Appendix 2

PROPOSED PROGRAMME FOR MINING OPERATIONS

Accompanying Application for Large Scale Mining Licence (LML)

Over

Area under Prospecting Licence No. 19622-HQ-LPL at Mwachilinga, Shantumbu Area, Kafue District.

By

Lu Hang Stone Mining Company Limited

Plot No.2440, Chipwenupwenu Road, Makeni,

P.O. Box 33612,

LUSAKA

2.0 PROPOSED PROGRAMME OF OPERATIONS

2.1 Introduction

Lu Hang Stone Mining Company Limited is a Zambian registered company under the Company Registration Act. The company has a dedicated team of Director and Shareholders with vast experience in quarry operations. Through its sister companies in China, Lu Hang Stone Mining Company Limited is actively involved in construction and civil engineering works with a dedicated and experienced team of directors. Recently, Lu Hang Stone Mining Company Limited was awarded a number of construction and civil works contracts in Zambia, a number of which are within Lusaka. To meet the contractual obligations, the company would require large volumes of quarry products.

It is from this background that the company herein applies for a Large Scale Mining Licence over the area covered by its Prospecting Licence No. 19622-HQ-LPL.

Upon grant of Large Scale Mining Licence, Lu Hang Stone Mining Company Limited intend to start quarrying operations at the identified dolomitic / Limestone hill within the tenement. The company will invest an initial sum of more than **USD 5.5 million** on Capex, infrastructure and operations over an initial 5 year period. The quarry operations will run on minimal mechanization, whilst utilizing locally available skilled and unskilled human resource as much as practically possible. As a matter of policy, and as part of its corporate social responsibility, Lu Hang Stone Mining Company Limited will be committed to contributing positively to the local and regional economic growth through the quarrying project at Mwachilinga / Shantumbu Area in Kafue District.

With increasing demand on quarry aggregates, the company plans to run the quarry throughout the year while maintaining sufficient stock piles to cover up for the planned plant maintenance period.

In as much as practically possible, the company will remain committed to the Environmental Management Plan (EMP) herein outline.

2.2 SUMMARY OF PROGRAMME OF OPERATION

No.	Activity Description	Period		Estimated Cost (USD)	Comments
		Start	End		
2.2.1	Prospecting works			20,000	Works completed for PHASE I Quarrying, works for PHASE II to be commenced as soon as LML is granted.
2.2.2	Mobilisation			12,000	Mobilisation for Quarrying operations commenced during Prospecting.

2.2.3	Procurement of Plant & Equipment	5,000	Commenced during Prospecting. About 90% Plant and Equipment procured.
2.2.4	Consultative meetings with stakeholders	3,500	Meeting conducted with stakeholders; Ministry of Mines, Energy & Water Development, ZEMA, Kafue District Council, Ministry of Land, Chief's Representative, Local Community.
2.2.5	Identification of effected households for possible relocation.	2,000	No household was affected.
2.2.6	Survey of tenement and pegging	2,500	Survey of tenement carried out; pegging certificate issued.
2.2.7	Environmental Project Brief (EPB); General mining area	3,000	EPB for Quarrying operation was prepared by consultant and submitted to ZEMA. Decision Letter awaited.
2.2.8	Casting of Crusher foundation and crushing plant assembly, Clearing of stock piling area & Construction of slab.	150,000	Crusher foundation constructed; Crushing plant being assembled. All Crushing Plant components delievered.
2.2.9	Construction and civil works; Office block, Workshop & Wash bay, Storerooms, Ablution block, First-Aid Clinic, Weigh Bridge, Fuel Station & Gen-Set room, Security fence & Gate.	350,000	Construction of all civil works in progress.
2.2.10	Over Burden Over Burden Removal		Not required for Phase I ; Quarrying the identified dolomitic /

					Limestone hill
2.2.11	Quarrying & Crushing Operations			As per Annex	Open Pit mining expected at the identified pit location.

2.3 Estimates of Expenditures

Table 2.3 (1) shows summary of estimated expenditure over the initial 5 Year period. Refer also to Annexure 2.3 (2) for details of expenditure over 5 Year period.

Table 2.3 (1): Summary of Estimated Expenditure for initial 5 Year Period.

No.	Description	USD	%
1	Salaries	2,860,000	52%
2	Consumables, Services & Others	1,760,000	32%
3	Tools	22,000	0.4%
4	Safety attire and Equipment	110,000	2%
5	Statutory Services and Consultancy	33,000	0.6%
6	**Sub-total Operational**	**4,785,000**	**87%**
7	Plant & Equipment	605,000	11%
8	Civil works & Infrastructure	110,000	2%
9	**Sub-total Capex**	**715,000**	**13%**
10	**Total Expenditure Projection**	**5,500,000**	

2.4 Quarrying Operations

During Phase I, it is planned that quarry production will concentrate on terracing of the identified dolomitic / Limestone hill. The operation would mainly use the CAT hydraulic hummer to break the dolomite. In some instances, drilling with a ZGYX 430 Drill Rig and light blasting on 90mm – 145mm Φ holes. The broken

material would then be loaded onto tipper trucks using a CAT 320D2 Excavator. The Tipper trucks would then transport the material to the Primary Crusher. Drill Rig, Hydraulic Rock Breaker, Excavator and Tipper trucks have been procured for the planned Quarry operations.

Figure 2.4(1): Showing some of the procured equipment for the Quarry.

Specification of the procured major Quarry Plant and Equipment are indicated in Table 2.4(2).

Equipment Description	Qty	Type / Specifications
Drill Rig	1	ZGYX 430 Type, Drill Φ – 90mm – 145mm, Boom height – 1,200mm, Max. drill length – 30m, Pressure – 10 –25kg/cm², Pressure Amount – 10-20m³/min
Compressor (Drill Rig)	1	Model G185 SDY-17, Size – 1900mm x 1630mm x 510.5mm
Hydraulic Breaker	1	CAT 320D Hydraulic Rock breaker
Excavator	1	CAT 320D2 Excavator
Dump Truck	7	Type – Dong Feng Liu Zhou

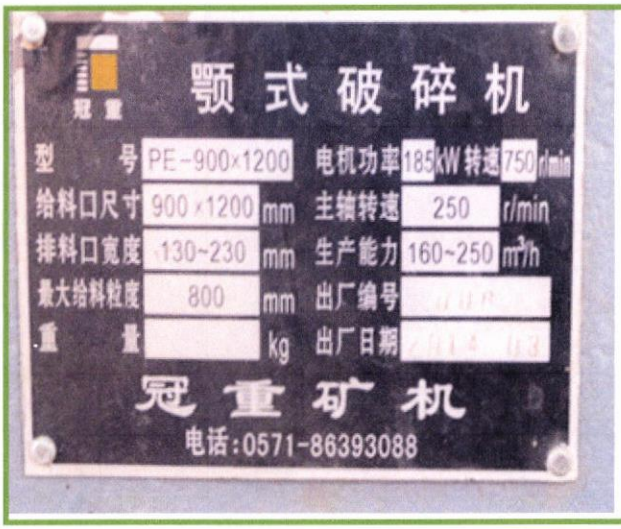
Table 2.4 (2): Quarry Equipment Specifications

2.5 Crushing Operations

A fixed mobile crushing plant consisting of Primary crusher (E Shi Crusher), Secondary Crusher, multiple vibrating screens and discharge conveyors will be incorporated in the crushing plant. Quarry material of about 900mm – 1200mm would be off loaded on the rump directly into the feeder, which will feed into the Primary Jaw Crusher (PJC). From the PJC, the crushed material will be conveyed via a conveyor belt into a Secondary Jaw Crusher (SJC) where the four (4) different quarry products would be produced i.e. -6mm Quarry dust, 0-5mm, 5.1-10mm, and 10.1-25mm will then be conveyed using three conveyor belts to storage areas awaiting collection by clients. The oversize rocks in the vibrating screen will be routed to the impact crusher and sent back to the Jaw Crusher for further crushing.

All components of the Crushing Plant (CP) have been procured readily available.

Specifications for the procured Crusher are indicated in Figure 2.5 (1).



Specifications	
Type	PE 900mm x 1200mm
Capacity	160-250m³ /hr
Intake	900mm x 1200mm
Outtake	130mm – 230mm
Max. intake	800mm
Power	185kW

Figure 2.5(1): Primary Crusher Specifications.

The Crushing Plant Quarry Aggregates production would be planned in quotas as indicated in Table 2.5 (2) below:-

Table 2.5 (2): Quarry Products Quota

Product	Quota
- 6mm Quarry Dust	15%
9.5mm Aggregate	18%
13.2mm Aggregate	23%
19mm Aggregate	45%

2.6 Stock piles and Waste Rock Dumps (WRDs)

The project will maintain stone aggregate material on three (3) stock piles based on aggregate sizes that is 0-5 mm, 5.1-10mm, and 10.1-25mm at the conveyor tail-end. The stock piles will act as storage and collection points.

Though no substantial Over Burden (OB), operation will be done at the main open pit, a WRD will be maintained. Both stock piles and WRDs will be located on the windward side so as to check on dust effect on both personnel and general work environment.

These stockpiles and WRDs operated and maintained in adherence to the Environmental Management Plan.

2.7 Production Estimates

The Quarry / Open Pit operations would effectively run on a 11 month operational year, and 20 working days per month to allow for annual maintenance and also avoid period of maximum wet conditions during the rainy season. However, crushing would be allowed for period of 12 months and 20 working days. A 250tph capacity Jaw Crushing Plant would be incorporated in quarrying operations for production of various sizes of quarry aggregates.

2.7.1 Planned rate of mineral ore recovery

In the initial 10 year period, the project would operate the identified limestone resource at the location at the dolomitic / limestone hill with initial estimated recoverable reserves of approximately **21.7million** tonnes at extraction rate of 1,600tpd building up to 2,000tpd by the 7th year while building up a steady stock pile buffer for the Crushing Plant at initial 6,800tonnes at end of 1st Year building up to 80,000 tonnes by the 7th Year. Quarry production parameters for the initial ten (10) year period are as shown in Table 2.13.1 (1). Two (2) year window production schedules would be produced regularly to guide quarry production. With maximum extraction rate of 440,000 tonnes per year, mine life is estimated at **49 Years** for Phase I Quarrying operations. Refer to Table 2.7.1 (1) for details on summary for 10 year planned extraction rates.

Table 2.7.1 (1): 10Yr Extraction Rates

	Year 1 - 3	**Year 4 - 6**	**Year 7 - 10**
NoWD/Month	20	20	20
Operational moths	11	11	11
NoWD per Year	220	220	220
Tonnes per day (tpd)	1,600	1,800	2,000
Tonnes per month (tpm)	32,000	36,000	40,000
Tonnes per year (tpy)	**352,000**	**396,000**	**440,000**

2.7.2 Crushing Plant production

Lu Hang Stone Mining Company Limited will incorporate a 250tpd Crusher plant in its operations at the site. The Crushing plant would however run at 98% capacity building up to 100% capacity by the 7th year.

The crushing plant is planned to quarry aggregates as per current market demand and considering the ever increasing demand resulting from increased construction activities. Planned annual production indicated in Table 2.7.2 (1)

Table 2.7.2(1); Planned Quarry Aggregates Production and Stock piles

Product Description	Annual Production (Tonnes)		
	Year 1 to 3	Year 4 to 6	Year 7 to 10
- 6mm Quarry Dust	51,840	52,920	54,000
9.5mm Aggregate	62,208	63,504	64,800
13.2mm Aggregate	79,488	81,144	82,800
19mm Aggregate	155,520	158,760	162,000

Lu Hang Stone Mining Company Limited also plans in Phase II of the project improve further on value addition and including lime production in their production line.

2.8 Planned waste rock volumes per month and disposal mechanisms

The project would run on moderate mechanised open pit mining method which would also allow higher levels of selective mining so as to reduce stripping ratios, and thus highly reduce amount of waste handling. However, a suitable waste dumping site has been included in the mine lay-out in compliance with the Environmental Act, and Mining Regulations.

It is however anticipated that not much waste would be generated, as quarrying would be done on a hill which almost 100% dolomitic/limestone material. Most of the waste generated would find use on the road rehabilitation works, and other works within the local community, as part of Corporate Social Responsibility (CSR).

2.9 Infrastructure Development

About USD 150,000 is planned for infrastructural development at the quarry site, which would include among others as shown in Table 2.9 (1):-

Table 2.9(1): Infrastructure Development

S/No.	Item Description	Value (USD)
1	Administration Office block	150,000
2	Workshops	
3	Canteen	
4	Ablution blocks	
5	Ware houses	
6	Access Roads	
7	Crushing Plant foundation structure	
8	Water Bore hole & Water supply system	
9	Electricity power supply system / transformer	
10	Explosive magazines	
11	Weigh bridge	
12	Fuel Storage tanks (U/G)	

A 1km access road has been constructed. The road has also greatly benefited the local community with easy access, and improved transportation. Construction of office block with all facilities, and a number of workers quarter is under way within the tenement area, which portion is also under title deed.

Figure 2.9(2): Showing the constructed Access Road and Office block under construction.

2.10 Electricity power supply

The proposed Quarry site lies within ZESCO electricity power grid, with the nearest Quarry within 1km already connected. About USD 35,000 is planned for construction of sub-station and power supply line. The existing ZESCO power supply line runs along the main access road and connects to the nearby Quarries.

Figure 2.10(1): ZESCO Power Supply line along the main access road to the proposed Quarry site.

2.11 Capital Plant and Equipment

The company has already procured capital plant and equipment. About 90% of the Plant and Equipment has already landed and is readily available. Very few portions of Plant & Equipment are in transit. Refer to Table 2.11(1) for details.

Table 2.11 (1): Procured Plant and Equipment

Item No.	Description	Qty	Unit Price (ZMK)	Value (ZMK)	Value (USD)	Notes
1	Primary Crusher	1	180,000	180,000	28,800	Readily available
2	Secondary Crusher	1	175,000	175,000	28,000	Readily available
3	Weigh Bridge	1	80,000	80,000	12,800	Available
4	Conveyor Belting	6	75,000	450,000	72,000	Available
5	Gen-Set	1	325,000	325,000	52,000	Available
6	Excavator (CAT 320D2)	2	750,000	1,500,000	240,000	1 Unit in transit
7	F.E.L (Liu Gong	2	56,250			1 Unit in transit

	ZL50CN)			112,500	18,000	
8	Hydraulic Rock Breaker (CAT 329)	1	937,500	937,500	150,000	Readily available
9	Air Compressor (Utility)	1	185,000	185,000	29,600	Readily available
10	Drill Rig (Crawler mounted)	1	190,000	190,000	30,400	Readily available
11	Compressor - Drill Rig	1	180,000	180,000	28,800	Readily available
12	Tipper Trucks	7	125,000	875,000	140,000	Readily available
13	F.E.L (Small)	1	27,500	27,500	4,400	Readily available
14	**Total Value**			**5,217,500**	**834,800**	

2.12 Manpower Requirement

The Project would initially engage about 80 direct employment places for both skilled and unskilled manpower, of which about 80% would be drawn mostly from the local community in Mwachilinga / Shantumbu Area. However, a team of Chinese expatriates would be engaged at initial stage, for installation of plant and equipment, and to offer On-the-job training to the local Zambian employees. On the job training would be highly be encouraged for effective and appropriate skills transfer. Full manpower requirement is indicated in Table 2.12 (1) below:-

Table 2.12 (1): Proposed Manpower requirement

S/No.	DESIGNATION	NUMBER
1.12.1	**Quarry Manager's Office**	
1.12.1.1	Quarry Manager (QM) – Mining Engineer	1
1.12.1.2	Secretary	1
1.12.1.3	Driver	2
1.12.1.4	Office Orderly	2
1.12.1.5	Security Guards	5

1.12.1.6	**Sub-Total**	**11**
1.12.2	**Engineering Section**	
1.12.2.1	Maintenance Engineer	1
1.12.2.2	Maintenance Foreman	1
1.12.2.3	Quarry Maintenance Technician	2
1.12.2.4	Crushing Plant Maintenance Technician	2
1.12.2.5	Utility vehicle Drivers	2
1.12.2.6	**Sub-Total**	**8**
1.12.3	**Accounts , Supplies & Human Resources Section**	
1.12.3.1	Accountant	1
1.12.3.2	Accounts Assistant	1
1.12.3.3	Supplies Officer	1
1.12.3.4	Stores Clerk	1
1.12.3.5	Administrative Officer (HR)	1
1.12.3.5	First-Aid Officer	1
1.12.3.6	Cleaners / General workers	4
1.12.3.7	**Sub-Total**	**10**
1.12.4	**Crushing Plant**	
1.12.4.1	Crusher Plant Supervisor	1
1.12.4.2	Plant Fitters	2
1.12.4.3	Welder	2
1.12.4.4	Heavy Duty Equipment Operators	12
1.12.4.5	Electrician	3
1.12.4.6	Bin/Weigh Bridge Operator	2
1.12.4.7	Crusher Operators	4

1.12.4.8	Crusher Attendants / Lashers	10
1.12.4.9	**Sub-Total**	**36**
1.12.5	**Quarry Section**	
1.12.5.1	Quarry supervisor	1
1.12.5.2	Blasters	2
1.12.5.3	Drillers	2
1.12.5.4	Heavy Equipment Operators	3
1.12.5.5	Compressor / Water pump Attendants	2
1.12.5.6	Open Pit Drilling & Loader Assistants (Lashers)	5
1.12.5.7	**Sub-Total**	**15**
1.12.6	**GRAND TOTAL**	**80**

2.13 Safety & Healthy

The Safety and Health of the workforce, surrounding communities and the environment is considered to being one of the keys to success in this project. As such a full Safety and Health programme will be established in order to produce the required outcome. This will be in line with current mine safety and health practices, and will include providing adequate medical facilities to cater for emergencies whilst providing adequate access for all other medical needs. In this regard, the project will coordinate adequately, and participate in all government health programmes concerning the local community with the responsible government line departments in Mwachilinga / Shantumbu Area.

First-Aid facility will be provided at the quarrying site, while all workers will be equipped with basic First-Aid skills.

The project will also create awareness on HIV/AIDS, prevention, and HBC among the employees and their families in collaborations with the District Health Management Team (DHMT).

2.14 Environmental Impact Study

At Prospecting stage, an Environmental Project Brief (EPB) was instituted, and submitted to Zambia Environmental Management Agency (ZEMA) on 3rd December, 2014. The submitted EPB was considered by ZEMA on 28th January, 2015, and subsequently Decision letter was issued dated 30th January, 2015. During the tenure of the Large Scale Mining Licence herein applied for, a full Environmental Impact Assessment would be carried out during the first year of the operations in collaboration with ZEMA.

2.15 Source of finance

The quarrying operations will be financed entirely through available funds from business activities under Lu Hang Stone Mining Company Limited. The company is fully committed to financing the proposed Quarrying Project, at Mwachilinga / Shantumbu Area.

2.16 Employment and training plan

The project is committed to the government policy of reducing poverty by creation of employment. As such the project will as much as possible make use of the locally available human resource so as to contribute positively to job creation resulting in poverty alleviation and improvement of local economy. On the job training will be encouraged so as to reduce dependence on labour force from other areas.