

EXECUTIVE SUMMARY OF

BASIN, BARBHATTA AND BINAURI FLAGSTONE QUARRY MINE

CLUSTER AREA: 86.86 ACRES/35.151 HA

AT VILLAGE: BASIN & BARBHANTHA, TAHASIL: RAJIM

DISTRICT: GARIYABANDH, CHHATISGARH

CATEGORY OF PROJECT: B1

BASELINE MONITORING PERIOD: DECEMBER 2019 TO FEBRUARY 2020

APPLICANT DETAILS

No.	Name of Mining Lease	Name & Address of the Lessee	Area in Ha
01	Basin Flagstone Mines	Fagendra Yadu Village Basin, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.88
02	Barbhanttha Flagstone Mines	Daymond Yadu Village Barbhatta, Tahasil Rajim, Dist Garibandh, Chattishgarh	1.36
03	Barbhanttha Flagstone Mines	Ghanshyam Yadu Village Barbhatta, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.49
04	Basin Flagstone Mines	Manish Kumar Sahu Village Basin, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.47
05	Basin Flagstone Mines	Neelam Kumar Sahu Village Basin, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.52
06	Basin Flagstone Mines	Pramod Singh Chandel Village Basin, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.40
07	Barbhanttha Flagstone Mines	Samir Yadu Village Barbhatta, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.86
08	Barbhanttha Flagstone Mines	Tulsi Ram Yadu Village Barbhatta, Tahasil Rajim, Dist Garibandh, Chattishgarh	0.43

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Document No. :KLPL-EIA(MM)B ₁ /2020-43	Document Name: EIA/EMP Report For Basin, Binauri & Barbhanttha Flagstone Quarry Mine over an area of 35.151Ha in Village Basin of Rajim Tahasil, District Chhatisgarh, Odisha.		
Issue. No.: 01	Date: 02.09.2020	Copy No.: -	Copy Holders Name: -

EXECUTIVE SUMMARY

11.1 INTRODUCTION

This Summary is a brief outline of Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) carried out for Basin Flagstone Quarry of eight mining lease areas located in Village Basin and Barbhatta in Rajim Tahasil of Gariyabandh District, Chhatisgarh. The lease areas simultaneously situated along with other 37 quarry leases within 500 metres of radius forming a cluster and the total cumulative area including the proposed lease area is 35.151 Ha. The said cluster is located at Basin, Binauri & Barbhatta Villages in Rajim Tahasil of Gariyabandh District, Chhatisgarh. As the lease area is less than 100 Ha, the project comes under category B1 as per EIA Notification, 14th September 2006 and subsequent amendments. Environment Impact Assessment and Environment Management Plan (EIA/EMP) is prepared with reference to the Terms of Reference (ToR) issued by SEAC, Chattisgarh. Respective ToR has been issued separately to the new applicants for their respective individual mines and separate mining plan has also been duly approved concerning all the leases.

11.2 HIGHLIGHTS

A. The Project

Table 11.1 Brief Profile of the Project: Basin and Barbhatta Flagstone Quarry (8 Lease area)

Sl. No	Salient Features	Description
1	Total mining lease area	5.41 Ha.
2.	Village	Basin and Barbhatta
3.	Tahasil	Rajim
4.	District and State	Gariyaband, Chattisgarh
5.	Land Category	Non Forest Pvt. Land
6.	Toposheet No.	64 H/13

7.	Nearest Town	Rajim
8.	Nearest road	SH 2 (2.55 km)
9.	Nearest River	Sukha river (4 Km)
10.	Nearest Rly Station	Rajim Railway station (12.70 Km)
11.	Nearest Airport	Raipur Airport (33.50 Km)
12.	Nearest Forest	Pokhra Reserve Forest 2 km
13.	Material to be Mined	Flag Stone (Low grade limestone)
14.	Rate of production	35428.56 TPY
15.	Nature of Waste	No mine waste or rejects is expected to be generated.
17	Source of water	Water will be arranged from local body i.e. gram panchayat through water tankers.

Table 11.2 Brief Information of Basin, Barbhatta & Binauri Flagstone Cluster Quarry

Sl. No	Salient Features	Description
1	Total mining lease area of Basin, Binauri & Barbhatta Cluster Flagstone Quarry Mines	35.151 Ha.
2.	Village	Basin, Binauri & Barbhatta Villages
3.	Tahasil	Rajim
4.	District and State	Gariyaband, Chattisgarh
5.	Land Category	Non Forest Pvt. Land
6.	Toposheet No.	64 H/13, 64 L/01, 64 G/16 & 64 K/04
7.	Nearest Town	Rajim

8.	Nearest road	SH 2 (2.55 km)
9.	Nearest River	Sukha river (3 Km)
10.	Nearest Rly Station	Rajim Railway station (12.70 Km)
11.	Nearest Airport	Raipur Airport (33.50 Km)
12.	Nearest Forest	Pokhra Reserve Forest (2 km.)
13.	Material to be Mined	Flag Stone (Low grade limestone)
14.	Rate of production	63272.74 Cu.m
15.	Top soil utilization	Top soil excavated from the mine pit area will be spread on the boundary and plantation will be done in such area to preserve top soil. Balance top soil will be preserved on pre identified separate land till their proper disposal. No mine waste or rejects is expected to be generated.
18.	Manpower	81no. Qualified personnels, 24 nos. of semi-skilled & 404 nos labourers. Total 509 nos.

B. Environmental Aspects

Pollution Potential: Land degradation, generation and propagation of fugitive dust, erosion of soil are the major pollutions anticipated from the proposed mining & allied activities

Environmental Impact: Marginal adverse impact on the localized air and land environment, which gets compensated by moderately beneficial impact on the human environment.

11.3 TYPE OF THE PROJECT

Basin and Barbhatta Flagstone are newly applied mine located at Basin and Barbhatta village. The proposed mining lease is comes under cluster situation i.e. there are 45 nos of lease exists within 500 m radius. Total cluster area comes to 35.151 Ha or 86.86 Acres. This cluster comes under ownership of different proponents and located in Village/Mouza Basin, Barbhatta &

Binauri of Rajim Tahasil, District Gariyaband, and Chhattisgarh. The lease details of cluster are given in the following table:

Table 11.3: Lease Details of Basin, Barbhatta & Binauri Flagstone Cluster Quarry

Sl. No.	Name of Proponent with Address	Location Village of Quarry	Tahasil	Plot No.	Area in Ha.	Kisam of Land	Mining Product
1	Sri Pramod Tiwari, Raipur	Basin	Rajim	1327	1.1200	Private	Flagstone
2	Sri Rajendra Gupta, Rajim	Barbhatta	Rajim	42	0.4850	Private	Flagstone
3	Ajay Ku Jadwani, Basin	Basin	Rajim	1012	3.2000	Private	Flagstone
4	Sri Mohan Sahu	Basin	Rajim	1178	1.0110	Private	Flagstone
5	Sri Pramod Challani	Binori	Rajim	2,3,4,8/1,3	2.4970	Private	Flagstone
6	Sri Kamal Aisani	Basin	Rajim	1318, 1319, 1320, 1321, 1322	0.4310	Private	Flagstone
7	Sri Lalit Mahadik	Basin	Rajim	848/27	0.3400	Govt.	Flagstone
8	Satnam Tiles	Basin	Rajim	1017, 1019	0.1600	Private	Flagstone
9	Satnam Tiles	Basin	Rajim	1327	0.5000	Govt	Flagstone
10	Sri Dharmendra Parmar	Basin	Rajim	1006, 1007	0.1680	Private	Flagstone
11	Sri Santosh Upadhyaya	Barbhatta	Rajim	165, 162/2, 168, 169/2, 170, 178	0.5900	Private	Flagstone
12	Sri Santosh Upadhyaya	Barbhatta	Rajim	88/1	0.4400	Govt.	Flagstone
13	Smt Suanjana Upadhyaya	Bhasera	Rajim	1075/1, 1075/2	1.2500	Private	Flagstone

14	Sri Bhagirathi Sahu	Barbhatta	Rajim	1461	0.4700	Private	Flagstone
15	Sri Ramesh Ku Sahu	Binori	Rajim	30, 32	2.6000	Govt	Flagstone
16	Smt. Anita Soni	Barbhatta	Rajim	27	0.3700	Private	Flagstone
17	Sri Ramesh Yadav	Bijli	Rajim	1027, 1029, 1031	1.7440	Govt.	Flagstone
18	Jay Mouli Mata (Sital Rajput)	Barbhatta	Rajim	17, 20, 21, 22, 23, 34, 35, 39, 40, 48, 49	1.2230	Private	Flagstone
19	Smt. Sarita Saraf	Bhasera	Rajim	1050, 1052	0.1900	Private	Flagstone
20	Jay Ma Ramaipath (Fagendra Yadu)	Barbhatta	Rajim	12, 44, 45	1.2020	Private	Flagstone
21	M/s Abhisekh Tiles	Barbhatta	Rajim	108, 109	0.4400	Govt	Flagstone
22	Sri Yogendra Sahu	Basin	Rajim	1416	0.5100	Private	Flagstone
23	Satguru Tiles Pro. Pahatia	Basin	Rajim	1327	0.4050	Govt.	Flagstone
24	Gurukrupa Polishing Krushna Medhwani	Binori	Rajim	53	0.9800	Govt	Flagstone
25	M/s Jay Ma Bhawani Prop. Pramod Tiwari	Basin	Rajim	1315, 1316, 1317, 1337, 1338	0.8030	Private	Flagstone
26	Smt. Santoshi Bai Sinha	Basin	Rajim	1012	0.4200	Private	Flagstone
27	Smt Vineeta Sharma	Basin	Rajim	1027, 1028	0.3100	Private	Flagstone

28	Sri Ramvishal Ogre	Basin	Rajim	1014	0.9200	Govt.	Flagstone
29	Sri Ranulal Jain	Basin	Rajim	1012	1.0520	Private	Flagstone
30	Sri Iswar Joshi	Binori	Rajim	31	0.4000	Govt.	Flagstone
31	Smt. Bhabvana Sribas	Basin	Rajim	1472/1, 1472,2	0.4300	Private	Flagstone
32	Sri Yadram Sahu	Basin	Rajim	1460	0.4500	Private	Flagstone
33	Sri Ramvishal Ogre	Basin	Rajim	1327	0.1200	Private	Flagstone
34	Sri Sarad Chaturvedi	Barbhatta	Rajim	75	0.8000	Private	Flagstone
35	Kishore Sachdev	Barbhatta	Rajim	75	0.7000	Govt.	Flagstone
36	Sri Ratanlal Sahu	Barbhatta	Rajim	1459/2	0.5100	Private	Flagstone
37	Vikas Chaturvedi	Basin	Rajim	1448	0.5000	Private	Flagstone
38	Sri Ghanashyam Yadu	Barbhatta	Rajim	4/3	0.4900	Private	Flagstone
39	Sri Nilam Kumar Sahu	Basin	Rajim	1459 / 1	0.5200	Private	Flagstone
40	Sri Pramod Singh Chandel	Basin	Rajim	1326 /2	0.4000	Private	Flagstone
41	Sri Samir Yadu	Barbhatta	Rajim	80, 81, 82	0.8600	Private	Flagstone
42	Sri Tulsiram Yadu	Barbhatta	Rajim	15	0.4300	Private	Flagstone
43	Sri Fagendra Yadu	Basin	Rajim	1462/1, 1465	0.8800	Private	Flagstone
44	Sri Manis Ku Sahu	Basin	Rajim	1312/1, 1314/1	0.4700	Private	Flagstone
45	Sri Diamond Yadu	Barbhatta	Rajim	4/1	1.3600	Private	Flagstone
Total Area					35.1510	--	--

To obtain environmental clearance, a suitable Environmental Impact Assessment and Environmental Management Plan for the mining lease area has been prepared. In a view to obtain environmental clearance for Basin Flagstone Quarry mines, the Lessee Fagendra Yadu has entrusted the assignment to M/s Kalyani Laboratories Private Limited Bhubaneswar for preparing EIA /EMP report. Kalyani Laboratories private limited (MoEF & CC and NABL accredited Lab) has gathered required baseline data for pre monsoon season (15th December 2019 to 15th March 2020) and accordingly prepared the EIA / EMP report.

11.3 PROJECT OUTLINE

11.3.1 Method of mining

Method of mining will be open cast mining. Mode of working will be manual. Only top soil will be removed by excavator and cutting of stone on the stone layer on mine surface will be done by stone cutter. The other operations like excavation and sizing etc. will be done manually by local labours by hardened chisels. Loading of sized stone on tractors will be done manually with the help of local labours. Transportation of flagstone will be done by tractors. Rejects of flagstone will be manually sized into hand broken stone chip in the mine area. Hand Broken stone chip will also be loaded on tractors manually.

11.3.2 Reserve Estimation

Reserve Estimation

The reserve within the lease has been calculated by graphical method. The details of mineable and geological reserve of the individual mines cluster have been given in the table below:

Table no.11.4: Reserve Calculation

Name of the Mines	Name of the Mines	Geological Reserve	Reserve Blockage in 7.50 m wide Mine Boundary	Reserve Blockage in Benches	Reserve blockage in No Mining Zone	Minable Reserve	Expected mining loss	Recoverable Reserve	Flagstone	Rejects of flagstone
Barbhatta Flagstone Mines	Manish Sahu	1,12,800	38,760	24,530.4	37,248	12,261.6	1,226.2	11,035.4	9,931.9	1,103.5
Basin Flagstone Mines	Fagendra yadu	2,11,200	93,024	83,436	--	34,740.	1,737	33,003	31,352.85	1,650.15
Barbhatta Flagstone Mines	Samir Yadu	2,06,400	82,728	65,450	--	58,221.6	2,911.08	55,310.52	52,544.99	2,765.53

Barbhatta Flagstone Mines	Daymond Yadu	3,26,400.0	91,560.00	75,580.8	--	1,59,259.2	7,962.96	1,51,296.24	1,43,731.43	7,564.81
Barbhatta Flagstone Mines	Ghanshyam Yadu	1,17,600.0	54,264.00	38,193.6	--	25,142.40	1,257.12	23,885.28	22,691.02	1,194.26
Basin Flagstone Mines	Pramod Singh Chandel	96,000.00	41,472.00	32,776.8	--	21,751.20	1,087.56	20,663.64	19,630.46	1,033.18
Basin Flagstone Mines	Neelam Sahu	1,12,320	46,612.80	42,746.4	--	22,960.80	1,148.04	21,812.76	20,722.12	1,090.64
Barbhatta Flagstone Mines	Tulsiram Yadu	72,240	19,370.40	9,727.20	39,664.8	3,477.60	173.88	3,303.72	3,138.53	165.19

11.3.3 Benching Pattern of the 8 lease areas

The flagstone is buried under top soil in the entire lease area. Width of benches will be maintained similar to height of benches. The quarry will be developed in benches of 3m height x 3 m width each out of which first bench will be of top soil. During advancement of mining the operational bench will be worked into 1.5m - 1.5 m height of sub-benches. Finally at mine boundary benches will be converted to 3m (H) X 3m (W) each as detailed in table below-

Table No.11.5 Benching pattern Details of individual clusters

BenchNumber	BenchSpecification	BenchHeight	BenchWidth
QuarryBench	SoilBench	3.00m	3.00m
QuarryBench	Soil+StoneBench	3.00m	3.00m
QuarryBench	StoneBench	3.00m	3.00m
QuarryBench	StoneBench	3.00m	3.00m
QuarryBench	StoneBench	3.00m	-

11.3.4 Waste Generation and Management

a)TopSoil:

Table No.11.6 Details of top soils

Name of the Mines	Name of the Mines	Top Soil generated in cu.m	Utilization of Topsoil
Barbhatta Flagstone Mines	Manish Sahu	6771	Approx. 630 cum soil will be stored on mine boundary and 3725 cum top soil will be stacked on No Mining zone in 1st year of mine development

			Balance 2416 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Basin Flagstone Mines	Fagendra yadu	21792	1500 cum top soil will be stacked at mine boundary in 1st year of mine development. Balance 20,292 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Barbhatta Flagstone Mines	Samir Yadu	19367	1,350 cum top soil will be stacked at mine boundary in 1st year of mine development. Balance 18,017 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Barbhatta Flagstone Mines	Daymond Yadu	44111	Approx. 2,500 cum top soil will be stacked at mine boundary and for backfilling of 502 sqm of excavated part of mine boundary during 1st year of mine development Balance 41,611 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Barbhatta Flagstone Mines	Ghanshyam Yadu	9144	1400 cum top soil will be stacked at mine boundary and also used for backfilling of 255 sqm. excavated area on boundary during 1st year of mine development. Balance 7744 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Basin Flagstone Mines	Pramod Singh Chandel	10230	670 cum top soil will be stacked at mine boundary in 1st year of mine development. Balance 9,560 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Basin Flagstone Mines	Neelam Sahu	16032	840 cum top soil will be stacked over mine boundary in 1st year of mine development.

			Balance 15,192 cum top soil will be preserved on land adjoining or nearby the mine by back filling in abandoned mine pits.
Barbhatta Flagstone Mines	Tulsiram Yadu	3312	3312 cum top soil will be used to backfill the northern pit of no mining zone and balance soil will be spread over no mining zone in 1st year of mine development.

b) Overburden: In the stone mines all the ROM is saleable material. Whatever overburden generated from the mines is ultimately sold by lessee. Therefore there would not be any unuseful overburden in the mine which requires their due management and proper disposal plan.

c) Sub grade & rejected mineral:

Statutory boundary is 7.50 m wide in order to comply the rules of MMR1961. Out of this statutory boundary 3.0 m wide area from the edge of mine pit is proposed to left to comply the provisions of MMDR. Dumping area is proposed on balance outer 4.50 m wide area of statutory boundary i.e. after 3.0 m of no activity zone. Therefore separate dumping area in the mine is not proposed. Rather outer 4.50 meter wide area under statutory boundary is itself considered as dumping area. Plantation and development of roads is also proposed on the same dumping area.

11.3.5 Reclamation / Rehabilitation / Afforestation

During the end of life of mines the ultimate depth of mining will be 15m. The quarry area will be finally converted into the water reservoir where the rain water will be stored and utilized for irrigation purpose. Further the plantation in the safety zone will serve as a barrier for the water bodies

11.4 PRESENT ENVIRONMENTAL SETTING

To achieve these objectives of EIA/ EMP study, the EIA team members of M/s Kalyani Laboratories Private Limited, Bhubaneswar monitored different environmental parameters of the core zone (Lease area) and buffer zone (10 km. radial distance) of the project site in accordance with the Guidelines for EIA issued by the MoEF & CC, Govt. of India. The baseline study was carried during the period from 15th December 2019 to 15th March 2020. The baseline monitoring and analysis of different environmental parameters was conducted by M/s Kalyani Laboratories

Pvt. Ltd. (MoEF & CC approved lab vide Gazzetted notification no.1573 dated 6th August 2014 and NABL accredited Lab no TC-7043 dated 16.03.2018).

11. 4.1 Land use and Topography

Land Use

The total area granted for mining lease is coming within the non forest waste land. 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.

Topography

Basin, Binauri & Barbhatta clusters flagstone quarry is featured in the Survey of India Toposheet No. 64 H/13, 64 L/01, 64 G/16 & 64 K/04. The cluster mine is located at a distance of 40 Km from District head quarter Gariyaband and is situated at a distance of 40 Km from the state capital Raipur. The area has been surveyed through hand held GPS for obtaining the co-ordinates and RL's of the required points.

The topography of the area is Flat land. The stone is buried under the soil in the entire lease area. The general slope is towards north. Maximum Altitude of the applied area is 289 m AMSL at south- eastern part while lowest side is 287 m AMSL at northern part of lease area. The applied area is devoid of any vegetation.

Physiographically, the northern part of Gariyaband District exhibits mostly the landform of structural plains with structural hills and valleys, denudational slope, denudational hills and valleys, pediments/pedi plains and flood plains along the courses of Mahanadi, Pairi river and Sargi rivers.

There is no perennial rivers/nallas or spring present within the cluster area. The drainage pattern of the area is mostly dendritic and the drainage of the area will be mostly controlled by Mahanadi and its tributary. At present there is no water source, which is passing through the lease area and its surrounding except, Sargi nalla at 810 m towards east, Sukha river at 4.10 km towards east, Village Pond at 480 m towards south-west, Canal at 190 m towards west, Reservoir

at 11.50 km towards south-east near Parsadakalan village area. Proper care will be taken at the time of mining.

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11.4.2 Climate & Meteorology

The climate condition of the district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July. From climatologically point of view, the average annual precipitation over the district is about 1200–1400 mm. Moderate temperature prevails over the area throughout the year barring the summer season (March–June), where the maximum temperature even exceeds 45 °C. The average minimum temperature over the district is 9.6 °C.

11.4.3 Ambient Air quality

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 PM₁₀ varies from 42.2-61.1µg/m³ and PM_{2.5} varies from 19.1-27.4µg/m³. The concentration of SO₂ varies from 6.0-9.4µg /m³ and NO_x concentrations vary from 10.1-18.4µg/m³. Concentration of particulate matters, Oxides of Sulphur and Nitrogen are within the NAAQ, 2009 standards.

11.4.4 Water Quality

As per the monitoring and analysis of surface water & ground water of selected sampling areas, it has been observed that,

Surface Water

The pH range of the water samples is neutral ranging from 7.6-8.3. Total hardness of the water sample ranges from 140-240 mg/l. Electrical conductivity of water sample ranges from 230-500ms/cm. Dissolved oxygen in the surface water sample ranges from 6.1-6.5 mg/l. Biochemical oxygen demand of the surface water body is 3-4 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.

From the water quality results it can be inferred that all the parameters analyzed are under the prescribed limit as per IS 2296:1982; class C and the water does not contain any pollutant which would be hazardous for human, animal or crop health.

Ground Water

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 244-284 mg/l, and total dissolved solid ranges from 230-530 mg/l and alkalinity ranges from 264-330 mg/l.

From the above water quality results it can be inferred that all the parameters analyzed are under the prescribed limit specified under IS10500, 2012 for drinking water. The water is free from microscopic organism and do not contain any pollutant which would be hazardous for human, animal or crop health, So it is fit for drinking purpose.

11.4.5 Noise Quality

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 55.4dB (A) and the night time noise level is 43.2dB (A). The maximum noise level is 58.3dB (A) during the day time at Purena Village and minimum noise level is 38.2dB (A) during the night time at Purena Village. The noise level is found to be maximum in Purena Village.

11.4.6 Soil quality

The soil of the area is neutral with the pH range of 7.6-8.0. The total organic carbon content of soils is 2.6-3.6%. Available nitrogen is 126-201Kg/Ha and potassium content is 325-448Mg/Kg. Soils of the area are low to moderate fertility. This type of soil will require more frequent irrigation and fertilization.

11.4.7 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 does 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.

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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.

11.4.8 Socio Economic Environment

There are 74nos of villages present within the buffer zone of the project area located within 10 km radius of the project site.

Table 11.7 Demographic profile of the buffer zone

Attributes	Details
No. of Villages	74
Total Household	17596
Total Population	79724
Male Population	39859
Female Population	39865
Total ST population	11001
Total SC Population	11864
Sex Ratio	99:100
Population below 6 Years	11102

Out of the total population, 51871nos persons are literate. Out of the total literate, male literacy is contributed by 29650 i.e. 57% and female literacy is contributed by 22221 i.e. 42%. It is observed that the literacy percentage is more among the male as compare to the female population. 55% of the total population (28855nos) of person is illiterate.

Out of the total population 79724, 41435 persons (51%) are workers and 38379 (48%) persons are non workers. This can be inferred that more than half of the population is having no livelihood opportunity.

Out of the total workers 30844 are main workers and 8246 are marginal workers.

11.5 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

11.5.1 Impact of Cropping Pattern

- 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 retained 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 sellable resulting no dump within the lease area
- At the end of conceptual period the excavated quarry will be 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 be no impact on the surrounding soil quality and cropping pattern of the area.

11.5.2 Impact on Air Quality and Mitigation Measures:

Mining operation and its associated activities are potentially air polluting and the major air pollutant is the particulate matter. The impacts on air quality due to the proposed mining are as below:

- Dust from excavation and mining of stone.
- Loading, unloading and screening.
- Vehicular movement on the haul roads.

The mitigation measures undertaken in the mine for control of air pollution are:

- Cutting of the flagstone associated with water sprinkling

- 1 no. of water tanker with 10000 liter capacity will be hired and used for water sprinkling twice in a day in haul roads, dumping site, loading and unloading site etc.
- Regular water sprinkling on the dumping areas.
- The mines workers are provided with the dust masks.
- Trees can act as efficient biological filters. As this is a small lease, the area available for plantation is very less. However a well planned plantation programme has been proposed for the mining area to arrest the dust pollution within the lease boundary.

11.5.3 Impact on Noise Quality and Mitigation Measures

The main noise generating source during mining operation and related activities are excavation, stone 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

11.5.4 Impact on Water Quality and Mitigation measures

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 m³ of water will be used for individual clusters area for this purpose. The water required for dust suppression and plantation purpose will meet through the rain water which will be stored in the exhausted mining pits. Only about 1 m³ 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 applicant and villagers ground water is available after 30 m or below it from normal 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. up to a depth of 15 m, 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

11.5.5 Impact on Vegetation and Mitigation measures:

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.

11.5.6 Impact on Socioeconomic Conditions:

- 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.

11.6 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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 mining cluster is Rs. 133.34 Lakhs and the updated capital cost and recurring cost (per annum) for the environmental facilities for the proposed mining project works out to be Rs. 5.68 Lakhs.

Table No.11.8: Cost of Environmental Management Plan (EMP)

Name of Mine	Name of Lessee	Proposed Cost of EMP
Basin Flagstone Quarry Mine	Mr. Manish Kumar Sahu	86,000/-
Barbhata Flagstone Mine	Mr. Samir Yadu	70,000/-
Barbhata Flagstone Quarry Mine	Mr. Diamond Yadu	85,000/-
Barbhata Flagstone Quarry Mine	Mr. Ghanshyam Yadu	57,000/-
Basin Flagstone Quarry Mine	Mr. Pramod Singh Chandel	52,000/-
Basin Flagstone Quarry Mine	Mr. Neelam Kumar Sahu	64,000/-
Barbhata Flagstone Quarry Mine	Mr. Tulsiram Yadu	67,000/-
Basin Flagstone Quarry	Mr. Fagendra yadu	87,000/-

11.7 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 CER plan has been prepared for the proposed mines of 8 mines cluster and also for the cluster of 45 mines located in the area. The details are as below:

Table 11.9 Proposed CER Plan (8 mines cluster)

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.113.84 Lakhs. Accordingly minimum 2% of the project cost i.e. Rs. 2.68 lakhs shall have to be spend for CER activities. However the proposed CER cost is more than the stipulated requirement. The CER plan has been prepared for the proposed mines of eight nos of lessee has been given in table below:

Table 8.1 Proposed CER Plan (8 mines cluster)

Name of the Mine	Lessee	Cost of the Project in Rs. lakhs	CER Activity	CER Cost
Basin Flagstone Quarry Mine	Mr. Manish Kumar Sahu	16.58	Installation of Rain water harvesting	90,000/-
Barbhata Flagstone Mine	Mr. Samir Yadu	18.26	Installation of water filter	Rs. 20,000/-
			Annual maintenance contract of above water filter in the name of school principal for 5 years - 5 X 1000/-per yr.	Rs. 5,000/-

			Annual maintenance contract of above water filter in the name of school principal for 5 years - 5 X 1000/-per yr.	Rs. 5,000/-
			Running water arrangement in toilet	Rs. 15,000/-
			Plantation in School Campus	5,000/-
			Total:	45,000/-
Barbhata Flagstone Quarry Mine	Mr. Diamond Yadu	25.41	Installation of Rain water harvesting	1,05,000/-
Barbhata Flagstone Quarry Mine	Mr. Ghanshyam Yadu	12.84	Installation of Rain water harvesting	1,20,000/-
Basin Flagstone Quarry Mine	Mr. Pramod Singh Chandel	14.45	Installation of Rain water harvesting	1,19,000/-
Basin Flagstone Quarry Mine	Mr. Neelam Kumar Sahu	14.38	Installation of water Filter	20,000/-
			Annual maintenance contract of above water filter in the name of school principal for 5 years - 5 X 1000/-per yrs.	5,000/-
			Plantation in school Campus	10,000/-
			Total:	35,000/-
Barbhata Flagstone Quarry Mine	Mr. Tulsiram Yadu	10.73	Development & Maintenance of Green Belt Water Filter AMC Plantation	35,000/-
Basin Flagstone Quarry	Mr. Fagendra Yadu	21.19	Installation of Rain water harvesting	71,000/-
			Planation around school campus	10,000/-
			Total	81,000.00
