

# **EXECUTIVE SUMMARY**

## **ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN**

**BARBASPUR FLAGSTONE QUARRY MINE**

**CLUSTER AREA: 33.38 ACRES / 13.51 HA**

**AT VILLAGE: BARBASPUR,**

**TAHASIL/ DISTRICT: MAHASAMUND, CHHATISGARH**

**NAME OF THE APPLICANT**

**SRI RAJENDRA GUPTA**

**AT / P.O. / TAHASIL – RAJIM**

**DISTRICT - GARIABAND**

**C.G. – 493885**

**ENVIRONMENT CONSULTANT**

**KALYANI LABORATORIES PVT. LTD**

**PLOT NO. 78/944, MILLENIUM CITY,**

**PAHALA, BHUBANESWAR - 752101.**

## 1.1 INTRODUCTION

Barbaspur Cluster Flagstone Quarry Mine is a new mining lease located at Village Barbaspur, of Tahasil & District of Mahasamund, Chhatisgarh State. As per EIA Notification, 14<sup>th</sup> September 2006 and subsequent amendments the project comes under category B1, as the cluster lease area is less than 100 Ha. As per Notification of MOEF & CC vide S.O. No. 3977(E), Appendix- XI, dated the 14th August 2018; Cluster over total mineralized area of 33.38 Acres or 13.51 Hectares is categorized as 'B1' & required Environmental Clearance from SEIAA, Chattisgarh. As per Ministry of Environment, Forest & Climate Changes (MoEF & CC), New Delhi, EIA Notification dated. 14th September 2006 and its subsequent amendments, Environmental clearance is a statutory requirement for mining of minerals. Thus, MoEF & CC had formulated its policies & rules for mining of minerals to achieve sustainable development and to prevent haphazard exploitation of natural resources. Environmental Impact Assessment (EIA) is an assessment of the possible impact-positive or negative-that a proposed project may have on the environment, together consisting of the natural, social and economic aspects.

On the basis of baseline study being conducted to adjudge Environment Impact Assessment (EIA) of the area, relevant EIA report along with Environment Management Plan (EMP) has been prepared in respect of Barbaspur flagstone quarry of Proprietor Rajendra Gupta over an area of 1.00 Ha at Village Barbaspur of Tahsil and Dist. Mahasamund Chattisgarh. 24 no. of other individual Quarries has been located within 500 mtrs of Barbaspur Flagstone Quarry as cluster of mines and the total cumulative area of the said cluster area is estimated as 13.51 Ha.

The detail of lease area and lessee has been tabulated as below:

**Table No.1.1 Details of Cluster Lease Area**

S. N.	Name of Proponent with Address	Location Village of Quarry	Tahasil	Plot No.	Area in Ha.	Kisam of Land	Mining Product	Annual Production CUM as per EC
1	Shri Ajay Kumar Chandrakar	Barbaspur	Mahasamund	209	0.71	Private	Flagstone	498.00
2	Shri Rajesh Chandrakar	Barbaspur	Mahasamund	213	0.80	Private	Flagstone	700.5
3	Ramanuj Chandrakar	Barbaspur	Mahasamund	212	0.75	Private	Flagstone	1751.5
4	Shri Jhalaram Chandrakar	Barbaspur	Mahasamund	16,81, 69,177	0.50	Private	Flagstone	487.50

5	Ramanuj Chandrakar	Barbaspur	Mahasamund	193,18 7/2	0.65	Private	Flagstone	1342.5
6	Shri Sai Bhandar	Barbaspur	Mahasamund	186/1	0.42	Private	Flagstone	1009.5
7	Shri Balmukund Chandrakar	Barbaspur	Mahasamund	177	0.80	Govt.	Flagstone	630.00
8	Smt Archana Chandrakar	Barbaspur	Mahasamund	1133, 1134, 1135	1.42	Govt.	Limestone	3999.0
9	Shri Kundan Parmar	Barbaspur	Mahasamund	1,91,1 92	0.30	Private	Flagstone	1153.5
10	Indrasen Bhandekar	Barbaspur	Mahasamund	187/1	0.30	Private	Flagstone	579.00
11	Hirendra Sahu	Barbaspur	Mahasamund	177, 186/2	0.560	Private + Govt	Limestone	946.50
12	Jhalaram Chandrakar	Barbaspur	Mahasamund	210	0.410	Private	Limestone	425.10
13	Mrs. Lochan Chandrakar	Barbaspur	Mahasamund	163/1	0.150	Private	Flagstone	624.00
14	M/s Aanad Stone industries	Barbaspur	Mahasamund	214	0.680	Private	Flagstone	2685.00
15	Milan Nishad	Barbaspur	Mahasamund	193/1	0.220	Private	Flagstone	540.00
16	Hemant Chandrakar	Barbaspur	Mahasamund	178/2	0.180	Private	Flagstone	150.00
17	Shri Kundan Parmar	Barbaspur	Mahasamund	194, 195	0.450	Private	Flagstone	1648.00
18	Shri Brijesh Chandrakar	Barbaspur	Mahasamund	180, 178/4, 181/4	0.330	Private	Flagstone	1516.5
19	Shri Suresh Chandrakar	Barbaspur	Mahasamund	207	0.72	Private	Flagstone	570.00
20	Shri Devanand Chandrakar	Barbaspur	Mahasamund	166	0.25	Private	Flagstone	806.23
21	Shri Manoj Chandrakar	Barbaspur	Mahasamund	200	0.36	Private	Flagstone	930.00
22	Shri Lildhar Chandrakar	Barbaspur	Mahasamund	159	0.360 0	Govt.	Flagstone	621.00
23	Shri Dular Parmar	Barbaspur	Mahasamund	190	0.50	Private	Flagstone	950
24	Shri Chandrashekhar Chandrakar	Barbaspur	Mahasamund	206	0.69	Govt.	Flagstone	513.75
<b>Total</b>					<b>12.51</b>			<b>25077.08</b>

Environment Impact Assessment and Environment Management Plan (EIA/EMP) has been prepared with reference to the Terms of Reference (ToR) issued by SEAC, Chattisgarh issued in favour of the Barbaspur flagstone quarry of Rajendra Gupta vide letter no 1638/Mine/Raipur/924, Nawa Raipur, Atal Nagar, Dtd.03.02.2020. The above mines have been situated within 500 mtrs of Basin flagstone quarry mines as per letter issued from the Office of Dist. Collector (Mines Division); vide letter no. 2040/Ka/E-Nivida/Kha.Li./Na.Kra.63/2018, Mahasamund, dtd.10/12/2019. The mining plan in respect of Barbaspur flagstone quarry has been duly approved by Deputy Director, (Directorate Geology & Mines, Admin Cell), Raipur Dist., Chattisgarh vide letter no. 640-2/Kha. Li./Teen-6/2019, Raipur, dtd.12/06/2019. Letter of Intent (LOI) for grant of fresh lease has been granted to project proponent by collectorate mining branch Mahasamund vide letter no. 237/K/E-Nivida/Kha.Li./Na.Kra.63/2018 Mahasamund, Dated 05/02/2019 on 1 hect land area under rule 42 of Chhattisgarh Minor Mineral Rule 2015. As per rule 38A of CGMMR 2015 as ammended lease period will be 30 years from the date of first lease agreement. Application for environment clearance was duly prepared and submitted to SEIAA, Chhatisgarh by the lessee with form 1, Proposed TOR and PFR alongwith approved mining plan for Barbaspur Flagstone Quarry.

Sri Rajendra Gupta, S/o Sri Madan Gopal Gupta, resided at Vill.- Rajim, Tahasil – Rajim, Dist. – Gariyabandh, Chattisgarh – 493 885 is the proprietor of the project. Being an experienced and full fledged businessman, he has full assessed over the flagstone marketing. He is also having sound financial capability.

The total area granted for mining lease is coming within the non forest waste land. The land details with plot no. and kissam in respect of Barbapur Flagstone Quarry Mines of Lessee Rajendra Gupta is given below the table,

**Table No.1.2 Land Schedule of Basin Flagstone Quarry**

Name of the Mines	Name of Lessee	Forest Land	Non Forest land			
			Private Agricultural Land	Grazing Land	Barren Land	Others
Barbaspur Flagstone Mines	Rajendra Gupta	Nil	1.00 Ha.	Nil	Nil	Nil

Barbaspur Flagstone Quarry Mines of Lessee Rajendra Gupta located at Village Barbaspur of

Dist. /Tahasil Mahasamund, Chattisgath; is featured in the Survey of India Toposheet No. 64 K/4. Barbaspur Cluster Flagstone Quarry is located at a distance about 12 km from Dist. Office Mahasamund and situated at 42 Km from State Capital Raipur. The site is located about 2 km from NH -6 towards South-East (Raipur – Pithora Road) and located about 23.90 km. from State Highway towards South (Rajim - Fingeshwar - Mahasamund R oad). The project site is well accessible through concrete road. Nearest Bus Stand situated about 2 km at Birkoni whereas Nearest Railway Line is located at Belsonda about 3 km. The latitude and longitude details of the mines are as follows:

**Table No.1.3 Toposheet Details with Latitude / Longitude**

<b>Boundary Points</b>	<b>Latitude</b>	<b>Longitude</b>
BL1	21°11'3.84"N	82°1'24.91"E
BL2	21°11'2.02"N	82°1'30.69"E
BL3	21°11'0.27"N	82°1'30.29"E
BL4	21°11'2.09"N	82°1'24.20"E

The assignment for conducting Environment Impact Assessment / Environmental Management Plan Study (EIA/EMP) was awarded to M/s Kalyani Laboratories Pvt. Ltd., Bhubaneswar ( QCI – NABET Accredited Consultant Certificate No. NABET/ EIA /1922 /RA0154 valid up to 28/04/2022 ). The EIA/EMP report has been prepared based on the baseline data generated from 15<sup>th</sup> Dec 2019 to 15<sup>th</sup> Mar 2020 (Winter Season).

### 1.1 BRIEF PROFILE OF THE PROJECT

**Table 1.4 Brief Profile of the Project: Barbaspur Flagstone Quarry/Rajendra Gupta**

<b>Sl. No.</b>	<b>Salient Features</b>	<b>Description</b>
1	Total mining lease area	1.00 Ha.
2.	Village	Barbaspur
3.	Tahasil	Mahasamund
4.	District and State	Mahasamund, Chattisgarh
5.	Land Category	Non Forest Pvt. Land.
6.	Toposheet No.	64 K/4
7.	Nearest Town	Mahasamund (12 km)
8.	Nearest road	NH 6 / AH 46 (2 km)
9.	Nearest River	Mahanadi River – 3.70 km, W Kodar River 5 Km.
10.	Nearest Rly Station	Mahasamund Railway Station (12 Km) (Belsonda - 3.35 Km)

11.	Nearest Airport	Raipur Airport (33.50 Km)
12.	Nearest Forest	Kukradih R.F. at 8 Km & Tumgaon R.F. at 10 km.
13.	Material to be Mined	Flag Stone ( Low grade limestone )
14.	Rate of production	5,670 TPY
15.	Nature of Waste	No mine waste or rejects is expected to be generated.
16.	Water requirement	For Dust Suppression 2 KLD, For Green Belt 4.5 KLD & for Drinking and washing 0.35 KLD. Total 6.85 KLD
17.	Source of water	Water will be arranged from local body i.e. gram panchayat through water tankers.
18.	Manpower	1 no. Qualified, 1 no. Experienced & 5 nos. Labourers. Total 7 nos.

### 1.2.1 Reserve Estimation

The reserve within the lease has been calculated by graphical method. The area is Flat land. The formula adopted for calculation of reserve is graphical method and thus mine specification arrived through graphical method are as under:-

**Table No.1.5 Reserve Estimation & specification**

<b>Particular of Mine</b>	<b>Details</b>
Lease area	1.000 (hect.)
Fresh area in the mine	10000.0 sqm.
Proposed depth of excavation from surface level	9.00 m
Thickness of Topsoil ( Alluvial Soil)	3.00 m
Outer Length of mine boundary	474.00 m
Inner Length of mine Boundary	416.67 m
Average Length of Mine Boundary	445.33 m
Width of Mine Boundary	7.50 m
Avg. Length of mine boundary (with top soil)	445.33 m
Fresh Area in mine boundary (with top soil)	3340.00 sqm.
Area for Stone Crusher	NIL sqm.
Area for Stone Storage	NIL sqm.
Specific Gravity of stone	2.40 t/cum
Total Geological Reserve	60,000 Cu.m / 1,44,000 tons
Total Reserve Blocked in mine boundary	20040.00 cu.m / 48096 tons
Reserve Blocked in Benches & Slope Maintenance	10725.00 cu.m / 25740 tons
Total Blockage	30765.00 cu.m / 73836 tons

Mineable Reserves = (Geological reserves - Blocked reserve)	29235.00 cu.m /70164 tons
Mine Loss	2923.50 cu.m /7016.4 tons
Rejectes of Flagstone	2631.15 cu.m /6314.76 tons
Recoverable Reserve = (Mineable Reserves - Deduction for Mine loss and Rejects)	23680.35 cu.m / 56832.84tons
Top soil	19980 cu.m /47952 tons

The details of the Mining of the existing quarries within the cluster area are given in the table below:

**Table No.1.6 Cluster Mining Quarry Details In Respect Of Rajendra Gupta Barbaspur Flagstone Mines (Mahasamund) With 24 Other Mines Located Within 500 Mtrs**

S. N.	Name of Proponent with Address	Location Village of Quarry	Annual Production CUM as per EC	Area in SQ M	Depth in M	Total Excavation	Geological Reserve CUM	Mineable Reserve	Recoverable Reserve
1	Shri Ajay Kumar Chandrakar	Barbaspur	498.00	7100	8.0 m	24528	24528	6568	4926
2	Shri Rajesh Chandrakar	Barbaspur	700.5	8000	15	94949.2	94949.2	44621.6	33466.2
3	Ramanuj Chandrakar	Barbaspur	1751.5	7500	10	52992	52992	23232	17424
4	Shri Jhalaram Chandrakar	Barbaspur	487.50	5000	6.0	18472	18472	5332	3999
5	Ramanuj Chandrakar	Barbaspur	1342.5	6500	10.0	54639	54639	16981.5	12736.124
6	Shri Sai Bhandar	Barbaspur	1009.5	4200	12.0	38786.00	38786.00	11216	8412
7	Shri Balmukund Chandrakar	Barbaspur	630.0	8000	9.5 m	55008	55008	14648	10986
8	Smt Archana Chandrakar	Barbaspur	3999.0	14200	10	98176	98176	55289.5	41467.12
9	Shri Kundan Parmar	Barbaspur	1153.5	3000	10	24840	24840	9340.75	7005.56
10	Indrasen Bhandekar	Barbaspur	579	3000	6	11660	11660	5644	4233
11	Hirendra Sahu	Barbaspur	946.5	5600	11	37548	37548	12564	9423
12	Jhalaram Chandrakar	Barbaspur	425.1	4100	6	26539.6	26539.6	6705.6	5029.2

13	Mrs. Lochan Chandrakar	Barbaspur	624.00	1500	10	13296	13296	3174.4	2380.8
14	M/s Aanad Stone industries	Barbaspur	2685.00	6800	8	63061	63061	33446.5	25084.8
15	Milan Nishad	Barbaspur	540.00	2200	11	15486	15486	3996	2996.8
16	Hemant Chandrakar	Barbaspur	150.00	1800	6	8319	8319	254425	708.188
17	Shri Kundan Parmar	Barbaspur	1648	4500	11	30628	30628	9587.52	7190.64
18	Shri Brijesh Chandrakar	Barbaspur	1516.5	3300	8	24321	24321	6979.5	5234.62
19	Shri Suresh Chandrakar	Barbaspur	570.00	7200	10.0 m	59733	59733	27775	20831.2
20	Shri Devanand Chandrakar	Barbaspur	806.23	2500	8.5 m	23850.4	23850.4	4041	3636.9
21	Shri Manoj Chandrakar	Barbaspur	930.00	3600	8.0 m	26624	26624	9932	7449
22	Shri Lildhar Chandrakar	Barbaspur	621.00	3600	6.0 m	9000	9000	4108.5	3081.37
23	Shri Dular Parmar	Barbaspur	950	5000	6.0 m	25000	25000	12375	11756.2
24	Shri Chandrashekhar Chandrakar	Barbaspur	513.75	6900	8.00	19027.5	19027.5	5138.37	3853.78
<b>Total</b>			<b>25077.08</b>	<b>125100</b>	<b>214</b>	<b>856483.70</b>	<b>856483.70</b>	<b>587121.74</b>	<b>253311.68</b>

**Table No.1.7 Summary Abstract of Reserve Estimations of the Barbaspur Cluster Flagstone Quarry**

Sl. No.	Descriptions	Quantity In Cu. M
1	Total Geological Reserve	8,56,483.70
2	Less : Mineral Blockade	2,69,361.96
3	Mineable Reserve	5,87,121.74
4	Recoverable Reserve after deduction for mine loss and rejects	2,53,311.68
5	Waste to be generated	3,33,810.06



**Table No.1.8 Statement of Annual Production Plan**

<b>Period</b>	<b>Area Under Excavation Sq.M.</b>	<b>Production Cu.M.</b>	<b>Reject Cu.M.</b>	<b>Topsoil Cu.M.</b>
1 <sup>st</sup> Year	3330	2065.50	229.50	9990
2 <sup>nd</sup> Year	800	1944.00	216.00	0
3 <sup>rd</sup> Year	875	2126.25	236.25	0
4 <sup>th</sup> Year	835	2029.05	225.45	0
5 <sup>th</sup> Year	3330	1992.60	221.40	9990
6 <sup>th</sup> Year	860	2089.80	232.2	0
7 <sup>th</sup> Year	815	1980.45	220.05	0
8 <sup>rd</sup> Year	840	2041.20	226.80	0
9 <sup>th</sup> Year	795	1931.85	214.65	0
10 <sup>th</sup> Year	867	2106.81	234.09	0
<b>Total</b>		<b>20,307.51</b>	<b>2,256.39</b>	<b>19989.00</b>

**1.2.2 Conceptual mining Details:**

As the proposed scheme of mining is drafted for excavation of stone till 9 m of depth from surface level. Therefore after reaching 9 m of depth in the mine or any time during the balance lease period, if there would be further minerals available as per investigation of district mining authorities and there is possibility of further exploration of mineral feasibly, than permission of further excavation of stone might be given as decided by respective authorities along with due compliance as then applicable.

During the conceptual period the maximum quarry size in respect of Barbaspur Flagstone Quarry of M/s Rajendra Gupta will be 0.66 Ha which will be converted to water reservoir. There will no waste dumping during the conceptual period as the waste/ reject will be utilized as construction material. Top soil generated duering conceptual period will be utilized for plantation purpose. Details conceptual plan has been given in the table below:

**Table No.1.9 Details Conceptual Plan**

A)	Estimated recoverable reserves	23680.35 Cum. or 56832.84 ton
B)	Average rate of production per year during Five year plan	2031.48 cum. or 4875.55 tons
C)	Expected rate of production After five year plan	2030.02 cum. or 4872.05 tons
D)	Sanctioned lease period	30 years

E)	Plan period	10 years
F)	Thus anticipated life of the Quarry	About 12 years. (Up to 9m of mine depth from surface level)

**Table No.1.10 Land use Details :**

Land use Category	Land use at the end of 5 years in Hect.	Land use at the end of 10 years in Hect.
<b>Forest Land</b>	Nil	Nil
<b>Agriculture Land</b>	Nil	Nil
<b>Waste Land</b>		
A. Lease Area	1.000	1
B. Quarrying & allied area		
1. Area under pits	0.666	0.666
2. Statutory Boundary	0.334	0.334
3. Area for dumping	0.200	0.2004
4. Plantation	0.200	0.2004

In this period topsoil will be removed from 3330Sq m area till the depth of 3 m. Total 19980 cum of topsoil will be generated till the RL of 265 m AMSL. Excavated top soil will be dumped at statutory boundary up to a feasible height and with safe angle of slope. During the mining operation rejects of flagstone will be generated which is not useful as flagstone. 5415.336 MT of rejects of flagstone is expected to be generated as detailed in Chapter- 4 and Chapter 5 during the plan period.

### **1.2.3 Manpower:**

Employment strength will be as under as it stood presently:-

- (1) Mining Mate : 1 no. Qualified
- (2) Supervisor : 1 no. Experienced
- (3) Semi-Skilled Labours : The strength will depend upon Production.
- (4) Skilled Labours : Taking standard O.M.S. of labour for 2126.25 cum or 5103 t. of production in 240 working days a year, 5 labours per day will be required at the rate of 5 tons per labour = 5 Labours per day.

Thus, total manpower reqt. = 7 nos. per day.

### **1.3 WATER & POWER REQUIREMENT:**

Water requirement for the proposed mines will be for dust suppression, Green Belt Development and Drinking and domestic purpose. Water will be arranged from local body i.e. gram panchayat through water tankers.

Detail breakup of water requirement is as below:

**Table No.1.11: Requirement of water for quarrying operations:**

<b>Details</b>	<b>Unit (KLD)</b>
Dust Suppression	2.00
Green Belt	4.50
Drinking & Washing	0.35
<b>Total Need of Water (1+2)</b>	<b>6.85</b>

Power is reqd. for stone cutting, pumping of water, temporary admin. Building and rest shelters. Total power requirement is 25 HP. Local electricity board shall be applied for electric connection.

#### **1.4 LAND ENVIRONMENT**

As per the satellite imagery data presented above it has been observed that about 80% of the land cover is fallow land, irrigated land (Rabi crop land) include 8.9% and 0.25% scrub land, quarry site 0.8%, pond/lake 0.97% and river is covered under 4.75% of the total land use plan.

Primary field survey shows that the buffer zone is dominated by forest and Agricultural land with less agricultural practice. The habitation and industrial area is also occupied within the buffer zone.

#### **1.5 SOIL QUALITY**

The soil of the area is neutral with the pH range of 7.5-7.9. The total organic carbon content of soils is 2.48-3.63%. Available nitrogen is 113-176Kg/Ha and potassium content is 302-426Mg/Kg. Soils of the area are low to moderate fertility. This type of soil will require more frequent irrigation and fertilization.

#### **1.6 WATER ENVIRONMENT**

##### **1.6.1 Surface Water analysis**

The pH range of the water samples is neutral ranging from 7.5-7.6. Total hardness of the water sample ranges from 152-240 mg/l. Electrical conductivity of water sample ranges from 240-500ms/cm. Dissolved oxygen in the surface water sample ranges from 6.3-6.4 mg/l. Biochemical oxygen demand of the surface water body is 4-6 mg/l. From the water quality results it can be inferred that all the parameters analyzed are under the prescribed limit as per class C

classification of surface water by CPCB and the water does not contain any pollutant which would be hazardous for human, animal or crop health.

### **1.6.2 Ground water analysis**

- Water is colorless and odorless and found to be suitable for human consumption.
- The pH level of the ground water sample ranges from 7.3-7.6. This indicates that the pH of the ground water in the study area is neutral and as per the drinking water standard.
- Total hardness ranges from 200-244 mg/l, and total dissolved solid ranges from 250-530 mg/l.
- Alkalinity ranges from 187-330 mg/l.

### **1.7 AIR ENVIRONMENT**

The major contributors of air emissions are industrial emission, vehicular movement combustion of bio-fuel and other man made sources. During the study period the concentration of PM<sub>10</sub> varies from 35.4-67.3µg/m<sup>3</sup> and PM<sub>2.5</sub> varies from 16.7-25.4µg/m<sup>3</sup>. The concentration of SO<sub>2</sub> varies from 5.1-9.4µg /m<sup>3</sup> and NO<sub>x</sub> concentrations vary from 9.9-19.3µg/m<sup>3</sup>. Concentration of particulate matters, Oxides of Sulphur and Nitrogen are within the NAAQ, 2009 standards.

### **1.8 NOISE ENVIRONMENT**

The study area includes industrial area and residential areas. The ambient noise levels were measured in eight sampling locations. In the project site the day time noise level is 51.4dB (A) and the night time noise level is 38.7dB (A). The maximum noise level is 52.9dB (A) during the day time at Bhasera Village and minimum noise level is 37.4dB (A) during the night time at Bhasera Village. The noise level is found to be maximum in Bhasera Village.

### **1.9 BIOLOGICAL ENVIRONMENT**

The buffer zones of the project site have only one protected forest i.e. Phokhra PF and few mixed open jungles. The area is covered with mostly scrub and open forest along with scattered vegetation near villages. The common plant species found in the study area are Neem, Peepal, Bargad, Gulmohr, Palas, Amrud, Amla etc. The project site and its buffer zone do not include any wild life sanctuary, ecosensitive area or wildlife corridor. The nearest wild life sanctuary is Udanti-Sitanadi Tiger Reserve which is at a distance of 110 km from the project site. The study area within 10 Km of the project site is devoid of any national parks, sanctuaries, Biosphere reserves, wild life corridors, tiger/elephant reserves etc. The area is also devoid of any kind of vulnerable, endangered and critically endangered flora and fauna. Udanti-Sitanadi Tiger reserve is located at a distance of 110 Km from the project site.

## **1.10 SOCIO ECONOMIC PROFILES**

There are 47 villages present within the buffer zone of the project area located within 10 km radius of the project site. Out of the total population, 50006 persons are literate which contribute about 53% within the buffer zone. Out of the total literate, male literacy is contributed as 28749 i.e. 57% and female literacy is contributed as 21257 by 43%. It is observed that the literacy percentage is more among the male as compare to the female population. About 34% of the total populations of the project villages are illiterate. Out of the total population, 37545 persons (about 75%) are workers and 57621 (about 25%) persons are non workers. This can be inferred that more than half of the population is depending on others for their livelihood. Regarding workforce participation rate of both the sex, the data reveals that female workforce participation rate is comparatively less with respect to male. Out of the total working population 22267 (59%) are male and 15278 (41%) are female. Out of the total workers 28795 are main workers and 11658 are marginal workers. In main workers population the male workers are dominated marginal in comparison to female workers whereas in case of marginal workers, female nos. exceeds male nos.

## **1.11 IMPACT & MITIGATION MEASURES**

### **1.11.1 Impact due to Water use in Mines**

In Flag stone mines water will be mainly used for domestic purpose, dust suppression, plantation and washing of heavy earth moving machineries. Only 3.5 m<sup>3</sup> of water will be used for this purpose. The water required for dust suppression and plantation purpose will met through the rain water which will be stored in the exhausted mining pits. Only about 1 m<sup>3</sup> of drinking water will be required for domestic use which is being sourced through tanker. However there is the proposal of construction of a tube well within the lease area for drinking purpose.

#### **Impact on Ground Water**

As per the data provided in the approved mining plan the depth of ground water is 30 m or below surface level as well as in nearby dug well and bore well etc. As the mining operation has been carried out above the ground water table i.e. upto a maximum depth of 15m, so this will not intersect the ground water table. Hence there would not be any adverse effect on the ground water.

#### **Mitigation measures**

- All stacking and loading areas should be provided with proper garland drains

- Check dams should be provided to prevent solids from wash off.
- Construction of garland drains around freshly excavated and dumped areas so that flow of water with loose material is prevented.
- The mine water should be passed through specially constructed catch pits to arrest any loose material being carried away with water.
- Any areas with loose debris within the leasehold should be planted.
- Garland drains should be constructed surrounding the waste dumps and should be connected to the surface water reservoir to avoid the run-off mixing directly to natural water channels before settling.

### **1.11.2 Impact of Cropping Pattern (Land Use)**

- The mining activities will be restricted within the lease area only. The air quality prediction modeling results shows that the ground level concentration of particulate matter is very less and it will spread up to a maximum distance of 500m from the lease area. So the impact of mining on the soil and cropping pattern will also not be observed.
- There is no waste water generated during the mining activities which will be discharged outside. The surface run off from the lease area will be retain within the lease and used for plantation, dust suppression and block cutting. So there will be no soil erosion from the lease area and its surrounding due to mining activity.

### **Mitigation Measures**

The mitigation measure of the land environment includes:

- Before the mining activity the top soil will be scrapped and stored in the lease area and will be utilized for plantation purpose.
- The flag stone excavated from the lease area will be completely selleable resulting no dump within the lease area
- At the end of conceptual period the excavated quarry will converted into water reservoir to supply water for local use like irrigation and pisciculture.
- Due to manual mining operation emission from the flagstone stone mines is very less there will no impact on the surrounding soil quality and cropping pattern of the area.

**Table No.1.12 Sources of Air pollution and Mitigation measures**

Potential	Magnitude of air	Control measures
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<b>sources</b>	<b>pollution</b>	<b>of air pollution</b>
Excavation of topsoil by excavator	Dust generation	Water sprinkling on the soil dump and utilization of soil in plantation purpose
Stone Cutting	Dust generation	Stone cutting with simultaneous water sprinkling
Dressing and Squaring	Dust generation	Water sprinkling
Loading of material	Air emission	Water sprinkling on haul road
Transportation	High dust	Provision for water sprinkle system on permanent road and water spray by tankers on temporary road. Green belt of trees with good footage on both side of haul road. Provision of water spay on the dumper to arrest fine dust before it is transported.

### **1.11.3 Impact due to noise and vibration**

The main noise generating source during mining operation and related activities are excavation, flagstone cutting, loading, unloading and transportation. As the proposed mining activity is opencast manual mining the noise generation will be less. It is expected that the generated noise will be limited within the mine lease cluster and there will be no profound effect of noise on the buffer zone. The noise level will be maintained below the threshold limit by vigorous maintenance of the machineries. As the proposed mining activity does not include any drilling and blasting activity there will be no ground vibration due to the proposed project.

#### **Mitigation measures**

Though the noise pollution in the said mines is very less then also following mitigation measures will be adopted for control of noise and vibration:

- A well planned green belt is proposed for the mining to reduce noise level.
- Regular maintenance of the machineries and vehicles to reduce the noise level.
- Use of ear muffs by the workers with occupational exposure to noise particularly during excavation and stone cutting

### **1.11.4 Impact on Terrestrial Ecology**

The lease area is devoid of any forest land. The nearest reserve forest is Kukradih R.F. at 8 km & Tunggaon R.F. at 10 km. from the lease area. The lease cluster and the surrounding area does not include any forest land. There is no existing vegetation within the lease area as the area is

mostly fallow land. The buffer zone also not includes any forest land and about 80% of the total land use in the buffer zone includes fallow land. No trees will be cut for the mining activities. As the core zone is devoid of major flora and fauna the impact on the ecological status of the area will not be there.

However the possible impacts on the biological environment will be as follows:

- As the lease area is devoid of any tree species, there will be no removal of the large tree species for mining activity
- Anthropological interference due to project activity may create negative impact on the habitation of the wild fauna and flora.
- As the buffer zone and the core zone is devoid of any forest land the impact on the biological environment is very minimal.

#### **Mitigation Measure**

- The lease boundary will be covered under plantation zone.
- The mining quarries will be properly fenced to reduce the risk of fall or slip of wild and domestic animals.
- The vehicles will be properly maintained silencer to reduce the sound level due to transportation of decorative stones.
- The green belt developed by the individual lease area will enhance the aesthetic view of the project.

**Table No.1.13 Proposed Green Belt Plan (Year Wise Plantation plan)**

<b>Year</b>	<b>Width of Plantation (mtr)</b>	<b>No. of row of plantation</b>	<b>Length of Mines Boundary</b>	<b>No of Saplings</b>
1st	2	3	89.07	134
2 <sup>nd</sup>	2	3	89.07	134
3rd	2	3	89.07	134
4 <sup>th</sup>	2	3	89.07	134
5 <sup>th</sup>	2	3	89.07	134
<b>Total</b>	-	-	-	<b>670</b>

#### **1.11.5 Impact on Socio-Economic Environment**

The project does not involve any loss of agriculture land. Some of the impacts would be directly beneficial to the socio-economic environment due to proposed employment potential and improved infrastructural facilities whereas some of them would be of adverse nature. The impact



of the project on the socio economic environment may be both positive and negative. The impacts have been summarized as below:

- Positive impact because of better job & business opportunity
- Negative impact due to air, water, soil pollution depending on the location of the villages.
- Positive impact by creating more livelihood option for the land less and labour class of people
- Positive impact by creating better education, health and communication facility for the villagers.
- No land or human habitation will be affected by the project activity

#### **Mitigation Measures**

- The exhaustive plan for the socio economic development along with the funding detailed in the project benefit chapter based on the need assessment carried out during the socio economic survey.
- The developmental work like supply of safe drinking water, plantation in the villages, health facility for the villagers, Education facility will be planned as per the requirement of the people and implemented through the village committee.
- As the pollution load in the decorative stone mines will be very less and it will be limited to the lease area only.
- All pollution control measures will be undertaken by the lessee to reduce the pollution level due to mining activity and not to spread out of the lease area.
- Thick green belt will be developed around the lease boundary to arrest the air pollutant and noise.

#### **1.12 DISASTER MANAGEMENT PLAN**

The following precautionary measures shall be taken to prevent any accident

- Top edge of opencast workings shall be kept properly fenced. At the final stage, the workings shall be fenced with masonry wall (of not less than 0.13m thick and 1.2m high with a parapet top).
- The sides of excavation and the height and width of benches shall be properly maintained as per mining regulations. Quarrying shall be done from top downwards. No overhand will be allowed.

- Special attention and requisite precautions shall be taken while working in areas of geological weakness like existence of slip, fault etc. Regular dressing of bench sides to ensure safety of workers employed within 5m of working face.
- Provision of safety belt or rope while persons are at work at the quarry sides or benches from where there are chances of falling down for stone than 1.8m.
- Drafting and implementation of preventive maintenance schedule for various kinds of machinery deployed in opencast workings.
- Provision of maintenance of properly laid haul roads with parapet wall fencing or guards and road signs at strategic points.
- Precautions against danger while traversing dumpers, excavators etc. by installing audio-visual alarms and appointment of spotters.
- Proper maintenance of vehicles and weekly examination by an engineer and daily examination by a competent person. Training and retraining (at specified interval) of the machinery operators. Adequate maintenance of electrical equipments & adequate illumination after daylight.

### 1.13 CORPORATE ENVIRONMENTAL RESPONSIBILITY

As per the MoEF & CC OM No. 22-65/ 2017-IA II(M) dated 01.05.2018, it has been recommended that 2% of the project cost will be accorded for Corporate Environmental responsibility. The approximate cost of the project is envisaged at Rs.2,01,000/-. Accordingly minimum 2% of the project cost i.e. Rs.41,000/- shall have to be spend for CER activities. The CER plan has been prepared for the proposed mines of eight nos of lessee has been given in table below:

**Table 1.14 Proposed CER Plan for Barbaspur Flagstone Mines of Sri Rajendra Gupta**

Name of the Mine	Lessee	Cost of the Project	CER Activity	CER Cost
Barbaspur Flagstone Quarry Mine	Mr. Rajendra Gupta	20.01 Lakh	Installation of Rain water harvesting Installation of water filter	Rs. 1,01,000/-
			Running water arrangement for toilet	Rs. 10,000/-
			Plantation around school campus	Rs. 5,000/-
			<b>TOTAL</b>	<b>Rs. 1,16,000/-</b>

**Table 1.15 Proposed CER Plan (Total Cluster area)**

Sl. No.	Activities	Location	Time Frame					Allocated Budget (Rs.)
			1 <sup>st</sup> Yr	2 <sup>nd</sup> Yr	3 <sup>rd</sup> Yr	4 <sup>th</sup> Yr	5 <sup>th</sup> Yr	
<b>Pollution Control measures</b>								
1.	Development & Maintenance of Green Belt and Dust Suppression and other environment management cost	Within lease area and surrounding area	**	**	**	**	**	62,500.00
<b>Peripheral Development Work in CER</b>								
1.	Rain Water Harvesting	Barbaspur	**	**	**	**	**	10,000.00
2.	Plantation around school campus	Barbaspur	**	**	**	**	**	30,000.00
3.	Employment opportunity for the local people including priority to youth of nearby Village.	Nearby villages	**	**	**	**	**	As per the Rule
4.	Health Camp for local villagers	Nearby villages	**	**	**	**	**	50,000.00
5.	Support to the Primary school for study material	Nearby villages	**	**	**	**	**	30,000.00
6.	Water sprinkling along the cluster road used for transportation	Nearby villages	**	**	**	**	**	50,000.00

#### **1.14 ENVIRONMENT POLICY**

Barbaspur Flagstone Quarry is presently under the jurisdiction of The Directorate Geology and Mining Chhattisgarh the concerned authority will stipulate a well defined Environmental policy for Barbaspur Flagstone Cluster by which the lessee is committed to conduct business with strong environmental conscience towards community, customer & employees. The safety and environment policy is as below:

- The Environment, health and safety policy of Barbaspur Flagstone Quarry is the rules and commitment driven towards conservation of environment with protection of employee's health and safety.

- The Lessee is committed towards efficient use of natural resources based on reduce, recycle and reuse method.
- The Project is committed towards identification of possible impacts and will take necessary management plan to mitigate the impacts.
- Our environment and safety performance will regularly monitored and reported and helps for continual improvement of our environment and health performance.
- For health and safety of workers, our efforts is for identification of workplace hazards and creating awareness among the workers for reduce accident. Training to the workforce regarding prevention of accident, accident response and emergency preparedness.
- We strongly believe that accident and adverse environment impact can control through good quality of working environment, safety management and worker's involvement.

#### **1.15 COST THE PROJECT AND ENVIRONMENTAL POLLUTION CONTROL MEASURES:**

In the process of environmental impact assessment a no. of site specific issues have been identified which require due consideration as part of the development planning and environmental project costing. The measures suggested are detailed under environmental management plan. The total cost of the project has been given in table below and the updated capital cost and recurring cost (per annum) for the environmental facilities for the proposed mining project.

**Table No.1.16: Cost of the Project**

<b>Name of the mines</b>	<b>Name of Lessee</b>	<b>Land Value in Rs. Lakhs</b>	<b>Cost of Admin Building Rs. Lakhs</b>	<b>Cost of Equipment Rs. Lakhs</b>	<b>Establishment cost Rs. Lakhs</b>	<b>Total cost Rs. Lakhs</b>
Barbaspur Flagstone Quarry Mine	Mr. Rajendra Gupta	11.51	1.00	2.50	5.00	20.01

**Table 1.17: Cost of Environmental Pollution Control Measures**

<b>Name of Mine</b>	<b>Name of Lessee</b>	<b>Proposed Cost of EMP</b>
Barbaspur Flagstone Quarry Mine	Mr. Rajendra Gupta	62,500/-