1.INTRODUCTION OF PROJECT & PROPONENT

The project is proposed to Limestone mining in an area of 3.420 hectares. The Mining sites are situated at Village- Chhotekadma, Tehsil –Darbha, District - Bastar and State-Chhattisgarh.

2. LOCATION

The mine lease area is located in Village- Chhotekadma, Tehsil –Darbha, District - Bastar and State-Chhattisgarh is on Khasra No. 169,170,175,176,177 & 179 covered in the Survey of India Topo Sheet No – 65 E/16, F/13.

Site coordinates:

S. N.	LATITUDE	LONGITUDE	S.N.	LATITUDE	LONGITUDE
BP 1	18°58'2283" N	81°51'23.01" E	BP 10	18°58'15.35" N	81°51'26.71"E
BP 2	18°58'21.78" N	81°51'26.13" E	BP 11	18°58'16.58" N	81°51'24.15" E
BP 3	18°58'21.35" N	81°51'26.19" E	BP 12	18°58'17.08" N	81°51'22.59" E
BP 4	18°58'20.46" N	81°51'28.05" E	BP 13	18°58'17.64" N	81°51'21.65" E
BP 5	18°58'19.36" N	81°51'27.66" E	BP 14	18°58'19.06" N	81°51'21.83" E
BP 6	18°58'18.94" N	81°51'29.81" E	BP 15	18°58'19.42" N	81°51'18.27" E
BP 7	18°58'17.11" N	81°51'29.49" E	BP 16	18°58'20.26" N	81°51'18.29" E
BP 8	18°58'17.61" N	81°51'27.02" E	BP 17	18°58'20.17" N	81°51'21.96" E
BP 9	18°58'16.39" N	81°51'26.78" E			

Nearest Railway Station: Jagdalpur about 19.5 km.

Nearest Airport: Nearest Airport Maa Danteshwari Airport Jagdalpur about 22 km.

Nearest Highway: NH-30 a distance of 4.5 Km .

3.RESERVES

General outline method has been used to calculate the reserves of Limestone in the quarry lease area. Because the deposit is simple, all most horizontal and structurally undisturbed and small, it is also equally flat all over the quarry lease area.

Table No. 10.1: Geological Reserves

S. No	Category	Reserves
1	Total Geological Reserve	17,10,000 T
2	Mineable Reserve	10,31,626 T
3	Proposed Production	62,500TPA
4	Ultimate depth of Mining	20 m from Ground level

4.MINING

Limestone Mining

Mining will be carried out by open cast bench method. following consideration taken for the proposed mine layout to be carried out systematically & scientifically:

1. All the operations will be carried out semi-mechanized with manually after blasting in the stone. Loading and unloading will be done manually or hire loader.
2. No OB/ waster material will be produced.
3. Some drilling and blasting will be required for removal of stone.
4. Roads will be properly made and sprayed by water for suppression of dust.
5. Roads in the lease area for the movement of loaded trippers/trucks.
6. No processing/beneficiation of Low Grade Limestone has been planned or required except sizing & screen of Limestone.

5.WATER SUPPLY

Water requirement for the proposed project will be provided for the workers for drinking & domestic purpose. Water will also be provided for dust suppression. Fresh water will be only used for drinking purpose. The break up for water requirement is given below:

Table 10.2 Water Requirement

Activity	Calculation	Total water requirement (in KLD)
Drinking	30 *45L/1000	1.35
Dust Suppression	138.5 m* 6m*1.0 lt * 2 /1000	1.66
Plantation	1000*2L/1000	2.00
Total		**5.01 KLD**

Drinking: @ 45 lpcd per labor
Dust Suppression: Total haulage road to be water sprinkled * road width *0.5 ltr. water*2times a day/1000

Plantation: Plants in one year*@ 5 L/per plant/1000

6.BASE LINE DATA

The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The baseline environment quality was carried out over a radial distance of 10 km around the mining lease area during Post-Monsoon Season covering the months of Oct 2022 to Dec 2022.

Environmental data has been collected in relation to proposed mining for: -

(a) Air

(b) Noise

(c) Water

(d) Soil

(e) Ecology and Biodiversity

(f) Socio-economy

Table BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Ambient Air Quality	The Ambient Air Quality Monitoring reveals that of monitoring stations with minimum Concentrations of PM10 were 33.05 µg/m^3 at AQ5 and maximum 57.31 µg/m^3 at AQ8. The result of PM2.5 reveals that the minimum concentration of 21.12 µg/m^3 at AQ5 while maximum concentration of 44.81 µg/m^3 was found at AQ8. The gaseous pollutants SO2 and NOx were within the prescribed CPCB limit of 80 µg/m^3. For residential and rural areas at all stations. The minimum & maximum concentrations of SO2 were found to be 8.03 µg/m^3 at AQ5 & 13.89 µg/m^3 at AQ8 respectively. The minimum & maximum concentrations of NOx were found to be 9.06 µg/m^3 at

	AQ 5 & 18.13 µg/m3 at AQ8 respectively. The free silica content in PM10 was found to be minimum 1.01 µg/m3 and maximum 2.63 µg/m^3 at AQ5 and AQ8 respectively.
Noise Levels	Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 40.03 dB (A) at NQ-5 & 56.04 dB (A) at NQ8 respectively. The minimum & maximum noise levels at night time were found to be 33.35 dB (A) at NQ5 & 47.41 dB (A) at NQ8 respectively. There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.
Water Quality	• The pH limit fixed for drinking water samples as per IS-10500 Standards is 6.5 to 8.5 beyond this range the water will affect the mucus membrane or water supply system. During the study period, the pH was varying for ground waters from 6.71 to 7.83. The pH values for all the samples collected in the study area during study period were found to be within the limits. • The desirable limit for total dissolved solids as per IS-10500 Standards is 500 mg/l whereas the permissible limit in absence of alternate source is 2000 mg/l. In ground water samples collected from the study area, the total dissolved solids are varying from 412 mg/l to 485 mg/l. The TDS of the samples were within the desirable limit & the permissible limit of 500 mg/l & 2000 mg/l respectively.

Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.05 to 7.85, which shows that the soil is alkaline in nature. Potassium is found to be from 71 mg/kg to 98 mg/kg. The water holding capacity is found in between 21% to 36%.
Ecology and Biodiversity	There are no Ecologically Sensitive Areas present in the study area, but many reserved forests regions surround the project area.
Socio-economy	The project will throw opportunities to local people for both direct and indirect employment. The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

7. BIOLOGICAL ENVIRONMENT

Flora of the Buffer Zone

The present study on the floral assessment for the proposed project activity is based on extensive field survey of the area. The study is conducted in post monsoon season. The plant species are identified during floral survey and with the help of nearby institutions / University and by secondary sources. Besides the collection of plant species, information is also collected with vernacular names of plant species made by local inhabitants.

Core Zone: The core zone comprises of undulating land with mounds/hillocks of limestone. Only some part of the lease area is covered with very thin soil. Vegetation/trees observed in the core zone were *Acacia arabica*, *Ziziphus* sp.*Calotropis* sp. and *Lantana camara along with* some grasses after monsoon. The most dominant tree species in the study area are *Artocarpus integrifolia*, *Azadirachta indica*, *Delonix regia*, *Eucalyptus* sp., *Ficus religiosa*, *Mangifera*

indica, Madhuca indica, Syzygium cumini, Annona squamosa, Psidium guajava and *Tamarindus indica*. etc.

Table: Anticipated impact and mitigation measures for biological environment

Impact Predicted	Suggestive measure
Disturbance to free movement / living of wild fauna viz. Birds, Reptiles etc.	If birds are noticed crossing the Buffer zone, they will not be disturbed at all; Labors will not be allowed to discards food, plastic etc., which can attract animals/birds near the Buffer site; Only low polluting vehicles having PUC will be allowed for carrying mining materials. Noise level will be maintained within permissible limit (silent zone-50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms.
Disturbance of riparian ecosystem/ wetlands	The riparian ecosystem or the wetlands will not be destroyed by the mine owners.
Monitoring of upstream and downstream water quality	Water quality will be monitored from upstream and downstream area to assess the impact on water quality and plankton and mining activity will be controlled to maintain the clean water conditions.

8.LAND ENVIRONMENT

Mining Activity: Harvesting of river bed minerals and other associated activities are the main sources of environmental degradations and most serious ones are detailed hereunder:

- Damage of river bank due to access ramps to river bed, causing damage to vegetation, soil erosion, micro disturbance to ground water, possible inducement of charged river course.

- Loss of riparian vegetation standing along the bank due to making roads connecting successive access to river bed.
- Contamination of Limestone aquifer water due to ponding, due to uneven rocky bed of river, Limestone bed thickness varies considerably and digging more Limestone from a pocket where thickness of Limestone is more may cause ponding. In this stagnant water bio-degradable materials especially flora waste gets accumulated causing contamination and inducing an unhealthy environment
- Surface degradation due to stockpiling and road network.

9. Mitigation measures

- Minimum number of access roads to river bed for which cutting of river banks will be avoided and ramps are to be maintained.
- Access points to the river bed will be decided basing on least steepness of river bank and least human activity.
- Mining is avoided during the monsoon season and at the time of floods.
- Mining schedule is synchronized with the river flow direction and the gradient of the land.
- Haulage roads parallel to the river bank and roads connecting access to river bed will be made away from the bank
- Care will be taken to ensure that ponds are not formed in the river bed
- Access roads from public roads and up to river bank will be aligned in such a way that it would cause least environmental damage.
- Vegetation development is proposed along the road sides of the approach roads, to arrest soil erosion. While selecting the plant species, preference will be given for planting native species of the area.

10. AIR ENVIRONMENT

Anticipated impacts and evaluation

Information on air quality was studied and various modelling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, transportation and unloading operations may cause deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating

problems of fugitive dust. Also, the collection and lifting of minerals will be done manually without any blasting. Therefore, the dust generated is insignificant as compared to mining process of other hard minerals like the process of drilling, blasting, mechanized loading etc.

Mitigation measures

The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. Utmost care will be taken to prevent spillage from the trucks. Overloading will be prevented. Plantation activities along the roads will also reduce the impact of dust in the nearby villages.

11. WATER ENVIRONMENT

Mining of Limestone from within or near a streambed has a direct impact on the stream's physical habitat characteristics. These characteristics include geometry, bed evaluation, substrate composition and stability, in stream roughness elements, depth, velocity, turbidity, sediment transport, stream discharge and temperature. Altering these habitat characteristics can have deleterious impacts on both in stream biota and associated riparian habitat.

The detrimental effects to biota resulting from bed material mining are caused by three main processes:

i. Alteration of flow patterns resulting from modification of the river bed
ii. An excess of suspended sediment
iii. Damage to riparian vegetation and in stream habitat.

12. NOISE ENVIRONMENT

Anticipated impacts and evaluation

As there will be no heavy earth moving machinery there will not be any major impact on noise level due to the mining and other association activities a detailed noise survey has been carried out and results are discussed in chapter 3. Blasting technique is not used for Limestone lifting, hence no possibility of land vibration. It was found that the mining activity will not have any significant impact on the noise environment of the region. The only impact will be due to transportation of materials by trucks.

13. Mitigation measures

As the only impact is due to transportation of Limestone to the construction though village roads, emphasis will be given on the following points.

- Minimum use of Horns at the village area.
- Timely maintenance of vehicles and their silencers to minimize vibration and sound.
- Phasing out of old and worn out trucks.
- Provision of green belts along the road networks.
- Care will be taken to produce minimum sound during loading.

It was found that the Limestone mining activity will not have any significant impact on the biological environment of the region. Since mining activity is carried out only during the day time, the movement of animals during the night will not be hindered. Proper mitigative measure will be taken by the contractor, in consultation with local NGOs working in the study area.

14. TRAFFIC ANALYSIS

From the traffic analysis it can be seen that the V/C ratio will be changed from 0.14 to 0.141 with LOS remain "A" i.e. "Excellent". So the additional load on the carrying capacity will be affected to a minimum level.

15.ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan is proposed for "Sand" mining project to mitigate the impact during the mining operation.

- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- Prior to mining, short awareness program will be conducted for labors to make them aware to way of working.
- If some causality or injury to animal occurs, it will be informed to forest department and proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild mammals (If exists) will be avoided

16. ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management will strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining:

a. Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

b. Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.

c. The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.

d. Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.

e. Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.

f. Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.

g. Plantation/afforestation as will be done as per program i.e. along the road sides and near civic amenities, which will be allotted by Government bodies as it is not feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people will also be involved.

17. BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Table Budget allotted for the Environmental Management Plan

Sl. No	Description	Capital Cost 1st year (Rs)	Recurring Cost (Rs) 2nd year	Recurring Cost (Rs) 3rd year	Recurring Cost (Rs) 4th Year	Recurring Cost (Rs) 5th Year
1	Pollution Control & Dust Suppression	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000
2	Pollution Monitoring	-	30,000	30,000	30,000	30,000
3	Plantation and salary for one gardener (part time basis).	48,000	48000	48000	48000	48000
4	Haul road Maintenance Cost (50 m)	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
5	Occupational health and safety cost	50000	50000	50000	50000	50000
TOTAL (Rs)		3,18,000	348,000	348,000	348,000	348,000

- Salary of Labour for haul road maintenance 250* 1 labor*400= 1,00,000/-
- Salary of 1 gardener (4000) /month * 12 = 48,000 / year
- * 20 lakhs per kilometer (2000 * 50m haul road = 1,00,000)

18. MONITORING SCHEDULE AND PARAMETERS

Table Monitoring schedule and parameters

S. No	Description of Parameters	Schedule and Duration of Monitoring
1	Air Quality a) In the vicinity of the mine b)In the vicinity of the transportation network	24 hourly samples twice a week for one month in each season except monsoon season

2	Water Quality Water quality of surface and groundwater around the site Drinking water must conform to drinking water standards	Once in a season for 4 season in a year
3	Ambient Noise Level	Twice in a year for couple of years & then once in a year
4	Soil Quality	Once in two years on project monitoring area
5	Inventory of Flora(tree plantation, survival etc)	Once in two years on project monitoring area
6	Socio-economic condition of local, population, physical survey	Once in 3 or 4 years

19. BENEFIT OF MINING

- ✓ Controlling river channel.
- ✓ Protecting banks.
- ✓ Reducing submergence of adjoining agricultural lands due to flooding.
- ✓ Reducing aggradations of river level.
- ✓ Generating useful economic resource for construction.
- ✓ Generating employment and improvement of socio economic conditions of the study area.

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