

Map Showing Mine Site & Surrounding Features

Prepared by

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SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**Production Capacity Expansion of Nandini
Khundini Limestone Mine**

From 0.15 MTPA to 1.03 MTPA

Mining Lease Area 53.57 ha (No increase in ML Area)

at

Village-Nandini Khundini, Tehsil-Dhamda

District : Durg, (CHHATTISGARH)

by

ACC Limited

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1.0 Project Description

ACC Limited is pioneer in cement manufacturing industry of India which got established in 1936. ACC established the cement plant at Jamul in Durg district, Chhattisgarh in 1965. The plant was named as Jamul Cement Works (JCW). Jamul Cement Works of ACC Limited started cement production in the year 1965 with an installed capacity of 0.25 MTPA of cement. The existing Clinker production capacity is 0.76 MTPA and Portland Slag Cement is 1.58 MTPA. It is now proposes to increase the clinker production of Jamul Cement works from 0.76 MTPA to 3.0 MTPA.

ACC has four three mining leases in Durg district, namely Jamul Cement Works Limestone Mine (Lease area 269.95 Ha), Pathariya Limestone Mine Lease-I (36.001 Ha), Pathariya Limestone Mine Lease-II (37.85 Ha) and Nandini Khundini Limestone mine (53.57 Ha). Nandini Khundini mine is yet to start operation.

Additional limestone required for producing 3.0 MTPA clinker at Jamul Cement Works would be partially meet from Jamul Limestone Mine, Pathariya Limestone Mine Lease-I & II and Nandini Khundini Limestone mine). To meet the additional requirement of limestone for clinker production at Jamul Cement Plant, the capacity expansion of Nandini Khundini Limestone Mine is proposed from 0.15 MTPA to 1.03 MTPA. Environmental Clearance to produce 0.15 MTPA has already being granted for Nandini Khundini Limestone Mine from MOEF vide letter no J-11015/237/2009-IA.II (M) dated 10th March 2011. Nandini Khundini mine is yet to start operation.

The limestone from Nandini Khundini Limestone will be crushed in the 1500 TPH crusher proposed to be located at Jamul Mines. The crushed limestone will be transported to the cement Plant through closed pipe belt conveyor.

Nandini Khundini Limestone mining lease was held by Bhilai Steel Plant from 1971 to 1991. The lease was denotified vide Gazette Notification dated 9th June, 1992. The mining lease (53.57 ha) was freshly granted to ACC Limited by the Chhattisgarh Government vide their office letter no. F 3- 18/2004/12 on 5th February 2008.

The project falls under 1(a) Category 'A' of the Schedule of EIA Notification 14-9-2006. Terms of Reference (TOR) for EIA Study has been approved by Ministry of Environment & Forests vide letter No. J.11015/338/2013-IA.II (M), 9th January 2014. This draft EIA report has been prepared as per the Terms of Reference (TOR) issued by the MOEF for Public Hearing. The Final EIA report will be prepared after considering the comments and views obtained during the Public Hearing.

Proposed capacity expansion of the mine will be done within the existing mine lease area of 53.57 ha. No extra land shall be acquired. No R & R is required for this project.

Location: Terrain of the area is flat. JCW is located at about 15 km south direction of mine (aerial distance). Proposed mine is connected with JCW by Jamul - Dhamda State Highway. Durg railway station (situated on Nagpur-Howrah Broad Gauge of SE railway) is located about 21 km from Nandini Khundini mine. The mine is well connected to NH-6, which passes through Bhilai town at about 20 km away. Nearest airport is at Raipur which is about 70 km from mine site.

There are no ecologically sensitive area and archaeologically important places within 10 km radius of the mine site. There is no protected or reserve forest present within the 10 km radius of the mine site. Sheonath river and Amner river area the main surface water bodies present in the study area. Sheonath river is located about 3.5 km west of the mine site. Amner river is located about 6.5 km in southwest direction. Tndula canal and its distributries are other source of surface water. Tandula canal is located about 3.6 km in east direction.

Project Cost: Total project cost is approx. Rs. 15 crores.

Employment: Project will create the direct employment for 32 people. It would also generate indirect employment for 100 drivers for transporting limestone from mine to crusher site, at Jamul Limestone Mines.

Water Requirement: 20 kl/day water will be required for the project. This water requirement would be meet from existing rainwater harvesting pits located within the lease area. Ground water will not be utilized for the mining operation. Packaged drinking water will be provided to the workers.

Power Requirement: 2 lakh unit per year power will be required for the project which will be sourced from State Electricity Board.

Mining Process: Mechanized opencast mining method comprising shovel - tipper combination will be adopted. Drills, hydraulic rock breaker, hydraulic excavator and dumper trucks will be deployed. Non electric delay detonators type blasting will be applied. The boreholes will be 115 mm dia and 7-9 m depth. Spacing between two holes will be 3.0-5.5 m. Blasting will be done once a week. The height of bench will be kept 7 m and width of the working bench will be 20 m. The ultimate depth of mine will be 30 m from ground level and the ultimate pit slope will be 45 to 60°. Overburden shall be stacked along the lease

boundary. The height of the dump shall be 3 m. The mineral reserve is 43.74 million tons. About 6.5 million tons of overburden will be generated during the entire life of mining, which will be backfilled in voids. Technically the mining methodology is based on 'Zero Waste' concept. No explosive storage magazine, workshop, material storage shed, administrative building and diesel filling station will be established in Nandini-Khundini Mine. Facilities available at Patheriya-I limestone mine will be used in Nandini Khundini mine.

2.0 Description of Environment

Baseline data was generated during the period 1st March 2014 to 31st May 2014. 10 km area around the mines boundary was considered as study area. Data was generated as per the standard procedures of the Ministry of Environment & Forests and the Central Pollution Control Board.

Meteorological data on wind speed, wind direction, relative humidity and temperature was generated at Nandini Nagar. Baseline ambient air quality was measured at 8 locations in the core and buffer zone. Noise levels were measured at 8 locations. Surface water quality of 4 locations, groundwater quality of 8 locations and soil quality of 8 locations was collected and analyzed. Data on plants and animals present in the core and buffer zone was collected from the published literatures and checked during field survey. Data on landuse, demography, occupation pattern, cropping pattern, infrastructure facilities were collected from District Statistics Handbook and village profile records.

The study area falls under Seismic Zone II. The limestone of this area is of lower Vindhyan age occurring as undulating terrain.

The predominant wind direction is from southwest and west direction. The average wind speed ranges from 0.5 to 8.8 m/s. Daily mean temperature varied from 19.8°C to 44.6°C. The relative humidity varied from 20-54%. The annual rainfall is 1288 mm.

Air Quality: PM_{2.5}, PM₁₀, SO₂, NO₂, benzene, ozone, ammonia, carbon monoxide as well as Benzo(a)pyrene, Silica, As, Ni and Pb in PM₁₀ were monitored at eight locations in the study area. The locations were selected as per CPCB guidelines. Monitoring was done at upwind direction and various downwind directions of the project, including road side villages. The baseline air quality levels of all parameters are found to be within the National Ambient Air Quality Standards prescribed for residential and industrial area.

Noise Quality: Ambient noise levels were monitored at 8 locations in the study area. The baseline noise levels are well within the National Standards for residential area (Standards are 55 dBA-day time and 45 dBA-night time).

Water Quality: 4 surface water samples and 8 groundwater samples were collected from the study area for chemical and biological analysis. Surface water samples were collected from upstream and downstream point of Sheonath River, Amner River and Dhamda Dam. The surface water quality of river and dam meets the designated use criteria. The surface water is fit for irrigation and industrial use. The surface water quality is fit for drinking only after conventional treatment. Groundwater samples were collected from hand pumps of villages around the project site. The groundwater quality meets the standards prescribed by Bureau of Indian Standards (BIS 10500).

Soil Quality: 8 soil samples were collected from the study area and analyzed. The texture of soil is sandy loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are moderate. The pH and conductivity of all the soil samples are within the acceptable range.

Sensitive Ecosystem: Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park, wildlife sanctuary and Forest are present within 10 km distance of the project site.

Socioeconomic Data: The proposed mine site is located in village Nandini Khundini, Dhamda Tehsil of District Durg in Chhattisgarh State. The 10 km area of the mine site falls in Dhamda and Durg tehsil, district Durg. There are 59 villages and Two Nagar Palika falls within the 10 km area of the mine site. According to 2011 census the total population of the study area is 114455 comprising 57257 male and 57198 female. Male female ratio of the study area is 999 female / 1000 male, which is much higher than the State and National average. Out of the total population about 18.7% is SC population and only 6.1% is ST population.

3.0 Environmental Impact and Mitigation Measures

Water Environment: Rainwater accumulated in existing pits inside mine area will be used for dust suppression and for green belt development.

Mitigation Measures: The surface runoff generated during rainfall event will be diverted to mined out pits inside the mine premises. This will act as rainwater harvesting structure. Garland drains with sedimentation pits at appropriate intervals will be made around the overburden dump. Runoff from dump slopes will be passed through befall plates filters to arrest the silt before letting it to the pits. Gully along the slopes will be provided with (Baffle plates) to arrest the silt. The slope will be compacted routinely and soil will be spread over it and stabilized by planting herbs and shrubs. This will prevent soil and silt erosion. Domestic wastewater will be treated in septic tanks and disposed in soak pits. All water accumulated inside the mine premises will be checked to avoid breeding of mosquitoes. The spent oil and lubricants from workshop, vehicles, etc will be given to authorized SPCB/CPCB recyclers/re-processors. There will be no discharge of wastewater outside the mine premises.

Air Environment: Dust is the main pollutant generated during various mining operations, including blasting, transportation on haul roads, loading and vehicular movement.

Mitigation Measures: Stable roads will be made inside the mining premises for movement of vehicles. Water sprinkling system (truck mounted) will be applied for dust suppression on haul roads. Regular maintenance of vehicles and equipment will be carried out. Wet drilling and controlled blasting (using latest NONEL technology) will be adopted. 15 to 30 m greenbelt will be developed on east side of the mine premises (towards Nandini Khundini village). Small herbs and shrubs like Bougainvillea, Kaner, Lantana, Adhusa, Ber, Custard apple, Casurina, Vitex negundo, etc. will be planted in the first 15 m. Thereafter trees like Shisham, Siris Gulmohar, Amaltas, Munga, Peepal, Jamun, Neem, Kadamb, Aam will be planted in next 15 m.

Noise Environment: Material handlings, movement of vehicle, blasting, loading and unloading activities are the main noise generating sources in the mine site.

Mitigation Measures: Material handling operations and movement of vehicles will be properly scheduled to minimize noise. Maintenance program for heavy vehicles will be routinely followed. Non-electric delay detonator will be used to minimize the ground vibrations. Workers working inside crusher house will be given ear plugs / ear muffs. Mining will be done only during day time. In this manner the noise level at the mine boundary will be below the national standard of 55 dBA during day time and 45 dBA during night time.

Land Environment: Overburden will be stacked at the periphery of mining lease boundary along the south side to form bunds of 3 m height (7.5 m inside the mine boundary). The slope will be maintained at less than 60°, with adequate number and size of steps / trenches made. The slopes will be compacted and spread with 8-10 cm thick soil cover and grass,

legumes and small shrubs will be planted along the slopes. Recyclable materials will be sorted out and sold to local recyclers. Inert material will be reused as landfill. Organic and other green waste will be taken to compost pit. Use of plastic inside mine area will be strictly prohibited. Mined out area will be suitably reclaimed after extracting the limestone. Reclamation will be done by backfilling the overburden. Voids will be converted to water body and can be used based on local regulatory authorities at the end of mining.

For reducing adverse environmental impacts from other sources, following mitigation measures are recommended in the EIA report:

- Wet drilling will be practiced. The drilling machine will have inbuilt water sprinkling arrangement and dust extraction system.
- Controlled blasting technique will be followed. The site will be wetted before blasting. Blasting will be done around noon.
- Non-electric shock tube initiating system and Noiseless Trunkline Delay detonators and IKON (Digital Electronic System) will be used to keep the air blast levels to the lowest possible limits and minimize noise and vibration.
- Ground vibrations to be continuously monitored during blasting using Minimate Seismograph, through study of the peak particle velocity at different distances.
- Hydraulic rock breaker will be used to eliminate the use of secondary blasting.
- Combination of primary rock breaker and backhoe will be used for efficient collection and loading.
- Compaction, gradation and proper drainage will be provided for haul roads.
- Haul roads in mines will be stabilized. Vehicular speed in mines area will be restricted to 20 kmph.
- Depression area within the worked out site will be converted to water body. The water body will act as water reservoir.
- Plantation shall be done on both side of Jamul Dhamda road from Patheriya to Jamul cement Works.

Air quality dispersion modeling study was conducted and it proved that the ambient air and noise quality of the area will remain well within the national ambient air quality and noise standards. No wastewater will be generated during mining. No toxic chemicals or wastes will be handled in the mines. Diesel and Explosives will be stored as per approval obtained from Chief Controller of Explosives.

Exposure to dust and respiratory disorders, noise induced hearing loss, mechanical injury to body parts are the identified occupational hazards. The workers will be checked during employment and then regularly shall be checked for any clinical complaints and abnormal symptoms by the medical team of Jamul Cement Works. Workers will be given personal protective equipment like nose mask, ear plugs/muffs, safety boots, gloves, goggles, etc as well as clean drinking water and toilet facility. Drivers and their attendants will be given rest room facility, complete with toilet, bathroom and recreation facility. Canteen facility will be provided for all workers and drivers. Regular training and awareness programs will be conducted for the workers so that they are aware of the work hazards, vector borne diseases, HIV, etc and will develop the behavior of using protective equipment.

The proposed mining activity will have certain negative impact on the environment. With implementation of recommended mitigation measures and safeguards, the adverse effects will get reduced to acceptable level. The groundwater level at Nandini Khundini village (near mining site) is 4.6 m during pre-monsoon. Since mining will be done upto 30 m, groundwater table will be intercepted. Blasting and mining will lead to opening up of fractures and fissures thereby improving groundwater flow. Development of secondary porosity by cracks and joints will also enhance the transmissivity and specific yield of aquifer. Seepage water will accumulate in the mining pits. The accumulated water will be used for dust suppression system and irrigation. During rainy season the surplus accumulated water will be discharged into nearby nalla.

The mining activity will have beneficial impacts in terms of direct and indirect employment opportunities. Jamul Cement Works will introduce a number of community development measures, which would improve the quality of life of the people living in the area.

4.0 Environmental Monitoring Program

ACC Limited is operating Pathariya Lease-I & Pathariya Lease-II limestone mines located close to Nandini Khundini mine. The mines are administratively operated from a single point located at Pathariya Limestone Mine Lease-I. The infrastructure like administrative buildings, workshop, magazine, lubricant and diesel storage already exists inside the Pathariya-I mine, which are common for Pathariya Lease – I & II and Nandini Khundini Mine. Environment Management Department already exists and is adequate to perform the responsibilities of Nandini Khundini mine. EMD will be strengthened by recruiting skilled & experienced staff.

EMD will be responsible for the following functions:

Regular monitoring of –

1. Ambient air quality at upwind & downwind direction inside mine and at two nearest villages (Nandini Khundini and Pathariya) throughout the year.
2. Fugitive dust emission monitoring at 10 m downwind direction of the fugitive dust generation source.
3. Collect and analyse the ground water quality of mine site (seepage water), and all the surrounding villages. The depth of water will be checked every year during May and November.
4. Collect and analyse the water quality of Amner, Sheonath river and village ponds, once during June and October.
5. Development and maintenance of greenbelt and greenery inside the mining lease area and between mines boundary and Nandini Khundini villages.

5.0 Additional Studies

Risk Mitigation Measures: Explosion / fire in explosive van are the risks and accident hazards. All safety measures recommended by the IBM shall be implemented. Mobile vehicles and arrangement for the first aid is available at Pathariya Limestone Mine Lease - I site. An effective communication system comprising landline and mobile phones facilities will be made available at the mine site. Ground vibration measurements will be carried out and blasting will be done as per recommendation. The ground vibration will be maintained within limit, so as to ensure safety of surrounding buildings and houses of villagers. Blasting technology selected for this operation will ensure that flyrocks are kept to the minimum and blast waves are of lower magnitude. The water pits will be properly fenced and warning signals and signboards put at various places of reservoir at the end of mine life.

6.0 Project Benefits

Limestone mining will generate substantial revenue for the state of Chhattisgarh, through optimal utilization of natural resource and royalty. The project will boost the infrastructure development of the area.

32 workers and 100 drivers will get employment in this project. Local people will be preferred for jobs, depending upon their skill and experience. Transport business, vehicle drivers and attendants, repairing workshops, grocery and retail stores, school, coaching centers, restaurants, self employed persons like tailors, carpenters, plumbers, electricians, etc will get indirect employment / livelihood opportunity from this project.

Rs.5 Lakhs per year has been earmarked for undertaking various community development activities. This money will be spent towards social development activities which include

construction of community centers and schools, maintaining roads, rain shelters, providing drinking water facility to the nearby villages, making toilets in schools and for community, providing free medical camps, providing scholarships to bright students and sportsperson, etc. Income generating schemes will be implemented for upliftment of women and poor sections of the society, which includes vocational training for mushroom cultivation, patta making, masala making and packaging, growing fruits and vegetables, development of fodder farms, etc.

7.0 Environmental Management Plan (EMP)

EMP for effective management of environmental impacts due to the mining activity and ensuring overall protection of the surrounding environment through appropriate management procedures has been prepared.

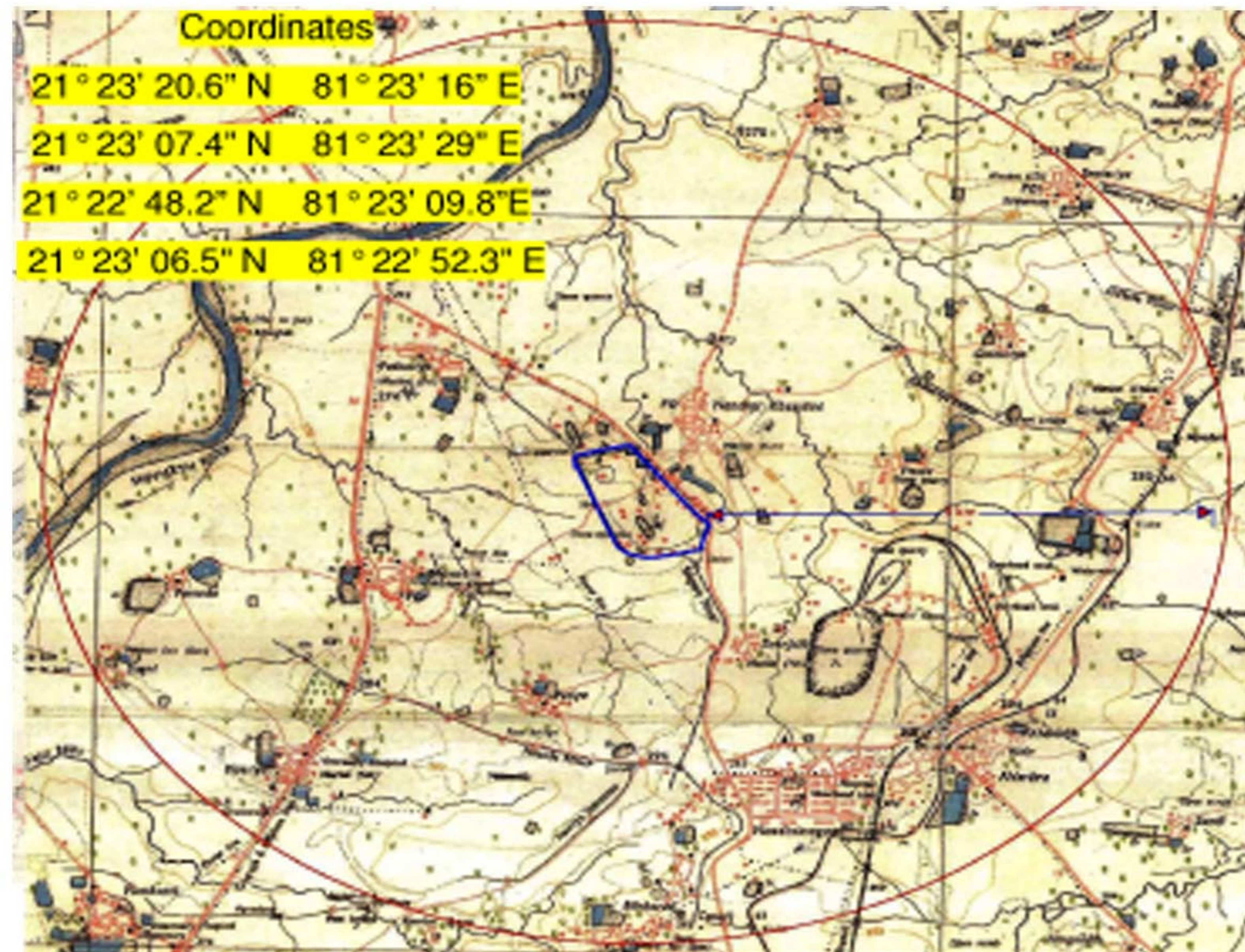
The capital cost for environmental management of the proposed mine is estimated to be Rs.30 Lakhs. This amount shall be used for procurement of Fugitive Dust Suppression systems like road side water sprinkling system and water tanker with rain gun and other facilities for suppressing the dust. Monitoring devices for ambient air, noise monitoring, and environment cell already exists. Occupational health and safety, energy development is an ongoing process and shall continue in future also. About Rs.10 Lakhs would be required as annual recurring expenses.

EMD will ensure that all pollution control devices function effectively. EMD will supervise disposal of spent oil and lubricants and used batteries to the authorized SPCB/CPCB vendors. Plantation will be started from day one and continue throughout the life of the project. Schemes for resource conservation, rainwater harvesting and social forestry development will be taken up. Regular environment, safety and health awareness programs for the workers will be conducted.

EMD will interact with the regulatory authorities, submit the monitoring reports and consent applications. The implementation of EMP would ensure that all elements of project comply with relevant environmental legislation throughout the mine life.



Location Map



Close View of Nandini Khundini ML Area Showing Coordinates



Photographs Showing Nandini Khundini ML Area