

EXECUTIVE SUMMARY

1. INTRODUCTIONS

The applicant M/s Alam Enterprise (Prop.- Sk. Mazrul Alam) has obtained Sand mining lease through e-tendering from the Govt. of West Bengal vide Letter of Intent no. **332/1037/MM/Auction 24/2018**, dated **23/08/2018** over an area of 9.37 acres / 3.79 ha on Damodar River (**Refer Annex 1.2**). Further Lol vide no. **332/168/MM/2022** was extended by DL&LRO dated **08.03.2022(Refer Annex 1.3)**. Again, LOI (vide no.: **893/61/MM/2022**) was extended by District Land & Land Reforms Officer on dated **14.11.2022** and will be **valid for 60 days after disposal of EC by SEIAA (Refer Annex 1.4)**. As riverbed Sand is replenished every year hence life of mine is not applicable. The proposed mine lease area shown in mouza map is attached as **Annex 2.1**.

This particular project is considered to be of 'B' category due to the size of the mining lease (3.79 HA). As per notification S.O. 3977(E) published on dated 14th August, 2018, our project is falls under category "B2" and need not to submit Environmental Impact assessment Study report. Further, **another 5 mines** with individual lease ≤ 100 ha are coming within 500m from the proposed project area. So, as per office memorandum issued by MoEF&CC, need to submit Environmental Impact Assessment Study report.

2. PROJECT NAME AND LOCATION:

Kumirkola Sand Mining Project is located on Damodar River. The Brief Description of the Project is given below:

Table 1: Brief Description of Project

Particulars	Details		
Sanctioned Mining Lease area coordinate of 3.79 ha	Project Co-ordinates		
	Points	Latitude	Longitude
	A	23°14'53.67"N	87°41'43.17"E
	B	23°14'55.33"N	87°41'46.38"E
	C	23°14'42.00"N	87°41'47.29"E
D	23°14'41.18"N	87°41'43.95"E	
Toposheet No.	73M/12		
Total area	3.79Ha/ 9.37 Acres		
Geological reserve	1,13,700 m ³ /year		
Mineable Reserves	91,800 m ³ /year		
Targeted production	91,800 m ³ /year		
Manpower	201		
Elevation	37 mRL to 40 mRL		
Land-use	River bed		

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Particulars	Details
Nearest habitation/town	Kumirkola village (1.00 km, SSE Direction)
Nearest airport	Netaji Subhash Chandra Bose International Airport (100.0 km, SE Direction)
Nearest railway station	Ishan Chandi Halt (11.00 km, NNE Direction)
Nearest highway	NH-2 (8.50 km, NE Direction) SH-8 (3.50 km, S Direction)
Power supply	Electricity connection is not required for the project. Mining will be carried out in day time only.
Nearest Hospital	Burdwan Medical College & Hospital (14.00 km, E Direction)
Educational Facility in the area	Kumirkhola High School (0.72 km, S Direction) Galsi B.Ed College (9.76 km, N Direction)
Water demand & supply	Water will be taken from hired tankers. The water requirement for mining & allied activities, drinking and plantation has been estimated to be 7.61 KLD (Dust suppression- 3.60 KLD, Drinking & domestic- 2.01 KLD and Green Belt-2.00 KLD).
Nearest tourist places	None in the Study Area
Defence installations	None in the Study Area
Archaeological features	None in the Study Area
Nearest Forest area	Ramnabagan Wildlife Sanctuary, (16 km, E Direction)
Nearest stream/river/water body	Damodar river (onsite)
Seismic zone	Zone III

3. MINING METHOD:

- The mining is confined to collection of sand from the riverbed. The extraction process will involve mining up to a maximum depth of 3 meters at the riverbank or up to the water table, whichever is less. Dry pit mining will be employed.
- The riverbed material will be collected in its natural state during the mining process. The mining method will be opencast manual (preferably) or semi mechanized. The river bed material will be collected in its existing form.
- The distance of 7.5 m shall be further marked from the lease boundary and this zone constituting the 'safety zone' shall be identified. No mining activities shall be undertaken within this 'safety zone'. This shall be in accordance of West Bengal Minor Mineral Concession Rules 2016 (WBMMCR-2016).
- The excavation of riverbed minerals will begin from the top of the designated area and progress downwards in 0.50-meter increments, removing the minerals in slices

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- Riverbed sand extraction will be done through bench of 1.00m height and 1.00m width, the whole material is mineable. The removal is done without affecting the base flow of the river and in such manner as to maintain the smooth flow of the river during the monsoons. This helps in protection of the banks from erosion.
- The mineral extraction will be done for a period of Five years from the date of Execution. Throughout the mining operation, the areas of the quarry will remain free from submergence, ensuring that there is no flooding or inundation. During mining operation, the river flow will be a way to enable dry pit mining. The ultimate slope of pit by the end of conceptual period shall be same as the shape of area.

Table 2: Required Raw Material

Inputs	Approx. quantity required	Basis
Water Requirement		
Water for Drinking and Domestic Purposes	2.01 KLD	100litre/capita/day
Dust Suppression & others	3.60 KLD	0.5 Liter per plant 2 times a day
Water for green belt development	2.00 KLD	Length of Road (m) x Width of Road (m) x 1litre/m ² x 2times per day)

The proposed mining project has a total water requirement of 7.61 KLD (Kilo Litres per Day). Drinking water needs will be met by sourcing it from the nearest village, while water for sprinkling and plantation purposes will be obtained from private tankers

4. PRODUCTS AND CAPACITIES:

The mining lease will be granted over an area of 3.79Ha/ 9.37 Acres on river Damodar at Mouza – Kumirkola, P.S.-Khandaghosh, Dist. –Purba Bardhaman, West Bengal, over Plot No. 1471(P), 1472(P), & ORS.; J.L No- 9.

Sand mining is generally carried out every year based on the replenishment quantities. As the lease is being done for five years, anticipated life of mine has been restricted for five years only. The Production programme from the mine for the next 5 years is given below is shown in **Table no. 3.**

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Table 3: Programme from Mining Lease Area

Year	Geological reserve (m ³)	Production (m ³) as per approved mine plan	Production (m ³) as per replenishment rate mentioned in DSR
1 st	1,13,700	91,800	88,128
2 nd	1,13,700	91,800	66,096 (75.0% replenishment rate)
3 rd	1,13,700	91,800	66,096 (75.0% replenishment rate)
4 th	1,13,700	91,800	66,096 (75.0% replenishment rate)
5 th	1,13,700	91,800	66,096 (75.0% replenishment rate)

5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:

Appropriate site selection for mining operations and strict adherence to guidelines such as the Sustainable Sand Mining Guidelines 2016 (SSG), Enforcement & Monitoring Guidelines for Sand Mining 2020, WBMMCR 2016, and The West Bengal Sand Mining Policy 2021 can effectively mitigate the potential adverse impacts of mining on the surrounding environment.

A comprehensive assessment has been conducted to identify the potential environmental impacts of the proposed production from the mine on various aspects, including air quality, water use and quality, land-use, ecological considerations, soil quality, and socio-economic factors.

A brief description of impacts by the proposed project is given in **Table no. 4**

Table 4: Description of Identifiable Impacts

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
A	Land Environment		
A.1	Land use & Land Cover	<ul style="list-style-type: none"> ○ The landscape of buffer zone will not be disturbed by the proposed river bed mining. Roads for transportation of mined minerals are already present and may be strengthened and/or maintained if required. ○ Mining within a river bed may have some impact on the stream's physical characteristics, such as channel geometry, bed elevation in stream 	<ul style="list-style-type: none"> ○ Sand mining activities will be limited to a maximum depth of 3.0 meters below the river bed or the water table, whichever is reached first. ○ The riverbed mining will be done in unsaturated zone, to minimizing loss to habitat Dredging will not be allowed. ○ The mining is planned in non-monsoon seasons only, so that the excavated area gets

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<ul style="list-style-type: none"> ○ There are no R&R issues involved with this project. 	<ul style="list-style-type: none"> ○ replenished during the monsoon each year. ○ Mining activities are strictly prohibited within a river-bed up to a distance of five times the span of a bridge structure on the upstream side, and ten times the span of the bridge structure on the downstream side.
A-2	Soil Quality	<ul style="list-style-type: none"> ○ Soil compaction may occur due to movement of trucks outside the lease area which may affect the soil characteristics like soil fertility, infiltration rate, porosity etc. This ultimately restricts the growth of deep-rooted plants which finally leads to stagnation of succession. 	<ul style="list-style-type: none"> ○ The movement of trucks will be restricted to haul roads. ○ The roads that will be used for transportation of mined minerals are already constructed. ○ The unpaved roads will be strengthened in order to reduce impact on soil quality.
A-3	Traffic Density	<ul style="list-style-type: none"> ○ The existing Level of Service (LOS) as per IRC on the roads that will be used for transportation of the mined minerals are of Level A and will remain constant after initiation of mining (Appendix 4.2). 	<ul style="list-style-type: none"> ○ Based on the data provided in Appendix 4.2, it is evident that the existing single road connecting the site to Kumirkola bypass road requires widening to accommodate double lanes. However, no intervention is necessary for the metal road as it will maintain its Level of Service (LoS) as "A," indicating smooth traffic flow and no congestion issues.
B	Air Environment		
B-1	Air Quality	<ul style="list-style-type: none"> ○ Handling of mined out minerals. ○ Exhaust gas from vehicles. ○ Dust emanating from access road and haul road. 	<p>The only air pollution sources are the road transport network of the trucks/dumpers. The dust suppression measures like the following will be resorted:</p> <ul style="list-style-type: none"> ○ Water sprinkling will be done on the roads regularly. This will reduce dust emission by 75%.

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
			<ul style="list-style-type: none"> ○ To prevent spillage, appropriate measures will be taken, including covering the carrying vehicles with tarpaulin and sprinkling water if necessary to mitigate dry conditions. ○ Proper tuning of vehicles along with pollution certificate to keep the gas emissions under check.
B-2	Noise Level	<ul style="list-style-type: none"> ○ Noise generated by vehicles transporting the mined minerals is identified as a major source of noise. The trucks used for transportation are expected to produce noise levels ranging from 80-85 dB(A). The material transportation road passes through the villages of Kumirkola, potentially affecting the residents who will be exposed to increased noise levels. However, considering the relatively low number of trucks (33 trucks or 66 trips), the incremental noise level is expected to be minimal 	<ul style="list-style-type: none"> ○ Periodical monitoring of noise near sensitive receptors will be done. ○ No other equipment's except the transportation vehicles will be allowed. ○ The well-tuned vehicles will be used and loud noise will be checked every day which help in reducing noise during operations. ○ By reducing the speed and/or volume of traffic on such roads to an acceptably low level.
C	Water Environment		
C-1	Hydrology, Hydro-geology and Water Quality	<ul style="list-style-type: none"> ○ Modifying the riverbed can lead to changes in flow patterns. ○ Excessive suspended sediment in the water can cause harm to riparian vegetation and disrupt the natural habitat within the stream. 	<ul style="list-style-type: none"> ○ Project activity will be carried out in the non-monsoon season and on dry bed. ○ Since mining will be done only in central 3/4th portion of the river bed there will be no diversion or modification in the river flow. It is not proposed to divert or truncate any stream in case of river bed mining.
C-2	Waste	<ul style="list-style-type: none"> ○ The estimated municipal solid 	<ul style="list-style-type: none"> ○ Dustbins will provide onsite

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
	Generation	<p>waste generated will be 24kg/day.</p> <ul style="list-style-type: none"> ○ The liquid waste generated by 201 employees will be 0.48KLD. 	<p>and will be cleaned with proper management of food waste. compost pit will be constructed for disposal of food wastes.</p> <ul style="list-style-type: none"> ○ Mobile toilets will be made available on site.
D	Ecological Environment		
D-1	Flora	<ul style="list-style-type: none"> ○ Fugitive emission from vehicle movement will form a layer in leaves thus reducing the gaseous exchange process. This ultimately affects the growth of plants. ○ The construction of a new linear surface, such as a road, can create a new microclimate and alter physical conditions in the surrounding area. This change can impact plant mortality and the biological community, extending from the road edge to varying distances. 	<ul style="list-style-type: none"> ○ The construction of a new linear surface, such as a road, can create a new microclimate and alter physical conditions in the surrounding area. This change can impact plant mortality and the biological community, extending from the road edge to varying distances. ○ Annual bio-monitoring will be conducted on roadside plants to assess their exposure to vehicular pollution. This monitoring will involve evaluating the dust load accumulated on plant surfaces and determining the Air Pollution Tolerance Index (APTI) of the plants.
D-2	Fauna	<ul style="list-style-type: none"> ○ The operational activities such as population influx, transportation and noise generation may have an adverse impact on fauna. ○ The presence of suitable roadside habitats for animals that rely on acoustic signals, like birds, presents a tradeoff between habitat availability and the potential negative impacts of traffic noise and passing vehicles on their survival and breeding success 	<ul style="list-style-type: none"> ○ Efforts will be made to minimize the impact of mining activities on residential areas and crucial wildlife habitats by carefully planning the right-of-way (ROW). This involves avoiding the direct route through residential areas and important wildlife habitats such as rookeries, raptor nesting areas, and calving areas, to the extent possible. ○ All equipment used in the mining operations will be

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
			<p>equipped with sound-control devices that are as effective as the original equipment. Motorized equipment will be properly muffled and maintained to ensure optimal noise control measures are in place.</p> <ul style="list-style-type: none"> ○ No mining will be carried out during the rainy season to minimize impact on aquatic life.
E	Social Environment		
E-1	Health	<ul style="list-style-type: none"> ○ The socio-health impacts of transportation primarily arise from truck emissions, dust generation, and traffic movement. There is also a potential increase in accidents due to reckless driving of dumpers transporting minerals along the roads. 	<ul style="list-style-type: none"> ○ It has to be ensured that all the workers are recruited locally to generate employment in the area. ○ Welfare activities should be initiated in the area so as to improve the quality of life of the local people.

6. ESTIMATED CAPITAL COST OF THE PROJECT:

Estimated Capital cost for the project is **1.14 crore**. The details of the estimated capital of the project shall be as follows.

Table 5: EMP Cost

Serial No.	Measures	Description		Investment for EMP
1	Pollution Monitoring	Air pollution	Yearly at 4 locations for air, 3 locations for water and 2 locations for noise during mining and 1 location for soil.	80,000
		Water pollution		40,000
		Noise Pollution		30,000
		Soil		20,000
2	Water Sprinkling	Water sprinkling will be done at approach road during the lease period in phases		99,800

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Serial No.	Measures	Description	Investment for EMP
3	Green Belt	Trees will be planted along the river bank and along the kuchha road during the lease period in phases.	80,200
4	Road maintenance	Repair and maintenance of approach road	2,20,000
Total EMP Cost			5,70,000

Table 6: CER Budget

Sl. No.	Considerations	CER Cost in Rs.
1	Health camp and free medicine	65,000
2	Educational support to poor student especially girls	85,000
3	Provide drinking water facility	78,000
Total in Rs.		2,28,000

7. PROJECT SITE SELECTION:

M/s Alam Enterprise emerged as the highest bidder in the e-bidding process conducted by the Government of West Bengal for the sand mining project on this government land. The site for sand mining was selected by the District Magistrate Office.

River bed mining is a site-specific project depending upon the geological set up and mineable portion of the river. Given the location within the meandering course of the river, there is minimal disturbance to objects of economic importance, making alternative site selection less viable.

The applicant will invest necessary funds for the rejuvenation and progressive reclamation program and other measures necessary to protect the quality of the environment and human health etc.

The land use pattern in the mine lease area undergoes changes throughout the pre-mining, mining, and post-mining phases. The river bed area serves as the initial zone, which gradually transforms into naturally reclaimed areas and restricted zones as the mining activities progress and conclude.

8. BASELINE ENVIRONMENTAL DATA:

The baseline data has been collected from October 2022 to December 2022. The details area given below:

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Ambient Air Quality Results: Samples were collected from 6 sampling locations during the period of October 2022 to December 2022 (post-monsoon season). The results are given below

- **Particulate Matter 10 (PM₁₀)**

The results of PM₁₀ of all locations are showing variations from 62.6 µg/m³ in the Near Project Site to 70.1 µg/m³ in the Khejurhati. Hence, the results are within the limits of National Ambient Air Quality Standards (NAAQS).

- **Particulate Matter 2.5 (PM_{2.5})**

The results of PM_{2.5} of all locations are showing variations from 26.9 µg/m³ in the Ghosh Kamalpur Village to 35.7 µg/m³ in the Khejurhati. However, the results are within the limits of National Ambient Air Quality Standards.

- **Percentage of Free Silica**

The PM₁₀ samples collected from various locations show the presence of free silica (polymorphs of quartz, cristobalite, and tridymite) at the following percentages: 0.39% (AAQ1), 0.46% (AAQ2), 0.44% (AAQ3), 0.32% (AAQ4), 0.48% (AAQ5) and 0.39% (AAQ6).

- **Gaseous Pollutants**

SO₂ levels range from 8.4 µg/m³ (Malickpur) to 13.8 µg/m³ (Bichkhara), within National Ambient Air Quality Standards.

NO₂ levels range from 10.5 µg/m³ (Malickpur) to 16.4 µg/m³ (Ghosh Kamalpur), but they comply with National Ambient Air Quality Standards (NAAQS).

The values of both the parameters are well within the prescribed limits.

Noise Quality results: Samples were collected from 6 locations

The ambient noise level at day time are varies from 50.3 dB(A) at Dadpur to 53.6 dB(A) at Khejurhati which is little high from standard limits of residential area are ~ 55 dB (A). The night time noise result is varying from 41.6 dB(A) at Dadpur to 44.1 dB(A) at Khejurhati which is within the standard limits of residential ~ 45 dB (A).

Ground Water Quality Results: The samples were collected from 5 ground water locations and 2 surface water sources

- **Ground Water results:** All results were found within standard drinking water standards

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(IS: 10500).

- **Surface Water results:** The surface water quality of the upstream and downstream water of Damodar River is within the prescribed CPCB Water Quality Criteria Class of water.

Soil Quality Results: The samples were collected from 5 locations

pH ranging from 7.05 to 7.2 in the study area. Bulk density of the study area ranges between 1.20 gm/cm³ Ghosh Kamalpur to 1.41 gm/cm³ at Malickpur. Electrical conductivity of the soil samples is found to be average and ranges from 224 µmhos /cm to 249 µmhos /cm. Organic carbon of the soil samples varies from 0.32% in Ghosh Kamalpur to 0.48% in Bichkhara. Nitrogen content in the surface soil of the study area varies between 258.3 kg/ha at Bichkhara to 285.1 kg/ha in Ghosh Kamalpur. Available Phosphorus ranges between 65.4 kg/ha at Bichkhara to 74.2 kg/ha at Kumirkola. Potassium content in the study area ranges between 334.9 kg/ha at Malickpur to 347.8 kg/ha at Dadpur.

From the data above we can infer that the soil of the study area is of low fertility with low Phosphorus and Potassium content, and agricultural activity, if any, would be highly dependent on the addition of external fertilizers. The good content of nitrogen (N) will aid in the growth of leaves.

Ecology and Biodiversity Results:

There is no forest present in the Study area.

A comprehensive biological study was conducted within a 10km radius of the proposed project site to analyze the flora and fauna composition. The study included a phytosociological assessment to determine vegetation density, diversity, frequency, and relative abundance. Faunal identification was performed at random sites. Data from the district forest department was obtained to facilitate these assessments.

For details information go through the **Chapter 3**.

Socio Economic Condition: The sand mine is located in village Kumirkola, District Purba Bardhaman in West Bengal. The socio economic profile will provide the insight to population growth rate; population density, gender ratio, work participation rate and description of the vulnerable population in the study area.

- **Demographic Profile:** There are 151 villages in the study area. These villages have 61,805 households accumulating 2,62,312 populations. According to the survey, gender ratio of study area was 961 in 2011

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- **Population:** The total population of the study area is 2,61,472 in 61,899 households, implying that there is an average of 4 members per households. According to the survey, gender ratio of the study area 959 in 2011.
- **Literacy rate:** Within the study area, the literacy rate accounts for 63.74% of the total population. Out of this, male literacy stands at 56.15% and female literacy at 43.85%.
- **Occupational Structure:** In the villages around the study area, people mainly earn from agriculture and animal rearing

9. IDENTIFICATION OF HAZARDS AND MITIGATION MEASURES:

All types of industries face certain types of hazards which can disrupt normal activities abruptly. Similarly, Riverbed mines also have risks which need to be addressed for which a disaster management plan has been formulated with an aim of taking precautionary steps to avert disasters and also take such action after disaster which limits the damage to minimum. In the sections below, the identification of various hazards, probable risks during the operational phase of the mining, maximum credible accident analysis and consequence analysis are addressed either qualitatively or quantitatively.

- **Risk Due to Inundation:** Mining will be done during the Post-monsoon periods (October-December); therefore, problem of inundation is not likely to happen except in case of accidental flash flood due to upstream dam opening or failure. Communication channels will be opened with government departments to give early warning in such situations and the workers will be immediately taken out
 - **Risks Due to Failure of Pit Slope:** In order to allay dangers due to open cast slope failure, final pit slope stability estimations will be made for the existing mines. Determining the factor of safety, the slopes shall be monitored at regular intervals to check any possible failure.
 - **Risks Due to Failure of Waste Dumps:** No waste will be generated during the 5-year plan period and thus there will be no waste dump during mining. The entire river-bed material will be transported to the end user. However, mined sand may be stored temporarily before transportation and stacks may be formed.

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- **Risks of Accidents Due to Trucks and Dumpers:** Identifying the hazards that come along with the presence of vehicles at the workplace (e.g. reversing operations, loading) can cause harm if not properly handled. Among some of the factors that may make vehicle accidents more likely are: Rough access roads, Time pressure, Inadequate brakes (possibly from lack of maintenance), Carelessly parked vehicles (e.g. being parked on a slope without being adequately secured), Unsafe coupling and uncoupling of trailers, Untrained drivers, Overturning vehicles. To avoid such instances, we will talk to the workers and their representatives and will involve them in the risk assessment process and tell them what to do, to reduce risk. All transportation within the mine lease area should be carried out directly under the supervision and control of management.

10. IMPACT OF THE PROJECT ON AIR, WATER, LAND, FLORA-FAUNA AND NEARBY POPULATION:

Details of the Impact of the River bed sand mining project on air, water, land, Flora-Fauna and nearby population given in the section **5(Anticipated environmental impacts and mitigation)**.

11. EMERGENCY PREPAREDNESS PLAN:

River bed mining projects entail various high-risk accidents such as landslides, subsidence, floods, underground mine inundation, fires, seismic activities, and tailing dam failures. To address these risks, an emergency plan is proposed, encompassing quick evacuation procedures and ameliorative measures. Mining and allied activities inherently carry potential hazards that impact both employees and the general public. To ensure safe and healthy working conditions, adequate safety measures are imperative in mines. Mining Rules & Regulations provide a well-defined framework and procedures for maintaining safety, encompassing the well-being of personnel, machinery, and the overall working environment. By strictly adhering to these regulations, safety is ensured across the mining operation.

- The lessee's preparedness to handle eventualities and the required assistance from local authorities should be clearly outlined. The shallow depth of activities in river bed mining will not involve any high risk accident due to side falls/collapse.
- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, RMMCR 1986, WBMMDR 2016, WBS(MTSS) Rules, 2021 and other laws applicable to mine will strictly be complied with.

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- During heavy rainfall the mining activities will be closed.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Competent persons will be provided first aid kits which they will always carry.

12. PUBLIC CONSULTATION:

Public Hearing will be done after submission of Draft EIA to concern authority. Hence at this moment there are no issues about this matter.

13. ENVIRONMENT MANAGEMENT PLAN AS PER OFFICE MEMORANDUM:

An EMP is a site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner. An effective EMP should ensure the application of best practice environment management to a project. The purpose of an EMP is to: (i) Assist Management to perform mining operations in an environmental friendly way; (ii) Improve the contribution of Management so that an EMP can be used effectively; (iii) Ensure a minimum standard and consistent approach to the implementation of EMP; (iv) Ensure that the commitments made as part of the project's EIA are implemented throughout the project life, and (v) Ensure that environment management detail is captured and documented at all stages of a project.

For detail EMP Consider **Chapter 10 in EIA Study Report.**

14. Occupational Health Hazards and Mitigation:

At site, during excavation and loading activity, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems. Addressing the occupational health hazard means gaining an understanding of the source (its location and magnitude or concentration), identifying an exposure pathway (e.g. a means to get it in contact with someone), and determination of likely a receptor (someone receiving the stuff that is migrating). Occupational hazard due to sand mining mainly comes under the physical hazards. Possible physical hazards and mitigation measures are mentioned below:

- **Light:** Workers may face risks associated with poor illumination or excessive brightness, leading to symptoms such as eye strain, headaches, eye pain, tearing, corneal congestion, and eye fatigue.
- **Heat and Humidity:** : Heat and humidity are encountered in hot and humid condition when temperatures and air temperatures increase in summer time up to 48°C or above in the river bed mining area. The direct effects of heat exposure are burns, heat exhaustion,

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heat stroke and heat cramps; the indirect effects are decreased efficiency, increased fatigue and enhanced accident rates.

- **Eye Irritation:** During the high windy days in summer the sand could be the problems for eyes like itching and watering of eyes.
- **Respiratory Problems:** Excessive airborne dust can pose a health hazard, aggravating respiratory conditions like asthma and causing irritation to the lungs and bronchial passages.
- **Noise Induced Hearing Loss:** Machinery is the main source of noise pollution at the mine site.

Mitigation Measures:

To minimize the health impacts PPE like dust masks, ear plugs/ muffs and other equipment's will be provided for use by the work personnel. All workers will be subjected to Initial Medical Examination as per Mines Rule 1955 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized.

15. POST PROJECT MONITORING PLAN:

The effectiveness of evaluation of environment mitigation programme, regular monitoring of the important environmental parameters will be taken up after completion of the lease period.

Sl.	Description of Parameters	Location	Schedule and Duration of Monitoring
A	Air Quality (PM₁₀, PM_{2.5}, SO₂, NO₂) monitoring in Four locations		
A-1	Four monitoring station	one within and three outside the plant area at an angle of 120° each-covering upwind and downwind directions	Will be monitored in every six months as per CPCB/ MoEF&CC Guidelines/ Notifications
B	Quality of surface and ground water around the site will be collected from 4 locations		
B-1	Two Surface Water Samples will be collected as per EIA Report and in consultation with SPCB, out of which one will be taken near the active working area.	Up stream	Will be collected on a quarterly basis in accordance with the guidelines and notifications provided by the (CPCB) and the Ministry of Environment, Forest and Climate Change (MoEF&CC).
		Down stream	
B-2	Two Ground Water Samples will be collected as per EIA Report and in consultation with SPCB, out of which one should be taken near the active working area.	Kumirkola	

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Sl.	Description of Parameters	Location	Schedule and Duration of Monitoring
C	Ambient Noise Level monitoring at 2 locations around the site		
C-1	Two Noise Samples will be collected as per EIA Report and in consultation with SPCB.	Onsite Approach road connect with main road	Will be monitored quarterly as per CPCB /MoEF&CC Guidelines/ Notifications
D	Inventory of flora to Judge the comparative status at one locations around the site		
D-1	An Inventory of flora will be prepared at one Location near the mine lease area		
E	Soil Quality		
E-1	Soil Samples will be collected from one location.	Kumirkola	Will be collected half yearly as per CPCB/MoEF&CC Guidelines/ Notifications
6	Implementation of biological green belt development through block plantation activities.		Every 6 months by a core Soil samples will be collected every six months by a core group consisting of representatives from the management team and the plantation executing agency.

Monitoring data analysis will be done as per CPCB guidelines by NABL/MoEF&CC approved laboratory and shall be submitted to concerned authority (as specified in Environment Clearance Letter issued by SEIAA and Consent issued by SPCB) on regular basis.