

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

EXECUTIVE SUMMARY

Project Proposal			
<p>“MudhenaFlagstone Quarry” Mine comes under located at Khasra no.333/1,Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh</p> <p align="center">Proponent Shri Abhishek Soni(Proprietor) Mahasamund, Tehsil Mahasamund, District Mahasamund, C.G. Pin Code- 493445</p>			
Location of the applied area			
Village &Tehsil	Village-Mudhena, Tehsil-Mahasamund		
District &State	District-Mahasamund, Chhattisgarh		
Extent of the ML area	0.45 Hectares Governmentland		
Survey of India Map No.	64 K/4		
Latitudes	Pillar No	Latitude	Longitude
Longitudes	1.	21°09'0.49"N	82°00'51.36"E
	2.	21 °08'59.94"N	82°00'52.45"E
	3.	21 °08'59.24"N	82°00'52.11"E
	4.	21 °08'58.86"N	82°00'51.68"E
	5.	21 °08'55.96"N	82°00'50.26"E
Transport Network			
Nearest City/ Town	Mahasamund, Approx. 6 km in East direction		
Nearest Railway station	Belsonda railway station which is approx. 3 km in NE direction		
Nearest Airport	Swami Vivekanand International Airport, Raipur- Approx. 29km in West.		
Archeological Place	No Archeological place in the study area.		
National Park, Wild Life Sanctuary, Wild Life Corridors, Biosphere Reserves, Protected Forest , Migratory routes for Birds etc. within 10 Km radius study area	None		
Reserve Forest and Protected Forest within 10 Km radius	No any Reserved / Protected Forest within 15 km radius.		
Water bodies within 10km radius	Yes Mahanadi- Approx. 400m in West Direction		
Mining Details			
Geological Reserves	57500 tons		
Production Capacity, cum/annum	2000 Tons/annum		
Method of Mining	open cast manual mining method		
Total Project Cost	Rs. 30.00 Lakhs		
Cost for Environmental Protection Measures	Capital Cost-Rs. 60,000/- Recurring Cost-Rs.25,000/-		

1.0 Introduction

The proposed “Flagstone Quarry” Mine comes under located at Khasra no. 333/1, Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh, Area- 0.45Ha, The proposed Flagstone production capacity from the mine lease is 2000Tons/Annum (800 m³) belongs to Shri Abhishek Soni. The lease for mining of Flagstone over an area of 0.45Ha was granted by the Government of Chhattisgarh.

The Mine Plan for the 1st Five year was approved by directorate of geology and mining Chhattisgarh, Raipur vide letter No. 5528/khani 2/Mi. Plan. Approved/S.No./2019(3) Nawa Raipur dated 26th October, 2021. As per the EIA notification of Ministry of Environment Forests and Climate Change, Government of India (MoEF&CC), dated 14th September, 2006, as amended from time to time. this project falls under category ‘B’ project, activity 1(a) of EIA Notification (due to cluster of mine lease area is more than 5ha.), an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) is required for obtaining Environmental clearance based on TOR as approved by the statutory authority, the TOR was granted by State Environment Impact Assessment Authority vide letter No. 728/SEAC,CG./Mine/1862 Nawa Raipur Atal Nagar dated 17/08/2022.

This EIA has been prepared as per the Terms of Reference granted and the EIA Notification. Further to assess the impact on environment, it is necessary to ascertain present status of environment prevailing at the project site and proposed operation including identification and Assessment of impact on the environment.

Keeping these points and statutory requirement in view, this Environment Impact Assessment Report and Environmental Management Plan (EMP) (here in after described as the EIA/EMP Report) has been prepared. Environmental Study has been carried out within 10 km radius of the mine area over a period of **15th October, 2021 to 14th January, 2022.**

1.1 Need for the Project

Minerals are the chief source of present phase of industrialization and play an important role in the present phase of the national economy and overall development of the nation. The Flag Stone slabs produced from the quarry will be supplied for the purpose of slab cuttings and then it will be sold to end user for construction purpose, at present due to growing fashion of ceramic tiles in rural area also, the demand of the flag stone is reduces, therefore the quarry management is focused on the byproduct as khanda and kattal which is being generated during the flag stone cutting.

2.0 Topography and Drainage Pattern

Topography: The area is almost a flat terrain with devoid of vegetation. It is about 250m from the village Mudhena which is situated in the west direction. The maximum elevation is about 268 m from M.S.L.

Drainage Pattern: Mahanadi River is present at about 400 m in west direction from the lease area. The drainage pattern is dendretic to sub dendretic.

2.1 Geology

The area around Mudhena village comes under Charmuria Formation of Raipur group of Chhattisgarh Supergroup. Charmuria formation comprises of Phosphatic limestone with shale inter-beds, cherty limestone and phosphatic dolomite, chert-shale inter-beds.

The area showing a nature and extent of the mineral body.

The area around Mudhena which is situated in Tehsil Mahasamund is covered by limestone of Charmuria formation of Raipur Group of Chhattisgarh Supergroup. This mineral body is homogeneous in nature. On the basis of detailed geological mapping, study of nearby pits etc of the area and lithology of the area following sequence can be established:

Soil

Flagstone

2.2 Reserves

Geological Reserve:

The reserves are calculated based on the following parameter:

Geological Reserve:

A. Geological Reserve of Flag Stone in fresh area:

$$\text{Area (m}^2\text{) x depth = Volume (m}^3\text{) x BD = Tonnage}$$

$$3500 \times 6 = 21000 \times 2.5 = 2500 \text{ tons (21000 m}^3\text{)}$$

B. Geological Reserve below the existing pit (5m pit with soil cover)

$$\text{Area (m}^2\text{) x depth = Volume (m}^3\text{) x BD = Tonnage}$$

$$1000 \times 2.0 = 2000 \times 2.5 = 5000 \text{ tons (2000 m}^3\text{)}$$

$$\text{Geological reserve (A+B) = 57500 tons (23000 m}^3\text{)}$$

Total Geological Reserve comes 23000 m³ (57500 tons)

Blockage of Reserve

A. Reserve Blocked in Mine Limit of 7.5m in fresh Area

$$\text{Area (m}^2\text{) x depth = Volume (m}^3\text{) x BD = Tonnage}$$

$$1930 \times 6.0 = 11580 \times 2.5 = 28950 \text{ tons (11580 m}^3\text{)}$$

B. Reserve Blocked in Mine Limit in old pit Excavation Area

$$\text{Area (m}^2\text{) x depth = Volume (m}^3\text{) x BD = Tonnage}$$

$$360 \times 2 = 720 \times 2.5 = 1800 \text{ tons (720 m}^3\text{)}$$

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

C. Reserve Blocked in Area Benches

Benches	Area	Depth	Volume	Tons
1 st bench	300	4.5	1350	3375
2 nd bench	265	3.0	795	1987.5
2 nd bench	134	2.0	268	670
3 rd bench	382	1.5	573	1432.5
Total	-	-	2986	7465

Total Blocked Reserve (A+B+C) = 38215 tons (15286 m3)

Mineable Reserve = (Geological reserve- Blocked reserve)
 =(57500- 38215)
 = **19285 tons (7714 m3)**

Recoverable reserve= 19285 x 75 % (25% mining loss)
 = **14464 tons (5786 m3)**

Anticipated Life of mine:

The estimated mineable reserve of this area is of the order of 14464 tons. The Conceptual quarry plan is prepared for the lease period of 30 years and anticipated life of mine will be approx. 10 years.

(Source- Approved mine plan)

2.3 Method of Mining:

Quarrying will be carried out by manually open-cast method adopting a system of benches maintaining it to 1.5m as per rule 61(2)(ii) of Chhattisgarh Minor Mineral Rule, 2015. Manual labors are also deployed for quarrying and handling quarrying waste. Flagstones will be loaded by labors into trucks and tippers. Truck/tipper will be used for loading and dumping of Flagstone.

In the instance matter the depth of Flagstone has been considered 6m from general surface for the calculation of reserves. The proposed method of quarrying will be open cast.

Table 1 Year wise productions

Year Wise Production	Area in m2 (a)	Depth in (meter) (b)	Volume	Specific Gravity	Minerals In Tons
1 st Year	490	1.50	735	2.5	1837.5
2 nd Year	490	1.50	735	2.5	1837.5
3 rd Year	490	1.50	735	2.5	1837.5
4 th Year	90	1.50	735	2.5	1837.5
	400	1.50			
5 th Year	533	1.50	800	2.5	2000.0
TOTAL					9350

3.0 Baseline Data, Impact Assessment and Management Plan

The EIA report incorporates one season data generated for a period from **15thOctober 2021 to 14thJanuary 2022**. A summary of the same is presented below:

3.1 Meteorology

Site Specific meteorological data is given in **Table4** and wind rose is given in **Figure 1**.

Table 4: Site Specific Meteorological Data

Month	Temperature °C		Wind Speed (Km/hr.)
	Min	Max	Avg.
October,2021	20.0	36.0	2.9
November, 2021	11.0	30.0	3.6
December, 2021	8.0	25.0	4.7

Source: Meteorological at station site

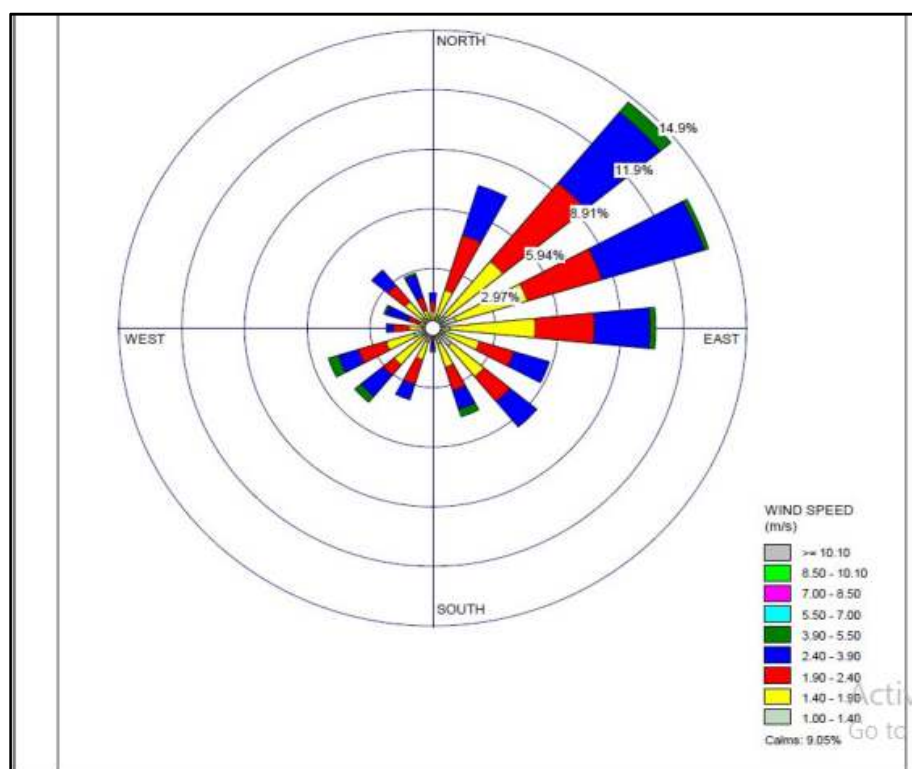


Figure 1: Wind Rose

3.2 Ambient Air Quality Status

The status of ambient air quality within the study area was monitored for the period of during **15thOctober 2021 to 14thJanuary 2022** at 8 locations including the Plant area and in nearby villages. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind directions. The levels of Respirable Particulate Matter (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂), and Oxides of Nitrogen (NO_x) were monitored. The minimum and maximum values of monitoring results are summarized in **Table 5**.

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

Table5: Summary of Ambient Air Quality Results

Parameters	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
AAQM Norms	100	60	80	80
AAQ-1 Project Site (Mudhena)				
MIN	53.5	23.5	9.9	11.9
MAX	64.2	28.4	17.7	24.3
AVERAGE	60.4	26.6	12.9	17.4
98 %TILE	63.9	28.3	17.7	24.3
AAQ-2 Nisda				
MIN	47.8	21.7	9.6	11.7
MAX	58.4	27.1	12.4	17.8
AVERAGE	54.2	24.8	10.8	14.5
98 %TILE	58.1	27.0	12.3	17.2
AAQ-3 Belsonda				
MIN	44.5	24.9	9.0	12.2
MAX	50.8	29.7	12.0	16.3
AVERAGE	47.3	26.6	10.4	14.4
98 %TILE	50.8	29.3	11.9	16.1
AAQ-4 Ghodari				
MIN	44.2	24.1	8.6	12.7
MAX	53.0	29.9	11.8	17.5
AVERAGE	49.4	27.5	10.8	15.1
98 %TILE	52.7	29.7	11.8	17.3
AAQ-5 Nandgaon				
MIN	43.5	20.5	8.7	10.7
MAX	48.4	24.5	11.9	16.4
AVERAGE	45.6	22.1	10.1	12.9
98 %TILE	48.4	24.4	11.8	15.8
AAQ-6 Bamhani				
MIN	44.3	20.1	9.1	11.0
MAX	50.7	24.2	10.7	13.6
AVERAGE	47.4	22.4	9.9	11.7
98 %TILE	50.4	24.0	10.7	13.3
AAQ-7 Bhilai				
MIN	45.2	20.7	8.3	10.3
MAX	52.7	25.1	11.4	14.5
AVERAGE	48.0	23.2	10.1	12.3
98 %TILE	52.6	25.1	11.3	14.1
AAQ-8 Kanpa				
MIN	39.5	17.2	7.6	9.9
MAX	46.9	22.1	9.9	12.7
AVERAGE	44.1	19.2	8.6	11.3

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

98 %TILE	46.7	21.5	9.8	12.6
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From the above results, it is observed that the ambient air quality with respect to PM₁₀, PM_{2.5}, SO₂ and NOx at all the monitoring locations was within the permissible limits specified by CPCB.

3.3 Ambient Noise Levels

Ambient noise level monitoring was carried out at the 8 monitoring locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 6**.

Table 6: Summary of Ambient Noise Level Monitoring Results [Leq in dB(A)]

Time (Hrs)	N-1	N-2	N-3	N-4	N-5	N-6	N-7	N-8	
Day Time	600	46.8	41.6	40.6	44.0	45.2	42.5	40.2	39.1
	700	49.6	43.1	41.9	45.9	47.3	44.4	41.5	40.8
	800	51.4	46.8	43.7	46.8	48.2	45.3	42.9	38.3
	900	53.9	48.5	45.3	49.4	50.8	47.9	45.5	42.7
	1000	55.7	48.2	47.0	53.8	55.2	52.3	47.5	48.1
	1100	59.7	49.2	46.2	52.7	54.1	51.2	46.0	41.1
	1200	61.5	46.6	46.9	51.2	52.6	49.7	45.6	45.6
	1300	62.6	46.2	45.2	50.4	51.8	48.9	46.0	42.6
	1400	61.8	47.8	44.1	48.3	49.7	46.8	42.6	45.1
	1500	62.8	49.1	44.5	50.3	51.7	48.8	44.5	47.4
	1600	60.7	47.5	41.6	48.4	49.8	46.9	47.3	42.4
	1700	60.3	47.1	45.6	47.4	48.8	45.9	43.9	39.8
	1800	58.2	46.4	45.3	49.3	50.7	47.8	45.5	41.6
	1900	59.4	46.1	43.8	48.3	49.7	46.8	42.9	40.8
	2000	56.2	43.8	44.2	50.7	52.1	49.2	42.3	44.7
2100	55.9	42.2	46.7	46.2	47.6	44.7	40.7	41.8	
2200	54.7	41.1	42.5	47.8	49.2	46.3	39.8	44.3	
Night Time	2300	49.2	40.5	40.8	45.9	47.8	44.4	38.4	40.2
	2400	45.8	39.8	40.0	46.1	46.5	43.8	38.2	40.6
	100	43.2	39.0	39.8	45.2	45.6	42.6	37.6	37.9
	200	40.2	39.5	41.1	44.7	43.2	43.2	37.8	36.9
	300	39.4	38.4	39.8	44.4	42.8	39.6	38.4	39.3
	400	38.8	38.7	39.0	42.9	41.2	40.2	39.8	39.3
	500	40.2	39.9	39.3	43.9	42.6	41.5	38.8	38.4
Range	38.8-62.8	38.4-49.2	39.0-47.0	42.9-53.8	41.2-55.2	39.6-52.3	37.6-47.5	36.9-48.1	
Ld	58.9	46.6	44.7	49.6	51.0	48.1	44.4	43.6	
Ln	44.1	39.5	40.0	44.9	44.8	42.5	38.4	39.1	
Ldn	58.0	47.7	47.0	51.9	52.5	49.9	46.0	46.0	

3.4 Ground and Surface Water Resources & Quality

Ground Water

Sampling was carried out at 8 locations during the study period. Sampling and analysis was carried out, as per standard methods and frequency of the sampling was thrice/stations. the summary of the results is presented below:

Analysis results of **Ground Water** reveal the following:

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

- **pH** varies from to 7.14 to 7.57
- **Total Hardness** varies from 185 to 695mg/L.
- **Total Dissolved Solids** varies from 251 to 878 mg/L.

Analysis results of **Surface Water** reveal the following:

- **pH** varies from to 7.41to 7.62
- **Total Dissolved Solids** varies from 182to 251 mg/L.
- **BOD** varies from 1.8to 2.2 mg/L.
- **COD** varies from 8.6 to 12.4 mg/L.

The heavy metal contents are found to be negligible. Water quality is excellent but it is not potable due to presence of coliform. It can be used for drinking purpose after installing bacteriological.

3.5 Soil Quality

Sampling was carried out at 8 locations during the study period. The summary of the results are presented below:

- pH in soil sample was observed in the range **7.19to 7.63**
- Organic Matter was observed in the range of **1.01 % to 1.47%**.

3.6 Biological Environment

Rare and Endangered Flora in the Study Area

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. **Among the enumerated flora in the study area, none of them were assigned any threat category, by RED data book of Indian Plants.**

4.0 IMPACT ASSESSMENT AND MITIGATION MEASURES

4.1 AIR Pollution

The air quality modeling has been done and the details are given below:

Sr. No.	Activity in the Quarry	Maximum Baseline Concentration ($\mu\text{g}/\text{m}^3$)	Incremental GLCs ($\mu\text{g}/\text{m}^3$)	Resultant Concentration ($\mu\text{g}/\text{m}^3$)	Limit (Industrial, Residential, Rural and other area) ($\mu\text{g}/\text{m}^3$)
1.	Excavation+Loading+Transportation	64.2	1.60	65.80	100

Prevention and Control of Air Pollution

- The dust generated during the process will be minimized by water spray at the working

faces before and after the activity.

- Plantation will be carried out on approach roads and in Lease boundary.
- Planning transportation routes of mined material so as to reach the nearest paved roads by shortest route. (minimize transportation over unpaved road;
- Personal Protection Equipment’s (PPE) like dust masks, ear plugs etc. will be provided to mine workers.
- Speed limit will be enforced to reduce airborne fugitive dust from vehicular traffic.
- Deploying PUC certified vehicles to reduce their noise emission.
- Spillage from the trucks will be prevented by covering tarpaulin over the trucks.

4.2 Water Quality Management

The impact of mining project on groundwater hydrology and surface water regime are site specific and depends upon the characteristics of the mineral, hydrogeology and requirement of groundwater for other uses.

ANTICIPATED IMPACTS

- No natural course of water stream is interrupted or diverted due to mining activity; hence no impact on natural drain is anticipated.
- Surface run off distribution during rainy season may get affected due to excavated pits and overburden stack.
- Runoff from the mining benches or from overburden during the rainy season may get contaminated.
- Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be rendered unfit for drinking and even for industrial use.
- Domestic sewage will be generated which can create contamination.

MITIGATION MEASURES

- Overall drainage planning has been done in such a manner that the existing pre-mining drainage conditions will be maintained to the extent possible so that run off distribution is not affected.
- The waste dump will be protected by retaining walls around the dump., moreover the excavated mineral itself is non-toxic and hence no effect due to water flow during rains following the contours of the area is expected.
- The excavated pit will be converted into the water reservoir at the end of mine life. This will help in recharging ground water table by acting as a water harvesting structure.
- Garland drain will be constructed on all sides of quarry along with settling pond in the lowermost part to remove the suspended solids from storm water. The collected water shall be used in plantation and spraying on haul roads. Settling ponds will be designed on the basis of silt loading, slope of the lease, detention time required etc.

Executive Summary for “FlagStone Quarry” at Village Mudhena, Tehsil- Mahasamund, District Mahasamund, Chhattisgarh of Shri Abhishek Soni

- Septic tanks and soak pits will be provided for the disposal of domestic effluent generated from mine site.

4.3 Noise Pollution Control

The area generally 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 manual method mining.

Noise pollution is mainly due to occasional plying of trucks. These activities will not cause any problem to the inhabitants of this area because there is no human settlement in close proximity to the lease area.

ANTICIPATED IMPACT

- The source of Noise pollution will be the vehicular movements.
- Noise will be generated by the digging of mine area using shovels, crowbars etc.

MITIGATION MEASURES

- **Maintenance of Machinery:** - The vehicles operating will be maintained and provided with good silencers. All machines will be used at optimum capacity.
- **Vegetation:** Plantation of trees around haul roads will be done to reduce the noise.
- **Hearing Protection:** Equipment like ear-muffs, ear-plugs, etc. are commonly used devices for hearing protection.

4.4 Greenbelt Development and Plantation

A green belt will be developed along the roads, barren area, surrounding office, rest shelter and other social forestry program. Green belt is erected not from biodiversity conservation point of view but is basically developed as a screen to check the spread of dust pollution. It is proposed to total number of plants **575 numbers sapling during 1st five years.**

Table- 8 Details of Greenbelt sapling during 1st three years

Total no. of sapling:-575 numbers			
Phase	Name of Tree	No. of Plants to be Planted	Location
1 st year	Katang Bans, Neem, Karanj, Khamer	115	7.5 m statutory restricted zone - 64nos
2 nd year	Katang Bans, Neem, Karanj, Khamer	115	7.5 m statutory restricted zone - 64nos
3 rd year	Katang Bans, Neem, Karanj, Khamer	115	7.5 m statutory restricted zone - 64nos
4 th Year	Katang Bans, Neem, Karanj, Khamer	115	7.5 m statutory restricted zone - 64nos
5 th Year	Katang Bans, Neem, Karanj, Khamer	115	7.5 m statutory restricted zone - 64nos

4.5 Solid and Hazardous Waste Generation and Management

No solid waste will be generated.

4.6 EMP and CER Details

The capital cost of proposed EMP measures is **Rs.60,000** and recurring cost of the EMP measures, including the environmental monitoring activities, is **Rs. 25,000**.

It is proposed to undertake the need specific proposed CER activities in the surrounding areas of the mine. The project proponent has proposed to incur budget of **Rs. 60,000/-**for CER activities.

5.0 CONCLUSION

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the project.