



PROJECT DESCRIPTION



EAGLE CEMENT CORPORATION

Main Office: 153 EDSA Bgy. Wack Wack, Mandaluyong City, Philippines

Plant Site: Brgy. Akle, San Ildefonso, Bulacan, Philippines

Draft as of February 2018



GIVE BACK TO
COMMUNITY



ENVIRONMENTALLY
SUSTAINABLE



PROFICIENCY IN
PRODUCTION



WORLD CLASS
PLANT FACILITIES



HIGH-QUALITY
CEMENT PRODUCTS

Table of Contents

1.0	PROJECT FACT SHEET.....	1
1.1	<i>Project Information</i>	3
1.2	<i>Proponent Profile</i>	3
2.0	PROJECT DESCRIPTION	4
2.1	<i>Project Location and Area.....</i>	4
2.1.1	<i>Impact Area</i>	7
2.2	<i>Project Rationale.....</i>	7
2.3	<i>Project Alternative</i>	7
2.4	<i>Project Components and Process</i>	8
2.4.1	<i>Quarry Operation.....</i>	8
2.4.2	<i>Siltation Pond</i>	12
2.4.3	<i>Access and Haul Roads</i>	13
2.5	<i>Project Size</i>	13
2.5.1	<i>Resource Estimate</i>	13
2.5.2	<i>Production Capacity</i>	13
2.5.3	<i>Project Size</i>	14
2.6	<i>Project Phases.....</i>	14
2.6.1	<i>Pre-construction</i>	14
2.6.2	<i>Construction</i>	14
2.6.3	<i>Operation</i>	14
2.6.4	<i>Abandonment.....</i>	15
2.7	<i>Manpower Requirement.....</i>	17
2.8	<i>Project Costs</i>	17

List of Annexes

Annex A – MPSA

Annex B – IEC Documentation

1.1 Project Information

Project Name	Eagle Cement MPSA No. 245-2007-III Quarry Project
Location	Barangay Akle, San Ildefonso Bulacan, Bulacan Barangay Talbak, Dona Remedios Trinidad, Bulacan
Project Type	Quarry Project (Resource Extractive Industry)
Area Covered	82.6033 hectares
Production Capacity	7,000,000 MT per year

1.2 Proponent Profile

Company Name	Eagle Cement Corporation
Address	Main Office: 153 EDSA Bgy. Wack Wack, Mandaluyong City, Philippines Plant Site: Brgy. Akle, San Ildefonso, Bulacan, Philippines
Contact Person	Engr. Medel L. Justiniano Mining and Sustainability Manager
Contact Number	Phone Number: +63 2 301-3453 Fax Number: +63 2 723-9283
Email Address	mljustiniano@eagle-cement.com.ph

Company Background and History

Eagle Cement Corporation is a fully integrated Filipino-owned company primarily engaged in the business of manufacturing, marketing, sale and distribution of cement under the brands Advance Type 1P, Exceed Type 1P and Strongcem Type 1.

The Company has the newest, state-of-the-art, and single largest cement manufacturing plant in the Philippines. The Company is the 4th largest player in the Philippine cement industry based on sales volume, with the fastest growing market share among all competitors in the industry since it started commercial operations in 2010.

The Company was incorporated and registered with the Securities and Exchange Commission (SEC) on June 21, 1995.

Eagle Cement plant is located in San Ildefonso, Bulacan and was established in 2008 under the vision and passion of its Chairman, Mr. Ramon S. Ang with the goal to provide high quality cement for the Filipino people.

2.0 PROJECT DESCRIPTION

2.1 Project Location and Area

The proposed project is located in Barangay Akle, Municipality of Sa Ildefonso and Barangay Talbak, Dona Remedios Trinidad both in the Province of Bulacan covered by MPSA 245-2007 with a total area of 82.6033 hectares encompassed by the following geographical coordinates:

Corner	Latitude	Longitude
1	15° 03' 30.00"	121° 04' 00.00"
1a	15° 03' 39.76"	121° 04' 00.00"
1b	15° 03' 49.52"	121° 04' 00.00"
2	15° 04' 00.00"	121° 04' 00.00"
2a	15° 04' 00.00"	121° 04' 08.37"
2b	15° 04' 00.00"	121° 04' 12.05"
2c	15° 04' 00.00"	121° 04' 21.76"
3	15° 04' 00.00"	121° 04' 30.00"
3a	15° 03' 57.06"	121° 04' 30.00"
3b	15° 03' 44.05"	121° 04' 30.00"
3c	15° 03' 31.03"	121° 04' 30.00"
4	15° 03' 30.00"	121° 04' 30.00"
4a	15° 03' 30.00"	121° 04' 19.95"
4b	15° 03' 30.00"	121° 04' 09.91"
1	15° 03' 30.00"	121° 04' 00.00"

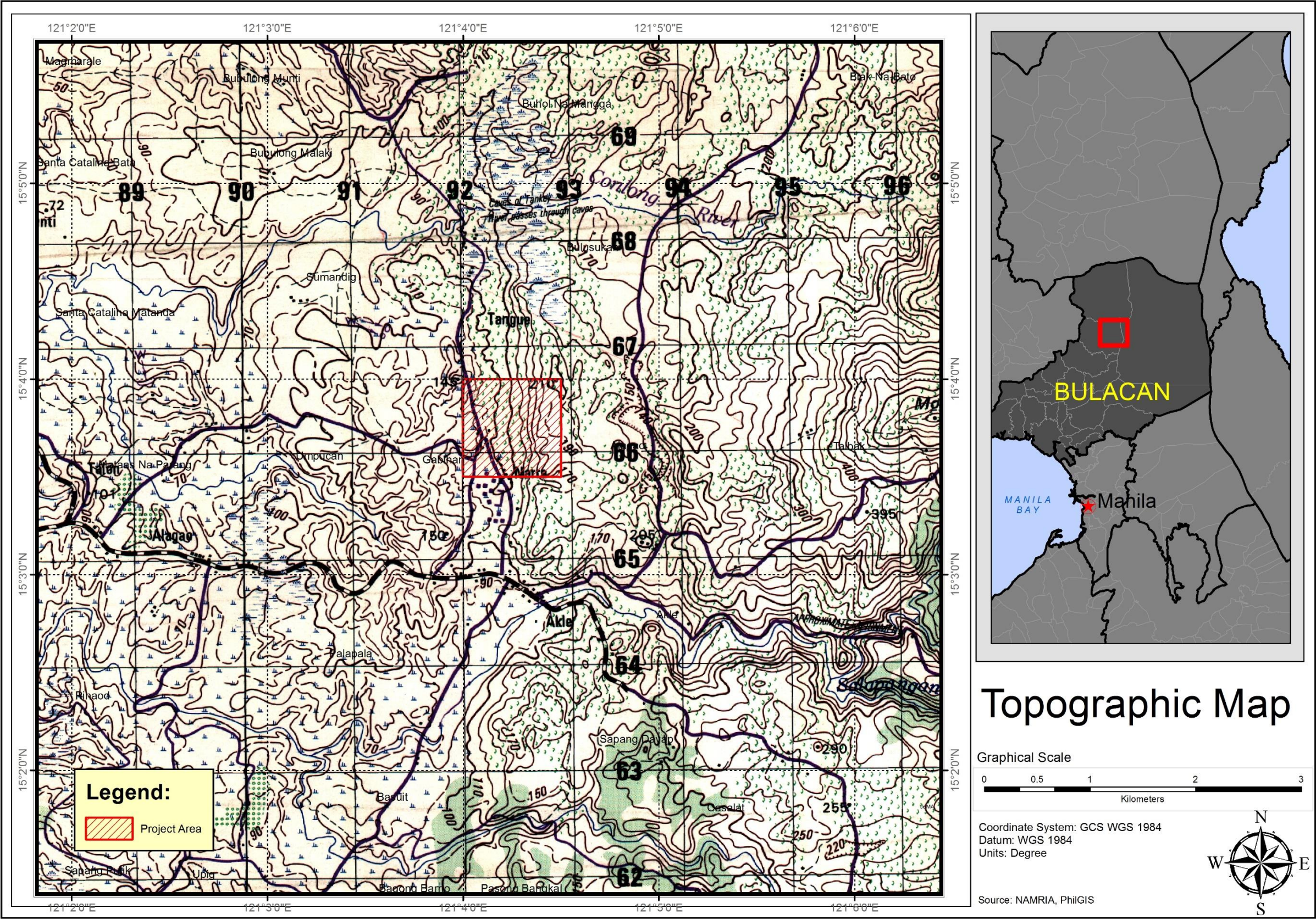
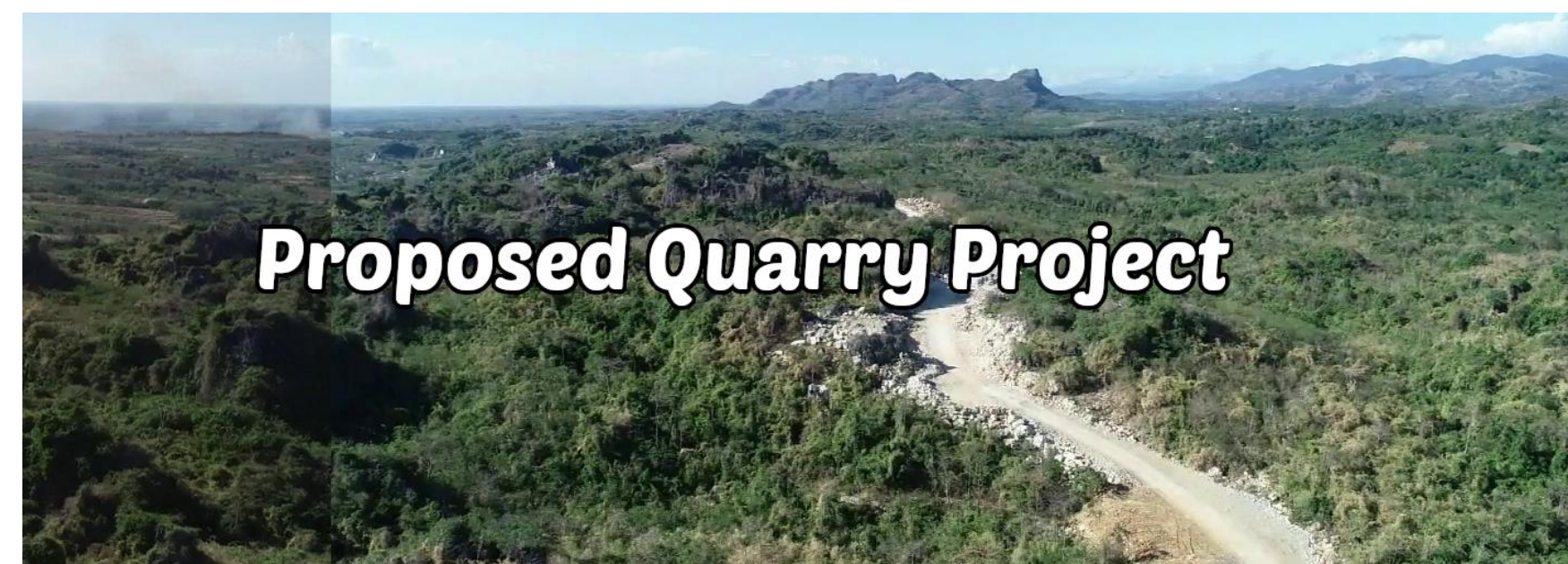




Figure 2 - 360 Degrees Stitched Drone Shot



2.1.1 Impact Area

The area subjected to Environmental Impact Assessment (EIA) is base on the perceived direct and indirect impact area of the proposed project. As stipulated in DAO 2003-30, direct impact areas, in terms of physical environment, are those where all project facilities are to be constructed/situated and the designated project area. On the other hand, areas not directly subjected to any activities/construction and those outside the project area but are within the jurisdiction of the Municipalities of San Ildefonso and Dona Remedios Trinidad (e.g. stretch of river draining the project area, communities along haul roads) are considered as indirect impact areas.

Consistent with the provision of DAO 2010-21, known as the *“Consolidated Implementing Rules and Regulations of the Philippine Mining Act of 1995”*, the direct impact barangay is Barangay Akle and Talbak while the indirect impact area is the Municipality of San Ildefonso and Dona Re.

2.2 *Project Rationale*

Eagle Cement Corporation is one of the biggest cement producing company in the Philippines, with the advancing economy of the country, the demand for cement products are continuously growing.

The advent of industrialization gave rise to the construction of various infrastructures such as high-rise buildings, roads, commercial centers, housing units, etc. In the establishment of these concrete structures/products, cement serves as the major ingredient for its creation.

The “build, build, build” policy of the current Duterte Administration further fuels the demand for cement on a greater scale.

In order to support the growing demand of cement products in the country, Eagle Cement will conduct a series of quarry expansion which include this proposed quarry project.

2.3 *Project Alternative*

The project will solely cover quarry operation, the depth of the pit and its location will depend on the exploration activities conducted by the company. Further, considering the type and location of mineral to be extracted, the only feasible mining/quarry method for the project is surface mining method, thus, there were no other alternative method considered for the project.

2.4 Project Components and Process

2.4.1 Quarry Operation

Method of operation to be utilized by the project is quarrying using conventional heavy equipment. The quarry operation will be divided into three (3) stages; the quarry development, the production stages and rehabilitation.

Development phase is the stage in quarrying where preparation for full blasts production will be carried out. It will involve stripping, removal of vegetative covers and the overburden, drill and blasting, establishment of bench face and a floor, drainage canals and access roads to the deposit. The production bench will be divided into a series of slices of ten (10) meter high and a 70° bench slope during production stage and five (5) meters in development areas. Development work will generally start from the uppermost portion of the area and progresses downward. A portion of the deposit will be sliced until a bench face with a slope of about 70° and a floor width of 30 meters, will be formed enough to sustain the safe movement of quarry equipment. Once a bench is formed, a new working level below (10m) will be worked out to form another set of production bench. Should topography warrant, the cycle of creating a new working level (benches) at lower elevation will continue until desired target is reached. Limestone will be extracted while access and benches are being established. Generally, the working parameters of the limestone quarry will be the following:

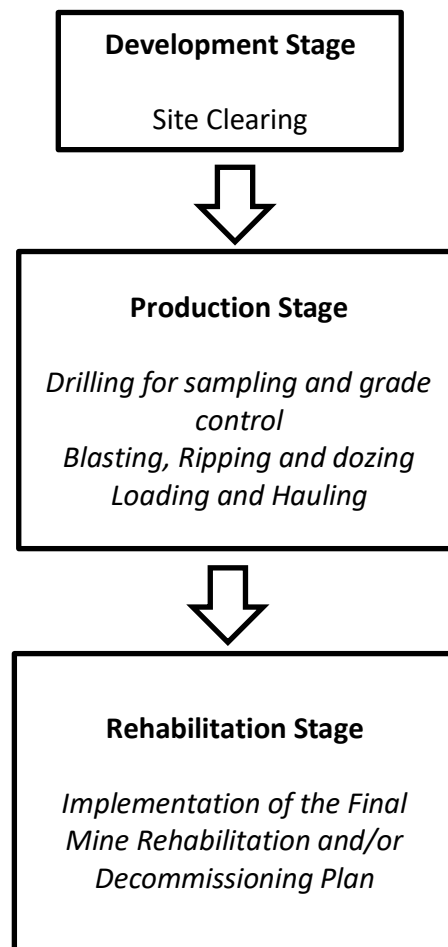
	<u>Devt / Prod'n stage</u>	<u>Final Pit</u>
Bench slope	70° - 75°	30°
Bench height	10m	5m
Bench width	5m (min.)	15m
Pit slope	60° (max.)	45°

During quarry development work, it is expected that overburden or waste material will be produced. The said overburden will be utilized as backfilling materials for the progressive rehabilitation.

The extraction or production stage is the actual removal of the deposit from the developed (cleared) benches. The major activities in this stage are drilling for quality control and blasting, ripping and dozing on ground followed by loading and hauling.

Blasted limestone materials from the bench will be loaded by either a wheel loader or power shovel excavator into a 35 and 50-ton Off Road Highway Truck and will be transported to the Cement Plant (with an existing ECC). The cycle of drilling for quality control, blasting, excavation, loading and hauling continues until all programmed benches have been subjected for production and resource exhaustion.

Typical quarry cycle involves the following:



2.4.1.1 Drilling and Blasting

Drilling and Blasting will be part of the production operation. Blasting shall be performed in outmost care and with the highest degree of practice in safety. Only blasting contractor that has the most advance blasting technology, duly registered and has the necessary license from government agency shall be awarded with the contract.

Non-electric detonation will be use for the initiation of the blasting sequence. This to minimize the effect of blasting such as air blast, excessive ground vibration and fly rock. To avoid any

accident from happening, a strict blasting procedure will be followed in coordination with the contractor and the company. The following is the blasting methodology to be followed:

2.4.1.1.1 Blasting Methodology

A. General Methodology:

Blasting operations shall be using dynamites or boosters as primers and ammonium nitrate as column charge. Full delay system of initiation shall be done using non-electric down line detonators and non-electric surface delays detonators. Starter initiator to be used shall be ordinary blasting cap & safety fuse.

B. Drilling & Blasting Parameters:

- Blast Hole Diameter: 4 inches
- Drill depth: 11 meters
- Burden and Spacing: 3.5m x 4m
- Drilling Pattern: Staggered
- Powder Factor: 0.30 kg/bcm to 0.36 kg/bcm
- Sub-drill: 10% of burden
- Stemming Height: 30% of Hole Depth

C. Fly-Rock, Noise, Vibration Control:

- All overlying loose materials and loose rocks shall be removed by bulldozer prior to drilling activity. Bench faces shall be oriented in such a way that blast throw or direction shall not be pointing directly to any structure, vital facilities or community.
- Blaster to prepare drilling layout to ensure the correctness of burden, spacing, and depth of hole
- Protective works, such as the use of blasting mats, shall be done in blast area in very close proximity to vital facilities and community.
- Full delay system of initiation shall be used. Only none electric down the hole detonators and trunk line delay detonators shall be used. Delay time between adjacent holes shall not be less than 17ms. Firing will be one hole at any given time.
- Stemming materials to be used composed of rock fragments sized 5/8 of hole diameter mixed with drill cuttings and compacted properly.

D. Safety Methodology:

Only a Licensed Blaster shall supervise the whole blasting activity. All manufacturers' safety guidelines and PNP rules and regulations shall be followed in conducting the blasting operation /activity. The company shall inform the nearby communities as to the time and date of any blasting operation.

1. Explosives Transport

- All explosives and its accessories should only be transported on a diesel fueled truck.
- Vehicle transporting explosives shall not be overloaded and in no case shall boxes or packages be piled in such a position that these may easily fall-off.
- A driver of explosives trucks should be in good condition and is not under the influence of liquor.
- Explosives truck should not enter to any blast layout with loaded holes.

2. Handling & Charging

- Only the Licensed blaster shall do the charging and priming.
- Primer should be assembled only before charging.
- Stemming height should be greater or equal to the designed burden of the layout. Size of stemming materials shall be 5/8 of the hole diameter mixed with some fine materials and compacted using a tamping stick.
- Only non-conductive materials should be used for charging or tamping. Tamping sticks should be flat at the bottom.
- Tamping of stemming materials should be done carefully not to hit the down line initiator causing it to misfire or initiated prematurely.
- Final connection of loaded holes should only be done when the exact firing time has been confirmed.
- A final inspection of the whole lay out should be made by the blaster, after which he will declare that the area is ready to be blasted.

3. Clearing & Traffic Control

- Clearing of blasting area shall be done by Contractor blasting crew. The Contractor shall designate blast guards to manned roadblocks and barricades.

- If possible, blasting time shall be set during breaks at work such as lunch or snack. No blasting will be allowed during night time.
- All possible entries towards the blasting area, at least 200 meters from the blast site, should be barricaded. Also, all equipment and personnel within 200 meters shall be evacuated for safety.
- When all roadblocks are in place, licensed blaster shall conduct final clearing of the area. It is only the Drilling and Blasting Supervisor or Project Manager who will give the clearance to fire the starter initiator after ensuring that the area is fully cleared.

4. Firing

- The licensed blaster will only install the starter initiator (OBC and Safety Fuse) once the area has been declared clear.
- Each fuse should bear a minimum of three (3) minutes period to allow the blaster to seek cover.
- A blasting timer should be made by licensed blaster as a warning shot, which will fire around five (5) to ten (10) seconds prior to the main blast.
- After checking all the connection, the blaster will seek the approval of Drilling and Blasting supervisor to fire the shot.
- Only the Drilling and Blasting supervisor or Project Manager shall have the authority to give signal to fire the shot.
- After firing the shot, the licensed blaster shall allow 5 to 10 minutes for dust and fumes to settle before checking for possible misfires.
- In case of a misfire, the blaster shall inform his supervisor about the presence of it. All roadblocks and barricades shall not be lifted and the whole step in firing shall be repeated all over again.
- Only the Drill and Blast Supervisor or Project Manager shall declare that blasting is over and barricades can be lifted. All equipment and personnel can now return and go back to resume their work.

2.4.2 Siltation Pond

A series of siltation pond will be constructed within the project area (MPSA 245-2007). Sediments shall be impounded from the first to the third pond in succession. The ponds shall be made of compacted earth, rock, and strategically placed adjacent to the quarry active area. The design of the pond shall have a capacity of **100,000 m³** which is capable of handling surface run-off and silt for a twenty-four hours continuous rainfall of 500 mm. Silt-laden runoff draining from the quarry area will be routed to the siltation pond to allow settling of silt materials. Effluent coming from

the silt pond shall comply with applicable water quality standards prior to release to the nearby surface waters.

2.4.3 Access and Haul Roads

Quarry development will start from the construction of access/haul road within the quarry site, which is designed to facilitate opening of benches. The haul roads will be maintained at a width of 15 meters or three times the width of the largest quarry equipment with a maximum grade of 8-12%. Pre-emptive measures through implementation of appropriate slope/ground failure monitoring plan will be adopted to identify any instability at an early, non-critical stage so that safety measures can be initiated to prevent or minimize impacts.

2.5 Project Size

2.5.1 Resource Estimate

The measured and indicated resources in MPSA 245 were obtained with the use of GEMCOM Surpac software. At an average grade of 45 percent CaO and a density of 2.4t/m³, the measured and indicated resource estimates are 8.22 and 46.82 million metric tons, respectively. Inferred resources which could be considered as a potential resource amounts to 70.9 Million Metric Tons. The resource estimates were conducted by PMRC Competent Person Geologist Rolando Pena with Geologist PRC License No. 068 and Competent Person Accreditation No. 07-08-08 from the Geological Society of the Philippines.

The table below summarizes the resource estimate:

Table 1 - Summary of Resource Estimates in Million Metric Tons

Measured Resource	Indicted Resource	Subtotal	CaO (%)	Inferred Resource
8.22	46.82	55.04	47.65	70.9

2.5.2 Production Capacity

The project will have a total production capacity of 7,000,000 MT/year, based on the resource estimate the total resource can support the project operation up to 7.5 years. However, with the potential resource of 70.9 Million Metric Tons the mine life can further increase from 7.5 years to 18 years life of mine.

2.5.3 Project Size

The total project area covered by the project is 82.6033 hectares covered by MPSA 245 - 2007.

2.6 *Project Phases*

2.6.1 Pre-construction

The activity during this phase are as follows:

- Strengthening of the exploration activities; and
- Securing of necessary environmental permits from government agencies and Local Government Unit (LGU).

2.6.2 Construction

Construction phase involves the following:

- Hiring of employees;
- Clearing and grabbing; and
- Development of access roads.

2.6.3 Operation

The quarry operation will employ quarrying method. Proper benching shall be utilized in the individual quarry sites. Once the over burden has been stripped, terrace-like extraction faces will be cut from the topmost strata progressing downward to serve as quarry levels for positioning equipment that will conduct excavation and loading activities thereat. Access from one bench level to another will be provided by ramps or spiral roadways.

Quarrying will be executed by multiple benching pattern, which provides greater operation flexibility and production output, and will be carried out by combined tractor and excavator/loader operations. Bench height will be limited by the maximum reach of the loader or excavator to be used. Bench width shall be governed by final pit slope, loading system and size of haul truck to be utilized. Drainage canals of sufficient depth to handle storm runoff will be laid along the bench toe, and berms with average height of 50cm will be provided on the unprotected crest site for added safety.

Excavation and loading shall be done by means of a mechanical loader/excavator (backhoe/payloader) and haul trucks. The excavators shall strip the limestone materials and load directly to the waiting dump trucks to be transported directly to the cement plant. Drilling and blasting operation will be utilized by the project.

2.6.4 Abandonment

Upon exhaustion of the limestone reserve, rehabilitation works shall be immediately implemented. Activities in this phase includes:

- Mobilization of equipment out of the quarry area; and
- Rehabilitation of remaining mined out area, and settling pond based on the planned land use plan of the Local Government Unit.

The Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP) is a mandatory requirement of the Environmental Compliance Certificate. This plan shall basically govern the flow of activities that will gear towards the achievement of the final land use over the disturbed areas.

Table 2 - Project Schedule

Project Phases	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Pre-Construction																
Construction																
Operation																
Decommissioning																

2.7 Manpower Requirement

Quarrying operation will be conducted by a general mining contractor. In-house manpower requirement for the proposed project will be from the existing quarry operation of the company.

Workforce Project Component	Number
General Manager <i>(Shared with existing operation)</i>	1
Quarry Supervisor <i>(Shared with existing operation)</i>	1
Environmental Protection/Pollution Control Officer <i>(Shared with existing operation)</i>	1
Quarry Laborers <i>(Shared with existing operation)</i>	24
Maintenance <i>(Shared with existing operation)</i>	6
Community Relations Officer <i>(Shared with existing operation)</i>	1
SHESD Personnel <i>(Shared with existing operation)</i>	3
Administrative Officer <i>(Shared with existing operation)</i>	1
Office Personnel <i>(Shared with existing operation)</i>	5
Total	43

2.8 Project Costs

The proposed project is an extension of the current quarry operations of the company. All the equipment and support facilities are erected and the required personnel requirement are on board.



Table 3 - Impact Management Plan

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
I. PRE-CONSTRUCTION						
	People	<ul style="list-style-type: none"> - Fear of loss of land (displacement) and livelihood - Fear of non-employment of locally qualified people due to the possible engagement of the company to non-local contractors/laborers; - Concern for their health and safety 	<ul style="list-style-type: none"> - Implement IEC program to improve the negative mindset of impact communities toward the project - Consider negative views of project-impact barangays/communities in the design and formulation of programs to avoid staunch opposition to the project - Develop a scheme and protocol of hiring in coordination with the barangay and MLGU - Conduct a skills and inventory assessment of the local labor force - Implement a livelihood program for residents that will not be employed especially women and out-of-school-youth 	ECC Community Relations Officer (CRO); Barangay; MLGU	Included in the project cost	Included in EPEP, SDMP, ECC Condition
		<ul style="list-style-type: none"> - Expression of positive views regarding the project such as generation of employment and additional tax, improvement of 	<ul style="list-style-type: none"> - Implement IEC program to enhance the positive views of impact communities toward the project 			

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
		local government services and of community infrastructures				
II. CONSTRUCTIONⁱ						
- Site preparation (clearing, grubbing, stripping of topsoil and overburden removal)	Terrestrial biology	<ul style="list-style-type: none"> - Loss of vegetation due to site clearing - Removal of economically and ecologically important species - Destruction of wildlife habitat - Disturbance/displacement/direct killing of wildlife - Difficulty in plant establishment due to loss in soil productivity - Change in microclimate - Internal habitat fragmentation - Improved accessibility of the area may attract illegal hunters and poachers 	<ul style="list-style-type: none"> - Prioritizing ecologically and economically important species in conservation - Use of indigenous species in the nursery - Strictly prohibiting poaching of wildlife - Establishment of buffer zones along creeks - Include flora and fauna protection programs in SDMP (wildlife protection and conservation campaign - Seeding of topsoil to maintain/improve soil quality - Progressive rehabilitation of disturbed areas - Routine monitoring of terrestrial flora and fauna 	ECCC; MMT	Included in the project cost	Included in EPEP, ECC condition

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
	Land	<ul style="list-style-type: none"> Loss of top soil due to ground/site preparation activities 	<ul style="list-style-type: none"> Rehabilitation/revegetation planning will be conducted in accordance with the FMRDP and in consultation with stakeholders even before Project commences The stockpiled topsoil layer will be re spread/mixed with limestone gravel to all disturbed areas/quarried out areas to prevent erosion and allow re-establishment of long-term vegetation Bulk of the total project area will be reverted to its pre-mining land use by strict adherence to the approved FMRDP The perimeter of the Quarry area shall be progressively rehabilitated and re-graded to match the surrounding landforms Soils that will be removed will be conserved and stockpiled in a pre-determined area and later used in rehabilitation and backfilling activities 	ECC	Included in the project cost	Included in EPEP, ECC condition

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> - The stockpile shall be graded to a stable relief - Establishment of safe working slopes and installation of land slide control structures. 			
		<ul style="list-style-type: none"> - Increase in surface erosion and down slope sedimentation brought about by mine quarry development activities - Top soil removal will be unavoidable to make way for the development of access and haul roads 	<ul style="list-style-type: none"> - Progressive ground clearing/ preparation will be employed to minimize the area disturbed at any one time - Progressive soil rehabilitation will be conducted in disturbed or cleared areas that will not be used for further development over the course of the project. - Erosion/ sedimentation controls will be installed to mitigate surface erosion and the consequent down slope or downstream sedimentation. These will include: <ul style="list-style-type: none"> • Installation of rainwater and runoff collecting systems at the toe of work areas; • "Vengineering" (i.e. planting of vegetation with high rainfall 	ECC	Included in the project cost	Included in EPEP, ECC condition

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<p>intercepting capacity and high transpiration rate characteristics to serve as re-evaporators/biological pumps, respectively).</p> <ul style="list-style-type: none"> – Top soil removed during the clearing, re-grading and ground preparation activities will be utilized as backfill to low lying areas and service roads. – Ground preparation and grubbing will be conducted progressively to minimize the total area of soil cover removal at any one time. – A detailed topsoil management plan (TMP) will be formulated and implemented to address topsoil removal, stock piling, and archiving of topsoil inventory for the project progressive rehabilitation activities. 			
		– Generation of unwanted materials (solid waste/biomass/debris)	<ul style="list-style-type: none"> – Materials recovered from vegetation removal can be used as: <ul style="list-style-type: none"> • Trash lines on steep slopes to mitigate soil erosion 	ECC	Included in the project cost	Included in EPEP, ECC condition

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> • Compost material/surface mulch for immediate soil cover and for improving SOM content of soils • Chipping of cut trees and using the chipped material as a growing medium for rehabilitation 			
	Water Quality	<p>– Ground water inflow and rainwater that will percolate into the quarry working area will produce contact water from the freshly blasted limestones. This may contain soluble minerals and metals and other mining related pollutants (i.e. chemicals from blasting)</p> <p>Hydrocarbon leaks and spills from vehicles and heavy equipment may contaminate the ground water and nearby body of water.</p>	<p>– A sediment and erosion control plan will be implemented for the project</p> <p>– Access roads will be provided with drains to contain and limit sedimentation downstream of the quarry.</p> <p>– Site water management will be implemented to mitigate any change in water quality this involves:</p> <p>– Monitoring and safety systems will be implemented to address any leakage related hazards that may occur.</p>	ECC	Included in the project cost	ECC,EPEP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
	Air quality/ Ambient Noise	<ul style="list-style-type: none"> – Noise disturbance – Fugitive dust generation – Vehicle/equipment emissions 	<ul style="list-style-type: none"> – Strictly implement covering of hauling trucks and water spraying; – Preventive maintenance of vehicles and equipment – Enclosure of equipment emitting high level of noise (when applicable) – Imposition of speed limits – Provision of dust and noise PPEs to employees 	ECC	Included in the project cost	Included in EPEP, ECC condition
	Economic	<ul style="list-style-type: none"> – Generation of employment – Generation of livelihood opportunities spurred by the multiplier effect of the construction activities – Local government generation of revenues from fees and permits 	<ul style="list-style-type: none"> – Preferential hiring of qualified barangay residents (LGCP R.A. 7160; 1995 PMA R.A. 7942) – Barangay Consultation on job requirements and qualification – Training to upgrade local skills of residents who can be hired by the project – Development of small and medium enterprises like transport, construction and utility services – Prompt processing of permits and payment of necessary fees 	Barangay LGU; ECC CRO; TESDA/TLRC	Included in the project cost	Included in SDMP and IEC Program
	Increase in Population,	<ul style="list-style-type: none"> – In-Migration 	<ul style="list-style-type: none"> – Policy on preferential hiring of locals 	ECC	Included in the	

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
	Health, and Safety risks	<ul style="list-style-type: none"> – Entry of migrant workers with families which might cause: <ul style="list-style-type: none"> • health problems due to diseases, overuse of public utilities /services, • competition of resources, • social conflicts, peace and order, • increase in pollution due to solid and liquid wastes. – Increase in traffic flow causing air (dust) and noise pollution 	<ul style="list-style-type: none"> – Health certificate for workers prior to hiring into the project – Safety and Health Program for workers and impact communities. – Community Health Survey – Management of entry of migrant workers – Increase and train Barangay tanods to be deployed in areas where migrant workers reside – Sprinkling of roads during dry seasons – Proper scheduling of delivery trucks to avoid traffic congestion – Assistance to the LGU on traffic management 	Barangay LGU; Barangay Tanods; ECC CRO; ECC MEPEO	project cost	Included in SDMP, IEC Program, and EPEP
	Peace and Order	<ul style="list-style-type: none"> – Economic activities and other services near the quarry development that might cause problems on peace and order and security breaches 	<ul style="list-style-type: none"> – Coordination with the Barangay LGU to ensure authorized establishments and control of unauthorized entry of outsiders. 	ECC CRO; ECC Security	Included in the project cost	Included in SHP and EPEP
	Cultural and Historical	<ul style="list-style-type: none"> – Possible unearthing of historical artifacts and/or fossil remains 	<ul style="list-style-type: none"> – Safeguard possible archeological site and immediately inform the National Museum in case of finds 		Included in the	Included in EPEP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
				ECC CRO, National Museum	project cost	
III. OPERATION PHASE						
<ul style="list-style-type: none"> – Surface mining operations – land clearing (removal of vegetation), stripping of overburden or waste rock (applicable to surface mining); – stockpiling – progressive rehabilitation of mined-out areas 	Land Use	<ul style="list-style-type: none"> – Land Slides and mass washings maybe induced by and operation activities on high angle slopes 	<ul style="list-style-type: none"> – Establishment of safe working slopes and installation of land slide control structures. – Installation of Warning signages in the active quarrying areas 	ECC	Included in the project cost	ECC, EPEP
	Geology	<ul style="list-style-type: none"> – Inducement of subsidence/collapse – Generation of open areas with greater potential for runoff, erosion and landslides 	<ul style="list-style-type: none"> – Implement a suitable and appropriate slope / ground failure monitoring plan to detect instability at an early and non-critical stage so that safety measures could be initiated to prevent or minimize impacts – Familiarize / orient / train mining personnel, staff and workers on recognition of the various slope / ground failure modes, hazard warning signs and standard operating procedures to be observed in the case of ground failure events or impending event; 	ECC; MMT	Included in the EPEP budget – Rehabilitation Program Cost	ECC; EPEP; Environmental Occupational Health Plan

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> – Identification, early recognition and monitoring of warning signs of potential and impending slope stability problems. – Implement appropriate and safe engineering and geotechnical design; – Formulation and implementation of subsidence control measures including subsidence prediction; 			
	Land/Soil Quality	<ul style="list-style-type: none"> – Soil Contamination due to accidental fuel and lubricant spills from vehicles and equipment may occur 	<ul style="list-style-type: none"> – Contaminated soils will be removed and disposed off site. – Haul trucks will be properly maintained 	ECC	Included in the project cost	ECC,EPEP, EMF
	Water Quality	<ul style="list-style-type: none"> – Soil and limestones will be disturbed during ground preparation. Disturbed areas may transport significant amounts of sediments into nearby streams. – Ground water inflow and rainwater that will percolate into the quarry working area will produce contact water from the freshly blasted limestones. This 	<ul style="list-style-type: none"> – A sediment and erosion control plan will be implemented for the project – Access roads will be provided with drains to contain and limit sedimentation downstream of the quarry. 	ECC	Included in the project cost	ECC,EPEP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
		<p>may contain soluble minerals and metals and other mining related pollutants (i.e. chemicals from blasting)</p> <ul style="list-style-type: none"> Hydrocarbon leaks and spills from vehicles and heavy equipment may contaminate the ground water and nearby body of water. 	<ul style="list-style-type: none"> Monitoring and safety systems will be implemented to address any leakage related hazards that may occur. Used oil will be sold to EMB accredited recyclers 			
	Air and Noise	<ul style="list-style-type: none"> Local increase in TSP and noise levels Air pollution due to Quarry operation 	<ul style="list-style-type: none"> Proper and regular maintenance of equipment Water spraying; quarry activities to be confined during daytime as much as possible IEC on proper scheduling of hauler trucks to avoid busy and late hours 	ECC	<ul style="list-style-type: none"> Included in the project cost 	
	Terrestrial	<ul style="list-style-type: none"> Vegetation is cleared during quarrying. Loss of soil due to erosion would reduce survivability of plants having no substrate to anchor themselves to and obtain nutrients 	<ul style="list-style-type: none"> Retain existing vegetation in areas of low mineral content Rehabilitation of open areas and enrichment planting and reforestation in buffer zones and mined out areas Fire protection by setting up of fire lines 	ECC	<ul style="list-style-type: none"> Included in the project cost 	

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
		<ul style="list-style-type: none"> Loss of habitat to birds and small animals such as lizards & amphibians 	<ul style="list-style-type: none"> Establishing check dams in gullies Establish vegetative bands at least 20 m width along creeks and ravines which would serve as habitats of endangered species of plants & animals Conduct 'progressive rehabilitation' of mined out parcels Earth-balling of rare, endemic, threatened species diversity in the project site 			
	Economic	<ul style="list-style-type: none"> Enhancement socio-economic welfare of the community Local government generation of revenues from taxes, permits and LGU share in the quarrying activities Payment of local taxes and fees to Municipal and Barangay Local Government Units Generation of employment Generation of livelihood opportunities by putting-up food stalls, variety stores and 	<ul style="list-style-type: none"> Implementation of community development programs through Social Development Management Plan equivalent to 1.5% of Operating cost based on the identified needs of the communities Total taxes paid to the national government will exceed >Excise Tax: 60% goes to the national government; 40%, to the local government-- <ul style="list-style-type: none"> -20% for host Provinces -45% for host Municipalities 	ECC CRO; Barangay LGU	Included in the project cost	Included in EPEP, SDMP, SHP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
		other services near the quarry area which might cause problems of congestion, peace and order and security breaches	<ul style="list-style-type: none"> -35% for host Barangays - Occupation Fees and Real Property Tax to province and municipalities - IEC on nature of jobs the proponents require and qualification - Consultation on job requirements and qualification - Skills training to upgrade local skills of residents that can be hired by the project - Implementation livelihood development programs through the SDMP - Coordination with the Barangay LGU to monitor issuance of business permits in small- to medium- scale commercial establishments to ensure proper zoning of business areas, peace and order, solid waste management 			
	Increase in Population,	<ul style="list-style-type: none"> - In-migration - Entry of migrant workers with families which might cause 	<ul style="list-style-type: none"> - Policy on preferential hiring of qualified barangay residents(LGCP R.A. 7160; 1995 PMA R.A. 7942) 	ECC CRO; Barangay LGU	Included in the	

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
	Health & Safety risks	<p>health problems due to diseases, overuse of public utilities /services, competition for resources, social conflicts, peace and order, increase in pollution due to solid and liquid wastes</p> <ul style="list-style-type: none"> – Increase in traffic flow, causing air (dust) and noise pollution – Safety and health risks to workers 	<ul style="list-style-type: none"> – Management of entry of migrant workers. – Health certificate for workers prior to hiring into the project. – Assistance in providing access to health and education services through the SDMP – Increase and train barangay tanods to be deployed in areas where migrant workers reside. – Buffer zones should be established around the perimeter of the quarry area. – Proper scheduling of hauler trucks to avoid late hours hauling and road congestion. – IEC on the community in terms of traffic safety – Sprinkling of roads during dry seasons – Assistance to the LGU on traffic management – Provision of safety facilities – Provision of PPE to every personnel 		project cost cost	Included in EPEP, SDMP, SHP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> – Conduct of safety orientation and training – Annual Health Monitoring 	ECC Safety and Health Office		
	Climate Change	– Impact of Climate Change: La Niña and El Niño phenomenon and possible consequential disasters	– Integrating Climate Change (DENR EMB MC 5- 2011) and Organizing and enhancing capabilities of men and women for Disaster Risk Reduction Management in the Barangays . IEC on DENR Special Order 2007-65, adaptation measures include protection of water aquifer, conduct of massive information and education campaign, establishment of protection measures, determination of the areas most vulnerable to natural hazards “to forewarn people,” and strengthening the protection of ecosystems	ECC CRO; CDRMMC; BDRMMC	Included in the project cost	Included in EPEP, SDMP, SHP
IV. ABANDONMENT PHASE						
<ul style="list-style-type: none"> – Rehabilitation of mined-out areas – Dismantling of structures 	Land Use	– Permanent land use change in areas to be occupied by the quarry areas and its facilities	– Bulk of the total project area will be reverted to its pre-mining land use by strict adherence to the approved FMRDP	ECC	Included in the project cost	Part of FMRDP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> – Buffer zones and physical barriers will be set around the quarry area to secure and limit access and disturbance – The final perimeter and cover of the quarry area will have an undulating profile to facilitate drainage – Stakeholders shall be consulted to for the final land use of the project area 			
	Land Use	<ul style="list-style-type: none"> – Integrity failure of the Water reservoirs (i.e. settling ponds/sedimentation ponds) and quarry areas may cause flooding risks downstream of these structures. 	<ul style="list-style-type: none"> – All the impoundment structures will be designed considering seismic and structural parameters – Structural integrity will be monitored for the duration of operation of these facilities and beyond mine closure. – An Emergency Response Plan will be developed to handle possible occurrence of water reservoir failure and downstream flooding. – Identify vulnerable areas and possible scenarios of flooding (i.e. its extent and its duration), and the necessary preventive measures 	ECC	Included in the project cost	

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
	Water Quality	– Failure of the settling ponds may cause contamination of stream and ground water downstream of these structures	– The water impounding structures will be constantly monitored for its integrity and will be done even after the mine closed and rehabilitated.	ECC	Included in the project cost	
	Biological	– Establishing vegetative cover in the area – Return of the avifauna and increase in population of small animals due to presence of habitat	– Use indigenous species that were once thriving in the area (refer to list of species) – Restore the habitat of the fauna by increasing vegetative cover	ECC	Included in the project cost	
	Socio-Economic	– Termination of LGU revenues from taxes, permits and share when the company ceases operation – Loss of Jobs/ Unemployment of mine workers – Loss of market of the established livelihood dependent on the mine operation – Transfer of company social assets/ facilities and services to the community	– Timely announcement and preparation of decommissioning/ Abandonment – Retrenchment Package to be offered to affected employees/workers. – Assistance in job hunting or transfer employment to other projects of the company. – Assistance to employees and their families in establishing livelihood or income generating activities. – Assistance to the community in establishing market/clients other than the company/ mine operations	ECC CRO; HR and Finance Office	Included in the project cost	

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> Identify diversity of products and services that will cater the needs of the community, adjacent barangays and City proper Consultation with the community through the BLGU on the social assets/ facilities and services to be transferred, acceptable to them. A Memorandum of Agreement or Deed of Donation will be crafted in order to ensure the responsibility of the community on the sustainable management of the transferred facilities and/or services 			
	Out-migration and psycho-social concerns on the closure of the operation	<ul style="list-style-type: none"> The loss of employment and job opportunities in the area may result to out-migration to search for jobs in other places Discontinuation of the social services offered by ECC through CSR and SDMP 	<ul style="list-style-type: none"> Establishment of livelihood projects for workers and their families as part of the retrenchment package Ensure sustainability of the livelihood projects established through the SDMP Assistance in the strengthening of the BLGU to increase their capacity to manage the social services to be transferred 	ECC CRO; HR and Finance Office	Included in the project cost	Part of FMRDP

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
			<ul style="list-style-type: none"> – IEC on the job and livelihood opportunities in accomplishing the final land-use and that the final land-use will spur economic growth to the community – Implement remaining community development activities to support the communities during closure and rehabilitation through the FMRDP Social Plan 			

List of Annexes

Annex A – MPSA

Annex B – IEC Documentation

Annex A – Mineral Production Sharing Agreement

Annex B – IEC Documentation
