

EXECUTIVE SUMMARY

1. INTRODUCTIONS

The applicant **Sk. Islam Hossen** has obtained Sand mining lease through e-tendering from the Govt. of West Bengal vide Letter of Intent No. **359/1232/MM/Auction27/2018**, dated **12.11.2018** over an area of **4.66 acres / 1.88 ha** on Damodar River near Mouza– **Selimabad, P.S.- Jamalpur, Dist. – Purba Bardhaman, West Bengal**, over Plot No. **953(P)**, J.L No- **30**. **Due to falling under non-potential zone, Proponent is surrendering 0.06 Ha, now the area after surrendering is 1.82 Ha/ 4.51 Acre.** Further, Lol vide no. **359/176/MM/2022** was extended by Office of the District Land & Land Reforms Officer, Purba Bardhaman dated **08.03.2022**. Again, LOI (vide no.:**893/64/MM/2022**) was extended by Office of the District Land & Land Reforms Officer, Purba Bardhaman dated **14.11.2022** and will be **valid for 60 days after disposal of EC by SEIAA**. The validity period of the lease is 5 years from the date of deed registration. 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 **1.82HA**). As per notification S.O. 3977(E) published on dated 14th August, 2018, our project is falls under categories "B2" and need not to submit Environmental Impact Assessment Study report. Further, another 2 mines with individual lease \leq 250ha 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:

Selimabad 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 1.82 ha	Project Co-ordinates		
	Points	Latitude	Longitude
	A	23°04'59.77"N	87°59'25.58"E
	B	23°05'00.24"N	87°59'32.06"E
	C	23°04'57.17"N	87°59'31.81"E
Location of the project	D	23°04'56.70"N	87°59'25.00"E
	State -	West Bengal	
	District-	Purba Bardhaman	
	P.S-	Jamalpur	
	Mouza-	Selimabad	
	JL No-	30	
	Plot No-	953P)	
Sand block code-	JAMALPUR/SELIMABAD/953(P)/B		

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Particulars	Details
Toposheet No.	73M/16
Total area	4.66 Acres / 1.88 Ha
Surrender area	0.06 Ha
Project area after surrender	1.82 Ha/ 4.51 Acres
Geological reserve (5 years)	2,16,172.32 m ³ (As per Approved Mine Plan)
Mineable Reserves (5 years)	1,67,474.16 m ³ (As per Approved Mine Plan)
Production as per Approved Mine Plan	41,454 m ³ /year (1 st year) 31,505.04 m ³ /year (2 nd year onwards) (76.00% replenishment rate)
Manpower	34 (The laborers will be drawn mainly from Selimabad and surrounding villages)
Elevation	38 mRL to 42 mRL
Land-use	River bed
Nearest habitation/town	Selimabad village (0.50 km, E Direction)
Nearest airport	Netaji Subhash Chandra Bose International Airport (66.00 km, SE Direction)
Nearest railway station	Berugram Railway Station (3.00 km, N Direction)
Nearest highway	NH-19 (8.00 km, NE Direction) SH-15 (1.00 km, SSE Direction)
Power supply	Electricity connection is not required for the project. Mining is being carried out in daytime only, and any requisite electricity is being sourced from solar panels, subject to approval from the Gram Panchayat if necessary. Diesel required for machinery is being outsourced from nearby villages.
Nearest Hospital	Selimabad Health Centre (0.50 km, SE) Jamalpur Hospital (2.00 km, SSE Direction)
Educational Facility in the area	Selimabad High School (2.00 km, E) Batrishbigha Primary School (1.00 km, NE) Jamalpur Mahavidyalaya (2.00 km, SE 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 4.84 KLD (Dust suppression- 3.00 KLD, Drinking & domestic- 0.34 KLD and Green Belt-1.50 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	Mana Forest (27.60, NW Direction)
Nearest stream/river/water body	Damodar river (onsite)
Seismic zone	Zone III

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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 2.94 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.
- 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.

Table 2: Required Raw Material

Inputs	Approx. quantity required	Basis
Water Requirement		
Water for Drinking and Domestic Purposes	0.34 KLD	100litre/capita/day
Dust Suppression & others	3.00 KLD	0.5 Liter per plant 2 times a day
Water for green belt development	1.50 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 4.84 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 **4.66 acres / 1.88ha** and area after surrendering is **4.51 acres / 1.82ha** on river Damodar at Mouza – **Selimabad, P.S.- Jamalpur, Dist. – Purba Bardhaman, West Bengal**, over Plot No. **953(P), J.L No- 30**.

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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.**

Table 3: Programme from Mining Lease Area

Year	Project area (Ha)	Production area (Ha)	Thickness (m)	Geological reserve (m ³)	Production (m ³) as per approved mine plan	Replenishment rate
1 st	1.82	1.41	2.94	53,508	41,454	100%
2 nd	1.82	1.41	2.2344	40,666.08	31,505.04	76%
3 rd	1.82	1.41	2.2344	40,666.08	31,505.04	76%
4 th	1.82	1.41	2.2344	40,666.08	31,505.04	76%
5 th	1.82	1.41	2.2344	40,666.08	31,505.04	76%

5. PROJECT COST:

Total Project Cost is **2.89cr.** The allocated budget for the EMP and CER Programme is Rs. **14,45,000** and Rs. **5,78,000** respectively based on a project cost. EMP amount will be spent over a period of **5 years** and CER amount will be spent over a period of **2 years.**

Table 4: Project Cost

Sl. No.	Considerations	Amount (Rs.)
1	Auction Value	1,00,36,000
2	Estimated Royalty	1,78,61,185
3	Miscellaneous	10,00,000
	Total Cost	2,88,97,185 Or 2.89 Cr

6. 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,

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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 5**.

Table 5: 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"> ○ Mining of minerals from the river bed will create a void which may affect the stream flow. ○ Mining within a river bed may have some impact on the stream's physical characteristics, such as channel geometry, bed elevation in stream roughness of the bed, flow velocity, discharge capacity, sediment transportation capacity etc. ○ Loss of adjacent land and/or structures. ○ Riverbed mining can have adverse effects on agricultural lands located near rivers. Changes in water flow and sedimentation can disrupt irrigation systems, affect soil fertility, and lead to the loss of productive agricultural land. 	<ul style="list-style-type: none"> ○ Sand mining activities will be limited to a maximum depth of 2.94 meters below the river bed or the water table, whichever is reached first. ○ Dredging will not be allowed. ○ The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year. ○ Grasses and bushes which have fibrous roots at the first instance are proposed to grown along the banks which enhances the binding properties of the soil. ○ The systematic and scientific removal of sand will allow sedimentation during monsoon and not cause bed degradation. ○ Restoration of bank will be ensured at the end of mine closure every year. ○ Mining activities in river-beds will not be allowed within a certain distance from bridge structures. The permissible distance is five times the span of the bridge structure on the upstream side and ten times the span on the downstream side, with a minimum distance of 250 meters on the upstream side and 500 meters on the

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
			<p>downstream side. This regulation ensures the protection of bridge structures and maintains the integrity of the river ecosystem.</p> <ul style="list-style-type: none"> ○ The proposed river-bed mining is unlikely to change any characteristics of the river as the mined minerals will be replenished every monsoon season.
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"> ○ Sand mining operations may involve the movement of trucks to transport sand. This can contribute to increased traffic congestion, particularly on roads leading to and from mining areas. ○ The constant movement of heavy trucks and dumpers associated with sand mining. This can result in potholes, uneven surfaces, and overall degradation of the road infrastructure. ○ Local communities near sand mining sites may experience disruptions to their daily lives due to increased traffic. This can impact residents' access to roads, schools, businesses, and other essential services. 	<ul style="list-style-type: none"> ○ Traffic management plan will help in avoiding any traffic jams and thus concentration of trucks at one place will be avoided. ○ By reducing the speed and/or volume of traffic on such roads to an acceptably low level. ○ Transportation of minerals will be stopped during the opening and closing hours of schools, colleges, and offices.

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
B	Air Environment		
B-1	Air Quality	<ul style="list-style-type: none"> ○ The extraction and transportation of sand can lead to the release of dust particles into the air, affecting air quality in the vicinity. ○ The use of vehicles for sand transportation in the project can lead to the emission of pollutants, contributing to air pollution. 	<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%. ○ Preventive measures will be implemented to minimize spillage during transportation of materials. This includes covering the carrying vehicles with tarpaulin to contain the load and prevent any loose material from escaping. ○ Proper tuning of vehicles along with pollution certificate to keep the gas emissions under check. ○ Plantation of trees along road sides as part of social forestry to help reduce the impact of dust in the nearby villages. ○ Vegetation improves air by capturing pollution particles, reducing carbon dioxide and producing oxygen. Photosynthesis in green plant consumes carbon dioxide, plants help in counteracting the increase of this gas in the atmosphere. Thus, planting of trees and shrubs for abatement of air pollution and improvement of environment is an effective way. ○ Plants with dust scavenging capacity i.e. plants species which have aesthetic value and high pollution tolerance level will be recommended for

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
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 Selimabad, potentially affecting the residents who will be exposed to increased noise levels. However, considering the relatively low number of trucks (18 trucks or 36 trips), the incremental noise level is expected to be minimal. 	<p style="text-align: center;">planting along the roads.</p> <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. ○ Plantation will be taken up along the approach roads and vicinity of river bank. The plantation minimizes propagation of noise and also arrests dust. ○ 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"> ○ During river bed mining Ground water table may be intersecting. ○ Sand mining can alter the physical structure of riverbeds, leading to the destruction of natural habitats for aquatic plants and animals. Changes in the riverbed can disrupt the breeding and feeding grounds for fish and other organisms. ○ Excessive suspended sediment in the water can cause harm to riparian vegetation and disrupt the natural habitat within the stream. ○ The extraction of sand from riverbeds can stir up sediment, releasing pollutants that were previously trapped in the 	<ul style="list-style-type: none"> ○ Mining will be done up to a depth at least 1m above the zero level. Mining will be done in scientific way and as per approve mine plan. ○ 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.

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		riverbed. This can degrade water quality, affecting both aquatic ecosystems and the availability of clean water for human use.	
C-2	Waste Generation	<ul style="list-style-type: none"> ○ Impact on surface water bodies through indiscrete disposal of liquid waste and suspended solids carried by flowing rainwater. 	<ul style="list-style-type: none"> ○ The estimated municipal solid waste generated will be 3 kg/day and liquid waste generated by 34 employees will be 0.07KLD. Effective waste management will be implemented through the provision of dustbins and mobile toilets at the project 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. ○ Emissions, litter, noise, and other physical disturbances from road activities can affect roadside vegetation, leading to changes in species composition. These impacts may extend to varying distances from the road. 	<ul style="list-style-type: none"> ○ To promote healthy roadside vegetation, it is recommended to choose native plant species that are resilient to stress and pollution and well adapted to the local climate. Selection should consider factors such as agro-climatic suitability, height and canopy structure, growth rate, and aesthetic qualities such as foliage and flower color. Hardy plants that can withstand severe weather conditions and require minimal irrigation are preferred. ○ 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 	<ul style="list-style-type: none"> ○ Efforts will be made to

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>as population influx, transportation and noise generation may have an adverse impact on fauna.</p> <ul style="list-style-type: none"> ○ 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. ○ Indiscriminate mining from active river channels has detrimental impacts on the benthic fauna, which resides in the sandy substratum at the river bottom. Excessive extraction of sand from rivers disrupts the eco-biology of various terrestrial insects that rely on aquatic environments during their initial life stages. ○ From a fisheries perspective, the loss of benthic invertebrates as a result of mining activities has a significant negative impact. This depletion of food resources can lead to a decline in the inland fishery resources in the area. 	<p>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</p> <ul style="list-style-type: none"> ○ All equipment used in the mining operations will be 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. ○ Exhaust silencers and acoustical pipe lagging (wrapping) will be utilized to minimize compressor noise and ensure optimal noise reduction. ○ A strict monitoring of the mining activity is utmost essential for reviving the health of the river ecosystem and in turn aquatic biology will be benefited. ○ No mining will be carried out during the rainy season to minimize impact on aquatic life. ○ Sand extraction in vegetated riparian areas will be avoided. ○ Undercut and incised vegetated banks will not be altered. ○ Large woody debris within the riparian zone will be preserved

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S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
			<p>and left undisturbed. If it needs to be moved, it will be carefully replaced rather than burned.</p> <ul style="list-style-type: none"> ○ Prompt and immediate action will be taken to evenly redistribute any spillage generated during the mining operation over the mined voids. ○ Access roads will not encroach into the riparian zones. ○ Efforts will be made to avoid the removal or disturbance of in-stream roughness elements during mineral extraction activities. If any elements are disturbed, they will be promptly replaced or restored.
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"> ○ Appropriate measures will be implemented in each impacted area to minimize significant adverse effects. ○ Welfare activities should be initiated in the area so as to improve the quality of life of the local people. ○ To enhance safety and minimize accidents, only licensed drivers will be hired and reckless driving fully prohibited. ○ We will ensure the provision of medical facilities, educational opportunities (with a focus on girls), and access to clean drinking water.

7. ESTIMATED CAPITAL COST OF THE PROJECT:

Estimated total cost for the project is **2.89cr**. The details of the estimated capital of the project shall be as follows.

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The details of the estimated EMP cost of the project shall be as follows.

Table 6: EMP Cost

Serial No.	Measures	Description		Investment for EMP per year
1	Pollution Monitoring	Air pollution	Yearly at 4 locations for air, 4 locations for water and 2 locations for noise during mining and 1 location for soil.	50,000
		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		25,000
3	Green Belt	Trees will be planted along the river bank and the kuchha road during the lease period in phases.		60,000
4	Road maintenance	Repair and maintenance of approach road		64,000
Total EMP Cost				2,89,000

Table 7: CER Budget

Sl. No.	Considerations	CER Cost in Rs. (1 st year)	CER Cost in Rs. (2 nd year)
1.	Conduct free eye check-ups and distribute free prescribed medicine at Selimabad High School and in local villages according to their needs- Two times yearly	1,20,000	-
2.	Conduct free eye check-ups and distribute free prescribed medicine at Dolordanga Primary School and in local villages according to their needs- Two times yearly	-	1,20,000
3.	Develop boundary wall at Selimabad High School	89,000	-
4.	Free ambulance service	-	80,000
5.	Free computer training to local village student	80,000	-
6.	Install and maintain drinking water facilities at village	-	89,000
Total/Year in Rs.		2,89,000	2,89,000
Total in 2 years		5,78,000	

****The entire CER cost of Rs. 5,78,000 will be invested within 2 years for the mentioned purpose after consultations with local villagers and local administrative authorities.**

8. PROJECT SITE SELECTION:

Sk Islam Hossen 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.

9. BASELINE ENVIRONMENTAL DATA:

The baseline data has been collected from October 2024 to December 2024. The details are given below:

Ambient Air Quality Results: Samples were collected from 6 sampling locations during the period of October 2024 to December 2024 (post-monsoon season). The results are given below

- **Particulate Matter 10 (Pm₁₀)**

The results of PM₁₀ of all locations are showing variations 66.9µg/m³ at Bonbibitala to 76.4µg/m³ at Jotkrishtai. 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 28.2µg/m³ at Batrishbigha to 35.4µg/m³ at Selimabad. However, the results are within the limits of National Ambient Air Quality Standards.

- **Percentage of Free Silica**

The percentage of free silica (polymorphs of quartz, cristobalite, and tridymite) as found in the PM₁₀ samples are found as 0.64% (Selimabad), 0.66% (Jotkrishtai), 0.55% (Kalera), 0.50% (Batrishbigha), 0.58% (Deriapur), 0.55% (Bonbibitala).

- **Gaseous Pollutants**

The results of SO₂ of all locations are showing variations from 15.4 µg/m³ at Batrishbigha and 21.7 µg/m³ at Jotkrishtai. However, the results are within the limits of National Ambient Air

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Quality Standards.

The results of NO₂ of all locations are showing variations from 21.9 µg/m³ in Deriapur to 27.7 µg/m³ in Jotkrishtai. However, the results are within the limits of 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 51.9 dB(A) at Kalera and Deriapur to 54.3 dB(A) at Jotkrishtai which is within standard limits of residential area are ~ 55dB(A). The night time noise result is varying from 42.5 dB(A) at Deriapur to 43.7 dB(A) at Selimabad, Jotkrishtai and Bonbibitala which is within the standard limits of residential ~ 45dB(A).

Water Quality Results: The samples were collected from 4 ground water locations and 2 surface water sources:

Ground Water results: The analysis results indicate that the pH of the samples ranges in between 7.1 to 7.4 which are well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 193.4 to 225.7 mg/l. The maximum hardness (225.7 mg/l) was recorded at GW₁ (Selimabad) and the minimum (193.4 mg/l) was recorded at GW₃ (Kalera). Chlorides were found to be in the range of 60.9 mg/l at GW₃ (Kalera) to 79.1 mg/l at GW₄ (Deriapur). Sulphate was found to be in the range of 32.6 mg/l to 46.5 mg/l. The maximum value observed at GW₁(Selimabad) whereas the minimum value observed at GW₄(Deriapur).

All results were found within standard drinking water standards (IS: 10500).

Surface Water results: The pH of the surficial water is 7.3 in (SW₁) and (SW₂) which indicates a slightly alkaline nature. In both the samples, the DO exceeds 6.0mg/l. Higher DO signifies good quality waters and healthy environment for aquatic life. The BOD concentration is 2.1 mg/l (SW₁) and 1.9 mg/l (SW₂) signifying less pollution in the waters. Higher concentration of harmful bacteria and other microorganisms in polluted water consumes the dissolved oxygen and thus the BOD increases. Total coliform in the samples is within 1000 MPN/100ml. Total coliforms are a group of bacteria commonly found in water contaminated by surface water and human or animal waste.

The overall class of water for individual samples comes as "C" which signifies that water of Damodar River can be used as drinking water source after conventional treatment and disinfection.

Soil Quality Results: The samples were collected from 4 locations:

pH ranging from 7.2 to 7.5 in the study area. Bulk density of the study area ranges between 1.24 gm/cm³ S₂ (Jotkrishtai) to 1.36 gm/cm³ at S₁ (Selimabad) & S₃ (Kalera). The electrical conductivity of the soil samples is found to be average and ranges from 252 µmhos /cm to 265 µmhos /cm. Organic carbon of the soil samples varies from 0.30% in Jotkrishtai to 0.48% in Deriapur. Nitrogen content in the surface soil of the study area varies between 114 kg/ha at S₁ (Selimabad) to 162 kg/ha at S₄ (Deriapur). Available Phosphorus ranges between 28.5 kg/ha at

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S₄ (Deriapur) to 44.5 kg/ha at S₂ (Jotkrishtai). Potassium content in the study area ranges between 240kg/ha at S₁ (Selimabad) to 267 kg/ha at S₂(Jotkrishtai).

Based on the provided data, it can be inferred that the soil in the study area has average fertility, indicated by medium levels of phosphorus and potassium. However, the nitrogen content in the soil is relatively good. Nitrogen is essential for leaf growth, suggesting that plants in this area would benefit from the available nitrogen for foliage development.

Ecology and Biodiversity Results:

There is no forest 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 Selimabad, 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 173 villages in the study area. These villages have 81,972 households accumulating 3,52,084 populations. According to the survey, gender ratio of study area was 972 in 2011
- **Population:** The total population of the study area is 3,52,084 out of 81,972 households, implying that there is an average of 5 members per households. According to the survey, gender ratio of the study area 972 in 2011.
- **Literacy rate:** Within the study area, the overall literacy rate is 67.81% of the total population. Among the literate population, male literacy stands at 55.0%, while female literacy is recorded at 45.0%.
- **Occupational Structure:** In the villages around the study area, people mainly earn from agriculture and animal rearing.

10. 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

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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 generally occurs except during the monsoon season; 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 Waste Dumps:** 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 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.

11. 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).

12. 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,

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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.
- 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.

13. 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.

14. 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.

15. 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

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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, 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.

16. 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 project 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		

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Sl.	Description of Parameters	Location	Schedule and Duration of Monitoring
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.	Selimabad	
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	Will be monitored quarterly as per CPCB /MoEF&CC Guidelines/ Notifications
		Approach road connect with main road	
D	Inventory of flora to Judge the comparative status at one location 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.	Selimabad	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 sample 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.