

## **Executive Summary**

Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14-9-2006 & its subsequent amendments, the EIA guideline Manual for mining of Minerals (Feb, 2010), of MoEF, Govt. of India for seeking environmental clearance for Boulder Stone Mine in Village- Maraka Chiring, Manggapara P.O.-Zekabari District- West Garo Hills, Meghalaya with total mining area of 1.33 Ha falling under Category B1.

The mining lease has been granted in favour of Smt. Promilla R Marak over an area of 1.33 Ha with Boulder Stone Mine in Village- Maraka Chiring, Manggapara P.O.-Zekabari District- West Garo Hills, Meghalaya. Mining shall be carried out on the basis of govt. consent order to continue mining operations for 30 years.

The estimated project cost is Rs. 0.20 Crores. Total geological reserve 12,76,790 MT and total production in 5 years 5,35,920 MT and a maximum of 1,27,250 MT/annum. The systematic workings are proposed keeping in view the conservation of mineral, Protection of Environment and safety of human and machineries.

No natural water courses are observed in and near the lease area and no such thing will be obstructed by proposed mining activities. The workings will be far above the level of ground water table and thus ground water will not intersect at any stage in workings. Although no separate soil observed at proposed mining site, however any soil come across in thin layer or in cavities will be scraped and temporarily stacked separately at proposed site. The soil will be used for plantation during each monsoon. The waste generated during mining will be used in construction and maintenance of approach roads, construction of site services. The lessee will also sell the waste by permit from the concerning department. Rest waste will be dumped at proposed site as per the planning.

The proposed project is an opencast project, where mining of stone will be done. Excavator shall be deployed for the removal of overburden & inter burden but its deployment will be rarely & occasionally for 4-5 days in a month. Methods of mining will be open cast. Mining will be confined to the allotted lease area from which maximum (peak) 127250 tonnes/annum of stone will be excavated every year and. Drilling and Blasting is proposed in this mining activity.

The water for drinking and sprinkling purposes will be supplied from the nearby area through tankers. Total water requirement for the project is 5.0 KLD which can further be divided in to drinking water requirement (1.2 KLD), water for dust suppression (2.5 KLD) and water for plantation purpose (1.3 KLD).

The baseline data was collected from Dec.-2019 to Feb.-2020 for winter season. Results of the baseline data show that the area is free from any form of pollution and this activity will not create any negative impact on the existing environment.

The proposed project is an opencast semi-mechanized mining project, where mining of Boulder Stone will be done. Excavators shall be deployed for the removal of overburden & inter burden. Methods of mining will be open cast semi-mechanized with drilling and blasting. Mining will be confined to the allotted lease area located in Village-Maraka Chiring Manggapara, P.O. Zekabari, District-West Garo Hills, Meghalaya from which a maximum of 127250 Tonns/Annum of Boulder stone will be excavated every year. Drilling and Blasting is proposed in this mining activity. Terms of Reference (ToR) for the proposed project has been granted by the Directorate of Environment, Meghalaya vide its letter no. ML/SEIAA/MIN/WGH/P-5/2020/1363 dated, Shillong, the 29<sup>th</sup> June, 2020.

#### **Salient features of the project**

1.	Online Proposal No.	SIA/ ML/MIN/49844/2020 dated 30 <sup>th</sup> Jan. 2020
2.	File No. Allotted By SEIAA, Meghalaya	ML/SEIAA/MIN/WGH/P-3/2020
3.	Name Of Proponent	Smt. Promilla R Marak
4.	Full Correspondence Address Of Proponent And Mobile Number	Smt. Promilla R Marak Village- Ampati, P.O.- PS – Ampatl, District- South West Garo Hills, State- Meghalaya PIN Code:- 794115
5.	Name of Project	Boulder Stone Mine
6.	Project Location (Plot/Khasra/Gata No.)	Village-Maraka Chiring Manggapara, P.O. Zekabari, District-West Garo Hills, Meghalaya (Area: 1.33 ha.)
8.	Name Of Village	Maraka Chiring Manggapara

9.	Post Office	Zekabari		
10.	District	West Garo Hills		
11.	Name Of Minor Mineral	Boulder Stone		
12.	Sanctioned Lease Area In Ha	1.33 Ha		
14.	Max. & Min mRL Within Lease Area	115 mRL to 90 mRL		
15.	Pillar Coordinates	Pillar	Latitude	Longitude
		1	25°36’42.97” N	90°01’06.66” E
		2	25°36’43.97” N	90°01’3.73” E
		3	25°36’47.43” N	90°01’06.44” E
		4	25°36’46.13” N	90°01’08.35” E
16.	Total Geological Reserve	12,76,790 MT		
17.	Proposed Production / Year	1,27,250 Tonnes / Annum		
18.	Sanctioned Period of Mine Lease	30 years		
19.	Production of Mine/Day	357.28 tonnes		
20.	Method of Mining	Open Cast Semi Mechanized with Drilling and Blasting		
21.	No. of Working Days	300		
22.	Working Hours/Day	08 hrs max, Day Time		
23.	No. of Workers	65		
24.	No. of Vehicles Movement/Day	8 Dumpers.		
25.	Type Of Land	Private Land		
27.	Nearest Metalled Road From Site	450 meters, W		
29.	Name of the QCI Accredited Consultant With QCI No. And Period Of Validity	GEOGREEN ENVIRO HOUSE PVT LTD, LUCKNOW NABET/EIA/1720/IA0023 Extended 8 <sup>th</sup> October 2020.		

30.	Any Litigation Pending Against The Project Or Land In Any Court.	No
31.	Proposed CER Cost	40,000/-
32.	Propose EMP Cost	3,72,000/-
33.	No. of trees to be planted	300 Saplings

### **Ambient Air Quality**

The maximum value for PM<sub>10</sub> was observed as 58.90µg/m<sup>3</sup> at Margaon Gatna (A5) while 24 hours applicable limit is 100µg/m<sup>3</sup> for industrial and mixed use areas. The area observes average PM<sub>10</sub> concentration in the range of 54.24 µg/m<sup>3</sup> - 54.8 µg/m<sup>3</sup> with the lowest concentration of 49.90µg/m<sup>3</sup> recorded at Village Thakuranbari (A8).

The maximum value for PM<sub>2.5</sub> was observed, as 39.20µg/m<sup>3</sup> at Banshali (A7) while 24 hours applicable limit is 60µg/m<sup>3</sup> for industrial and mixed use areas. The area observes average PM<sub>2.5</sub> concentration in the range of 34.29 µg/m<sup>3</sup>–34.68 µg/m<sup>3</sup> with the lowest concentration of 30.30 µg/m<sup>3</sup> recorded at Village Diglapara (A6).

The maximum value for SO<sub>2</sub> was observed, as 7.20 µg/m<sup>3</sup> at Diglapara (A6) while 24 hours applicable limit is 80.00 µg/m<sup>3</sup> for industrial and mixed use areas. The area observes average SO<sub>2</sub> concentration in the range of 5.88 µg/m<sup>3</sup> - 6.14 µg/m<sup>3</sup> with the lowest concentration of 5.0µg/m<sup>3</sup> recorded at Vill. Diglapara (A6). All the villages have observed value well under the prescribed limit.

The maximum value for NO<sub>2</sub> was observed as 15.80µg/m<sup>3</sup> at Thakuranbari (A8) while 24 hours applicable limit is 80µg/m<sup>3</sup> for industrial and mixed use areas. The area observes average NO<sub>2</sub> concentration in the range of 14.19 µg/m<sup>3</sup> – 14.31µg/m<sup>3</sup> with the lowest concentration of 13.10 µg /m<sup>3</sup> recorded at village Margaon Gatna (A5). All the villages have observed value well under the prescribed limit.

### **Noise Quality**

Ambient noise levels were measured at 08 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 46.2 Leq dB and 61.6Leq dB

respectively and minimum and maximum level of noise during night time were 39.2 Leq dB and 49.2Leq dB respectively.

## **Water Quality**

### Ground water

1. During the monitoring period analysis of ground water shows that pH ranges from 7.56 to 7.81;
2. The Total dissolve solid (TDS) concentration was found to be ranging in between 114 mg/l to 138 mg/l.
3. Total Hardness as  $\text{CaCO}_3$  was observed to the ranging from 73 mg/l to 96 mg/l.
4. Bacteriological studies revealed the absence of E.Coli & Coliforms.
5. The ground water quality at the study area is found under the limits of drinking water standards.

### Surface water

Analysis of the result indicates that the pH ranges in between 6.59 to 7.12 which are well within the prescribed standard of 6.5 to 8.5 of CPCB. The maximum pH of 7 was observed at the Downstream of Ganol River (SW2). The surface water quality in the study area does not indicate any industrial contamination.

## **Soil Quality**

Monitoring data shows that the texture of soil at all the locations is sandy clay. The monitoring sites have sand ranging from 62% to 69% in soil samples. Silt content varies from 10% to 13%, while Clay content varies from 20% to 25% in the soil samples.

1. The data shows that value of pH ranges from 7.62 at Dhal Basti (Near Project Site) to 7.90 in Sigia indicating that soil samples vary from slightly alkaline in nature.
2. The conductivity at Dhal Basti (Near Project Site) is minimum 328.4 $\mu\text{mhos/cm}$ , while in the village Chapri it is maximum of 336.4  $\mu\text{mhos/cm}$ .
3. Magnesium value ranges from 2.1 mg/100gm in Dhal Basti (Near Project Site) to 2.5 mg/100gm in Dulung.

4. The average concentration of Nitrogen, Phosphorus and Potassium in the soil samples varies from 5.68 to 7.26 mg/100gm, 63.84 to 76.24 mg/100gm, 2.8 to 4.2 mg/100gm respectively.

### **Ecology and Biodiversity**

There are no Ecologically Sensitive Areas present in the study area but some Reserved Forests are present in the buffer area of the project site.

### **Socio-economy**

The implementation of the Boulder mining project at over an area of 1.33 Ha situated in Village-Maraka Chiring, Manggapara P.O.-Zekabari District- West Garo Hills, Meghalaya will throw opportunities to local people for both direct and indirect employment. The study area is slightly lacking in housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated activities.

### **Impacts on Land Environment**

Mining is essentially an excavation of mineral. The land environment is greatly affected by it. Specially, in case of mining which is being carried out by opencast semi-mechanized method, it is expected to affect the land environment essentially.

### **Anticipated Impacts**

#### *Land Use /Land Cover*

The land is totally stony and has stone boulders in large amount. This land is good for mining. There is no forest land or agriculture in the mine lease area. Land use pattern for preoperational, operational & conceptual stage of the mining as per mine plan for the proposed mine site is given below in Table 4-1: Present land use Pattern. The existing land use / land cover pattern within the study area (10 Km, Buffer including core Area) as studied through Site survey & satellite imagery is given as follows. As per the mine plan the exhausted benches will be reclaimed by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir.

### **Impacts on Water Environment**

The mining process will not divert and utilize the surface & ground water. Quantity of water will remain the same. The existing background level of water quality as indicated by the baseline data revealed that impact on water environment will be insignificant in this project.

### **Anticipated Impacts**

Because of the open Cast & semi mechanization method in the mining activity, the impact of mining operations on water quality is also expected to be insignificant. There would be no impact on the quality/quantity of ground water as existing ground water level in study area is deep. Surface water is also not diverted or disturbed. Therefore, there would not be any impact on surface water and ground water quality. The lease area is Hilly and Stony where only direct precipitation flows down the slope during rains. The water comes across in the workings during monsoon. The water will fill in the working pits. Some water will flow by joints and cracks and rest water has to dewater during and after the monsoon. The monsoon water which directly precipitates over the working will fill in the pit and rest water which precipitates outside the pit will flow down towards lower altitude side by slope of the area.

The rainfall remains around 2500 mm to 3000 mm per year towards maximum. The water accumulate in the working pit is being dewatered by 10 HP diesel operated pumps and this practice will be continued in future. The water will fill in the non-working pits for use for plantation and also dewatered in nearby nalahs. The rubble stone walls are constructed towards lower side of the dumps to check the wash off during monsoon. During rains the rainwater flow on natural slope of the surface, which flows during rains only in north-west direction.

Since the mining process is totally dry, no effluent will be generated hence no adverse impact on water is anticipated. Mining activity will be done by opencast semi mechanized method. The deposit will be worked from the top surface to above ground water table. No water table (aquifer) will be intersected by the mining activities. Hence there will not be any adverse impact either on the quality or quantity of ground water. There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

### **Domestic Effluent**

No domestic effluent is generated at the mine site due to absence of any colony in the mining area. Hence the question of contamination of ground water does not arise. Any adverse impact on the ground water regime is not expected from the domestic effluent.

#### Surface Run-Off

The land of the study area is semi-arid and the Landscape is hilly and stony. The threat of pollution of due to surface run-off is also not possible as because entire study area does have any natural surface water course.

#### Mitigation Measures

There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

### **Impacts on Air Environment**

Mining Operation carried out by opencast manual & semi mechanized method generate dust particles due to various activities like Loading & Unloading of stone, and Transportation. The impact on ambient air quality in the area surrounding the mining area depends upon the pollutant emission rate and prevailing meteorological conditions. As it is an open cast semi-mechanized mine, particulate Matter (Dust) of various sizes is the only pollutant of any significance.

### **Anticipated impacts**

The major sources of air pollution in the proposed mine is dust generation due to extraction, loading and haulage of mineral and wind erosion of exposed material. In this present study, United States Environmental Protection Agency (USEPA-42 series) approved mathematical equations have been used to predict concentrations for different operations in mining including the mineral transportation. The operations considered for determining source strength for dispersion modeling are as follows:

- Excavation,
- Loading, and
- Haulage.

### **Mitigation Measures**



**Haul Road:** -The long life WBM (Water Bound Macadam) haul roads will be constructed and maintained for traffic movement.

**Transport:** - The speed of dumpers/ trucks on haul road will be controlled as increased speed increases dust emissions. Overloading of transport vehicles will be avoided. The trucks/ tippers will have sufficient free board. Spillage of ore on public roads will be cleared immediately and vehicles will play in safe speed.

**Green Belt:** - Planting of trees all along main mine haul road and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks.

#### **Other Mitigation Measures**

- Water sprinkling will be done on the roads regularly.
- Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- Fortnightly scraping of road in order to keep the roads almost leveled. This will ensure smooth flow of vehicles and also prevent spillage.
- Proper tuning of vehicles to keep the gas emissions under check.
- Plantation of trees along the roads to help reduce the impact of dust in the nearby villages.

#### **Impacts on Noise Environment**

The area general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine as the project is proposed for open cast semi-mechanized mining method.

#### **Anticipated Impact**

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#### **Anticipated Impact**

Noise will be generated by the digging of mine area using blasting and drilling etc. The source of Noise pollution will be the vehicular movements.

#### **Mitigation Measures**

Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations Mitigation measures due to other source of noise will be mitigated as follows:

<b>S. No.</b>	<b>Measures</b>
1.	The adequate silencers will be provided in diesel operated mine Machineries and trucks and tractors.
2.	Compact and leveled haul road are proposed for smooth running of transport vehicles.
3.	The transport vehicles should be filled up to rated capacity of the vehicle to minimize the noise.
4.	The shrubs and bushes located in the area and proposed plantation will check the propagation of noise.
5.	The bumps on haul/ approach roads are proposed to remove time to time. The voids on haul roads are proposed to fill by waste and leveled time to time.
6.	Drilling with sharp bits and control blasting will minimize the noise pollution.

### **Environmental Management Plan (EMP)**

Proper environmental management plan is proposed for “Boulder Stone” mining project to mitigate the impact during the mining operation.

- No labour camps will be established on site.
- No cooking, or burning of woods will be allowed in the nearby area.
- Prior to commencement of mining, a short awareness program will be conducted for labours to make them aware of way of working and various precautions to be taken while at work. Such program will be repeated occasionally.
- In the event of any some causality or injury to any animal occurs, proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild animals, if exists mining operations will be avoided in the area.
- It will be ensured that noise produced due to vehicles movement while carrying stone is within the permissible noise level.
- No piling of Stone will be done in adjoining area.

- If wild animals are noticed crossing the area, they will not be disturbed or chased away, instead the labors will move away from their path.

### **Environment Monitoring Program**

<b>S. No.</b>	<b>Activity</b>	<b>Schedule</b>
<b>Air Pollution Monitoring</b>		
1.	Ambient air monitoring of parameters specified by MoEF (PM <sub>10</sub> , SO <sub>2</sub> & NO <sub>2</sub> ).	Twice in a Year except monsoon
<b>Water Quality Monitoring</b>		
2.	Monitoring water quality surface water from the river	Twice in a Year except monsoon
3.	Monitoring of one sample of tube well and open well at mine / nearby location. Parameters are essential parameters as per IS: 10500:2012.	Twice in a Year except monsoon
4.	Monitoring of water spray requirements	Log-sheet of water spray will be maintained on daily basis
<b>Noise Quality Monitoring</b>		
5.	Noise in the ambient atmosphere in mining lease	Twice in a Year except monsoon
<b>Greenbelt Maintenance</b>		
6.	Monitoring schedule for Greenbelt development as per mining plan	Yearly
<b>Soil Quality Monitoring</b>		

<b>S. No.</b>	<b>Activity</b>	<b>Schedule</b>
7.	Soil at six locations	Twice in a Year except monsoon

The proposed project is expected to provide employment to local people in different activities such as mining, sizing (sieving) transportation and plantation activities. The revenue generated from the production and sale of mineral will also add to the exchequer of government, which in turn will help in the growth of state economy. Excavated material will cater the huge increasing demand of mineral in the fast-growing construction industry of Meghalaya and nearby states etc. The project is not expected to have any major adverse impact on the environment and whatever impacts are anticipated