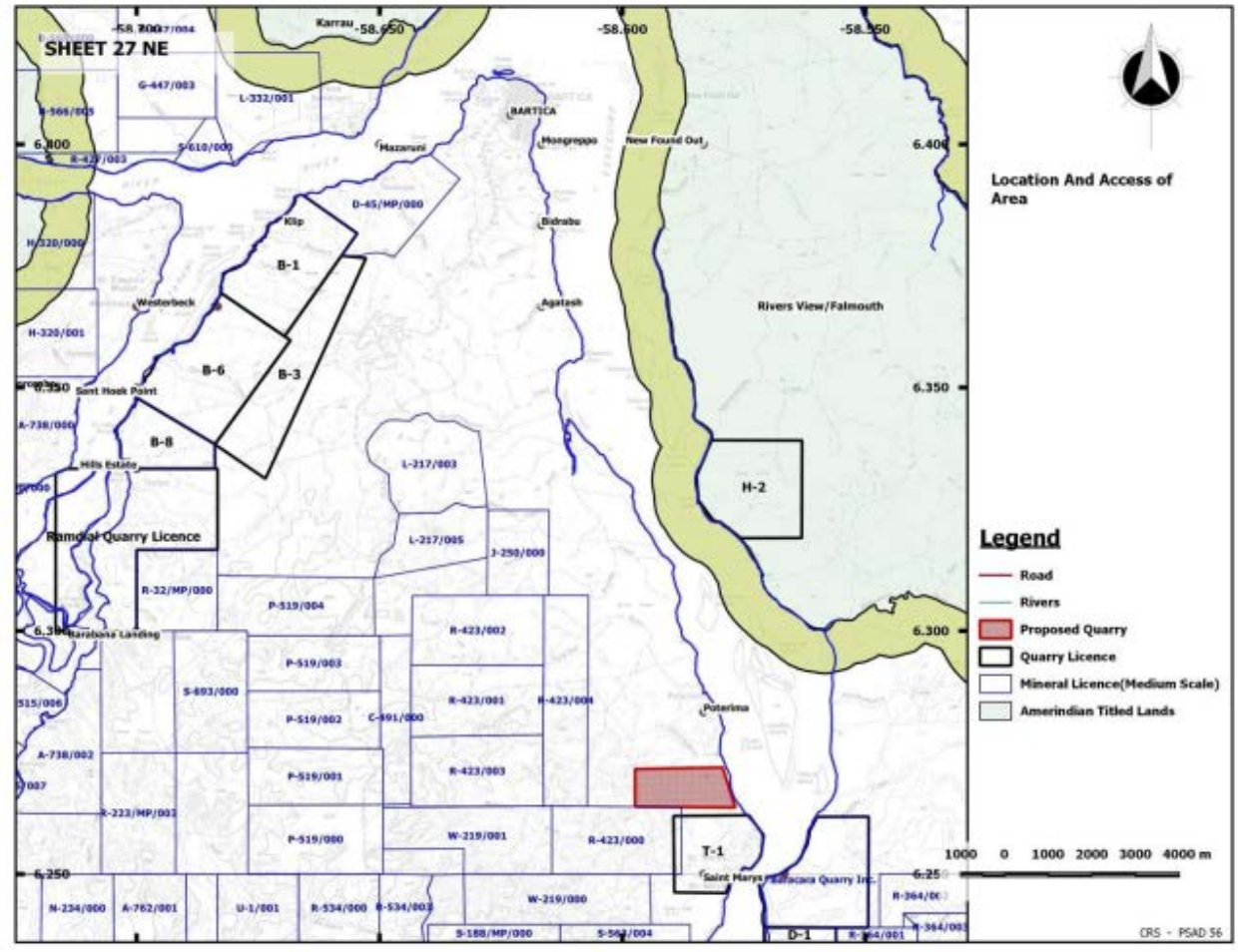
foreman, one blast/drill overseer, two blasters, two drillers, and one haul truck operator, two over road drivers, one loader operator, two mechanics, two plant mechanics and one electrician. The planned life of the phase 1 project is five (5) years with an additional five years for post closure monitoring. All rehabilitation activities will adhere to the standards set forth in the permitted Rehabilitation and Closure Plan. The average rehabilitation cost per acre was assumed at USD 15,000 per acre (based on USA Western States Reclamation Audit for Quarries). The total surface disturbance for Essequibo Quarry Pit, based on permitted disturbance limit was found to be 8.46 acres. The total cost for rehabilitation was assumed to be USD 126,900. Whenever possible, reclamation will be conducted concurrently with quarry operations

All equipment used in production, material haulage as well as auxiliary operations will be eliminated. Reclamation of the area after production is terminated will depend on the intended end use of the area. It is realistic to assume that a relatively large area of exposed bedrock (about 8.46 acres) will be created. The bedrock will be broken up and re-soiled for planting of trees or other vegetation if biological reclamation of the quarry is requested.

An Environmental Management Plan has been designed to manage and, to every extent possible, prevent or mitigate the potential environmental impacts associated with the proposed project (Essequibo Quarry) to be conducted. The EMP applies specifically and exclusively to those activities conducted within the confines of the Mining Permit to further delineate and characterize the extent of the stone resources contained within the project area. The plan only covers the first five (5) years of the project and will be updated as needed.

Location and Access

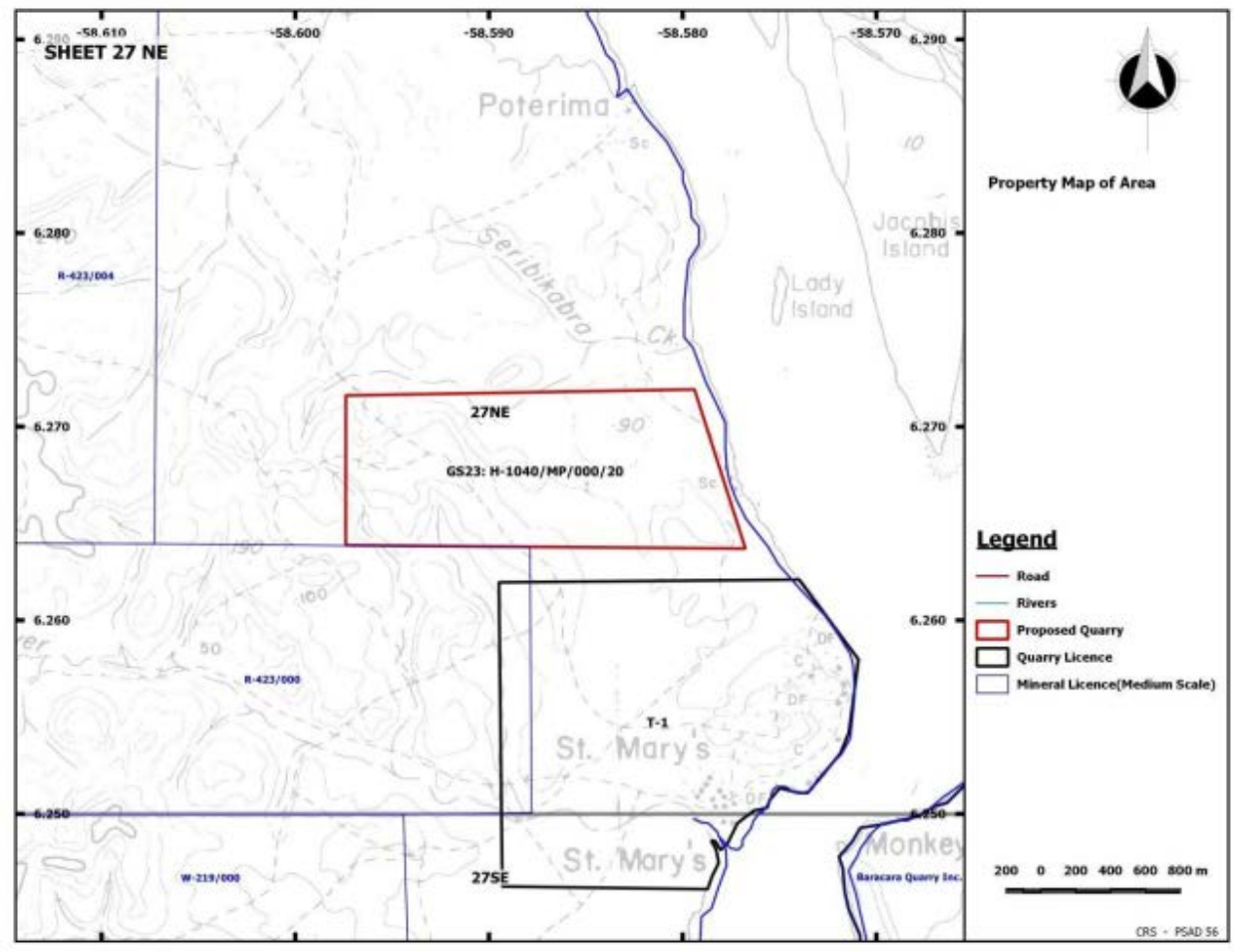
The property is located on map sheet 27 NE on quarter degree topographical sheet. The proposedproject is south of the Sherima Crossing on the left bank of the Essequibo River. The centre of theproperty is located 21.92Km from the Crossing. The distance from the capital city Georgetown to Sherima Crossing is 142 Km. The area is accessed from Georgetown by asphalt road to Linden and thereby 4-wheel drive road towards the Sherima Crossing. The Project site is also accessed by the Bartica-Potaro Road.



Location and Access Map

Mineral Tenure

The quarry project area does not overlap any previous properties. The property is GS23:H 1040/MP/000/20.



Geologic Structure

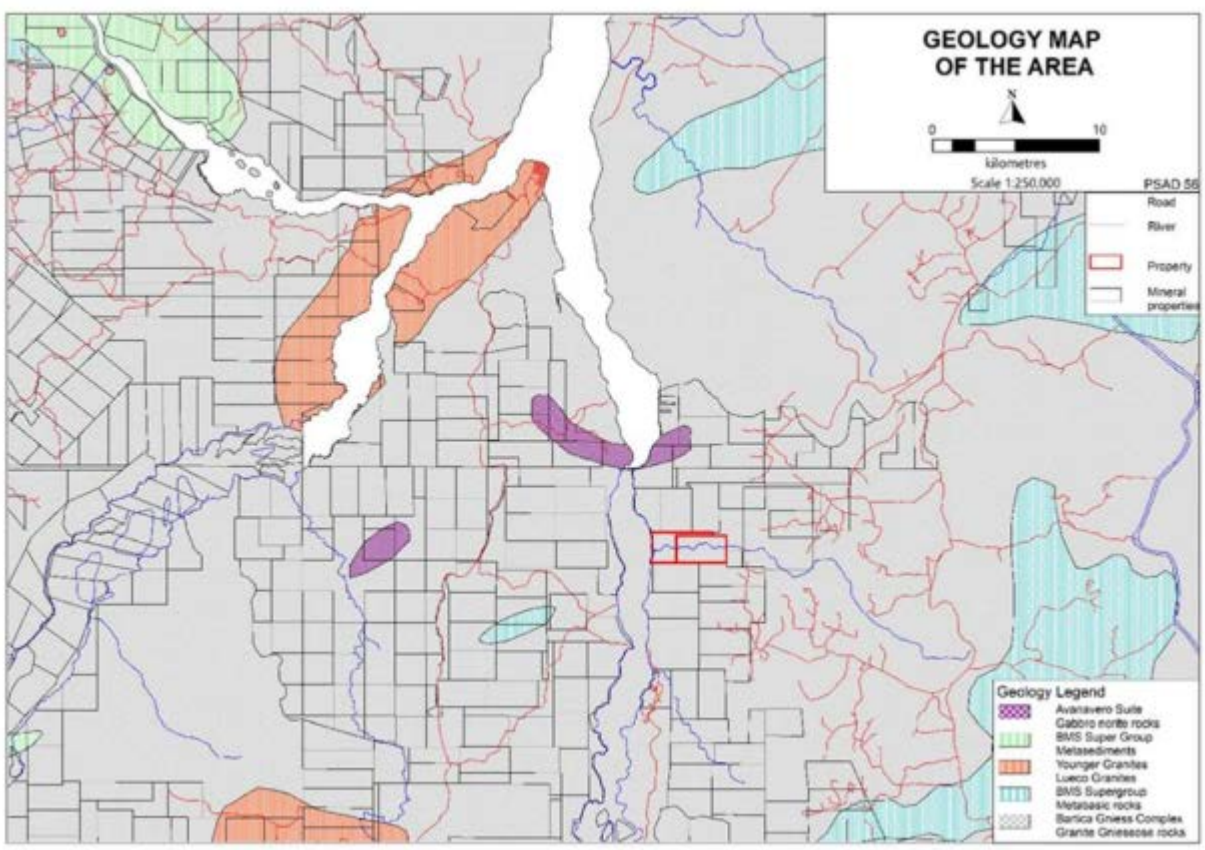
The rock quarried at Essequibo Quarry is dark medium grained, massive gabbro that extends north to south along the property. The fresh rock can be seen on the quarry face up to the 50 feet contour, above which the rock is weathered. The weathered portion is regarded for the purpose of the survey as overburden. No attempt was made to pit the overburden its depth, the 50 feet contour being taken as the top of the fresh rock. The rock exposed is fresh and variable, consisting of four main twocs: (1) a light grey massive biotite- granite (2) veins of coarse granitepegmatite, (3) gneissose—biotite granite, and (4) melano-cratic rock. The gneissose biotite— granite is the commonest type and there is a marked

mineralogical foliation which strikes NNW— SSE and dips 35 degrees to the West. Although some of the rock is massive, by far the larger proportion shows this foliation and this should be considered when suitability of the metal for road construct ion is considered. The average specific gravity of the rock is 2.67. The fresh rock can be seen on the quarry up to the 50ft contour above which the rock is weathered. The rock is exposed as fresh and variable consisting of four main types: 1. light grey massive biotite granite 2. veins of coarse granite-pegmatite 3. gneissose biotite granite and 4. melanocratic rock. The gneissose biotite-granite is the commonest type and there is marked mineralogical foliation which strikes nnw-sse and dips 35 degrees to the west The main rock classification in the project area is granite. Granite is coarse-grained igneous rock of even texture and light colour, primarily composed of feldspar, quartz along with various other minerals in varying percentage. Based on recent work by Innovative Mining Inc., samples collected were tested for engineering properties. The uniaxial compression strength of the granite is about 50-60 MPa, porosity of approximately 20% and permeability 10-4 cm/s. the Aggregate Abrasion Value, Aggregate Crushing Value and Aggregate Impact Value reside about 30-35%. The average modal composition is estimated at: quartz-27%, K-feldspar-30%, Plagioclase – 30%, biotite and muscovite – 5 and 7%, respectively, hornblende – 6%, and Perthite at 3%. Opaque minerals were identified as 2 to 3%.

Essequibo Quarry Regional Geology

The area is located in Trans-Amazonian Tectonothermal province in the Guiana Shield, part of the Amazonian Craton (Plate 6). The Trans-Amazonian Tectonothermal province is a granitoid-greenstone terrane between 2.25 and 2.0 Ga in age (Gibbs and Olszewski, 1982; Cox et al., 1993; Santos et al. 2000) whose structural trends broadly parallels the Atlantic coast from Venezuela, through the Guianas to Amapa state in Brazil. In Guyana, the region's rocks, collectively known as the Barama-Mazaruni Supergroup, are Paleoproterozoic in age and comprise an east-west trending series of mafic through felsic volcanic flows with intercalated clastic sediments (Gibbs, 1980; Gibbs and Barron, 1993). The Barama-Mazaruni Supergroup sequences formed through orogenic collision events, which developed due to juvenile plate tectonic processes (Gibbs and Barron, 1993). These strata were deformed by the Trans-Amazonian Tectonothermal Episode (2.1-2.0 Ga). They were subsequently intruded by granite intrusions known as the Younger Granite Group, which probably were emplaced coevally with a regional sub-greenschist facies metamorphic event (Williams et al., 1967)

Mafic dykes belonging to the Younger Basic Group or the Avanavero Suite (1.78 Ga) cut the metamorphosed rocks as seen at Toolsie Persaud's Quarry. The Bartica Assemblage in northern Guyana consists of various ortho-and Para gneisses and amphibolites, generally metamorphosed in the almandine facies (Gibbs and Barron, 1993). The development of hypersthene in some Bartica Assemblage bands suggests that these may have reached the granulite facies, possibly reflecting an original dried composition (Cannon, 1964). The northern Guyana metallogenic Province, which includes Barama-Mazaruni Supergroup, isthe principal metallogenic province of Guyana.



Local Property Geology

Three distinct lithological units are found within the area (Figure 2). The oldest unit being the Bartica Gneiss complex with ages of 1.9 Ga – 1.8 Ga, then the pluton was emplaced (younger granites) approximately 1.7 Ga – 1.6 Ga ago. The PAPA dykes (Post Avanavero Pre Apatoe) then intruded the Bartica gneiss complex around 0.2 Ga.

Younger Basic Rocks (PAPA dykes)

Large Igneous Province or LIPs are usually made up of granitic plutons, dykes, and sills, mostly mafic, ultramafic, and gabbroic intrusions. They are primarily melanocratic rocks ranging from a fine grain matrix to a coarse grain matrix.

Younger Granites rocks.

Granodiorite is an intrusive igneousrock that has phaneritic textured. The grain sizes are visible to the naked eye. Granodiorite formation is slow cooling crystallization below Earth's surface. It is similar to granite and diorite, but It has more plagioclase feldspar than orthoclase feldspar. It appearsto be a small pluton intrusion with coarse grain biotite.

Gneiss Metamorphic rocks

In that area, distinct gneisses are present but occur in narrow zones within a belt of syn-tectonic granites with amphibolitic xenoliths and amphibolite slivers.

Potential of Essequibo Quarry

Based on recent work by Innovative Mining Inc., samples collected were tested for engineering properties. The uniaxial compression strength of the granite is about 50-60 MPa, porosity of approximately 20% and permeability 10-4 cm/s. the Aggregate Abrasion Value, Aggregate Crushing Value and Aggregate Impact Value reside about 30-35%. The average modal composition is estimated at: quartz-27%, K-feldspar- 30%, Plagioclase – 30%, 6 biotite and muscovite – 5 and 7%, respectively, hornblende – 6%, and Perthite at 3%. Opaque minerals were identified as 2 to 3%. The fact that the total average percentage components accounted for in the analyses is 99.37%, the stone can be regarded free of insoluble or organic materials, making it suitable for quarrying.

Based on existing information and samples collected the mineable tons for the initial five years is 2,238,720. The overall rock body is 1,574 acres with some estimated minable tons of 5,532,100 in the 16.44 acres. This will be revised based on weathering and rock compressive strength away from the outcrop.

Mining Method Comparison and Selection

In light of the proposed production capacity and geomorphology of the area delineated, the existing open pit, a surface mining operation with benches is proposed. The expansion of the pit will consist of laybacks to the permitted pit limits.

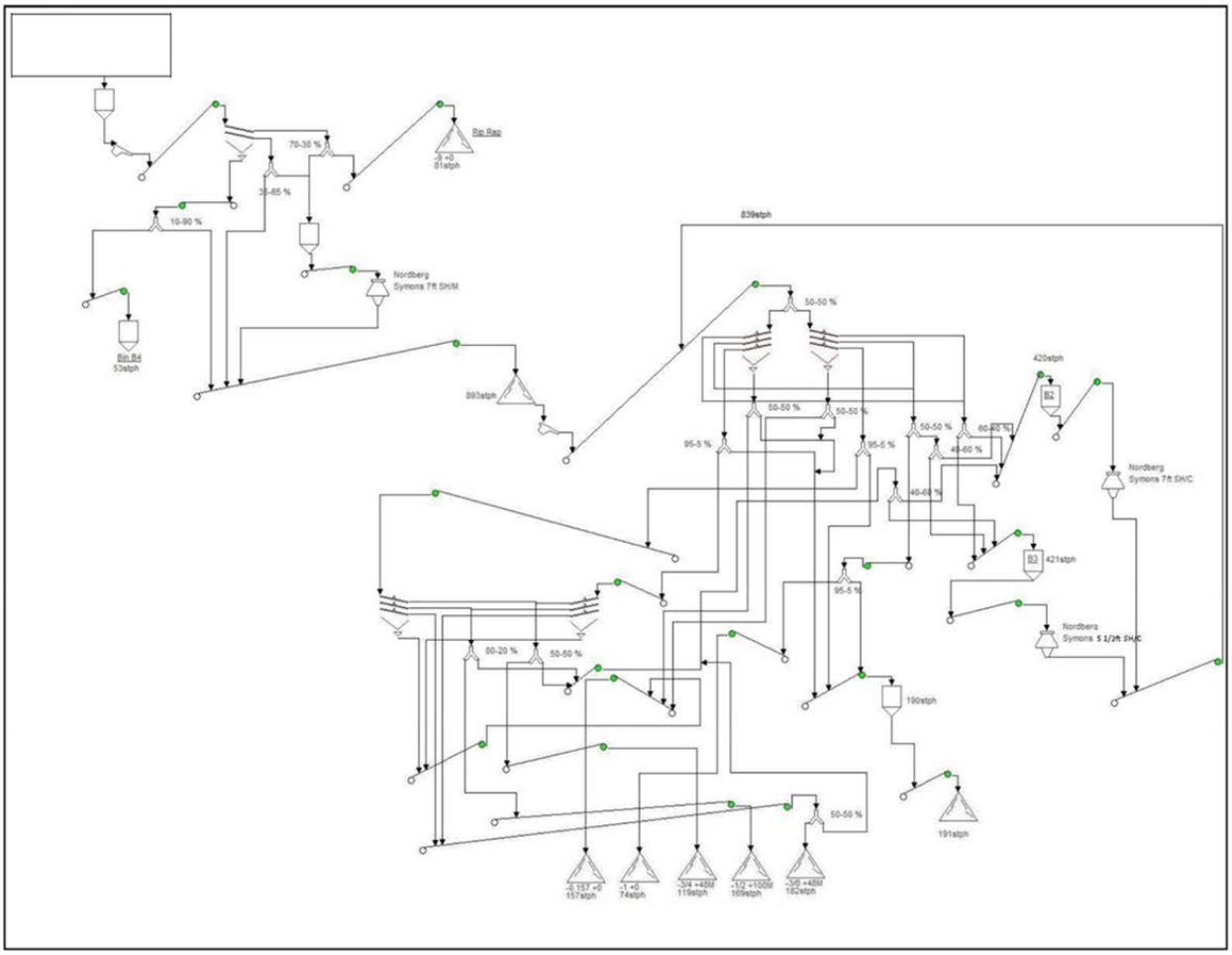
For the design of the pit, it was assumed that the pit slopes and benching will follow the permitted conditions of a 1.15H: 1V pit slope, a maximum bench height of 7.5 m and a minimum catch bench width of 5 m. The pit will have an overall strip ratio of 0.160:1 (waste to ore), and a mine life of 5 years with possibility for expansion. Mining will continue to down to the 0 ft. ASL bench elevation, with potential for extension of mine life with potential reserves at further depths.

Backfill

It is potentially possible to establish an internal dump in quarried out areas and external dumps in areas where stone reserves are poor. Back-filling of quarried out areas in the future quarry represents one of the viable rehabilitation scenarios. The overburden material from external dumps may be used for modelling of the quarry surface. The indigenous flora will be used for revegetation.

Sequencing

As the pit progresses downwards, new pit roads will be established along the northern and southeastern side of the pit and roads from the processing area will be used for pit access. Additionally, an in-pit sump will be established on each level as the pit progresses downwards. At the beginning of mining, a ramp will be established on the east side of the pit and extended to the crusher level. This will facilitate a ramp retreat/layback sequence on the eastern side of the pit to the 22.5 m bench.



Quarry Flow chart

Planned Mining Methods

Mining Context

Quarrying methods will include industrial quarrying with the aid of blasting to fragment rocks. Blasting will be done according to the quarry plan. The method of quarry blasting has proven to be effective over several decades of use, and the use of other methods of quarrying are not 8 justified. This method allows for economic exploitation of the deposit, and is safe for personnel and facilities provided that standard procedures and rules regarding work safety are followed. The explosives used for blasting will be stored in a magazine or delivered to the site directly prior to blasting.

Mining Methods

The primary fragmentation of rocks will be done by single row or multi row bench blasts. A hydraulic hammer or secondary blasting will be used to fragment oversized boulders. After blasting, excavators or wheel loaders will be used to load blasted rocks into high capacity dump trucks. The rocks will be hauled away with high capacity dump trucks. All of the work will be done according to approved procedures and operating guidelines.

Project Activities/Design

Overburden Stripping and Pile and Re-utilizing The mass of overburden is estimated at 239,912 tons. The characteristics of the soil include vegetative cover, top soil, saprolite and clay. The top soil will be stripped and stored for rehabilitation purposes. The overburden will also be stripped and stockpiled for rehabilitation purposes. Berms will be constructed around overburden spoil heaps to prevent run-offs and sedimentation of natural drainage systems. Overburden spoil piles will be located in areas of poor stone reserves.

Drilling and Blasting

Stone will be fragmented by blasting in the form of several standard bench blasts, rock breakers will be utilized in place of secondary blasting. If adequate quarry development is achieved with a long face, then it may be possible to consider single row bench blasts, which usually consumes less explosives. It is assumed that the effect of individual bench blasting will amount to 6,250 tons, once to twice per week to meet the annual production capacity of 300,000 tons as planned.

Bench Design and Construction

The proposed stone quarrying will involve three horizontal benches, a maximum 18 m quarry face height and a 370 slope. The quarry face height is usually based on the technical possibilities of the drilling technology used to prepare for the bench blasting, on requirements regarding the fragmentation of blasted rocks, and on safety instructions for loading of raw materials. The slope of the quarry face is basically based on the angle of the drill holes used to prepare for bench blasting. The quarry faces are proposed to set back at least minimum 10 m (working terrace width) for safe operation of loading and hauling equipment.

Proposed Quarry Development- Bench Levels

Bench 3 18 m

Bench 2 7.5- 15 m

Bench 1 0-7.5 m

Slopes slightly from 0 m ASL in the west to -2.6 m in the east

The proposed quarry floor slopes slightly from 0 m in the west to about -2.6 m in the east in order to drain the quarry. It is possible to use temporary surface drains (gutters) if percolation and run off of rainwater from higher benches proves the sloping inadequate.

Haul Road and Haulage

A main haul road is proposed so as to provide access to individual quarry benches, mainly in the western and northern part of the deposit. As the pit progresses downwards, pit roads and ramps would be established along the eastern to western side of the pit. Ramps will have slope angles of 2.5% and be 13 meters wide to accommodate haulage equipment. The road width will be 13 m. It is assumed that the blasted rocks will be hauled by high capacity dump trucks. The main haul road will serve for hauling blasted rocks and also any unsuitable layers and overburden. Therefore, a dump for any unusable materials is located near the road. The proposed route of the main haul road is also based on the chosen location of the processing technology section, so as to minimize the length of the haul roads. It is necessary to consider the geomorphology of the terrain when proposing the route, so as to limit road gradient.

Facilities Construction

The project will see housing facilities made from local wood produce and aggregate materials. This will occur simultaneously with equipment mobilization to the site. Local skills and labour will be used for construction.

Planned Production Rate

The quarrying and annual production schedule is set at 300,000 tons per annum. It is assumed that a six months' period is necessary for commencement and initial development of production and that production will stabilize at 300,000 tons per annum, after development works are completed.

Product (Tons)	**Year 2022**	**Year 2023**	**Year 2024**	**Year 2025**	**Year 2026**	**Total**
Aggregates	150,000	150,000	150,000	150,000	150,000	750,000
Boulders	150,000	150,000	150,000	150,000	150,000	750,000
Total	**300,000**	**300,000**	**300,000**	**300,000**	**300,000**	**1,500,000**

Potential mineable reserves and production rate

Tonnage per month: 25,000 tons per month

Tonnage per day: 1,250 tons blasting production per day

Stock Pile inventory (end 2021 of boulders and aggregates) - Nil

Total Projected production- 1,500,000.

Environmental Management

Our Vision is to be leaders in environmental management in the quarry industry of Guyana. We will be committed to ensuring that all activities are undertaken and managed in a responsible manner to promote our fundamental responsibilities to the environment in which we will be operating in. Our activities and operations will support the principles of sustainability and be managed to minimise effects on the environment.

Essequibo Quarry Environmental Policy (July 2021) will aim to embrace the principle of sustainable development through implementation of the following commitments which are of relevance to this EMP: • Conducting Essequibo Quarry operations to minimize environmental risk and, where practicable, eliminate adverse environmental impacts.

• Continual improvement of Essequibo Quarry environmental performance including regular review and the setting of rigorous environmental objectives and quantified targets- particularly with regards to: - Efficient use of energy (including appropriate use of alternative fuels);

- Conservation of water;

- Minimisation and recycling of wastes;

- Prevention of pollution; and - Effective use of virgin and recovered resources and supplemental materials.

• Open and constructive engagement with communities that surround Essequibo Quarry Operations.

• Reducing the greenhouse gas emissions from Essequibo Quarry processes, operations and facilities.

• Protecting and where possible, enhancing biodiversity values at and around Essequibo Quarry facilities

Water Management

When the Quarry project is approved, there will be two discharge points. The first allows discharge from the Water Management Pond (WMP1) into the drainage system along the Seribikabra Creek. The second discharge is from the Water Management Pond (WMP2). A third discharge point is provided for discharge from the oil and grease separator adjacent to the workshop.

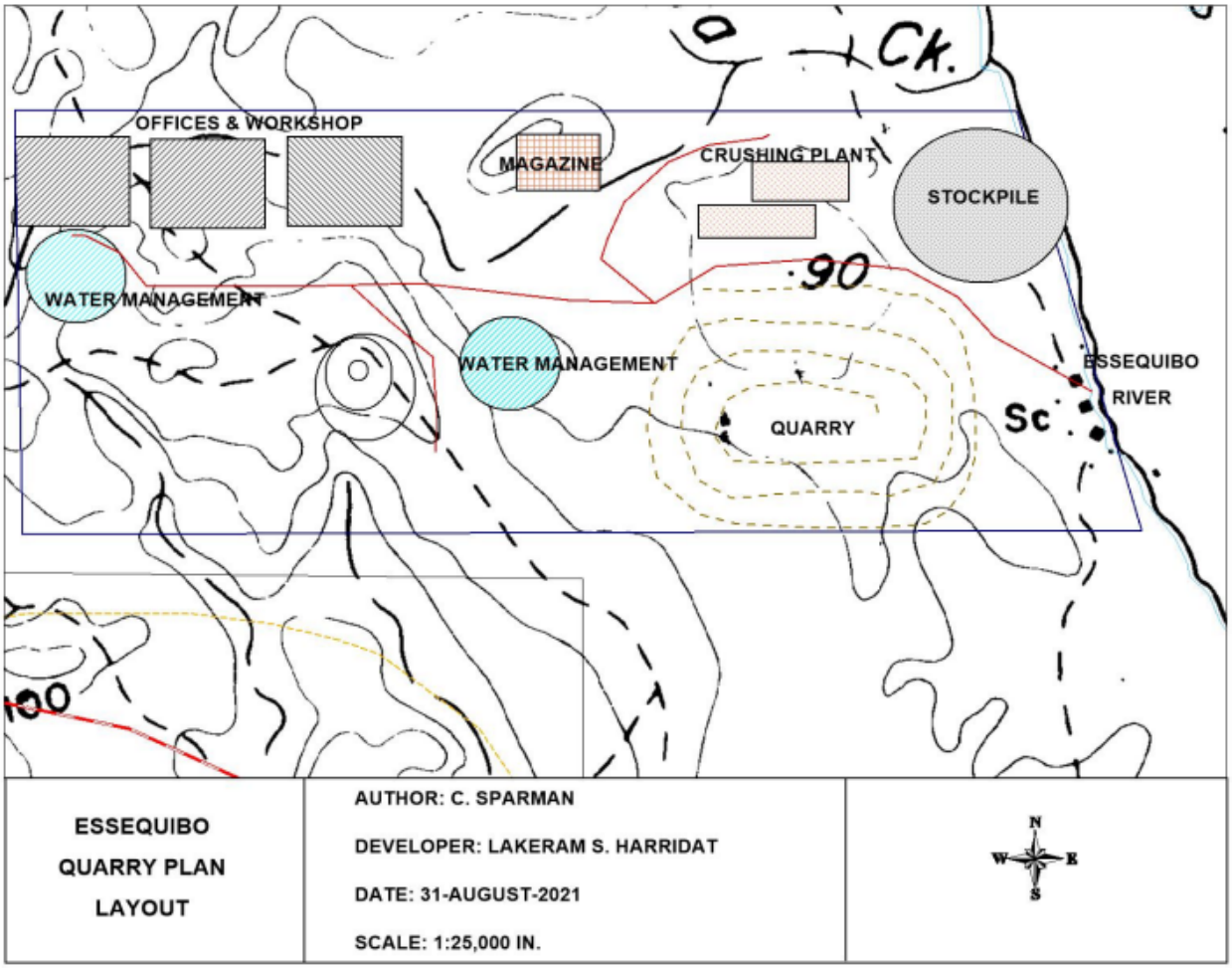
Water Management Strategy

The water management system at the quarry has been designed so that all rainfall runoff is contained within the quarry sump then pumped to a sedimentation pond. This water will then be reused within the quarry operation or discharged into the Seribikabra Creek. Discharges of water into the Seribikabra Creek will only be under controlled circumstances. Discharges from the quarry will not exceed 50 NTUs and pH 6.5-8.5, and visibly free of oil and grease.

Utilities

Electric power will be sourced from 1000 KVA generators onsite. This will be responsible for power to the plant, office and housing areas. Electrical poles and approved wired for the load will be used for overhead conveyance.

Water will be sourced from the Seribikabra Creek and rainfall. All water will be treated using Puritabs and filtered through a sand filter. The sand filter will discharge into three (3) sets of water-polishers to remove bacteria and fines.



Site Layout Plan

Potential impacts to land/soil

Soil erosion and sedimentation, top soil mixing, compaction and rutting may occur during construction and operation of the mine. Soil contamination may also occur as a result of the accidental release of fuels, waste oils and lubricants.

Mitigation measures:

Soil erosion and sedimentation impacts will be minimized through the implementation of best management practices outlined in the storm water and sediment control, and erosion control management plans of the EMP. Fuels and waste oils will be managed to ensure safety in handling and the prevention of spills to soil.

Potential impacts to air quality:

Fugitive dust from access roads, the pit excavations and the crusher, and diesel engine emissions are the main elements of air quality concern at the quarry.

Mitigation measures:

Fugitive dust emission will be managed by periodic wet suppression on roadways, process areas and accessible working faces. Speed limits will be enforced within the quarry and access road to limit fugitive dust, and spray bars will be installed at several points on crushing equipment to limit dust generation. Vehicles will be maintained according to the manufacturer's manual and are kept in good working order.

NOISE AND VIBRATIONS:

Noise and vibrations will be produced from the operation of heavy equipment, the generator, pit excavation and blasting operations.

Mitigation measures:

Noise emissions will be mitigated by installing sound suppression equipment on vehicles, e.g. mufflers; ensuring vehicles are maintained according to the manufacturer's manual and are kept in good working order. Vegetative buffer zones will be maintained between the mine face and the mine site accommodation and contiguous land uses, which will act as a noise buffer. Mine site buffer zones will be established in accordance with the GGMC Code of Practice for Quarrying.Blasting will be conducted in

accordance with a Quarry Blasting Plan to be developed in accordance with the GGMC Code of Practice for Quarrying and approved by the GGMC prior to implementation of the plan.

IMPACTS TO WATER (BOTH GROUND AND SURFACE):

The quarry may be excavated below existing groundwater levels. This could result in groundwater infiltration to the quarry floor. Rain induced infiltration and leaching of chemical impurities from exposed spoil piles, and spills of oil and grease from operations can infiltrate and affect ground water quality. Vegetation clearing for construction will reduce rain interception by forest cover and may result in increased discharge to the Essequibo River and Seribikabra Creek. During construction and operation of the mine sediment discharge and erosion may potentially impact the water quality of receiver water bodies.

Mitigation measures:

Ground and surface water impacts will be mitigated through the implementation the storm water, sediment control, and erosion control management plans of the Quarry and the GGMC Code of Practice for Quarrying.

FIANACIAL ANALYSIS

The project will see 32 persons employed.

		Personnel/Year						Cost ($/ton)				
Classification	**Salary**	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
Quarry Foreman	USD 7.10 $/hr	1	1	1	1	1		0.045	0.045	0.045	0.045	0.045
Drill/Blast Overseer	USD 4.06 $/hr	1	1	1	1	1		0.026	0.026	0.026	0.026	0.026
Driller	USD 3.04 $/hr	2	2	2	2	2		0.04	0.04	0.04	0.04	0.04
Blaster	USD 3.04 $/hr	2	2	2	2	2		0.04	0.04	0.04	0.04	0.04
Haul Truck Operator	USD 5.11 $/hr	1	1	1	1	1		0.03	0.03	0.03	0.03	0.03
Loader Operator	USD 5.68 $/hr	1	1	1	1	1		0.036	0.036	0.036	0.036	0.036
Mechanic	USD 4.26 $/hr	2	2	2	2	2		0.054	0.054	0.054	0.054	0.054
Plant Mechanic	USD 4.26 $/hr	2	2	2	2	2		0.054	0.054	0.054	0.054	0.054
Electrician	USD 4.26 $/hr	1	1	1	1	1		0.027	0.027	0.027	0.027	0.027
Plant Foreman	USD 5.68 $/hr	1	1	1	1	1		0.036	0.036	0.036	0.036	0.036
Plant Operator	USD 4.26 $/hr	3	3	3	3	3		0.081	0.081	0.081	0.081	0.081
Plant Laborer	USD 2.84 $/hr	1	1	1	1	1		0.018	0.018	0.018	0.018	0.018
Scale Operator	USD 2.27 $/hr	1	1	1	1	1		0.015	0.015	0.015	0.015	0.015
TSU Magazine Security	USD 10.60 $/hr	4	4	4	4	4		0.271	0.271	0.271	0.271	0.271
Site Manger	USD 16,364.00 $/Year	1	1	1	1	1		0.055	0.055	0.055	0.055	0.055
Engineer	USD 13,636.00 $/Year	1	1	1	1	1		0.045	0.045	0.045	0.045	0.045
Safety Professional	USD 8,182.00 $/Year	1	1	1	1	1		0.027	0.027	0.027	0.027	0.027
Environmental Officer	USD 8,182.00 $/Year	1	1	1	1	1		0.027	0.027	0.027	0.027	0.027
Medic	USD 8,182.00 $/Year	1	1	1	1	1		0.027	0.027	0.027	0.027	0.027
Over Road Driver	USD 4.26 $/hr	2	2	2	2	2		0.054	0.054	0.054	0.054	0.054
Cook	USD 16,364.00 $/Year	2	2	2	2	2		0.11	0.11	0.11	0.11	0.11

	Total	32	32	32	32	32	Total ($/Ton)	1.118	1.118	1.118	1.118	1.118

The feasibility of the project is summarized below.

The capital investment is captured in the table below totaling USD 11, 349,276.

Capital Expenditures						
Mining Equipment						
Type of Equipment	**Make Model**	**Qty**	**Cost Per Unit**	**Total Cost**	**Replacement (Yrs)**	**Depreciation (Yrs)**
Drilling Equipment						
Production Drill	Atlas CopcoDM 25-SP	1	USD 156,800.00	USD 156,800.00	0	5
Exploration Drill	Aircore	1	USD 280,000.00	USD 280,000.00	0	5
Loading Equipment						
Production Loader	Cat 990	2	USD 377,192.00	USD 754,384.00	0	5
Production Excavator	Cat 320 D	2	USD 153,440.00	USD 306,880.00	0	5
Haulage Equipment						
Haul Truck	Cat 775 F	1	USD 784,000.00	USD 784,000.00	0	5
Haul Truck	Volvo FH	32	USD 112,000.00	USD 3,584,000.00	0	5
Support Equipment						
Stripping & Rehabilitation	Cat D6RIILGP Bulldozer	1	USD 258,720.00	USD 258,720.00	0	5
Production Excavator	Cat 320 D	2	USD 153,440.00	USD 306,880.00	0	5
Transportation	Toyota Hilux 4x4	2	USD 22,400.00	USD 44,800.00	0	5
Stemming Holes	Ingersoll-Rand Bobcat S185 Skidsteer	1	USD 20,832.00	USD 20,832.00	0	5
Power Admin	Miller 4KW Generator	1	USD 5,600.00	USD 5,600.00	0	5
Water Supply	Cat 613CII water Truck	1	USD 160,160.00	USD 160,160.00	0	5
Sales	Cat 980H Loader	1	USD 224,000.00	USD 224,000.00	0	5
Transport Explosive	4 x 4 Toyota Pick Up truck	1	USD 28,000.00	USD 28,000.00	0	5
Power Procesing Plant	CAT 1000 KW Generator	1	USD 100,000.00	USD 100,000.00	0	5
Haulage	CAT 740 Truck	1	USD 156,800.00	USD 156,800.00	0	5
Maintenance	Lincoln Air 500 Welding Plant	1	USD 16,800.00	USD 16,800.00	0	5
Total			**USD 3,010,184.00**	**USD 7,188,656.00**		

Capital Expenditures						
Processing Equipment						
Type of Equipment	**Make Model**	**Qty**	**Cost Per Unit**	**Total Cost**	**Replacement (Yrs)**	**Depreciation (Yrs)**
Primary						
Primary Crusher	Nordberg C200 59 X 79	1	USD 2,000,000.00	USD 2,000,000.00	LOM	5
Conveyors		5	USD 1,500.00	USD 7,500.00	10	5
Feeder	MF1000 Feeder	1	USD 108,000.00	USD 108,000.00	15	5
Scalper	6 x 16 Triple Deck Scalper	1	USD 28,400.00	USD 28,400.00	15	5
Secondary						
Conveyors		18	USD 1,500.00	USD 27,000.00	10	5
Triple Deck Screens	8 x 24 Triple Deck Screens	4	USD 143,500.00	USD 574,000.00	15	5
Feeder	MF200C Feeder	8	USD 42,000.00	USD 336,000.00	15	5
Secondary Crusher	7' STD Cone	1	USD 375,000.00	USD 375,000.00	15	5
Tertiary						
Conveyors		6	USD 1,500.00	USD 9,000.00	10	5
Sand Screw	54 x 34 Double Screw	1	USD 120,520.00	USD 120,520.00	15	5
Truck Loading Bins		4	USD 68,800.00	USD 275,200.00	15	5
Tertiary Crusher	5.5" Short Head Cone	1	USD 120,000.00	USD 120,000.00	15	5
Tertiary Crusher	7' Short Head Cone	1	USD 180,000.00	USD 180,000.00	15	5
Total			**USD 3,190,720.00**	**USD 4,160,620.00**		

Total Capital Expenditure	**USD 11,349,276.00**					

Revenue projections for the 5-year period is summarized below.

Year	Asphalt Aggregates Revenue	Concrete Aggregate Revenues	Gabion Rock Revenues	Boulder Revenues	Total Revenue
2022	USD 2,556,750.00	USD 2,727,000.00	USD 2,556,750.00	USD 2,556,750.00	USD 10,397,250.00
2023	USD 2,556,750.00	USD 2,727,000.00	USD 2,556,750.00	USD 2,556,750.00	USD 10,397,250.00
2024	USD 2,556,750.00	USD 2,727,000.00	USD 2,556,750.00	USD 2,556,750.00	USD 10,397,250.00
2025	USD 2,556,750.00	USD 2,727,000.00	USD 2,556,750.00	USD 2,556,750.00	USD 10,397,250.00
2026	USD 2,556,750.00	USD 2,727,000.00	USD 2,556,750.00	USD 2,556,750.00	USD 10,397,250.00
Total	**USD 12,783,750.00**	**USD 13,635,000.00**	**USD 12,783,750.00**	**USD 12,783,750.00**	**USD 51,986,250.00**

The following is a cash flow of the Essequibo Quarry project.

Item		Year 1 2020	Year 2 2021	Year 3 2022	Year 4 2023	Year 5 2024	Totals
Mine Production							
Asphalt Aggregates (ton)		75,000	75,000	75,000	75,000	75,000	375,000
Concrete Aggregates (ton)		75,000	75,000	75,000	75,000	75,000	375,000
Gabion Rock (ton)		75,000	75,000	75,000	75,000	75,000	375,000
Boulders (ton)		75,000	75,000	75,000	75,000	75,000	375,000
Total Production (ton)		**300,000**	**300,000**	**300,000**	**300,000**	**300,000**	**1,500,000**
Revenue							
Asphalt Aggregates ($/ton)	$ 34.09/ton	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 12,783,750.00
Concrete Aggregates ($/ton)	$ 36.36/ton	USD 2,727,000.00	USD 2,727,000.00	USD 2,727,000.00	USD 2,727,000.00	USD 2,727,000.00	USD 13,635,000.00
Gabion Rock ($/ton)	$ 34.09/ton	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 12,783,750.00
Boulders ($/ton)	$ 34.09/ton	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 2,556,750.00	USD 12,783,750.00
Total Revenue		**USD 10,397,250.00**	**USD 10,397,250.00**	**USD 10,397,250.00**	**USD 10,397,250.00**	**USD 10,397,250.00**	**USD 51,986,250.00**
Capital Costs							
Direct Costs (Exploration Drilling)		USD 95,000.00	USD 0.00	USD 0.00	USD 0.00	USD 0.00	USD 95,000.00
Mobile Equipment- Depreciation		USD 1,553,832.00	USD 1,553,832.00	USD 1,553,831.00	USD 1,553,831.00	USD 1,553,830.00	USD 7,769,156.00
Mobile Equipment- Rebuilds		USD 0.00	USD 0.00	USD 0.00	USD 0.00	USD 0.00	USD 0.00
Fixed Equipment Depreciation		USD 922,914.00	USD 922,914.00	USD 922,914.00	USD 922,914.00	USD 922,914.00	USD 4,614,570.00
Indirect Costs		USD 200,000.00	USD 200,000.00	USD 200,000.00	USD 200,000.00	USD 200,000.00	USD 1,000,000.00
Contingency		USD 363,953.00	USD 363,953.00	USD 363,953.00	USD 363,953.00	USD 363,953.00	USD 1,819,765.00
Total Capital		**USD 3,135,699.00**	**USD 3,040,699.00**	**USD 3,040,698.00**	**USD 3,040,698.00**	**USD 3,040,697.00**	**USD 15,298,491.00**
Operating Costs							
Operating		USD 6,282,321.00	USD 6,282,321.00	USD 6,282,319.00	USD 6,282,319.00	USD 6,282,319.00	USD 31,411,599.00
Sinking Fund		USD 41,256.00	USD 41,256.00	USD 41,256.00	USD 41,256.00	USD 41,256.00	USD 206,280.00
Loan Payment		USD 0.00	USD 0.00	USD 0.00	USD 0.00	USD 0.00	USD 0.00
Total Operating		**USD 6,323,577.00**	**USD 6,323,577.00**	**USD 6,323,575.00**	**USD 6,323,575.00**	**USD 6,323,575.00**	**USD 31,617,879.00**
Total Cash Flow (Pre Tax)		USD 937,974.00	USD 1,032,974.00	USD 1,032,977.00	USD 1,032,977.00	USD 1,032,978.00	USD 5,069,880.00
Cumulative Cash Flow (Pre Tax)		USD 937,974.00	USD 1,970,948.00	USD 3,003,925.00	USD 4,036,902.00	USD 5,069,880.00	
NPV (Discount Rate 10%)	**USD 3,148,396.00**						
IRR	62%						
Tax							

Taxable Revenue		USD 937,974.00	USD 1,032,974.00	USD 1,032,977.00	USD 1,032,977.00	USD 1,032,978.00	USD 5,069,880.00
Corporate Tax (40%)		USD 375,190.00	USD 413,190.00	USD 413,191.00	USD 413,191.00	USD 413,191.00	USD 2,027,953.00
Royalty ($ 0.11/ton)		USD 33,000.00	USD 33,000.00	USD 33,000.00	USD 33,000.00	USD 33,000.00	USD 165,000.00
Net Income		**USD 529,784.00**	**USD 586,784.00**	**USD 586,786.00**	**USD 586,786.00**	**USD 586,787.00**	**USD 2,876,927.00**

Conclusion

The lack of construction stone – boulders, gabbro etc. is a major problem in Guyana. This is affecting the implementation and execution of critical infrastructural projects – private and governmental. The implications of this situation are far reaching and impact negatively on the economic development of the country. As a sawmill operator, the investor is faced with prolonged shortages of stone from time to time that has halted the housing sector. This has prompted him to pursue the establishment of a quarry operation. The operation will be carried out with the main objective of addressing the stone shortage.

The quarrying activities that are to be carried out by the project will be guided by:

- The 1980 Constitution of Guyana provides the foundation for the national environmental institutional and legislative framework, stating that:

"In the interests of the present and future generations, the State will protect and make rational use of its land, mineral and water resources, as well as its fauna and flora, and will take all appropriate measure to conserve and improve the environment".

- Within this constitutional mandate, the Environmental Act Cap. 20:05 of 1996 is the primary environmental legislation in Guyana and establishes the Environmental Protection Agency (EPA) and provides for the management, conservation, protection, and improvement of the environment through the prevention or control of pollution, the assessment of the impact of economic development on the environment, and the sustainable use of natural resources. Their functions are stipulated in Part II 4 (1) of the Guyana Environmental Act Cap. 20:05.

The Environmental Act Cap. 20:05 and the EPA form the basis for the environmental institutional framework of Guyana. Within this framework, each sector is administered by its corresponding ministry.

- The mining sector is administered jointly by the EPA, the Guyana Geology and Mines Commission (GGMC), and the Minister of Environment and Natural Resources. The GGMC is responsible for the promotion and administration of the mining industry, including permitting, licensing, infrastructure

development, and other technical aspects of the industry. The Minister of Environment and Natural Resources manages and collaborates with the GGMC and is responsible for the negotiation of large scale exploration, prospecting and mining agreements.

- The Guyana Mining Act of 1989, which seeks to make to provisions with respect to prospecting for and mining of metals, minerals and precious stones, for regulating their conveyance and for matters connected therewith. The agency in charge of making sure this act is complied with is the Guyana Geology and Mines Commission (GGMC) which was established in 1970. The functions of this agency are as follows:

- ✓ Promotion of mineral development;
- ✓ Provision of technical assistance and advice in mining, mineral processing, mineral utilisation and marketing of mineral resources;
- ✓ Mineral exploration;
- ✓ Research in exploration, mining, and utilisation of minerals and mineral products; Enforcement of the conditions of Mining Licences, Mining Permits, Mining Concessions, Prospecting Licences (for Large Scale Operations), Prospecting Permits (for Medium and Small Scale operations) and Quarry Licences;
- ✓ Collection of Rentals, fees, charges, levies etc. payable under the Mining Act;
- ✓ Hall Marking

The maintenance and operation of explosives magazines are subjected to The Explosives Act: Chapter 16:06 of the Laws of Guyana. Construction, storage and management of the explosive magazine, and use of explosives will be in accordance with relevant sections of The Explosives Act: Cap.16:06. Explosives will also be used in accordance with The Explosive Act.

• The Occupational Safety and Health Act of 1997 (Cap. 99:06), which provides for the registration and regulation of industrial establishments, for occupational safety and health of persons at work, and for purposes connected therewith or material thereto.