

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT &
ENVIRONMENTAL MANAGEMENT PLAN
FOR**

**“IDILPUR SAND MINE ON DAMODAR RIVER, LOCATED AT
MOUZA-IDILPUR, J.L NO-24, P.S-BARDHAMAN,
DISTRICT- PURBA BARDHAMAN
BLOCK ID-BARDHAMAN-I/IDILPUR/810 (P) & OTHS7/B
STATE- WEST BENGAL**

**PLOT NOS. 810(P),812(P),829(P),830(P),1267(P),1268(P),1419(P),1420(P)
(TOTAL AREA- 4.99 HA/12.34 ACRE)”**

[SECTOR 1(a) – NON-COAL MINING (RIVERBED MINING), CATEGORY B1]



PROJECT PROPONENT

IDILPUR SAND MINE

(NAMITA ENTERPRISE)

(PROP. – KANAI CHANDRA DAS)

**Vill- FAKIRPUR, P.O- KANCHANNAGAR, PURBA
BARDHAMAN, WEST BENGAL PIN- 713102**

JUNE, 2025

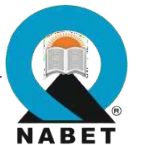
ENVIRONMENT CONSULTANT: Eco Tech Labs Pvt Ltd

QCI-NABET ACCREDITATION CERTIFICATE NO. :NABET/EIA/22-24/SA0222 VALID

TILL: 10.06.2026

QCI-NABL ACCREDITED LABORATORY FOR ENVIRONMENTAL BASELINE SAMPLING:

Green Vission (Certificateno.:TC-15288,validtill:11/01/2029)



List of Abbreviations-

Abbreviation		Description
AQ	:	Air Quality
AP	:	Air Pollution
CER	:	Corporate Environment Responsibility
CO	:	Carbon Monoxide
CPCB	:	Central Pollution Control Board
CRZ	:	Coastal Regulation Zone
CSR	:	Corporate Social Responsibility
DO	:	Dissolved Oxygen
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
epEPA	:	Environmental Protection Agency
FAE	:	Functional Area Experts
GIS	:	Geographic Information System
GLC	:	Ground Level Concentration
GoI	:	Government of India
GPS	:	Global Positioning System
GW	:	Ground Water
Ha	:	Hectare
IBM	:	Indian Bureau of Mines
IMD	:	Indian Meteorological Department
INR	:	Indian Rupee
ISO	:	International Standards Organization
kLD	:	kilolitres per Day
kVA	:	kilo Volt Ampere
kWH	:	kilo Watt Hour
LSG	:	Local Self Government
LULC	:	Land Use & Land Cover
MoEF& CC	:	Ministry of Environment, Forest and Climate Change
MT	:	Metric Tonne
MTPA	:	Metric Tonnes Per Annum
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education and Training
NDIR	:	Non-Dispersive Infra-Red
NH	:	National Highway
NOC	:	No Objection Certificate
NPV	:	Net Present Value
NW	:	North West
OSHAS	:	Occupational Health and Safety Assessment Series
PAP	:	Project Affected People
PFR	:	Pre-Feasibility Report
PM	:	Particulate Matter

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- Annexure-6. Certificate of NABET Accreditation & NABL Certification of laboratory

Declaration by the Project Proponents

I, KANAI CHANDRA DAS of NAMITA ENTERPRISE (Owner of Applied lease of IDILPUR Riverbed Sand Mine), hereby confirm that, M/s Eco Tech Labs PVT.LTD ,Environmental Consultancy and Laboratory has prepared the Draft EIA Report for the Proposed Riverbed Sand Mining of 'IDILPUR Riverbed Sand Mine'. Mining Project at Mouza- IDILPUR, P.S- Bardhaman, J.L. No-24, Plot NOS-810(P), 812(P), 829(P), 830(P), 1267(P),1268(P), 1419(P),1420(P). District – Purba Bardhaman, State – West Bengal.

We hereby undertake the ownership of the Draft EIA Report.

NAMITA ENTERPRISE

Vill- Fakirpur, P.O- Kanchannagar,

Dist-Purba Bardhaman

WB- 713102

Place

Date

TOR COMPLIANCE

The compliance to the Terms of Reference (ToR) for EIA and preparation of Environment Management Plan issued by State Level Expert Appraisal Committee, West Bengal is given in the Table below:

Table: Compliance to TOR

S No	TOR Points	Compliance in the Final EIA Report	Citation
1.1	Project Details		
1.	Year-wise production details since 3194 should be given, clearly stating the highest production achieved in any one year prior to 3194. It may also be categorically informed whether there had been any increase in production after the EIA Notification 3194 came into force, w.r.t. the highest production achieved prior to 3194.	Not Applicable	
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The Letter of Intent (LOI) for IDILPUR Riverbed Sand Mine to project proponent NAMITA ENTERPRISE was issued by Government of West Bengal.	Annexure 2
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	Complied. All documents including approved mine plan, EIA and Public Hearing are compatible with one another in terms of the lease area, production levels, waste generation and its management, mining technology etc. and all documents are on the name lessee.	Annexure 4
4.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Complied. High resolution satellite image used for land use study and Google earth image is given.	Chapter 2 and Chapter 3.

5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Complied. Toposheet in 1:50,000 scale is given.	Chapter 3.
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S No	TOR Points	Compliance in the Final EIA Report	Citation
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	Complied.	Chapter – 2
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement /deviation /violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	Complied.	Chapter - 2
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	No underground mining required. The proposed method of Mining will be Open-cast semi mechanized mining method by forming benches. Width of the benches will be maintained similar to height of benches.	Details given in Chapter 2.

9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	Not Applicable	
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EXECUTIVE SUMMARY

INTRODUCTIONS

The applicant Kanai Chandra Das of NAMITA ENTERPRISE has obtained Sand mining lease through e-tendering from the Govt. of West Bengal vide Letter of Intent Memo No. **292/306/MM/Auction 22/2018**, dated **26/03/2018** over an area of **12.34 acres / 4.99 ha** on Damodar River near Mouza- IDILPUR, P.S.-Bardhaman, Dist. - Purba Bardhaman, West Bengal, over Plot No.- 810(P) ,812(P), 829(P), 830(P), 1267(P),1268(P),1419(P),1420(P)., **J.L No- 24**. Last Lol vide no. **PBD-54015(99)/230/2024/MM/1041** was extended by Office of the District Land & Land Reforms Officer, Purba Bardhaman dated **26.12.2024** **which is 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**.

This particular project is considered to be of 'B' category due to the size of the mining lease (**4.99 HA**). 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 5 mines with individual lease \leq 240ha 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.

PROJECT NAME AND LOCATION:

IDILPUR 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 4.99 ha	Project Co-ordinates		
	Points	Latitude	Longitude
	A	23°13'32.77"N	87°48'58.79"E
	B	23°13'30.72"N	87°49'04.05"E
	C	23°13'20.53"N	87°49'01.13"E
	D	23°13'22.49"N	87°48'56.50"E
Location of the project	State -	West Bengal	
	District-	Purba Bardhaman	
	P.S-	BARDHAMAN	
	Mouza-	IDILPUR	
	JL No-	24	
	Plot	810(P),812(P),829(P),830(P),1267(P),1268(P),1419(P),1420(P)	

Particulars	Details	
	No-	
	Sand block code-	BARDHAMAN-I/IDILPUR/810(P) & OTHS7 /B
Toposheet No.	73M/16	
Total area	12.34 Acres / 4.99 Ha	
Geological reserve	144710 m ³ /year (As per Approved Mine Plan)	
Mineable Reserves	120789.35 m ³ /year (As per Approved Mine Plan)	
Production as per Approved Mine Plan (5 years)	495236.335 m³	
Production as per Approved DSR	120789.35 m³/year (1st year) 93611.74625 m³/year (2nd year onwards) (77.5% replenishment rate)	
Manpower	31 (The laborers will be drawn mainly from IDILPUR and surrounding villages)	
Elevation	41 mRL to 43 mRL	
Nearest habitation/town	IDILPUR village (1.00 km,)	
Nearest airport	Netaji Subhash Chandra Bose International Airport (80.00 km)	
Nearest railway station	IDILPUR ROAD Railway Station (2.3 km)	
Nearest highway	NH-2 (4km)	
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	BARDHAMAN MEDICAL COLLEGE HOSPITAL 10 .00 KM	
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 4.86 KLD (Dust suppression- 2.00 KLD, Drinking& domestic- 1.00 KLD and Green Belt-1.86 KLD).	
Educational Facility in the area	None in the Study Area	
Nearest tourist places	None in the Study Area	
Archaeological features	Damodar river (onsite)	
Nearest Forest area	Tildanga Forest (4.99km West Direction)	
Seismic zone	Zone III	

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 2.90 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 0.04-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 of the Project

Inputs	Approx. quantity required	Basis
Water Requirement		
Water for Drinking and Domestic Purposes	1.55 KLD	100litre/capita/day
Dust Suppression & others	2.50 KLD	0.56 Liter per plant 2 times a day
Water for green belt development	8.60 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 12.65 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

PRODUCTS AND CAPACITIES:

The mining lease will be granted over an area of **4.99 Ha/ 12.34 Acres** on river Damodar at Mouza - **IDILPUR**, P.S.- **BARDHAMAN**, Dist -**Purba Bardhaman**, West Bengal, over Plot No.- 810(P) ,812(P) ,829(P),830(P),1267(P),1268(P),1419(P),1420(P) , J.L No- 24.

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: Details of Reserve

Year	Total Area (HA)	Minable Area (HA)	Thickness	Geological Reserves	Minable Reserves	Replenishment Rate(%)
1 st	4.99	4.30	2.90	144710	120789.35	100
2 nd	4.99	4.30	2.90	112150.25	93611.74625	77.5
3 rd	4.99	4.30	2.90	112150.25	93611.74625	77.5
4 th	4.99	4.30	2.90	112150.25	93611.74625	77.5
5 th	4.99	4.30	2.90	112150.25	93611.74625	77.5

Total Project Cost is 7.65 cr.

Table 4: Project Cost

Sl. No.	Considerations	Amount (Rs.)
1	Auction Value	11066000
2	Estimated Royalty Including cess,DMF,GST etc of 17489271.17 cft (495236.335CumX 35.315) @ 3.60	62961376.25
3	Miscellaneous(Temporary Labourer Rooms,Toilets ,Haul Road preparation & MaintenanceEtc.)	2472623.75
	Total Cost	7,65,00,000.00 approx. 7.65 cr

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 5**.

Table 5: Description of different Impact

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
Land Environment		
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 3.00meters 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 240 meters on the upstream side and 500 meters on the downstream side. This regulation ensures the protection of bridge structures

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>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.
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.
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.
Air Environment		
Air Quality	○ The extraction and	The only air pollution sources are

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
	<p>transportation of sand can lead to the release of dust particles into the air, affecting air quality in the vicinity.</p> <ul style="list-style-type: none"> ○ The use of vehicles for sand transportation in the project can lead to the emission of pollutants, contributing to air pollution. 	<p>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 planting along the roads.
Noise Level	<ul style="list-style-type: none"> ○ Noise generated by vehicles 	<ul style="list-style-type: none"> ○ Periodical monitoring of noise

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
	<p>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 IDILPUR, potentially affecting the residents who will be exposed to increased noise levels. However, considering the relatively low number of trucks (10 tripper trucks/tractors or 20 trips), the incremental noise level is expected to be minimal.</p>	<p>near sensitive receptors will be done.</p> <ul style="list-style-type: none"> ○ 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.
Water Environment		
<p>Hydrology, Hydro-geology and Water Quality</p>	<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 riverbed. This can degrade water quality, affecting both 	<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.

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
	aquatic ecosystems and the availability of clean water for human use.	
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 2 kg/day and liquid waste generated by 31 employees will be 38 Kg/ day. Effective waste management will be implemented through the provision of dustbins and mobile toilets at the project site.
Ecological Environment		
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.
Fauna	<ul style="list-style-type: none"> ○ The operational activities such as population influx, transportation and noise 	<ul style="list-style-type: none"> ○ Efforts will be made to minimize the impact of mining activities on residential areas

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
	<p>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>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 and left undisturbed. If it needs to be moved, it will be carefully

Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>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.
Social Environment		
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.

ESTIMATED CAPITAL COST OF THE PROJECT:

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.	1,50,000
		Water pollution		50,000
		Noise Pollution		50,000
		Soil		50,000
2	Water Sprinkling	Water sprinkling will be done at approach road during the lease period in phases		2,00,000
3	Green Belt	Trees will be planted along the river bank and along the kuccha road during the lease period in phases.		5,50,000
4	Road maintenance	Repair and maintenance of approach road		12,00,000
5	Employees welfare	Temporary rest room , kitchen, Bathroom on the project site		2,50,000
Total EMP Cost				24,00,000

Table 7: CER Budget

Sl. No.	Considerations	CER Cost in Rs. (1 st year)	CER Cost in Rs. (2 nd year)
1.	Construct Toilet for students at near by Primary School	465000.00	465000.00
2.	Installation Water purifier at near by Primary School	50,000	50,000
3.	Medical Camp	2,00,000	2,00,000
4.	Plantation Work at near by School premises.	50,000	50,000
Total/Year in Rs.		765000.00	765000.00
Total in 2 years		15,30,000.00	

****The entire CER cost of Rs. 15,30,000.00 will be distributed for the mentioned purpose after consultations with local villagers and local administrative authorities.**

PROJECT SITE SELECTION:

NAMITA ENTERPRISE OF IDILPUR SAND MINE 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.

BASELINE ENVIRONMENTAL DATA:

The baseline data has been collected from March 2025 to May 2025. The details are given below:

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

- **Particulate Matter 10 (PM10)**

The results of PM10 of all locations are showing variations from 66.2 $\mu\text{g}/\text{m}^3$ to 74.8 $\mu\text{g}/\text{m}^3$. Hence, the results are within the limits of National Ambient Air Quality Standards (NAAQS).

- **Particulate Matter 2.5 (PM2.5)**

The results of PM2.5 of all locations are showing variations from 24.8 $\mu\text{g}/\text{m}^3$ in IDILPUR to 35.2 $\mu\text{g}/\text{m}^3$ in Chanchai. 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 0.04 $\mu\text{g}/\text{m}^3$ to 0.049 $\mu\text{g}/\text{m}^3$

- **Gaseous Pollutants**

The results of SO₂ of all locations are showing variations from 8.7 $\mu\text{g}/\text{m}^3$ to 10 $\mu\text{g}/\text{m}^3$ at Near Project Site. However, the results are within the limits of National Ambient Air Quality Standards.

The results of NO₂ of all locations are showing variations from 26.7 $\mu\text{g}/\text{m}^3$ to 28.5 $\mu\text{g}/\text{m}^3$. However, the results are within the limits of National Ambient Air Quality Standards (NAAQS).

The lowest level of CO was observed at Chalbalpur (0.04 mg/m^3) while the highest value (0.049 mg/m^3) was observed at Chak Shanjadi. These levels are found to be well within the NAAQ standard of 2.0 mg/m^3

for residential and industrial areas.

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 52.6 dB(A) to 53 dB(A) which is well within the standard limits of residential area are ~ 55 dB (A). The night time noise result is varying from 44.8 dB(A) to 24.1 dB(A) at IDILPUR which is within the standard limits of residential ~ 24 dB(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 6.84 to 7.1 which are well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 146.0 to 152.0 mg/l. The maximum hardness (152.0mg/l) was recorded at GW4 (Chanchai) and the minimum (146.0 mg/l) was recorded at GW2 (Haibatpur). Chlorides were found to be in the range of 34.42 mg/l at GW1 (Near Project Site) to 42.904 mg/l at GW4 (Chanchai). Sulphate was found to be in the range of 44.52 mg/l to 49.06 mg/l. The maximum value observed at GW1(Near Project Site) whereas the minimum value observed at GW4(Chanchai), which is well within the specified standard of 200 mg/l as per IS 10500:2012.

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

Surface Water results: The pH of the surficial water is 7.24 (SW1) and 7.36 (SW2) which indicates a slightly alkaline nature. In both the samples, the DO exceeds 5.4 mg/l. Higher DO signifies good quality waters and healthy environment for aquatic life. The BOD concentration is 3.5 mg/l (SW1) and 4.0 mg/l (SW2) signifying less pollution in the waters. Higher concentration of

harmful bacteria and other microorganism EXECUTIVE SUMMARYs in polluted water consumes the dissolved oxygen and thus the BOD increases. Total coliform in the samples is within 1200 MPN/1400ml.

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 4 locations:

pH ranging from 7.12 to 7.35 in the study area. Bulk density of the study area ranges between 1.35 gm/cm³ S4 (Chanchai) to 1.39 gm/cm³ at S2 (Haibatpur). Electrical conductivity of the soil samples is found to be average and ranges from 318µmhos /cm to 224 µmhos /cm. Organic carbon of the soil samples varies from 0.42% in (Chanchai) to 0.46% in (Chalbalpur). Nitrogen content in the surface soil of the study area varies between 136.8 kg/ha at S3 (Chalbalpur) to 144.4 kg/ha at S4 (Chanchai). Available Phosphorus ranges between 41.82 kg/ha at S2 (Haibatpur) to 44.6 kg/ha at S3 (Chalbalpur). Potassium content in the study area ranges between 63.7kg/ha at S3 (Chalbalpur) to 72.6 kg/ha at S1(Near Project Site).

Based on the provided data, it can be inferred that the soil in the study area has medium fertility, indicated by medium and low 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 **IDILPUR**, 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 162 villages in the study area. These villages have 87,436 households accumulating 3,74,280 populations. According to the survey, gender ratio of study area was 973 in 2011.
- **Population:** The total population of the study area is 3,74,280 out of 87,436 households, implying that there is an average of 4 members per households. According to the survey, gender ratio of the study area 973 in 2011.

- **Literacy rate:** Within the study area, the literacy rate accounts for 66.50% of the total population. Out of this, male literacy stands at 55.0% and female literacy at 24.0%.
- **Occupational Structure:** In the villages around the study area, people mainly earn from agriculture and animal rearing.

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 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 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:** 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.

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).

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 3152, MMR 3161 and Mines Rules 3155, RMMCR 3186, 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.

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.

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.**

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, 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 3155 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized.

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, PM2.5, 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 down wind 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.	IDILPUR	
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.	IDILPUR	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

Sl.	Description of Parameters	Location	Schedule and Duration of Monitoring
			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.

CHAPTER 1

INTRODUCTION

INTRODUCTION

PURPOSE OF REPORT

As per the notification of the MoEF&CC of September 2006, as amended in December 2009, mining projects spread over an area less than 240ha are categorized under Category B in the Schedule, including expansion and modernization of existing projects or activities. All these projects require prior environmental clearance from State Environment Impact Assessment Authority (SEIAA), on the recommendations of State Expert Appraisal Committee (SEAC) before the commencement of mining activities. In line with the said notification, a presentation was made to the State Expert Appraisal Committee, W.B. in the meeting held on **11th APRIL, 2025** for determining the ToR for the preparation of EIA/EMP report. State Environment Impact Assessment Authority (SEIAA), West Bengal, issued TOR; vide letter no. **TO25B0107WB5773681N & File No. EN/T-II-1/111/2025 to NAMITA ENTERPRISE, on 28th MAY, 2025 (Refer Annex 1).**

Based on the ToR conditions stipulated by SEIAA, a draft EIA was prepared. The present draft EIA/EMP prepared for assessing the environmental impacts on the study area (10km from boundary of the project site) due to the proposed mining activities.

IDENTIFICATION OF PROJECT & PROPONENT

Sand mining involves the extraction of sand from its natural configuration, and it serves as a valuable resource for a wide range of projects, including land reclamations, the construction of artificial islands, coastline stabilization, and various construction. These activities bring about significant social and economic benefits to communities and industries involved. On a global scale, sand and gravel mining represents the largest volume of solid material extraction. Each year, an estimated 47 to 59 billion tonnes of material are mined worldwide (Steinberger et al., 2010). Within this substantial volume, sand and gravel, collectively known as aggregates, account for the largest share, ranging from 68% to 85%, and also exhibit the highest growth rate of extraction (Krausmann et al., 2009). River and marine aggregates continue to serve as the primary sources for building and land reclamation projects. Compared to other sources, in-stream gravel requires less processing and yields high-quality material that is well-suited for concrete production.

The project involves extraction of sand from **Damodar River** in **Purba Bardhaman** District, over Plot no. **1 2 9 3 (P) , 1 3 7 7 (P) & ORS.**, J.L No- 24 of **IDILPUR** mouza in **Bardhaman** P.S. Letter of Intent was granted to **IDILPUR SAND MINE, NAMITA ENTERPRISE** for sand mining from the Govt. of West Bengal vide letter no. **313/229/MM/ 2022**, dated **11.03.2022** over an area of **12.34 acres / 4.99 ha (Refer Annex 2)**. Last Lol vide no. **PBD-54015(99)/221/2024/MM/42** was extended by Office of the District Land & Land Reforms Officer, Purba Bardhaman dated **08.01.2024 which is 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**. The validity period of the lease is 5 years from the date of deed registration.

PROJECT PROPONENT

IDILPUR SAND MINE, NAMITA ENTERPRISE was the highest bidder in the e-bidding process conducted by government of West Bengal. The applicant is involved in the mining business for last many years. The applicant will invest necessary funds for the scientific and systematic development of mines and other measures necessary to protect the quality of the environment and human health etc. The address of the proponent is provided below:

Name of the Applicant : NAMITA ENTERPRISE
Address of the Applicant : Vill- Fakirpur, P.O- Kanchannagar
 PURBA BARDHAMAN, West Bengal Pin- 713102
Period of Lease : 5 years

BRIEF DESCRIPTION OF PROJECT

The location of site and the geographical coordinates of the site superimposed on toposheet, are provided in **Figures 1** and **2** respectively as well as project site on satellite image has been shown in **Figure 3**. Mining will be carried out up to a maximum depth of 2.90 m in river bed. Mining will be carried out only during day time except monsoon season. A brief description of the project is given in **Table 1..**

Table 1: Brief Description of Project

Particulars	Details		
Sanctioned Mining Lease area coordinate of 2.05 ha	Project Co-ordinates		
	Points	Latitude	Longitude
	A	23°13'32.77"N	87°48'58.79"E
	B	23°13'30.72"N	87°49'04.05"E
	C	23°13'20.53"N	87°49'01.13"E
	D	23°13'22.49"N	87°48'56.50"E
Location of the project	State -	West Bengal	
	District-	Purba Bardhaman	
	P.S-	Bardhaman	
	Mouza-	IDILPUR	
	JL No-	24	
	Plot No-	810(P),812(P),829(P),830(P),1267(P),1268(P),1419(P),1420(P).	
	Sand block code-	BARDHAMAN-I/IDILPUR/810 (P) & OTHS7/B	
Toposheet No.	73M/16		
Total area	12.34Acres / 4.99HA		
Geological reserve	144710m ³ in 1 st year (As per Approved Mine Plan)		
Mineable Reserves	120789.35 m ³ in 1 st year (As per Approved Mine Plan)		
Production as per Approved Mine Plan	495236.335 m³ for 5 years		
Production as per Approved DSR	120789.35 m³/year (1st year) 93611.74625 m³/year (2nd year onwards) (77.5 % replenishment rate)		

Particulars	Details
Manpower	31 (The laborers will be drawn mainly from IDILPUR and surrounding villages)
Land-use	River bed
Nearest habitation/town	IDILPUR village (1.00 km,)
Nearest airport	Netaji Subhash Chandra Bose International Airport (105.00 km)
Nearest railway station	IDILPUR ROAD Railway Station (2.3 km)
Nearest highway	NH-2 (4 km)
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	BARDHAMAN MEDICAL COLLEGE HOSPITAL 10 .00 KM
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 9.97 KLD (Dust suppression- 3.0 KLD, Drinking & domestic- 0.31 KLD and Green Belt-6.78 KLD).
Nearest tourist places	None in the Study Area
Defense installations	None in the Study Area
Archeological features	None in the study area
Nearest Forest area	Damodar river (onsite)
Nearest stream/river/water body	Tildanga Forest (10.00km West Direction)
Seismic zone	Zone III

Mining will be carried out by opencast manual mining method (as per approved mine plan) with formation of benches. Proposed height & width of benches shall be kept 1 m & 1 m respectively over all pit slopes shall be maintained. No overburden is present over the sand deposit and no waste will be generated as the entire materials are saleable. A barrier of 7.5m will be left all along the boundary. The mined-out minerals will be loaded in tipper truck/tractor. The tipper truck/tractors and equipment's will be on hire basis or in-house depending upon requirement. The movement of tipper truck/tractors after mineral loading will be through approach roads.

The entire mineral produced will be used in construction of roads, buildings and other infrastructures. The entire mineral will be sold to the buyers thereby bridging the gap between demand and supply of these minor minerals in the region. This will also generate much needed employment to the local people. Economy will be boost up of the area and there will be an overall growth of the region in terms of standard of living, education, health and transport.

SCOPE OF STUDY

As per the EIA Notification of 14th September 2006 and subsequent amendments, all 'Category A' projects require prior clearance by the Expert Appraisal Committee, Ministry of Environment, Forest & Climate Change, New Delhi and all category 'B' projects require prior clearance by the State Environment Impact Assessment Authority of the State. This report is prepared for SEIAA, West Bengal State. The environmental clearance process for new projects comprises of a maximum of four stages. The four stages in sequential order are as given below.

Stage 1 - Screening: It refers to the definite assignment of category to projects or activities where the same is not completely specified. The projects are categorized as 'A', 'B1' and 'B2'. Category 'A' projects are scrutinized and cleared through the Environment Appraisal Committee (EAC) at MoEF&CC, Govt. of India. In case of Category 'B' projects, scrutiny of application is done at the State level committee respective to categorize project into 'B1' or 'B2' category. The proposed sand mine is under Category 'B1' project and shall be appraised by State Level Committee of West Bengal.

Stage 2 - Scoping: It refers to the process where EAC or SEAC determines detailed and comprehensive Terms of Reference for the EIA report and can also include site visits by the committee if required.

Stage 3 - Public Consultation: It refers to the process by which concerns of local people and other stakeholders are ascertained and their views taken regarding the project. The public consultation takes part in two steps: public hearing and written responses.

Stage 4 - Appraisal: This refers to detailed scrutiny of the application and EIA report to make categorical recommendations to the regulatory authority.

The detailed scope of work for the sand mining project was conducted in accordance with the Terms of Reference (TOR) issued by the State Environment Impact Assessment Authority (SEIAA), West Bengal. The TOR, referenced as letter no. **TO25B0107WB5773681N, on 28th MAY, 2025 to NAMITA ENTERPRISE.** The scoping process followed the regulatory requirements outlined in Clause 7(i) of the EIA Notification 2006, as amended to date.

The overall contents of the EIA report follow the list of contents given in **APPENDIX III, Generic Structure of Environmental Impact Assessment Document** of the Gazette Notification on Environmental Clearance issued by Ministry of Environment, Forests & Climate Change, and Government of India vide no. SO 1533 dated 14th September 2006.



A. Map of India



B. State of West Bengal



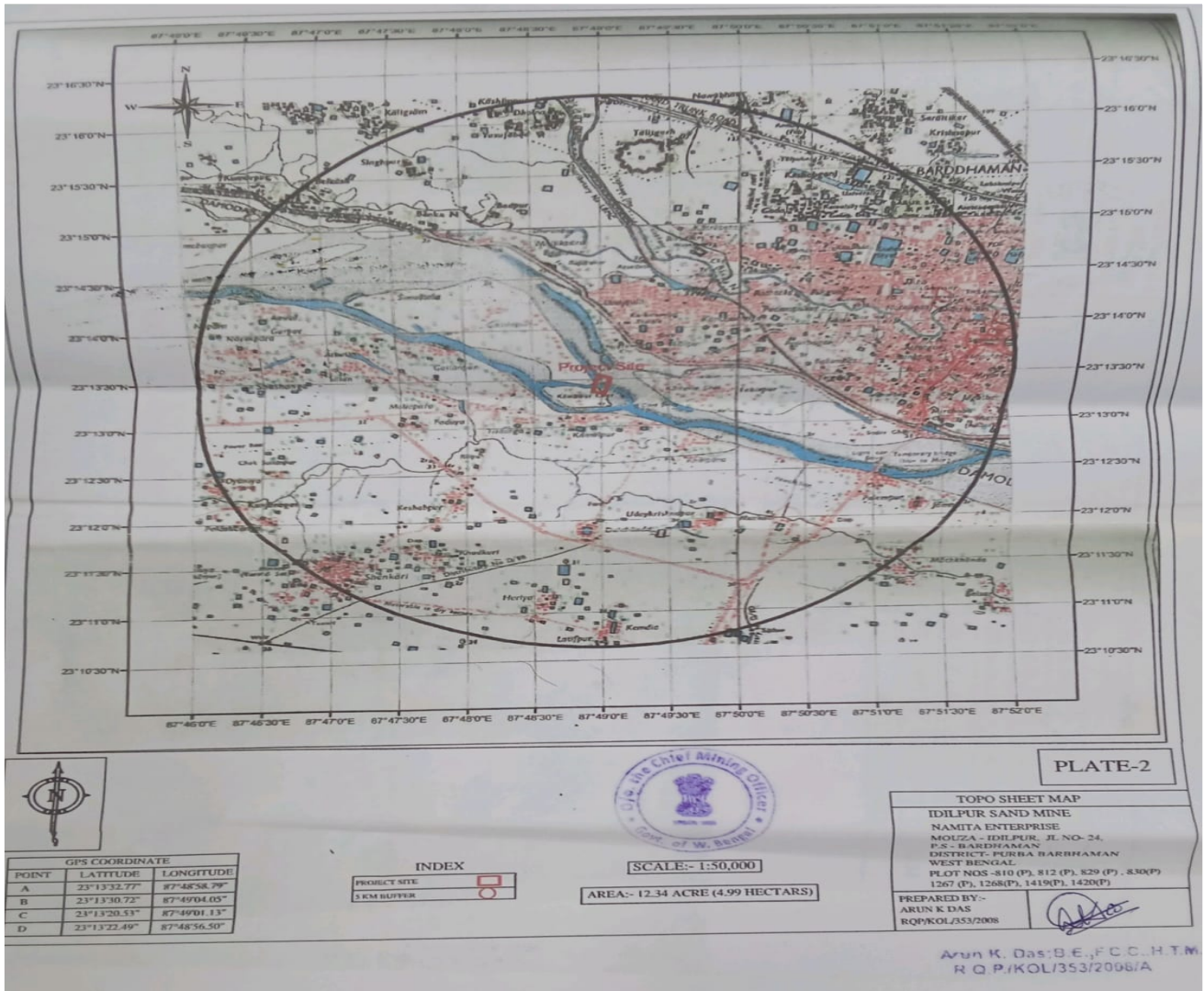
C. Purba Bardhaman District, West Bengal



D. Project site

Fig no. 1: Location Map of the Project site

Fig no. 2: Topo sheet



IDILPUR Sand Mining Project
Mouza- IDILPUR, P.S- Bardhaman, Purba Bardhaman

Project Proponent
NAMITA ENTERPRISE

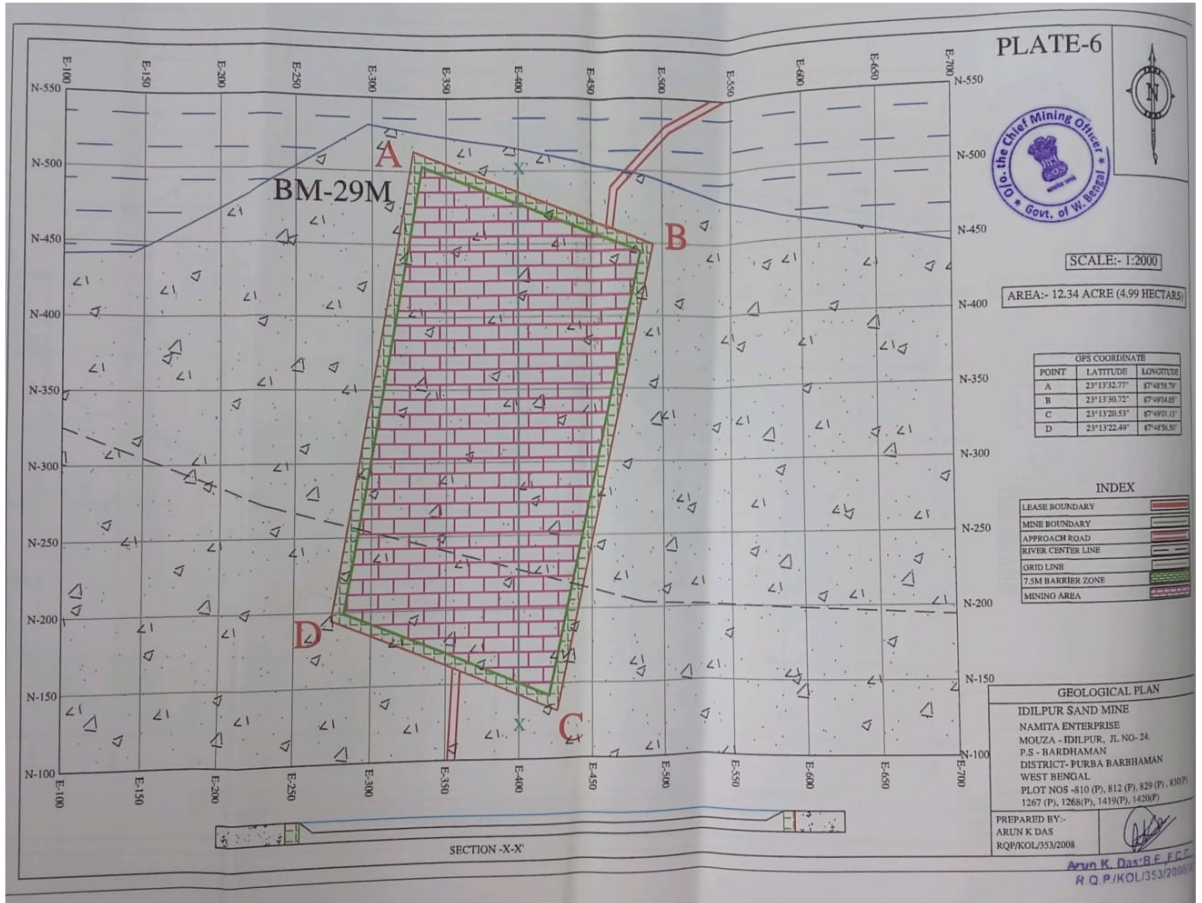


Fig 3: Geological Co-ordinate Map
 (1 Km buffer of the Project Site)

IDILPUR Sand Mining Project
Mouza- IDILPUR, P.S- Bardhaman, Purba Bardhaman

Project Proponent
NAMITA ENTERPRISE

CHAPTER 2

PROJECT DESCRIPTION

CHAPTER 2: PROJECT DESCRIPTION

TYPE OF THE PROJECT

The project is riverbed Sand Mine on Damodar River. Letter of intent for ordinary sand mining for this mine has been issued by Additional District Magistrate and District Land Reform Officer, district West Bengal to the project proponent vide memo no. 313/229/MM/2022 dated 11.03.2022 for 4.99 hect area at Mouza - IDILPUR, JL. No. - 24, Plot No - 810(P), 812(P) ,829(P),830(P),1267(P),1268(P),1419(P),1420(P) , P.S. - Bardhaman, Dist. - Purba Bardhaman, and West Bengal.

The project is categorized under 1(a), category 'B1' as per the EIA Notification 2006, (S.O. 1533(E) dated 14th September 2006 and its subsequent amendments and will be appraised at SEAC, West Bengal thereof and thus Environmental Clearance (EC) is required to be obtained from State Environmental Impact Assessment Authority (SEIAA). Lease agreement for ordinary sand mine will be executed after compliance of the terms and conditions of letter of intent. Therefore preferred bidder is submitting quarry plan. He also has to obtain environment clearance under Environment Impact Assessment notification no. S.O.1533 dated 14-09-2006 from Ministry Of Environment, Forest and Climate Change- Government of India.

NEED FOR THE PROJECT

Mineral resources of any country are the "TREASURE-TROVE" of its national economy. Sand is basic material for civil building & civil construction works. The project shall also provide additional revenue to local body and create direct and indirect employment opportunities, which will catalyze overall growth of the State and improve the quality of life of the people living in the region and transform the region's economy from predominantly agricultural to significantly industrial sector and accelerate the pace of regional development of region. There is huge demand of sand in the region as well as throughout country for the use in construction of House, Canal, Dam, Pachri and other infrastructure etc.

LOCATION OF THE PROJECT (MAPS SHOWING GENERAL LOCATION, SPECIFIC LOCATION, PROJECT BOUNDARY & PROJECT SITE LAYOUT)

Total Land area of IDILPUR Sand Mine is 4.99 Ha/ 12.34 acres. It is a Government land. The proposed site is located under Mouza - IDILPUR, P.S- Bardhaman, Dist - Purba Bardhaman, and State. - West Bengal. The proposed project is located about 6 km away from Burdwan Junction. It is about 105 kilometers away from Netaji Subhash Chandra Bose International Airport. The location overview of the proposed project is given in Figure 1. Toposheet of the study area, Google earth image of 10 km around project site, Photograph of the study area and connectivity map is given in figure number 2, 6,4, 7 respectively.



Figure 4: Site Photograph of the Project

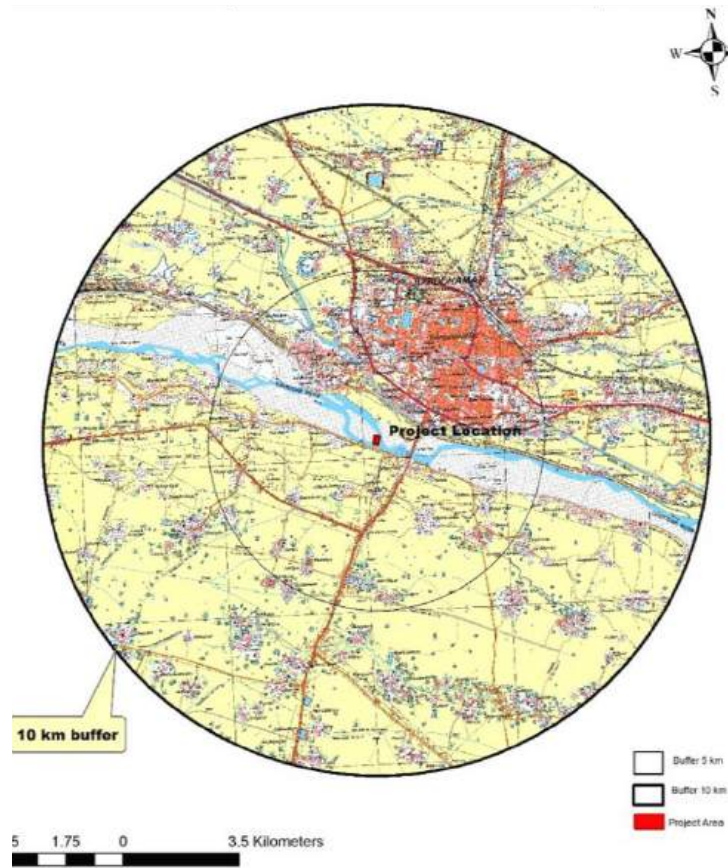


Figure 5: Toposheet of 10 Km Radius of Study Area



Figure 6: Google Earth Image of 10 Km Radius around Project Site



Figure 7: Connectivity Map

Specific location

The proposed project is located at Mouza - IDILPUR, P.S. - Bardhaman, Dist. - Purba Bardhaman, and State. - West Bengal. Latitude and Longitude of Plot corners are indicated as below:

Point	Latitude	Longitude
A	23°13'32.77"N	87°48'58.79"E
B	23°13'30.72"N	87°49'04.05"E
C	23°13'20.53"N	87°49'01.13"E
D	23°13'22.49"N	87°48'56.50"E

The land use of the project area is falling under non notified industrial area. Affidavit regarding same is attached as **Annexure-III**.

SIZE OR MAGNITUDE OF OPERATION (INCL. ASSOCIATED ACTIVITIES REQUIRED BY OR FOR THE PROJECT)

The proposed project covers a total applied area of 4.99 Ha. The applicant will excavate sand at the maximum annual production capacity till the depth as given in table below than reserves will be re-estimated every year as per replenishment in river after winter study by the project proponent for further excavation of reserves as per grant capacity in EC. Details of size and magnitude of project in the follows -

Table 8: Size and Magnitude of Project area

IDILPUR Sand Mine	
Mine Area	4.99 Hectare
Production Capacity	120915050 Cum in 1 st year & 93611.74625 cum in 2nd to 5th year.
Lease Period	Start after execution of lease deed

Topography and Geology of the Area:

Topography of the area: Bardhaman district extends from 22°56' to 23°53' North latitude and from 86°48' to 88°24' East longitudes. Lying within Burdwan Division, the district is bounded on the north by Dumka (of Jharkhand), Birbhum and Murshidabad, on the east by Nadia, on the south by Hooghly, Bankura and Purulia and on the west by Dhanbad (of Jharkhand) districts.

Purba Bardhaman district is a flat alluvial plain area that can be divided into four prominent topographical regions. On the north, the Kanksa Ketugram Plain lies along the Ajay River, which joins the Bhagirathi River at Katwa Town. The Bardhaman Plain occupies the central area of the district, with the Damodar on the south and the south-east. On the southern part is the Khandaghosh Plain. The Bhagirathi flows along the eastern boundary of the district, and the Bhagirathi Basin occupies the eastern part of the district.

The river Barakar forms the State boundary to the west; the Ajay separates Birbhum and Dumka to the north with exception of a portion of Katwa subdivision; the Damodar forms a southern boundary with Purulia and Bankura, while Bhagirathi forms the main eastern boundary with a few exceptions. The maximum length from east to west is 208 Km while the maximum breadth from north to south is 112 KM. In shape the district resembles a hammer.

Geology:**Regional Geological: -**

Bardhaman district with its varied tectonic elements and riverine features, is a transitional zone between the Jharkhand plateau which constitutes a portion of peninsular shield in the west and Ganga-Brahamaputra alluvial plain in the north and east.

In general the Jharkhand plateau consists of the met sedimentary rocks of pre Cambrian age, Gondwana sedimentary rocks, Rajmahal basalts and upper tertiary sediments. Laterite has developed on these older rocks as well as on early Quaternary sediments. Towards south, the alluvial plain merges with Damodar-kasain-Subarnarekha deltaic plains.

The western half of the district resembles a promontory jutting out from the hill ranges of Chotonagpur plateau and consists of barren, rocky and rolling country with a laterite soil rising into rocky hillocks, the highest being 227 m. These diversify the otherwise monotonous landscape and lend a special charm to the skyline around Asansol subdivision.

Ajoy-barakar divide is a convex plateau, the average altitude being 150 m. The gradient is westerly to the west and to the east it is northerly towards Ajay and southerly towards Damodar below the latitude. The Ajoy- Damodar inter-stream tract is made up of several stows consisting of vales and low convex spurs which run in almost all directions except north-east and thus lends a very complicated character to local relief.

The Geology of this district has been studied mainly by the G.S.I. whereas the State Directorate and others have carried out geological mapping in only selected parts. The tentative stratigraphic succession of the district has been suggested as follows:

Regional Stratigraphy

Division	Group	Formation	Lithology
Upper Gondwana	Jabalpur	Umia	Sandstone, Shale
		Jabalpur	Clays, Sandstone
		Chaugon	Clays, Sandstone
	Rajmahal	Kota	Sandstone, Grits, Coal Bands
		Rajmahal	Basaltic Lava flows
	Mahadeva	Maleri	Red Clays, Sandstone
Panchmari		Red Sandstone, Clays	
~~~~~UNCONFORMITY~~~~~ ~~~~~			
Lower Gondwana	Panchet	Panchet	Brown Sandstone, Shales
	Damuda	Raniganj	Sandstone, Shale, Coal Seam
		Barren Measures	Sandstone, Ironstone Shale
		Barakar	Sandstone, Shale, Coal Seam
		Karaharbari	Sandstone, Grits, Coal Seam
	Talchir	Rikba	Sandstones
		Talchir	Greenish Shale
		Boulder Bed	Boulder Bed

#### Local Geology:

The depressions and flood plains of the rivers are covered with alluvium. As there is no alternate channel for flood water of Damoder in this area, the flood water recedes after a few days and deposits a fair amount of silt and sand on the adjoining low-lying areas of Damoder.

#### Replenishment Study

##### *Origin and Control of mineralization*

The Damodar River is one of the most important right-hand tributaries of the Bhagirathi – Hugli River (commonly known as the Ganga River) in its lower reaches in the state of West Bengal in Eastern India. The river Damodar rises from the Khamarpur Hills (1050 meters) of the Chotonagpur Plateau in Jharkhand. Leaving behind the dissected plateau of Chotonagpur in the west, this rain fed river enters the rolling plains of Bankura – Bardhaman districts of West Bengal. The river ultimately flows through the flat plains of Hugli – Howrah districts of West Bengal and joins the Bhagirathi – Hugli River (Ganga River) which falls into the Bay of Bengal. The Damodar River basin represents about three-fourth of its area as the upper catchment situated in Jharkhand, while the low-lying flood plains entirely lie in West Bengal. The region is richly endowed with varied mineral resources. Being a rain fed river, about 95% of the annual flow is received during the monsoon months from June to October and the remaining months the river becomes almost dry. The core drainage system of the Damodar river basin is constructed by the Damodar river and its principal tributary, the river Barakar, that drains about 23,370.98 sq. km.

area of Jharkhand and West Bengal states. DVC has constructed four dams (Tilaiya, Maithon on Barakar River and Konar and Panchet Hill on the upstream part of the Damodar River). Maithon Dam is located at Maithon in the state of Jharkhand which is about 155 km from our project site. In the downstream area the flood protection embankments have been constructed along the banks of the Damodar, but are not sufficient to cope up with the steadily rising river bed due to silting. Durgapur Barrage was constructed in the downstream part of the river which is 77 km from the project site. The total catchments area of the Damodar River system is 22,528 Sq Kms of which 16,934 Sq Kms (77.5 percent) is in the state of Jharkhand. Sand is available in the riverbed of Damodar River with depths varying from 2 - 10 meters. So almost 100% of the sand is replenished every year. Hence as per SSMG 2016 and WBMMCR 2016, sand mining will be restricted upto 3m or wherever it intersects the ground water level whichever is less. The depth of water level in the pre monsoon period varies from 1.43 to 31.03 mbgl whereas that to the winter it varies from 1.03 to 31.00 mbgl (CGWB report, Bardhaman).

#### ***Deposition of minerals in riverbed***

The deposition in a Damoder River bed is more pronounced during rainy season although the quantum of deposition varies from stream to stream depending upon numbers of factors such as catchment, lithology, discharge, river profile and geomorphology of the river course. As per DSR (District Survey Report) annual deposition of riverbed minerals has been calculated on pre-monsoonsand volume. The pre-monsoon sand volume of the river is the depleted resource and is replenished by the monsoon rainfall. For estimating mineable mineral potential, the thickness of the sand bar considered extractable based on base flow level is given in **Table 9**.

**Table 9: River wise Thickness of sand bar considered mineable**

<b>River Name</b>	<b>Considered Mining Thickness (m)</b>
Damodar	2.900
Dwarakeswar	3.00
Ajay	3.00
Hoogly	2.50

#### ***Geomorphology:-***

Bardhaman district with its varied tectonic elements and riverine features, is a transitional zone between the Jharkhand plateau which constitutes a portion of peninsular shield in the west and Ganga-Brahamaputra alluvial plain in the north and east. In general the Jharkhand plateau consists of the metasedimentary rocks of pre- Cambrian age, Gondwana sedimentary rocks, Rajmahal basalts and upper tertiary sediments. Laterite has developed on these older rocks as well as on early Quaternary sediments. Towards south, the alluvial plain merges with Damodar-kasain- Subarnarekha deltaic plains.

The western half of the district resembles a promontory jutting out from the hill ranges of Chotonagpur plateau and consists of barren, rocky and rolling country with a laterite soil rising into rocky hillocks, the highest being 227 m. These diversify the otherwise monotonous landscape and lend a special charm to the skyline around Asansol subdivision.

Ajay-barakar divide is a convex plateau, the average altitude being 150 m. The gradient is westerly to the west and to the east it is northerly towards Ajay and southerly towards

Damodar below the latitude. The Ajay- Damodar inter-stream tract is made up of several stows consisting of vales and low convex spurs which run in almost all directions except north-east and thus lends a very complicated character to local relief.

***Replenishment Estimation as per District Survey Report in empirical formula***

The estimation of sedimentation rate based on empirical formula need critical analysis of different factors related to the LULC property of the catchment area, slope geometry, sediment erosion factor of catchment litho-type. This will help to assess replenishment rate more precisely.

Replenishment studies based on empirical formula for existing mining leases have also been conducted and are given in Table 10.

**Table 10: River wise replenishment rate estimation based on empirical formula**

River Name	Location	Lease Area	Surface RL Before mining	Mine out Thickness	Mine out Volume	Annual Rainfall- 2020	Estimated Replenished Volume as per Dandy- Bolton	Replenishment Rate
		m2	m	m	cum	m	cum	%
Ajay	Malcha	31800.00	43.00	2.90	57420.00	1.48	40314.00	70.00%
Ajay	Harinathpur	28700.00	42.00	2.95	84664.99		61382.13	72.50%
Ajay	Churpuni	39600.00	17.00	3.00	118800.00		86724.00	73.00%
Damodar	Naricha	15100.00	34.00	2.88	43488.00		24616.00	74.99%
Damodar	Bongpur	27100.00	23.00	2.90	78590.00		60907.24	77.50%
Damodar	Jafrabad	20200.00	20.00	2.90	59388.00		24134.88	77.499%

***Rainfall & Climate:***

The district experiences a climate which is transitional between CW_{g3} and AW₁ types, where 'C' stands for 'warm temperate rainy climates with mild winter', 'W' for 'dry winter not compensated for by total rain in the rest of the year', 'g₃' for 'eastern Ganges type of temperature trend' and 'AW₁' for 'tropical savanna climates'. Average temperature in hot season is 30°C while at the cold season is 20°C. And average rainfall is 1313 millimetre.

The cold season starts from about the middle of November and continues till the end of February. March to May is dry summer intervened by tropical cyclones and storms. June to September is wet summer while October and November is autumn.

It has been observed that the locations where mining activity has been taken place, at the end of monsoon it replenishes.

***Sedimentation Study:***

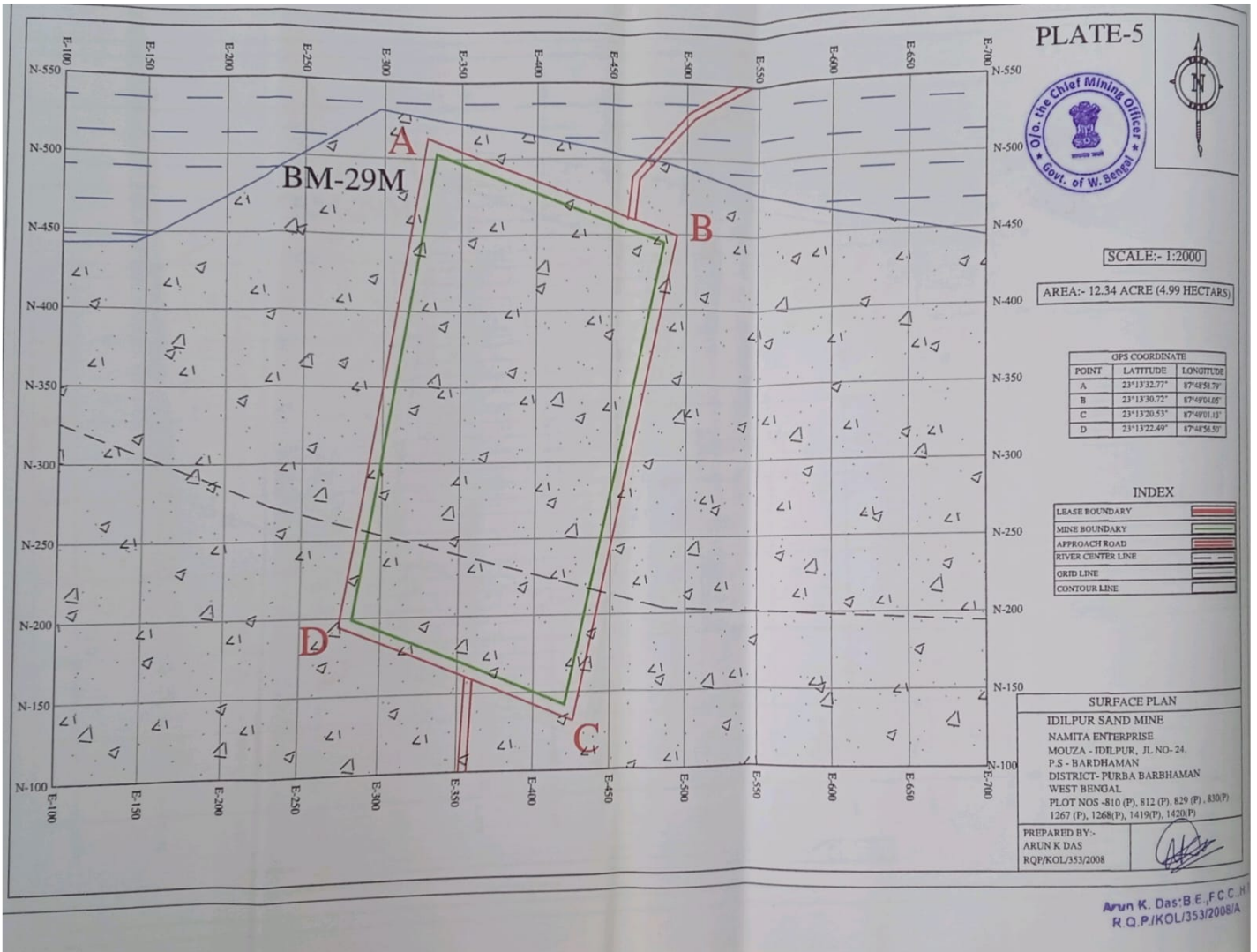
The water moving over the land surface is the dominant agent of land space alteration. Near surface weathering provide sediment load for the flowing streams. Some of the load gets deposited along the path of the river and only the rivers to the sea carry a fraction of the total material waste from the lands. In fact, the land space evolves essentially due to the water flowing over it in small rills and gullies, joining to form small streams, which combine to form rivers. The process of these watercourses eroding and conveying water is a continuous process and has been going on since the formation of this planet and the elements surrounding it. Hence rivers are ever changing but in a man's lifetime it may not be much depending on the land space through which it passes. Sediment transport is essentially a two - phase flow in which the fluid phase is air or water and the solid phase is sediment particle. The process of

erosion, transport and deposition of sedime

collectively termed as sedimentation, are natural processes and have been occurring throughout the geologic time. Sediment transportation mainly occurs through rolling, sliding or by saltation (bouncing along the bed). The most common modes of sediment transport in rivers are bedload and suspended load. As bedload, sediment particles saltate, roll and slide, but always staying close to the bed. As suspended load, sediment is carried by the fluid turbulence up in the water column. The wash load comprised of the finest suspended sediment (typically less than 0.00315 mm in diameter). These particles remain in permanent suspension as they are small enough to bounce off water molecules and stay afloat. Sand consists of small grains or particles of mineral and rock fragments. Although these grains may be of any mineral composition, the dominant component of sand is the mineral quartz, which is composed of silica (silicon dioxide) found in inland continental settings and non-tropical coastal settings. Quartz is particularly prevalent as it is extremely resistant to physical and chemical breakdown by the weathering process. Sand particles range in diameter from 0.0624 mm to 2.0 mm. Before the execution of DVC Multipurpose River Project, the Damodar overflowed regularly during heavy monsoon rains and caused extensive floods which gave rise to emergence of a number of distributaries. As the four dams (Tilaiya, Konar, Maithon and Panchet) came into operation, the huge monsoon water flows of the upper Damodar catchment area were held back in the adjacent reservoirs of those four large dams. Furthermore, due to diversion of the downstream flow from the Durgapur Barrage through the Left and Right Bank Main Canals, lower Damodar became a lean and thin stream with considerably feeble flow. During monsoon season, heavy amount of water release from dams/barrages then water carry a large quantity of sand, which gets deposited in the extracted mine, thus replenished every year in huge quantity. This resulted in the discontinuation of the flow. As the Damodar River enters from plateau region into plain region, a sudden change in gradient is observed. This results in the release of the river load along the bed leading to the siltation. The resultant siltation leads to the aggradations of the river bed, decreasing the carrying capacity of the river. In addition, the embankments constructed along the river banks also force the carried materials to be deposited within the river channel. The sand block is approximately 77 km in the downstream portion of the Durgapur Barrage. That is why, during the cusp of the monsoon season, when huge quantity of water is released from the barrage, the maximum amount of sand, which has been extracted during the drier seasons is replenished in the downstream portion. In the dry seasons some water is released from the barrage which also accounts for some replenishment of sand in the dry season. So, almost 100% of the sand is replenished every year. The cyclic mining shall be adopted to facilitate the sedimentation of the excavated pits. The Mining is suggested on rotation basis in such a way that pit of previous year mining will act as depository for the monsoon season. Sand will be extracted from the pit lot during one year; extracted quantity of the same are automatically replenished by rainfall in the monsoon by the river itself on account of its flow and velocity.

***Significant feature of mining:***

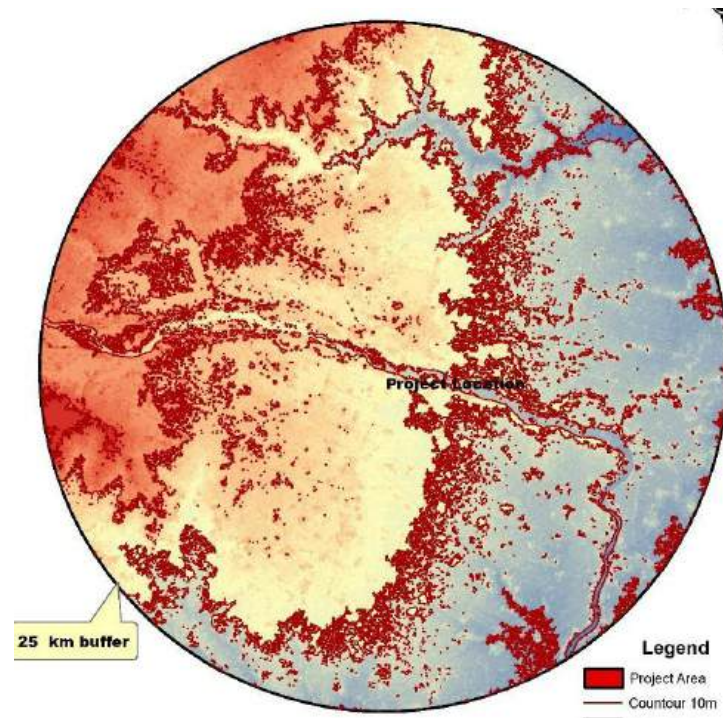
1. The mining shall be done by Semi- Mechanized opencast method.
2. Loading will be done mechanically.
3. The working period of mining will be 240 days (except monsoon season).
4. No mining will be done during rainy season.
5. No drilling or blasting will be involved.



**Figure 8: Surface Plan of IDILPUR Sand Mine**

### Contour map:

A contour map is a two-dimensional representation of a three-dimensional surface, where contour lines connect points of equal value, typically representing elevation on a topographic map. Each line indicates a specific elevation level, and the spacing between the lines can show the steepness of the terrain: close lines indicate steep slopes, while widely spaced lines suggest gentler slopes. Project location is comparatively lower than surrounding area. The contour interval is 10 m. The elevation of the project location is 30 m and the surrounding area elevation is 20, 30, 40m. The highest elevation is 75 m which is situated within study area far from the project location.



**Figure 9: Contour map in 24 km radius**

#### **Drainage Map:**

A drainage map in an Environmental Impact Assessment (EIA) report is crucial for illustrating the surface water drainage patterns of a specific area.

#### **Importance of a Drainage Map:**

**Impact Assessment:** Helps identify how a proposed project might alter existing drainage patterns, potentially leading to flooding or erosion.

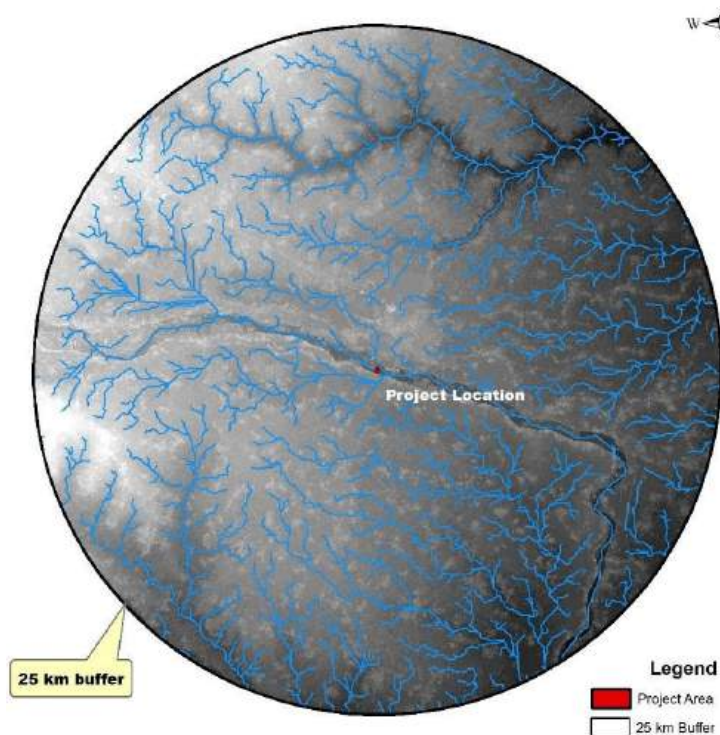
**Water Quality:** Assists in evaluating potential impacts on surface water quality due to runoff from construction activities.

**Mitigation Strategies:** Facilitates the development of strategies to manage drainage, like retention ponds or storm water management systems.

**Regulatory Compliance:** Ensures adherence to local regulations regarding water management and environmental protection.

#### **Conclusion:**

Including a detailed drainage map in an EIA report is essential for understanding the hydrological impacts of a project, guiding sustainable design, and ensuring that potential environmental effects are adequately addressed. In this project location several drainage canals are seen.

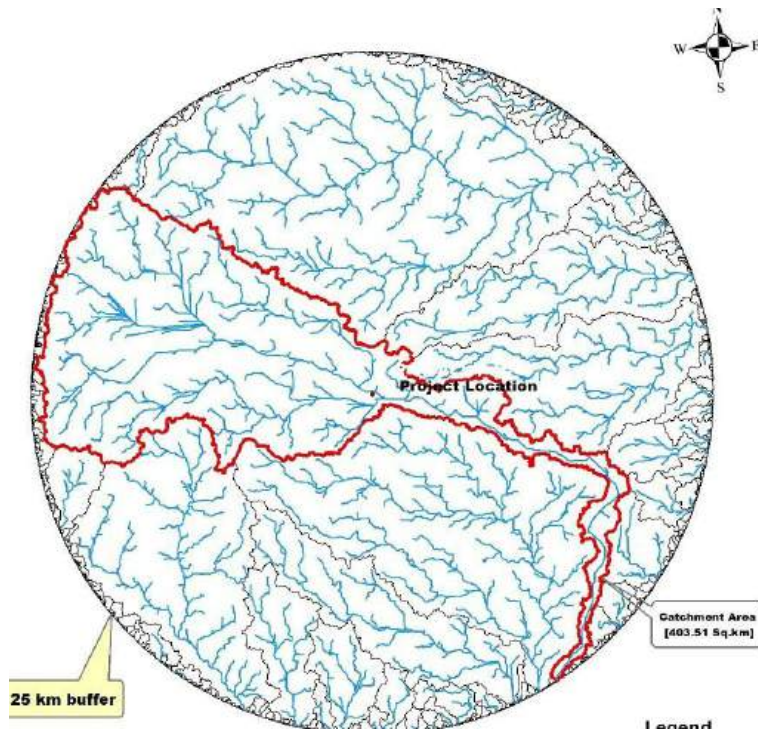


**Figure 10: Drainage map in 24 km radius**

**Catchment area:**

A catchment area is the region where precipitation collects and drains into a common outlet like a river, lake, or reservoir.

A catchment area in (EIA) refers to a geographic zone surrounding a project site that identifies and encompasses the land that contributes to the water flow into that site, essential for evaluating potential environmental impacts.



**Figure 11: Catchment area map in 24 km radius**

### RESERVES ESTIMATION

The reserves within the lease have been estimated category. The sand covers the part of the mining area and homogeneous in nature. The area is Flat land. The formula adopted for calculation of reserves is graphical area method.

**Reserves Categorization-** The basic requirement of the applicant will be river borne sand from top of the deposition. Hence calculation of the reserves is done on the basis of market terminology rather than Geological classification.

**Table 11: Calculation of Geological Reserves of IDILPUR Sand Mine**

Name of lease holder	Total area (in hect)	Total area (in sqm)	Average thickness (in m)	Geological Reserves (Total area *Avg thickness) cum
NAMITA ENTERPRISE	4.99	50000	2.90	144710

### Mineral Reserves

The minable reserves will be realized after keeping 100m distance from river bank or 1/3rd of the distance between the bank line, whichever is less in order to protect the river banks here **100 mtr line is considered.** Safety area = 7000 m²

Mineable area of sand reserves of the proposed lease area after deducting Safety area = 43000 m².

After consideration of average ground water level, minimum 2.90 depth of thickness of sand is considered for extraction; So, the estimated extractable reserves is ( 43000*2.900) m³ .=  
124700m³

Total Area in Hect	Total Area in Sqm	Minable Area in Hect	Minable Area in Sqm	Geological Reserves in cubic meter	Average Thickness in m	Net Minable Reserves in cubic meter
4.99	50000	4.30	23400	144710	2.90	120789.35

#### Top Soil above Minable Area-

The proposed area is river bed sand. Therefore, no top soil found into the lease area.

#### Year wise Production:-

Sand will be lifted from the riverbed for all the eight months except the monsoon period from June to September. Proposed production for next five years is given below:

**Table 12: Year wise Production Plan for the First 5 Years**

Year	Replenishment Rate (%) as per empirical method mentioned in DSR	Net Minable Reserve after considering safety zone and maintaining 24 degree slope (Cum)	Minable Reserves (Cum) Or Annual Production (Cum)
1	100	120789.35	120789.35
2	77.5	120789.35	93611.74625
3	77.5	120789.35	93611.74625
4	77.5	120789.35	93611.74625
5	77.5	120789.35	93611.74625
	<b>Total</b>		<b>495236.335</b>

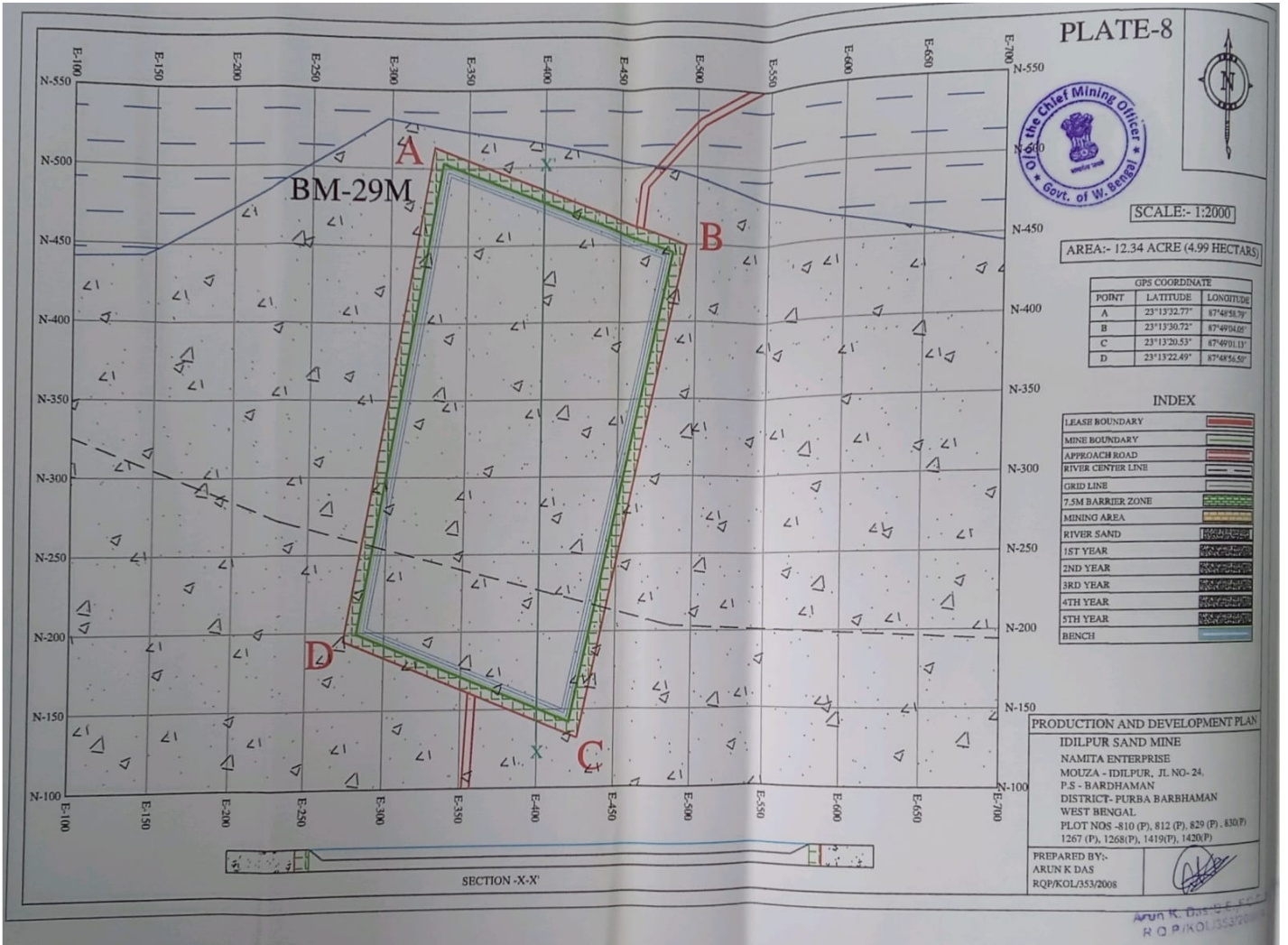


Figure 12: Yearly Production Plan

### ***TECHNOLOGY AND PROCESS DESCRIPTION***

The mining technology is semi mechanized open cast method in single shift manual mining without any change in technology.

#### **Method of Mining**

The method of mining is open cast semi-mechanized i.e. ordinary sand will be excavated in layers of 1 meter depth to avoid ponding effect and after first layer is excavated; the process will be repeated for the next layer so on up to a depth of 2.90 meter in riverbed. Sand will be gathered in small hips on suitable areas as instructed for loading purpose. Loading will be done by deploying light capacity and light weight loaders.

#### ➤ **During the mining various points will be considered:**

- Loading will be done by deploying light weight loaders, etc.
  - Only 240 days have been considered for mining, rest 124days of monsoon season for replenishment of the area.
  - The transportation system is mainly surface transport by 10 tones capacity tipper trucks/dumpers
  - Extraction of sand is done by manually with simple hand tools such as shovel etc.
  - The bench height will be 1m, at final stage the slope of the bench will be maintaining 24-degree slope.
  - There is no waste will generate during mining operation. The entire mineral is used in the time of mining.
- **Exploration and Drilling:** After end of plan period steps will be taken as per instruction of mining authorities. This is river bed sand. No drilling & blasting is required.
- **Dumping of Topsoil:** This is riverbed ordinary sand. Therefore no top soil is generated.
- **Blasting:** Blasting is not required for river bed sand mining project.

#### **Machineries utilized for mining**

Mining will be carried out through Semi- Mechanized method open cast mining methodology with deployment of light machineries

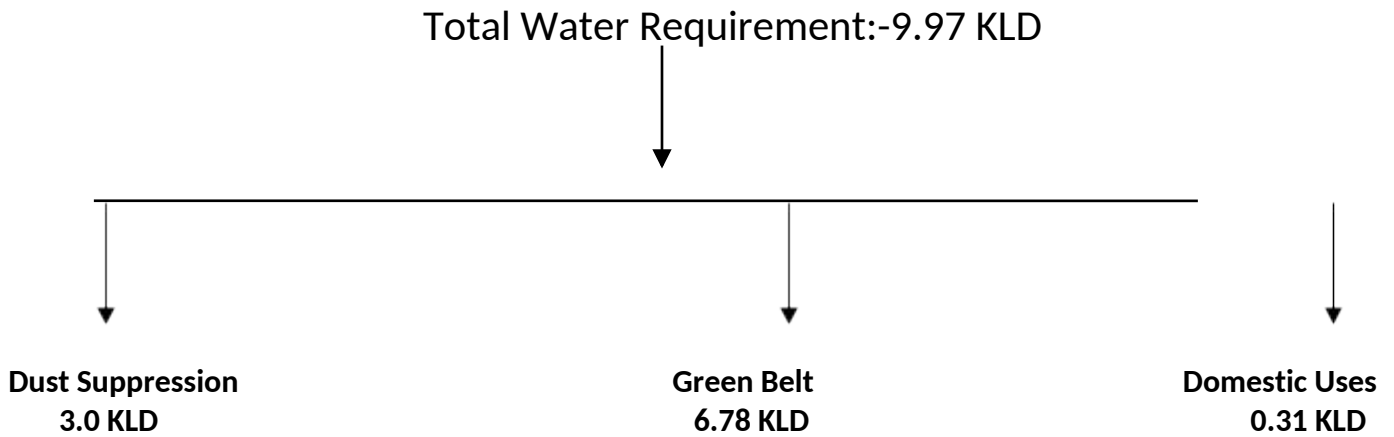
**Table 13: Equipment Details**

<b>SI No.</b>	<b>Equipment</b>	<b>Capacity</b>	<b>No.</b>	<b>Production</b>
1.	Excavator	20 T class, 0.9-1.2 cum bucket capacity	2	40 cum/ hr
2.	Tipper / Trucks	10T	6	-
3.	Sprinkler	4 KL	2	--

### ***RESOURCE REQUIREMENTS OF THE PROJECT***

#### **Water Requirement**

The total water requirement shall be 9.97 KLD for domestic usages, plantation and dust suppression purpose. No water is required for the mining process. Water will be arranged from active river channel and from gram panchayet through tankers. Details of water requirement is given below-



**Figure 13: Water Requirement of the project area**

#### **Power Requirement**

There is no power requirement for the project and the excavation will be done only daytime.

#### **Manpower Requirement**

The mining project will generate direct & indirect employment. About 33 per day people will get direct employment, and some persons will also be affected indirectly and employed with allied and related industries, such as transportation, maintenance, etc. Following staff & workers are proposed to be employed: -

**Table 14: Manpower Details of IDILPUR Sand Mine**

<b>SI No.</b>	<b>Manpower</b>	<b>Numbers</b>
1.	Mines Maneger	1
2.	Supervisor	2
3.	Workers	10
4.	Operators for excavator	2
5.	Transport Manager	1
6.	Accounts	1
7.	Security	2
<b>Total</b>		31

#### ***PROJECT DESCRIPTION INCLUDING DRAWINGS SHOWING PROJECT LAYOUT, COMPONENTS OF PROJECT ETC***

The project is riverbed Sand Mine on Damodar River. issued by Additional District Magistrate and District Land Reform Officer, district West Bengal to the project proponent vide memo no. 366/1126/MM/Auction 22/2018 dated 01.10.2018 for 4.99 hect area at Mouza - IDILPUR, JL. No. - 24, Plot No - 1293(P), 1377(P) etc, P.S. - BARDHAMAN, Dist. - Purba Bardhaman, and West Bengal. The layout plan of the proposed mine is given below-

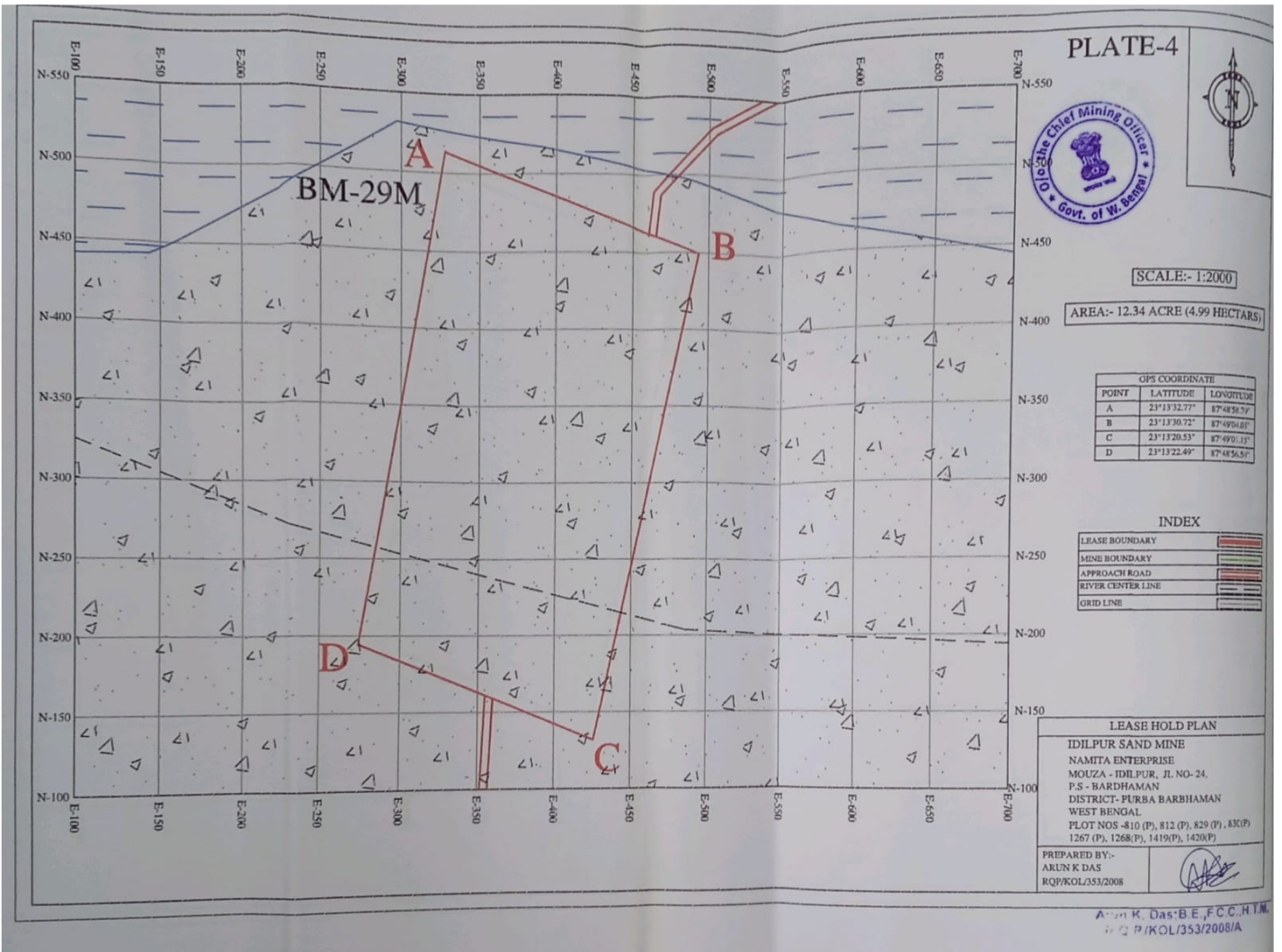


Figure 14: Lease hold plan of IDILPUR Sand Mine

***ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE:-***

This is an Opencast Sand Mining project under Schedule: 1(a) Category- 'B1' as per EIA notification dated 14th September, 2006, West Bengal Minor Mineral Concession Rules (WBMMCR) 2016, although no significant technological advances have been adopted for this project, it is imperative to address potential risks of technological failures.

## CHAPTER 3.

# DESCRIPTION OF THE ENVIRONMENT

## Chapter3:- DESCRIPTION OF THE ENVIRONMENT

### ***BASELINE STUDY AREA AND PERIOD***

This chapter illustrates the description of the environmental status of the study area with reference to the prominent environmental attributes. The study area covers the region falling within 10 km radius around the proposed Riverbed Sand mining. The environmental setting is considered to adjudge the baseline environmental conditions, which are described with respect to climate, hydro- geological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, and ecology, socio-economic profiles of people, hydro-geological aspects, land use and archaeological importance.

The present report incorporates the data monitored over a period of three months from **1st March 2025 to 31st May 2025** and secondary data collected from various government, semi-government and public sector organizations. The primary baseline monitoring consists of meteorology, ambient air quality, noise levels, water quality, soil quality and ecology (aquatic and terrestrial). The land use, geology, demography, is based on the secondary data collected from various Government, semi-Government and public-sector organizations.

### ***VALUED ENVIRONMENT COMPONENTS (VEC)***

Valued environmental components (VECs) are environmental elements that are considered to be important for scientific, ecological, social, cultural, economic, historical, archaeological, or aesthetic reasons. VECs can be physical, biological, or socio-economic components of the environment, and can include:

- Air Environment
- Noise Environment
- Water Environment
- Soil
- Ecology and Biodiversity
- Socio-economic Environment

### ***METHODOLOGY FOR BASELINE STUDY - FREQUENCY SAMPLING OF AIR, WATER/GROUNDWATER, SOIL, NOISE***

The methodology adopted for the study is outlined below:

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
<b>1</b>	<b>Air Environment</b>						
<b>(i)</b>	Meteorological Wind Speed Wind Direction Max. Temperature Min. Temperature Relative Humidity Rain fall Solar radiation Cloud cover	1 location at project site	One hourly continuous for one season	Automatic Weather stations with sensor and microprocessor Max/ Min Thermometer Hygrometer Anemometer Rain gauge As per IMD specifications	IS 8829 Site specific primary data is essential Secondary data from IMD, Pune	Site specific primary data	Secondary data IMD Pune for data verification and selection of sampling locations
<b>(ii)</b>	<b>Ambient air quality</b>						
	<b>Pollutants</b> PM ⁽¹⁰⁾	8 location, one at project site and 7 in buffer area (in the project impact area/study area)	24 hourly twice a week	As per CPCB Guidelines Gravimetric	IS: 5182 (Part 23): 2006 (As per CPCB guidelines)	<ul style="list-style-type: none"> <li>• Minimum 2 locations in up wind.</li> <li>• 2 Sites in downwind (based on impact receptor). predominant wind direction</li> <li>• Sensitive receptORS.</li> <li>• Transportation route receptORS.</li> <li>• Land use pattern</li> </ul>	Interpretation based on CPCB NAAQ standards 2009
	PM ^(2.5)		24 hourly twice a week	As per CPCB Guidelines Gravimetric	PM 2.5 gravimetric analysis – revision 9, July 2008 Page 1 of 24(As per CPCB guidelines)		
	SO ₂		8 hourly continuous and averaged for 24 hours twice a	Improved West &Gaeke	IS: 5182 (Part-2)-2001, RA 2006 (As per CPCB guidelines)		

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
			week				
	NO _x		8 hourly continuous and averaged for 24 hours Twice a week	Modified Jacob Hochheiser	IS: 5182 (Part-6)-2006 (As per CPCB guidelines)		
	CO		8 hourly continuous and averaged for 24 hours twice a week	NDIR Method	IS: 5182 (Part 10)-3199 RA-2003 (As per CPCB guidelines)		
<b>2</b>	<b>Noise</b>						
	Hourly equivalent noise levels dB(A)	8 location, one at project site and 7 in buffer area (in the project impact area/study area)	24 hourlies Once in season	Noise level meter	IS:9877.5 2001 (As per CPCB)	<ul style="list-style-type: none"> <li>• Minimum 2 locations in up wind</li> <li>• 2 sites in downwind (based on impact receptor)</li> <li>• sensitive receptorS.</li> <li>• Transportation route receptorS.</li> <li>• Land use pattern</li> </ul>	CPCB /OSHA
	Day Time Noise Levels (Leq _{day} ) dB(A)		Once in season		CPCB/ OSHA		
	Night time Noise Levels (Leq _{night} ) dB(A)		Once in season		CPCB		
<b>3</b>	<b>Water Environment</b>						
i	<b>Parameters for water quality</b> <b>Surface water</b> pH; Turbidity; Total Hardness (as CaCO ₃ ); Total Alkalinity (as CaCO ₃ );	Set of grab samples during study period at 4 * location	Once in season	Samples for water quality has been collected and analyzed as per Standards methods for examination of water and wastewater analysis published by	As per the CPCB guidelines Test method is given in respective component in, Section-3 of EIA report	<ul style="list-style-type: none"> <li>• Based on water utilization</li> <li>• Upstream and downstream based on outlet (if any)</li> </ul>	* Subject to availability of surface water sources

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	Chlorides (as Cl); Sulphate (as SO ₄ ); Nitrate (as NO ₃ ); Fluoride (as F); BOD ₃ Days at 27°C; COD; Phenolic Compounds (as C ₆ H ₅ OH); Lead (as Pb); Iron (as Fe); Arsenic (as As); Cadmium (as Cd); Total Chromium (as Cr); Mercury (as Hg); Copper (as Cu); Zinc (as Zn); Selenium (as Se); Oil & grease; Colour; Dissolved solids; Residual free chlorine; Boron (as B); Calcium (as Ca); Magnesium (as Mg); DO;			American Public Health association.			

(ii)	Set of grab samples during study period at the above mentioned 4 locations for ground water.	Once in season	Samples for water quality has been collected and analyzed as per Standards methods for examination of water and wastewater analysis published by	As per the CPCB guidelines Test method is given in respective component in, Section-3 of EIA report	<ul style="list-style-type: none"> <li>• Based on water utilization</li> <li>• Ground water flow pattern</li> <li>• Based on impact zone</li> </ul>	
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Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	Barium as Ba; Boron as B; Calcium as Ca; Chloramines as Cl ₂ ;Chloride as Cl;Copper as Cu; Fluoride as F; Free Residual Chlorine; Iron as Fe; Magnesium as Mg; Manganese as Mn; Nitrate as NO ₃ ; Phenolic Compounds as C ₆ H ₅ OH; Selenium as Se; Sulphate as SO ₄ . Total Alkalinity as CaCO ₃ . Total Hardness as CaCO ₃ . Zinc as Zn, Cd; Pb; Hg; As;Ni;Cr			American Public Health association.			
<b>4</b>	<b>Land Environment</b>						
<b>i</b>	<b>Soil</b> Particle size distribution; Texture; pH. Electrical conductivity; Bulk density; Organic carbon;	One location at project site and 7 locations in buffer area	Once in season	Collected and analyzed as per soil analysis reference book, M.I.Jackson and soil analysis reference book by C.A. Black	Based on Utilization pattern Land use pattern Downwind based on impact receptor due to deposition of dust	<i>Handbook of Agriculture, Indian Council of Agricultural Research</i>	

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	Sodium (Na); Potassium (K); Moisture content; Total Nitrogen; Available phosphorous; organic matter; Total Soluble Chloride; Total Soluble sulphate; Water holding capacity; Porosity;						
ii	<b>Land use/Landcover</b> Location code Total project area Topography Drainage (natural) Cultivated, forest, plantations, water bodies, roads and settlements	Study area	At least 20 known vectors for geo referencing and verification	Global positioning system Topo sheets Satellite Imageries* (1:50,000) Satellite Imageries*	Digitization of primary data (Toposheet) Superimposing of latest satellite Imageries (cloud free data) Geo referencing Classification using ERDAS /GIS software	-	-

5	<p><b>Biological Environment Terrestrial</b></p> <ul style="list-style-type: none"> <li>• Inventarization of floral and faunal species in core and buffer zone</li> <li>• Density in core zone</li> <li>• Importance value index (IVI) of trees,</li> </ul>	Project area and 7 locations in buffer area	Five-Seven days in a season	<ul style="list-style-type: none"> <li>• Quadrata sampling/ Enumeration/ Survey methods.</li> <li>• Transect method/ Visual Encounter Survey</li> <li>• Point Count/ Opportunistic Survey</li> <li>• Tracks and signs, and visual encounter survey</li> </ul>	<ul style="list-style-type: none"> <li>• Land use /Landcover classification</li> <li>• Sensitive area in the vicinity</li> <li>• Land utilization</li> <li>• Downwind based on impact zone</li> </ul>	Preliminary assessment point quarter plot less method for terrestrial vegetation survey
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Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	<ul style="list-style-type: none"> <li>Biodiversity index</li> <li>Identification of rare threatened and endangered species</li> </ul> <p><b>Fauna</b></p>						
	<ul style="list-style-type: none"> <li>Avi fauna</li> <li>Rare and endangered species</li> <li>Sanctuaries / National park / Biosphere reserve</li> <li>Migratory routes</li> </ul>						Secondary data to collect from Government offices/forest department, NGOs, published literature
<b>6</b>	<b>Socio-economic</b>						
	Demographic structure; Infrastructure resource base; Economic resource base; Health status; Morbidity pattern; Working pattern; Cropping pattern	Study area	In two phases of the project	<ul style="list-style-type: none"> <li>Primary data collection through questionnaire</li> <li>proportionate Random sampling method</li> <li>Transect walk</li> </ul>	<ul style="list-style-type: none"> <li>Land utilization pattern</li> <li>Population pattern</li> <li>Gender pattern</li> <li>Working pattern</li> </ul>		Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies

### ***MICRO-METEOROLOGY OF STUDY AREA***

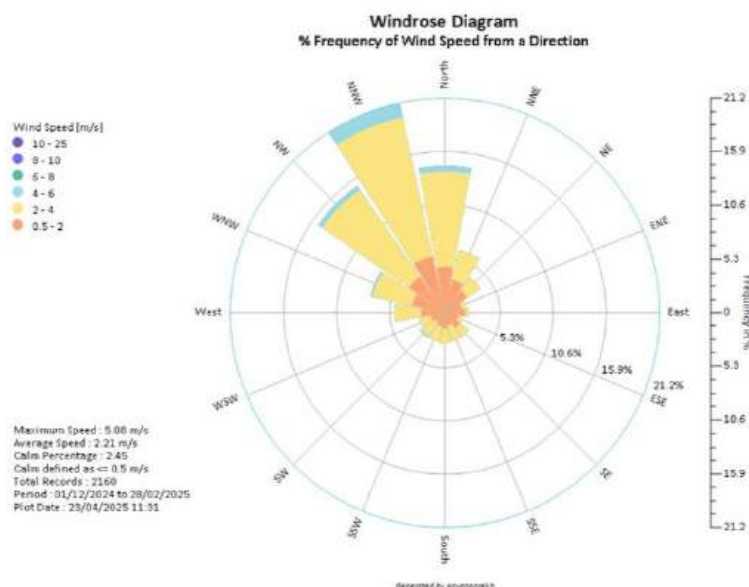
The meteorological parameters play a vital role in transport and dispersion of pollutants in the atmosphere. The collection and analysis of meteorological data, therefore, is an essential component of Environmental Impact Assessment Studies. The long term and short-term impact assessment could be made through utilization and interpretation of meteorological data collected over long and short periods.

The secondary meteorological data of the study period collected from [www.imdpune.gov.in/](http://www.imdpune.gov.in/). The month wise meteorological data is given in **Table 15**. The wind rose during the study period is presented in **Figure 15**.

**Table 15: Meteorological Data of the study area**

Period	Wind Speed (m/s)			Temp (°C)			Relative Humidity (%)			Rainfall (mm)		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Mar 24	12.0	0.6	9.00	38.00	34.99	36.50	82	77.5	79.00	14.99	0	0.5
April 24	9.0	0.4	6.50	39.90	36.10	38.00	87	78	82.50	34.99	0	1.16
May 24	9.0	5.0	7.0	34.99	31.00	33.00	88	80	84.00	101.00	0	3.5

Source: Weather Summary for 1st March 2024 to 31st May 2024 (<https://power.larc.nasa.gov/data-access-viewer/>)



**Figure 15: Wind Rose Diagram of Study Area (March 2024 to May 2024)**

## ***LAND USE/LAND COVER OF THE STUDY AREA***

### **Introduction**

Remote sensing data is a general source of information on natural resources in a region or territory that tracks the state of those resources over time due to its continuous scope. Remote sensing is a powerful and rigorous data collection process. Satellite imaging surveys provide a great way to measure both the quantitative scale of natural vegetation and the changes in conditions brought on by climate change. Understanding the complexities of the earth's surface properties, as well as phenomena such as complex environments, is also fascinating.

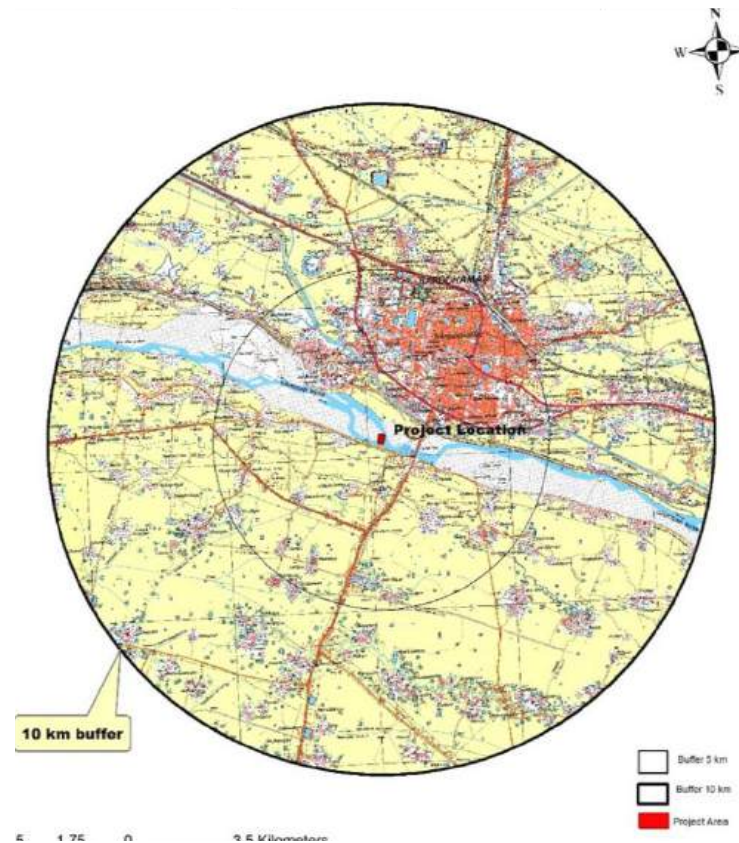
### **Methodology**

Land use area and land use classification analysis as follows:

1. Development of an input database.
2. Data processing and analysis.
3. End planning of development.

### **Data input Toposheet:**

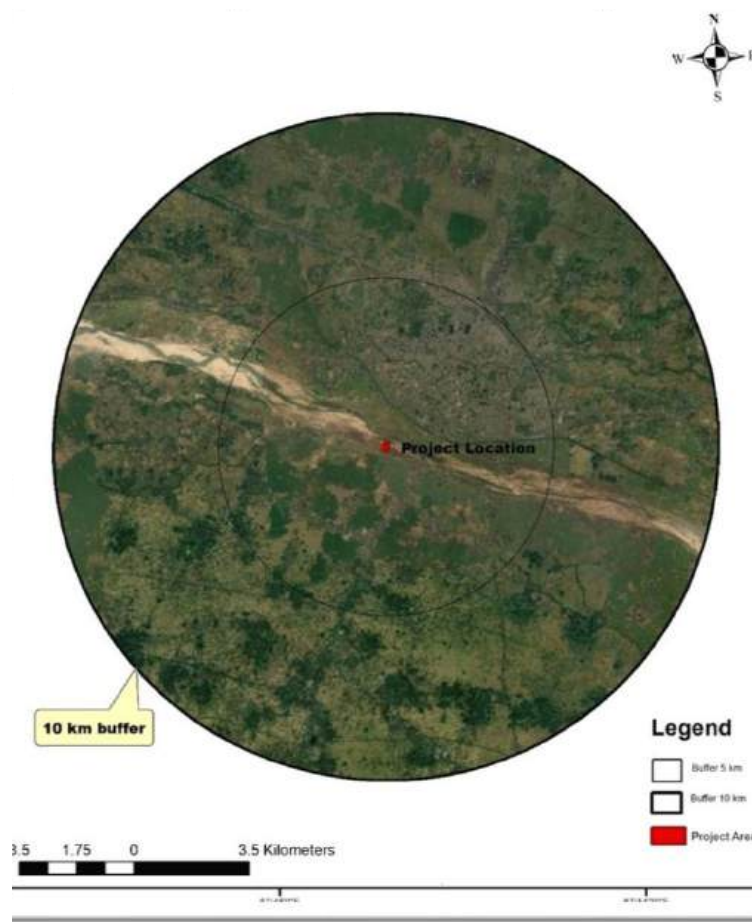
Figure 2. is showing the project location and its surrounding area on the toposheet of series 73M/11, 73M/12, 73M/15 & 73M/16 of SOI (Survey of India)



**Figure 16: Topographical sheet covering the project location and its surroundings**

### Google Earth image

A computer application called Google Earth creates a three-dimensional depiction of the planet, mostly using satellite photos. The application allows users to view cities and landscapes from different perspectives by mapping the Earth by superimposing satellite photos, aerial photography, and GIS data onto a three-dimensional globe. Google Earth images have been analyzed for spatial characteristics, soil sensors, latitude, longitude, and geo-recording of satellite images. (Figure.3).



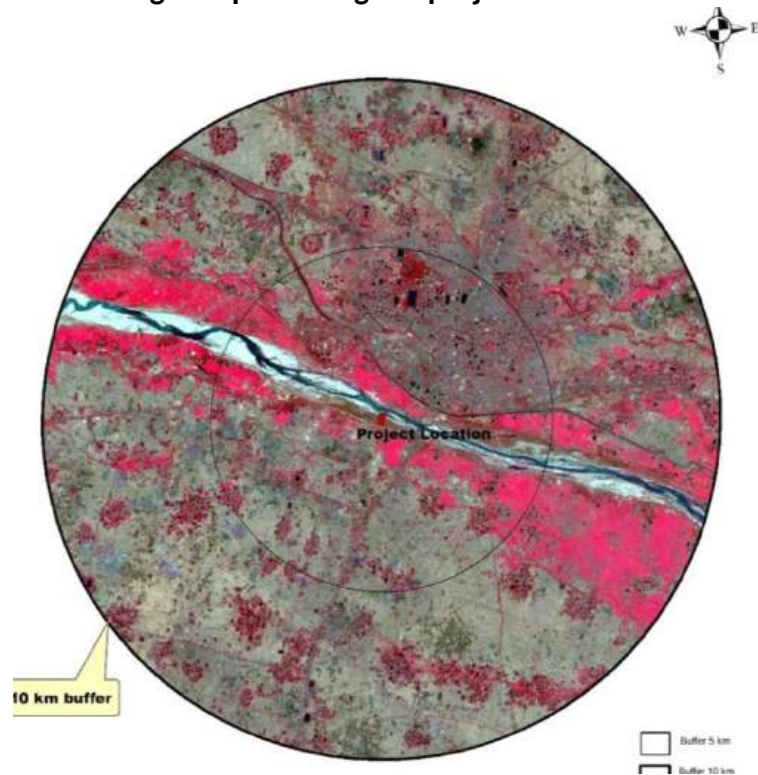
**Figure 17: Project site on Google Earth Image**

### *Satellite Image Analysis*

Satellite data or satellite image has been downloaded to the framework and a land-use map has been created from the website of the European Space Agency <https://scihub.copernicus.eu>, information provided in Table 16. The first move was the establishment of the FCC standard (using Sentinel 2 bands B2, B3, B4, and B8) and the implementation of the LULC Classification Map of the test site around the site for project area (Figure 3). Sentinel-2 data from the above source have been downloaded to cover the whole area. Sentinel-2 has a total of 13 bands in it. Both bands vary in their spatial resolution. Radiometric and atmospheric corrections have been used to generate the reflectance file. For Sentinel-2, bands 2, 3, 4, and 8 were selected to prepare the RGB to achieve improved classification accuracy. The RGB of the sample region is prepared using the boundary form file to clip the data. Area of significance to all the adjacent scenes. Mosaicking was carried out to minimize the disparity between the various sensing dates and the impact of color issues. The following are the specifics of the satellite image used in this study.

**Table 16: Specifics of the satellite imagery used in this project**

<b>Name</b>	S2B_MSIL2A_20240118T044029_N0511_R033_T24QWF_20240118T064748.SAFE
<b>Mission</b>	SENTINEL 2
<b>Instrument</b>	MSI
<b>Sensing time</b>	2024-01-18T06:47:48.000000Z
<b>Platform</b>	SENTINEL 2
<b>Resolution</b>	10 M

**Figure 18: Satellite Image Map covering the project location and its surroundings**

## **Processing/Analysis of data**

### ***Restoration of image data***

Data errors, noise, and geometric distortions are added during scanning, transmitting, and recording operations, and restoration processes are designed to detect and compensate for them. The aim is to make the image resemble the original scenario as closely as possible. Since each band's pixels are stored independently, image restoration is relatively simple. Picture restoration attempts to restore image data that has been blurred or corrupted in order to provide a more precise depiction of the original scene. This usually includes the initial analysis of raw image images to correct geometric distortions and calibrate the data radiometrically. Image correction and restoration procedures are often referred to since retrieval operations since they normally precede the editing and review of image data in order to extract relevant data and information.

### ***Radiometric corrections***

To calibrate pixel values or fix value errors, radiometric correction is used. The method improves the readability and precision of remote sensing data. When comparing various data sets over time, radiometric calibration and correction are especially important. The difference between the energy emitted or reflected from the surface to the earth as measured by aircraft or satellite instruments and the true energy emitted or reflected from the surface to the earth. This is due to the sun's azimuth, as well as elevation and ambient conditions, which can modify the sensor's capacity. In order to obtain actual or true ground radiance or reflectance values, radiometric errors must also be taken into account.

### ***Geometric corrections***

Geometric correction is an integral step in the pre-processing of the image since the orientation of the images is calculated. However, the geometric adjustment also requires pixel values in their original location in order to change the original values. Raw digital images usually contain such extreme geometric inconsistencies that they cannot be used as diagrams. The cause of these distortions varies between altitude variance and the velocity of the sensor platform, including panoramic distortion, Earth curve and atmosphere.

### ***Ground Truthing***

A study of identification was carried out in order to gain a broad understanding of the field of analysis. In order to assess the accessibility of the region as well as the pattern and distribution of vegetation and its composition, it was necessary to have knowledge of current field conditions. Land validation means the formation of a connection between objects and objects observed, labeled, marked, and satellite imagery. In satellite imaging for identification, the appearance of a few species of plants on the field was associated with its tonality.

## **Final outputs-**

### ***Land use Classification***

Land Use Land Cover (LULC) maps of the area offer information to help people appreciate the current landscape. Annual LULC information on national spatial datasets can enable monitoring of the temporal patterns of agricultural habitats, forest conversion, surface water sources, etc. on an annual basis. Figure 3, showing the land use and land cover map of the area, is taken from the Sentinel 2 datasets by adding the B2, B3, B4, and B8 bands.

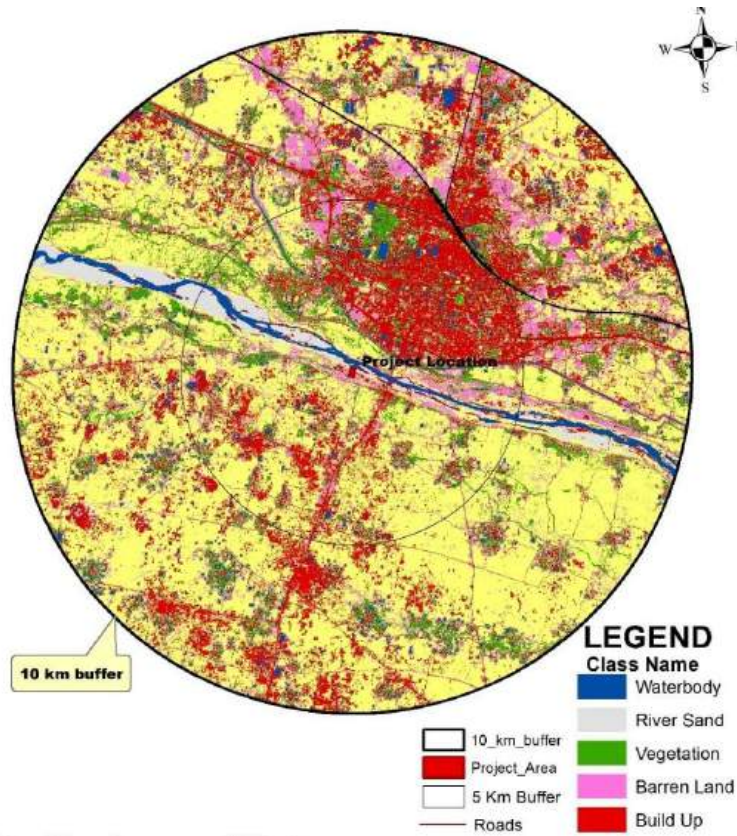
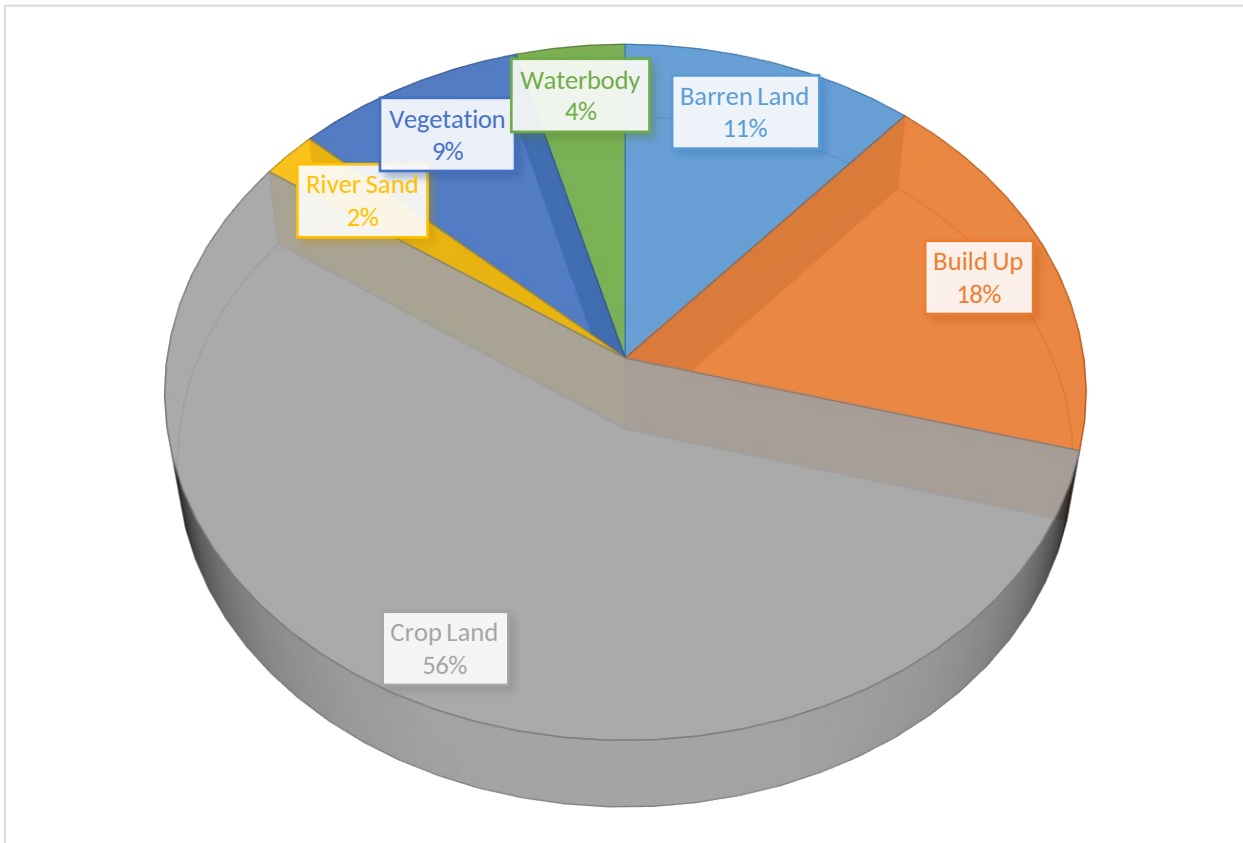


Figure 31: Land use/Land covers of 10 km Study Area

Table 17: Land-use Classification - Area (10 Km. Radius)

ID	CLASS NAME	AREA(SQ.KM)	AREA(HEC)	AREA (%)
1	Barren Land	36.58	3658.24	11.38
2	Build Up	57.33	5733.47	17.84
3	Crop Land	178.26	17826.24	55.24
4	River Sand	7.00	700.39	2.18
5	Vegetation	28.72	2872.23	8.93
6	Waterbody	13.56	1355.90	4.22
		241.24	24146.69	100.00



**Figure 20: Pie Diagram showing the percentage of area covered by LULC classes**

#### **Interpretation of the classes of land use Crop land:**

Agriculture plays a dominant role in economic growth through the provision of food for the country, and the provision of raw materials for Agro - based industries. As per figure 3.10 & 3.11, agricultural land covered is 55.24% of the region field which is 178.26 sq.km.

The region benefits from the alluvial soil of the Damodar River and its tributaries, making it ideal for cultivating a variety of crops. The main agricultural products of Bardhaman include rice, jute, potatoes, vegetables, and fruits. The district also supports the cultivation of mustard and sugarcane. The area's agricultural practices are largely rain-fed, although irrigation systems, particularly through canals and the use of groundwater, are also common. Bardhaman's farmers are known for their expertise in crop rotation, a practice that helps maintain soil fertility and ensures high productivity. The district plays a significant role in contributing to the agrarian economy of West Bengal.

**Built-up Area:**

Built-up land refers to human habitats created for non-agricultural purposes, which includes, panchayats, revenue villages, buildings, industries, manufacturing units, transport facilities, and water tanks, etc located within a 10 km radius of the project site. The study area covers 241.24 sq. km. Settlements are primarily concentrated across the connecting points of roads that span the project area, Figure 3.11 clearly indicates that clustered and organized settlements are scattered mainly in the northern side of the study region and cover 17.84% area which is 57.33 sq.km. It is important to note that the environment around the project site doesn't falls within this class.

**Water Bodies:**

This category includes surface water areas, either in the form of wetlands, lakes, River, reservoirs, etc. These are clearly visible on the satellite image in blue to dark blue or cyan color, depending on the depth of the water.

These areas have been classified and mapped as water bodies; this unit is spread out over 13.56 sq. Km area, which is 4.22 % of the total study area. As per Figure 2, there are dispersed water bodies located within the middle of the study area surrounding the project location, as well as there are patches of water bodies along the east portion, surrounded by mainly the croplands and fellow land.

**Vegetation**

The study area has a rich and diverse vegetation due to its varied climatic conditions and fertile soil. The district's vegetation is predominantly tropical, with a mix of deciduous and semi-evergreen species. The plains and riverbanks are covered with lush green fields, dominated by rice paddies, which are a staple crop. The region also supports a variety of fruit trees, such as mango, guava, and jackfruit, along with numerous vegetable crops. The presence of wetlands and water bodies adds to the richness of the local flora, including aquatic plants and grasses. In the forested areas, particularly in the eastern parts of Bardhaman, one can find a variety of hardwood trees like sal, teak, and eucalyptus. The region's diverse vegetation supports a wide range of wildlife, including various species of birds, insects, and small mammals.

This land use/land cover class of vegetation in the study area occupied a majority of 28.72 sq.km of class, which is 8.93% of the total study area.

### **Fallow Land, Barren Land and Open Land area:**

Barren land refers to areas of land that are unproductive and unable to support plant growth or agriculture without significant intervention. This could be due to factors such as poor soil quality, lack of nutrients, water scarcity, extreme weather conditions, or contamination. In many cases, barren land is the result of soil erosion, deforestation, or overgrazing, which depletes the land's natural resources. While barren land is often viewed as unusable, it is possible to rehabilitate it through various methods, such as soil reclamation, afforestation, irrigation, and sustainable land management practices.

By restoring the fertility of barren land, it can be transformed into productive space for agriculture, reforestation, or other beneficial uses. Within study area total 36.58 Sq. Km. areas comes under Barren Land class which is 11.38 % of total area.

### **River Sand**

River Sand deposition refers to the process by which mud, silt, sand, and other debris settle and accumulate on the ground after a mud flood event. When a mud flood occurs, water mixes with loose soil, rocks, and organic material, creating a thick, sludgy flow. As this flow moves across the land, it can bury structures, landscapes, and vegetation. Once the water recedes or slows down, the heavier particles (like mud and sand) begin to settle, forming layers of deposition. This land use/land cover class of Mud Flood in the study area occupied a majority of 7.00 sq.km of class, which is 2.18 % of the total study area as shown in Table 3 and pie diagram as shown in figure 20.

### ***AIR, NOISE, WATER, SOIL - (Air Quality):-***

The ambient air quality with respect to the study zone around the proposed project area forms the baseline information. The various sources of air pollution in the region are traffic, urban rural activities and industrial activities (Mining activities). The study area represents mostly rural environment.

This section describes the selection of sampling locations, methodology adopted for sampling, analytical techniques and frequency of sampling. The results of monitoring carried out for study period **March 2025 to May 2025** representing winter season.

### ***Methodology***

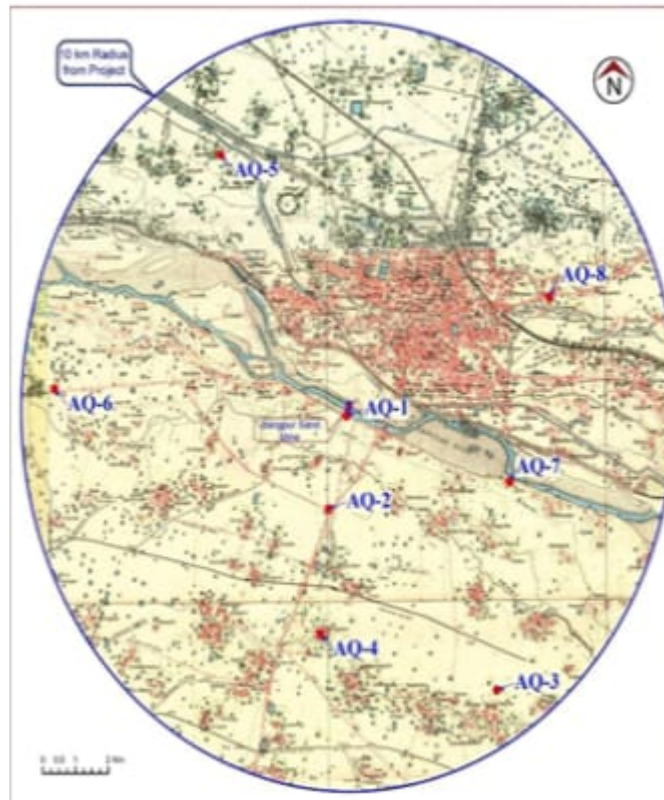
PM₁₀, PM_{2.5}, Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x), and Carbon dioxide (CO) were the major pollutants associated with project. The baseline status of the ambient air quality has been established through field monitoring data on PM₁₀, PM_{2.5}, Sulphur dioxide (SO₂), oxides of nitrogen (NO_x), and Carbon dioxide (CO) at 8 locations within the study area. The locations for air quality monitoring were scientifically selected based on the following considerations using climatological data.

- Meteorological conditions on regional scale;
- The methodology for conducting the baseline environmental survey and selection of sampling locations considered the guidelines given in the EIA manual of the MoEFCC;
- Covering all 120° sectors and different radii
- Topography of the study area and sensitive locations
- Representative of the regional background air quality for obtaining baseline status

Air Quality Monitoring (AQ) stations were set up at eight (8) locations. The location of the selected stations with reference to the project area is given in the **Table 18.** and shown in **Figure 17.**

**Table 18: Details of AQ Monitoring Locations**

Code	Name of the Location	Latitude	Longitude
AQ - 1	Near Project site	23°12'56.83"N	87°49'57.65"E
AQ - 2	IDILPUR	23°12'49.73"N	87°49'54.60"E
AQ - 3	Idilpur	23° 12'54.75"N	87°48'55.61"E
AQ - 4	IDILPUR	23° 12'55.78"N	87°49'56.59"E
AQ - 5	Telipukur	23°12'53.80"N	87°49'56.62"E
AQ-6	Polempur	23° 12'51.75"N	87°48'51.61"E
AQ-7	Kamalpur	23° 12'53.78"N	87°49'54.59"E



**Figure 21: Ambient Air Quality Sampling locations**

#### *Presentation of AQ Data*

Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AQ monitoring stations. The summary of these results for each locate on are presented in **Table 17 and Table 18**. These are compared with the standards prescribed by Central Pollution Control Board (CPCB) for industrial and rural /residential zone.

**Table 31: Summary of Ambient Air Quality Results – (Pre Monsoon Season March 2024 to May 2024)**

Station Code	Name of the Location	PM ₁₀ (µg/m ³ )				PM _{2.5} (µg/m ³ )				SO ₂ (µg/m ³ )			
		Min	Max	Mean	98 th percentile	Min	Max	Mean	98 th percentile	Min	Max	Mean	98 th percentile
AQ - 1	Near Project site	65.2	77.53	71.2	75.7	31.3	36.2	34.0	34.2	8.4	9.7	9.6	9.6
AQ - 2	Idilpur	68.6	79.2	74.8	78.8	24.8	36.8	35.2	35.4	7.8	8.4	8.7	8.2
AQ - 3	IDILPUR	71.2	80.6	77.2	80.0	34.2	37.8	35.8	33.8	8.6	9.8	9.6	9.5
AQ - 4	IDILPUR	66.8	74.6	71.5	74.2	31.7	35.4	34.5	34.0	9.2	10.4	10.0	10.2
AQ - 5	Polempur	62.4	68.3	66.2	68.0	30.4	24.7	24.8	33.2	9.0	10.2	9.7	10
<b>NAAQS standards</b>		<b>100</b>				<b>60</b>				<b>80</b>			

**Summary of Ambient Air Quality Results - Pre Monsoon Season (1st March 2024-31st May 2024)**

Station Code	Name of the Location	NO ₂ (µg/m ³ )				CO (mg/m ³ )			
		Min	Max	Mean	98 th percentile	Min	Max	Mean	98 th percentile
AQ - 1	Near Project site	26.4	28.2	27.8	27.5	0.38	0.41	0.40	0.40
AQ - 2	Idilpur	24.7	27.0	26.7	26.8	0.42	0.24	0.43	0.43
AQ - 3	IDILPUR	26.0	27.4	26.8	27.0	0.40	0.42	0.41	0.41
AQ - 4	IDILPUR	27.2	28.6	28.3	28.4	0.40	0.43	0.42	0.42
AQ - 5	Polempur	26.8	28.0	27.8	27.6	0.36	0.39	0.38	0.38
<b>NAAQS standards</b>		<b>80</b>				<b>2</b>			

**Observation**

Values of PM₁₀ in the background environment ranged from 66.22 µg/m³ to 74.8 µg/m³. The values of PM_{2.5} range from 2.5 µg/m³ to 24.8 µg/m³. The values of Sulphur dioxide levels were found to vary from 8.7µg/m³ to 10.0 µg/m³. The value of Nitrogen Oxide ranged from 26.7 µg/m³ to 28.5 µg/m³. The values of oxides of Nitrogen were observed to be well within the NAAQ standard of 80µg/m³. The value of CO ranges from 0.40 mg/m³ to 0.43 mg/m³. The result indicates that silica concentration in the surrounding of project site was found to be in the range of 0.042 µg/m³ to 0.049 µg/m³.

**Interpretation**

Based on air analysis data, it is concluded that most parameters are below their respective NAAQ limits, suggesting that the air quality is within safe standards for public health. The PM₁₀ concentration is bit higher in the AQ2 and AQ8 probably because of the nearby traffic movement through the adjacent road. Continued monitoring and proactive measures may be necessary to address potential sources of pollution and ensure the air remains clean and safe for the local population. Identifying and addressing specific sources of pollution, such as vehicular traffic, can help reduce pollutant levels. Adopting energy-efficient practices can contribute to reducing air pollution.

**Ambient Noise Quality**

The environmental assessment of noise from the proposed quarrying activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

The environmental impact of noise can have several effects varying from Noise Induced Hearing Loss (NIHL) to annoyance depending on loudness of noise.

The main objective of noise monitoring in the study area is to establish the baseline noise levels, and assess the impact of the total noise expected to be generated other quarrying activities.

**Objective**

The main objective of monitoring of ambient noise levels was to establish the baseline noise levels in different zones. i.e, Residential, Industrial, Commercial and Silence zones, in the surrounding areas and to assess the total noise level in the environment of the study area.

**Methodology****Identification of Sampling Locations**

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in and around the quarry site area. Noise at different noise generating sources has been identified based on the activities in the village area and ambient noise due to traffic.

The noise monitoring has been conducted for determination of ambient noise levels at eight locations in the study area Pre- Monsoon season (1st March 2024 to 31st May 2024). The noise levels at each location were recorded for 24 hours. The environment setting of noise monitoring locations in four areas is given in **Table 20** and shown in **Figure 22**.

**Instrument Used for Monitoring**

Noise levels were measured using integrated sound level meter manufactured by Cygnet (Baseline Technology). The integrating sound level meter is an integrating/logging type with Octave filter attachment (model OB-100) with frequency range of 31.5 to 16000 Hz. This instrument is capable of measuring the Sound Pressure Level (SPL),  $L_{eq}$  and octave band frequency analysis

### ***Method of Monitoring***

Noise level monitoring was carried out continuously for 24 hours with one hour interval starting at 06:00 hrs to 06:00 hrs next day. The noise levels were monitored on working days only and not on Saturdays, Sundays and public holidays. During each hour,  $L_{eq}$  were directly computed by the instrument based on the sound pressure levels.  $L_{day}$  ( $L_d$ ) and  $L_{night}$  ( $L_n$ ) values were computed using corresponding hourly  $L_{eq}$  of day and night respectively. Monitoring was carried out at 'A' response and fast mode.

### ***Equivalent Sound Pressure Level ( $L_{eq}$ ):***

The  $L_{eq}$  is the equivalent continuous sound level, which is equivalent to the same sound energy as the actual fluctuating sound measured in the same period. This is necessary because sound from noise source often fluctuates widely during a given period of time. This is calculated from the following equation:

$$L_{eq} = L_{50} + \frac{(L_{10} - L_{90})^2}{60}$$

$L_{day}$  is defined as the equivalent noise level measured over a period of time during day (6 am to 10 pm).

$L_{night}$  is defined as the equivalent noise level measured over a period of time during night (10 pm to 6 am).

**Table 20: Details of Noise Monitoring Locations**

Code	Location	Latitude	Longitude
NQ - 1	Near Project site	23°12'56.83"N	87°49'57.65"E
NQ - 2	IDILPUR	23°12'49.73"N	87°49'54.60"E
NQ - 3	Idilpur	23° 12'54.75"N	87°48'55.61"E
NQ - 4	IDILPUR	23° 12'55.78"N	87°49'56.59"E
NQ - 5	Telipukur	23°12'53.80"N	87°49'56.62"E
NQ-6	Polempur	23° 12'51.75"N	87°48'51.61"E
NQ-7	Kamalpur	23° 12'53.78"N	87°49'54.59"E

### ***Noise Analysis Results***

The values of noise level parameters like  $L_{eq}$  (day), and  $L_{eq}$  (night), were monitored during study period and it's found that both inside (industrial) and outside (residential) of project area the day and night equivalent noise level is as per the standards given by the CPCB.

**Table 21: Noise Levels dB (A) in the Study Area**

Station Code	Location	Leq dB (A) Day Time	Leq dB (A) Night Time
NQ - 1	Near Project site	53.0	42.8
NQ - 2	IDILPUR	49.7	43.7
NQ - 3	Idilpur	50.5	42.5
NQ - 4	IDILPUR	53.1	42.2
NQ - 5	Telipukur	50.7	43.1

**Noise Standards**

Ambient air quality standard in respect of noise have been stipulated by Govt. of India, Gazette notification vide S.O. 123(E), dated 14.2.2000 and subsequently amendments under the Environment (Protection) Act, 3186.

**Table 22: National Ambient Noise Level Standard**

Area code	Category of area	Limits in dB(A)	
		Day Time	Night Time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	24
D	Silence	50	40

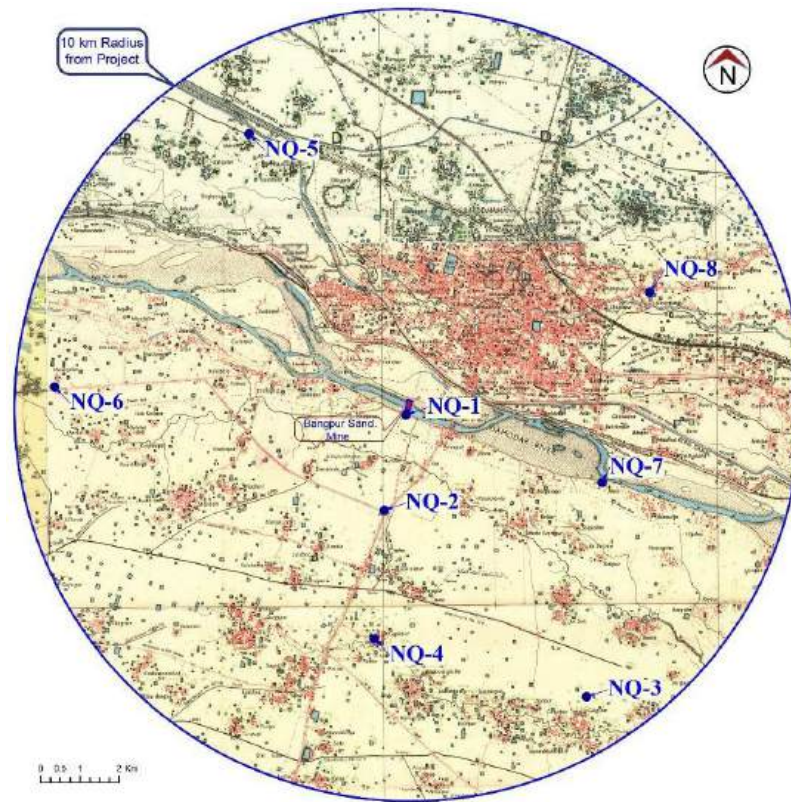


Figure 22: Noise Monitoring Location

**Observation**

Noise levels were monitored in eight locations including project within the study area. The noise levels ranged from 52.6 to 53.1 dB (A) during day time and noise levels ranged from 24.1 to 44.8dB (A) during night time. Over all the monitored noise levels are found to be within the stipulated standards set by CPCB.

**Interpretation**

Based on noise analysis data, it is concluded all the monitored noise levels into the study area is found to be within the stipulated standards set by CPCB.

**Water Quality**

Selected water quality parameters of surface and ground water resources in the study area have been studied for assessing the water environment and evaluate anticipated impact of the quarry. Understanding the water quality is essential in preparation of EIA and to identify critical issues with a view to suggest appropriate mitigation measures for implementation.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict impact on water quality by this project and related activities.

**Water Sampling Locations**

Water samples were collected from five surface and six ground water locations. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards for drinking water as per IS: 10500 for ground and surface water sources. The water sampling locations are listed below in **Table 23** and **Figure 23**.

**Table 23: Water Sampling Locations**

SR. NO.	Station Code	Name Of The Location	Latitude	Longitude
Surface Water				
1	SW1	Damodar River Up stream	23°57'00.12"N	88°75'00.55"E
2	SW2	Damodar River Down stream	22° 55'22.00"N	88°22'39.61"E
Ground Water				
1	GW1	IDILPUR	23°12'49.73"N	87°49'54.60"E
2	GW2	Idilpur	23° 12'54.75"N	87°48'55.61"E
3	GW3	IDILPUR	23° 12'55.78"N	87°49'56.59"E
4	GW4	Telipukur	23°12'53.80"N	87°49'56.62"E

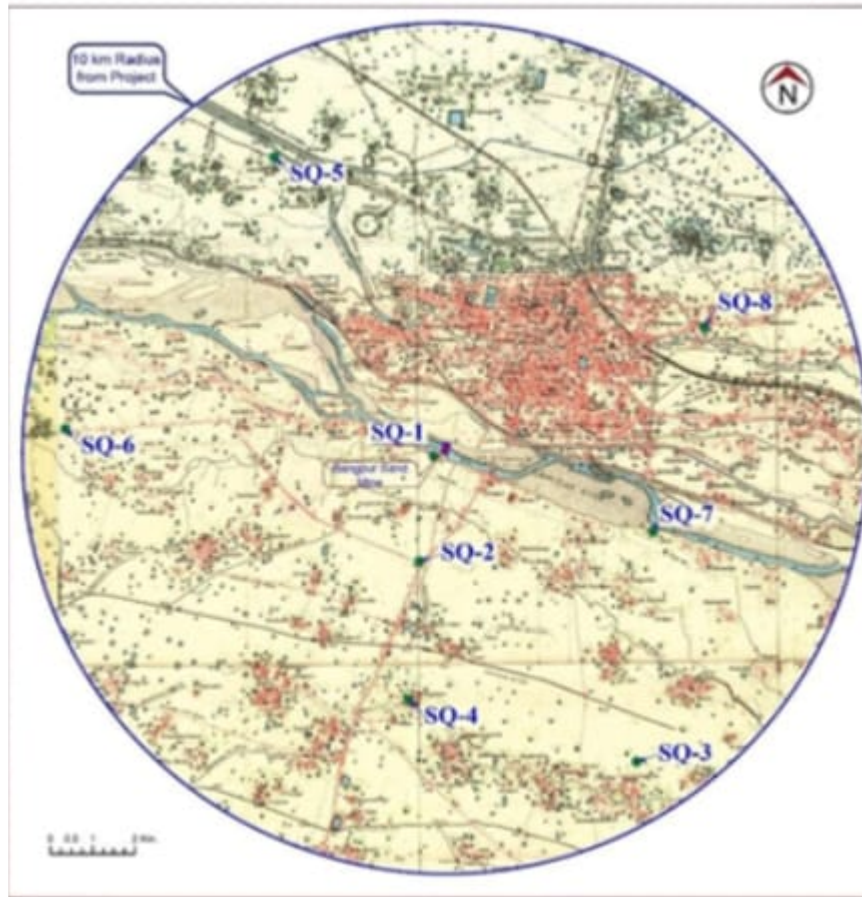


Figure 23: Ground Water & Surface Water Monitoring Locations

**Presentation of Results**

The analytical results of ground water and surface water samples are given in **Table 23 and Table 24**. The quality of surface water samples were compared with surface water specification IS 2296:3182 Class C and ground water samples were compared with drinking water specification IS 10500:2012 standards

**Table 24: Ground Water Quality Pre Monsoon Season March 2024 to May 2024**

S. NO.	Parameters	Result				Unit
		GW 1	GW 2	GW 3	GW 4	
1.	Turbidity	052	0.57	0.62	0.50	NTU
2.	pH	6.91	7.02	6.84	7.1	-
3.	Electrical Conductivity	546.0	572.0	558.0	584.0	μS/cm
4.	Total Dissolved Solids	393.0	406.0	402.0	426.0	mg/L
5.	Total Hardness as CaCO ₃	146.0	152.0	150.0	148.0	mg/L
6.	Nitrates as NO ₃ ⁻ -N	2.2	2.4	2.0	2.8	mg/L
7.	Phenolic Compound as C ₆ H ₅ O ₆	<0.001	<0.001	<0.001	<0.001	mg/L
8.	Aluminum as Al	<0.01	<0.01	<0.01	<0.01	mg/L
9.	Total Chromium as Cr	<0.005	<0.005	<0.005	<0.005	mg/L
10.	Copper as Cu	<0.005	<0.005	<0.005	<0.005	mg/L
11.	Cadmium as Cd	<0.005	<0.005	<0.005	<0.005	mg/L

12.	Potassium as K	9.74	10.84	10.06	11.86	mg/L
13.	Sodium as Na	42.16	44.82	44	46.38	mg/L
14.	Calcium as Ca	37.02	41.28	38.94	44.18	mg/L
15.	Magnesium as Mg	11.4	12.2	11.9	14.3	mg/L
16.	Bicarbonates as (HCO ₃ ⁻ )	134.0	146.0	142.0	136.0	mg/L
17.	Chlorides as Cl	34.42	39.16	37.86	42.74	mg/L
18.	Sulphates as SO ₄ ²⁻	44.52	47.24	24.23	49.06	mg/L
31.	Fluoride as F	0.26	0.30	0.24	0.24	mg/L
20.	Iron as Fe	0.2	0.22	0.20	0.24	mg/L
21.	Zinc as Zn	0.12	0.14	0.14	0.15	mg/L
22.	Mercury as Hg	<0.01	<0.01	<0.01	<0.01	mg/L
23.	Arsecnic as As	<0.005	<0.005	<0.005	<0.005	mg/L
24.	Manganese as Mn	<0.005	<0.005	<0.005	<0.005	mg/L
24.	Cyanide as Cn	<0.01	<0.01	<0.01	<0.01	mg/L

**Table 24: Surface water Quality (Pre Monsoon Season March 2024 to May 2024)**

S.No.	Parameters	Result		
		SW 1	SW 2	Unit
1.	Turbidity	22.4	26.2	NTU
2.	pH(24 DC)	7.24	7.36	-
3.	Electrical Conductivity	704.0	722	μS/cm
4.	Total Dissolved Solids	508	527	mg/L
5.	Total suspended solids	14	18	mg/L
6.	Total Hardness as CaCO ₃	318	212	mg/L
7.	Oil &Grease	<2.0	<2.0	mg/L

8.	Nitrates as NO ₃ ⁻ -N	3.4	3.8	mg/L
9.	Biochemical Oxygen Demand (27 ⁰ C, 3Days)	3.5	4.0	mg/L
10.	Chemical Oxygen Demand	16	18.2	mg/L
11.	Dissolved Oxygen	5.4	5.8	mg/L
12.	Potassium as K	9.8	11.0	mg/L
13.	Sodium as Na	52.2	56.4	mg/L
14.	Calcium as Ca	43.2	24.8	mg/L
15.	Magnesium as Mg	17.4	20.5	mg/L
16.	Mangaese as Mn	<0.005	<0.005	mg/L
17.	Cupper as Cu	<0.005	<0.005	mg/L
18.	Total Chromium	<0.005	<0.005	mg/L
31.	Lead as Pb	<0.005	<0.005	mg/L

20.	Total Alkalinity as $\text{CaCO}_3$	210	224	mg/L
21.	Bicarbonates as $(\text{HCO}_3^-)$	210	224	mg/L
22.	Chlorides as Cl	50.36	54.72	mg/L
23.	Sulphates as $\text{SO}_4^{2-}$	50.6	58.2	mg/L
24.	Fluoride as F	0.36	0.42	mg/L
24.	Phenolic Compounds as $\text{C}_6\text{H}_5\text{OH}$	<0.001	<0.001	mg/L
26.	Arsenic as As *	<0.005	<0.005	mg/L
27.	Iron as Fe	0.74	0.82	mg/L
28.	Zinc as Zn	<0.005	<0.005	mg/L
29.	Mercury as Hg	<0.001	<0.001	mg/L
30.	Cyanide as Cn	<0.001	<0.001	mg/L
31.	Total Coliform	1100	1400	MPN/100 ml

### ***Observations & Interpretation***

#### Ground water quality:

- The analysis results indicate that the pH ranges in between 6.84 to 7.1, the minimum pH was observed at GW3, 4; the maximum pH was observed at GW1.
- Total Hardness expressed as CaCO₃ was observed to 208 - 302(mg/L)
- Chlorides were found to be in the range of 93-141 mg/l, the minimum concentration of chlorides was observed at GW4, whereas the maximum value was observed at GW3.
- Sulphates were found to be in the range of 44.52to 49.06 mg/l. The minimum value observed at GW2 whereas the maximum value observed at GW3.
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 393to 426 mg/l, the minimum TDS observed at GW3 and maximum concentration of TDS observed at GW4.
- Zinc and iron found below detectable limit.

All parameters are within desirable limits as per IS 10500:2012 for all stations.

#### Surface water quality:

- The analysis results indicate that the pH values in the range of 7.24 to 7.36, the minimum value was observed at SW4 and maximum value was observed at SW2.
- DO was observed to be in the range of 5.42to 5.8 mg/l. The minimum DO value was observed at SW4 and maximum DO was observed at SW3.
- The TDS was observed in the range of 508 to 527 mg/l, the minimum TDS value was observed at SW2, and whereas maximum value was observed at SW1.
- The chlorides and Sulphates were found to be in the range of 50.36 to 54.72 mg/l and 50.6 to 58.2 mg/l, respectively.
- Total hardness expressed as CaCO₃ ranges between 124 to 248 mg/l.
- The calcium & magnesium were found to be in the range of 43.2to 24.8 mg/l and 17 to 20.5 mg/l, respectively. Zinc is found below detectable limit.

As per CPCB water quality criteria the class of water comes under Class B for SW3 & SW4 and Class C for SW1 & SW2.

### **Soil Quality**

Soil is generally differentiated into two horizons of minerals and organic constituents of variable depth, which differ from the parent material below in morphology, physical properties, constituents, chemical properties, and composition and biological characteristics. The physico- chemical characteristics of soil have been determined at eight (8) locations during the monitoring period with respect to colour, texture, cation exchange capacity, pH, N, P, and K etc. The location of sampling was given in Table 3.

**Table 24(a): Details of Soil Sampling Locations**

Code	Location	Latitude	Longitude
S1	IDILPUR	23°12'49.73"N	87°49'54.60"E
S2	Idilpur	23° 12'54.75"N	87°48'55.61"E

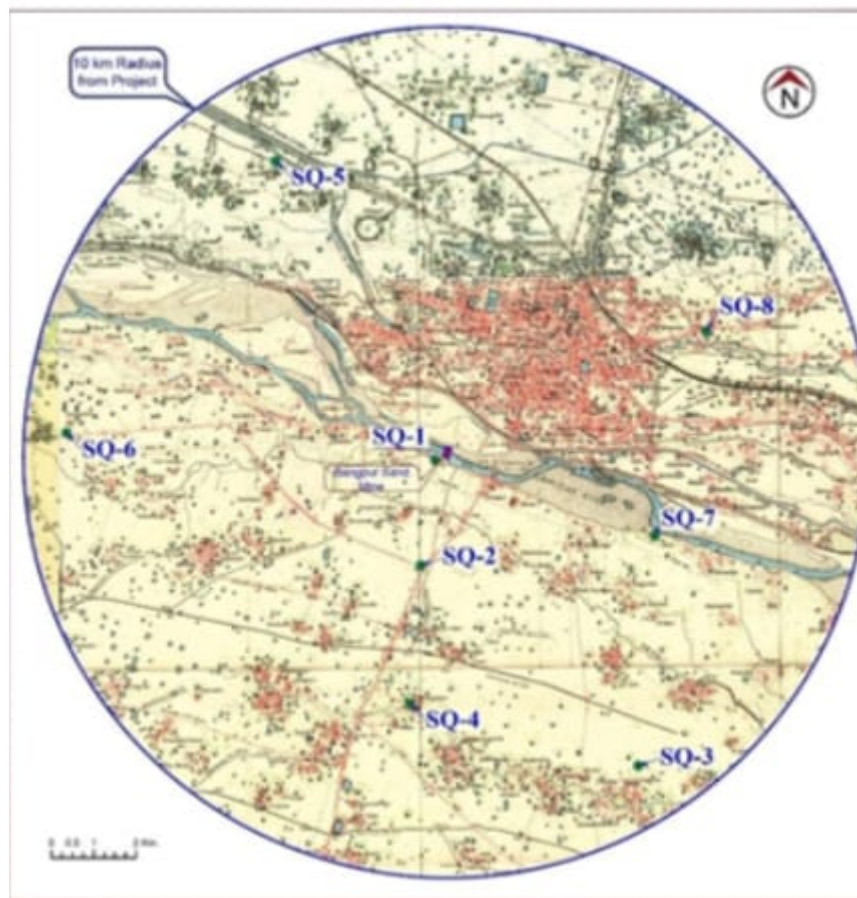




Figure 24 : Soil Monitoring Locations

### Soil sampling results

The soil sample was collected in presence of the functional area experts and analyzed by NABL accredited laboratory, during the winter season, results are given in Table 26.



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 TC-15288

Urvashi Malhar, Phase II, MEAV-25, Bengal Ambuja Housing Complex, City Centre, Durgapur-713216  
 Contact : 0343-2543019, 9732580459, 9433158173, email : greenvision.dgp@gmail.com, Website : www.greenvisiondurgapur.com

SOIL					
Parameters	Unit	S1	S2	S3	S4
Soil Colour	---	Brownish	Brownish	Brownish	Brownish
pH	---	7.24	7.35	7.12	7.18
Electrical Conductivity	umhos/cm	204.0	224.0	208.0	198.0
Moisture	%	4.2	4.6	3.8	4.0
Clay	%	32	30	34	28
Silt	%	28	30	30	34
Sand	%	40	40	36	38
Infiltration Rate	Cm/hr	1.22	1.26	1.3	1.28
Bulk Density	Gm/cm ³	1.35	1.38	1.36	1.39
Porosity	%	42.2	44.0	43.4	41.8
Nitrogen as N	Kg/ha as P	140.2	136.8	144.4	138.5
Phosphorus	Kg/ha as P	43.0	42.2	44.6	41.8
Potassium as K	Kg/ha as K	63.7	68.5	70.2	72.6
Organic Carbon	%	0.43	0.45	0.46	0.42
Organic matter	%	0.8	0.76	0.75	0.78

**Table 26: Soil Characteristics**

**Table 27: Standard Soil Classification**

Sr. No.	Soil Test	Classification
1	pH	< 4.5 Extremely acidic 4.51- 5.50 Very strongly acidic 5.51- 6.00 moderately acidic 6.01- 6.50 slightly acidic 6.51- 7.30 Neutral 7.31- 7.80 slightly alkaline 7.81- 8.50 moderately alkaline 8.51- 9.0 strongly alkaline 9.01 very strongly alkaline
2	Salinity Electrical Conductivity ( $\mu$ mhos/cm) (1ppm = 640 $\mu$ mhos/cm)	Up to 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)

3	Organic Carbon (%)	up to 0.2 : very less 0.21-0.4 : less 0.41-0.5 medium, 0.51- 0.8: on an average sufficient >1.0 more than sufficient
4	Nitrogen (Kg/ha)	up to 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient
5	Phosphorus (Kg/ha)	up to 0.2 : very less 16-30 less 31-50 medium, 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potash (Kg/ha)	0-120 very less 120-180 less 181-240 medium, 241-300 average 301-360 Better >360 more than sufficient

**Source:** Soil Survey Manual by IARI (Indian Agricultural Research Institute)

### ***Observations & Interpretation***

- It has been observed that the pH of the soil in the study area varied from 7.3 to 7.8 the maximum pH value of 7.8 was observed at S8 whereas the minimum value of 7.3 was observed at S1 & S3.
- The electrical conductivity was observed to range from 430 to 543  $\mu\text{S}/\text{cm}$  with the maximum observed at S3 with the minimum observed in S5.
- The available Nitrogen value varies from 183 to 324 kg/ha.

- The available Phosphorus value varies from 20 to 24 kg/ha.
- The available Potassium value varies from 239 to 280 kg/ha.

A total of 8 samples in and around the project site are collected and analyzed. It has been observed that the pH of the soil quality ranged from 7.3 (S1 & S3) to 7.8 (S8) indicating that the soil is slightly alkaline in nature.

### ***TRAFFIC STUDY***

The traffic survey, to ascertain the traffic density in the study area was conducted of old Burdwan Road connecting to mining site of IDILPUR Sand Mine. The composition of Traffic includes two wheelers, three wheelers, four wheeler (Passenger Cars) and four wheeler like heavy vehicles like Trucks, Lorries, and Bus etc. The recommended PCU Factors for various types of vehicles on Urban Roads has been adopted from IRC 106-3190 guidelines as shown in **Table 28**.

**Table 28: Recommended PCU Factors on Urban Roads**

<b>Types of Vehicles</b>	<b>Passenger Car Equivalency (PCE)</b>
Motor Cycle or Scooter (2-Wheeled)	0.75
Passenger Car, Pick-up van	1
Auto-rickshaw (3-Wheeled)	2.0
Light Commercial Vehicle	2.0
Truck or Bus	3.7
Bicycle	0.5

Thus, volume of vehicles was estimated as: PCU unit = No of vehicles* x PCE of those particular



**Figure 24: Location of the Node for Traffic Survey**

Traffic study was carried out at Old Burdwan Road in front of the project site plant as shown in **Figure 17**. Data was collected by physically counting the number of vehicles plying in both directions. The hourly counts were carried out for the different type /category of vehicles. The variation in the traffic flow at the given road along with the number of vehicles during peak hour & lean hour is presented in the **Table 29** and **Figure 24**.

**Table 29: Traffic Survey Node I**

	<b>During Lean Hrs.</b>	<b>During Lean Hrs. Vehicles in PCU's</b>	<b>During Peak Hrs.</b>	<b>During Peak Hrs. Vehicles in PCU's</b>
Two Wheelers	65	48.75	120	90
Three Wheelers	10	20	20	40
Car/Jeep	30	30	90	90
Light Commercial Vehicle	14	28	28	56
Bus	7	26	15	56
Trucks/Lorries	50	185	95	351
<b>Total</b>	<b>177.5</b>	<b>338</b>	<b>368</b>	<b>683</b>

Lean Hrs: Before 8.00 hrs (morning), 13.00 to 17.00 hrs afternoon & after 24.80 hrs (evening)

Peak Hrs: Between 8.00 to 13.00 hrs & 17.00 to 24.80 hrs in the evening.

### ***Existing Traffic Scenario & Level of Service***

Capacity of road as per IRC = 1500 PCU's/hr Total

Volume in PCUs during Peak Hours = 624.40

Existing Volume/Capacity ratio =  $624.40/1500 = 0.42$

The level of service is "C" that is GOOD.

**Table 30: Level of Service**

Sl. No.	Existing Volume/Capacity	Level of Services
1	0.0 to 0.2	"A" (Excellent)
2	0.2 to 0.4	"B" (Very Good)
3	0.4 to 0.6	"C" (Good)
4	0.6 to 0.8	"D" (Fair)
5	0.8 to 1.0	"E" (Poor)

During the proposed project an addition of maximum 10 trips per day (i.e. 5 trucks per day to and fro) of the trucks are envisaged. To understand that impact due this addition the following modified scenarios on the access roads is discussed. The Node I is shown in the figure.

### ***Modified Traffic Scenario & Level of Service***

Five (5) additional trucks i.e. 10 trips assume to enter and exit during peak hrs for the proposed project (worst case scenario).

Node I: ~5 trucks of 10 additional volume in PCU will be  $3.7 \times 10^9 = 4.11$  per hour during peak hours.

#### **Traffic Flow at Node I**

Total volume during peak hours in PCUs after completion of the project (V) =  $683 + 8.22 = 691.22$

Capacity of Road as per IRC (C) = 1500 PCU's/hr

Modified Existing Volume/Capacity ratio will be  $(V/C) = 691.22/1500 = 0.46$

The level of service of the road will be "C" after the proposed project that is "GOOD".

The above results indicated that the post project scenarios will contribute to addition in existing traffic, the level of service will continue to be GOOD. Traffic will continue to run smoothly without congestion and no widening of road is anticipated.

## ***ECOLOGY AND BIODIVERSITY***

Study of biological environment is one of the most important aspects for Environmental Impact Assessment. In view of the need for conservation of environmental quality and biodiversity study, biological environment is one of the most important aspects for Environmental Impact Assessment. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between them but also with the abiotic components viz. physical and chemical components of the environment. Generally, biological communities are the indicators of climatic and edaphic factors. The biological environment includes mainly terrestrial ecosystem and aquatic ecosystem. The mining activities are one such external influence, which might affect the ecology of an area, if proper management measures are not taken.

### **Objectives of Ecological Studies**

The present study was undertaken with the following objectives:

- To assess the nature and distribution of vegetation in and around the project site
- To evaluate the distribution of animal life spectra, including avifauna and butterflies, available in this area
- To ascertain whether the proposed project will have any adverse impact on the ecology in and around project areas, and suggest mitigation measures, if needed.

### **Study Area:**

Project site is located at Mouza - IDILPUR, P.S. Bardhaman, Dist. Purba Bardhaman, West Bengal. As per guidelines of MoEF for Environmental Impact Assessment, the study area was restricted up to 10 km periphery of the project site. All observations were undertaken in May 2024 in the study area



**Figure 26: Study area for Biological Environment**

#### **Survey Methodology Flora**

- To achieve the above objectives a detailed study of the area was undertaken within 10 km radius from the Project site. The different methods adopted were as follows:
- Generation of primary data by undertaking systematic ecological studies in the study area;
- Identified vegetation patterns at different locations through GIS map and physically surveyed representative sites
- Primary data collection for flora through random sampling method for trees, shrubs and herbs from the selected locations to know the vegetation cover qualitatively;
- Study area for primary data collection is from the project site while remaining up to 10 km will be represented by secondary data
- Physical inspection and recording the state of biodiversity at selected vegetation patches, were undertaken in 5 Locations
- At each sampling point, floral diversity and species composition were recorded using line transects at various locations. Plant samples that could not be identified in the field were

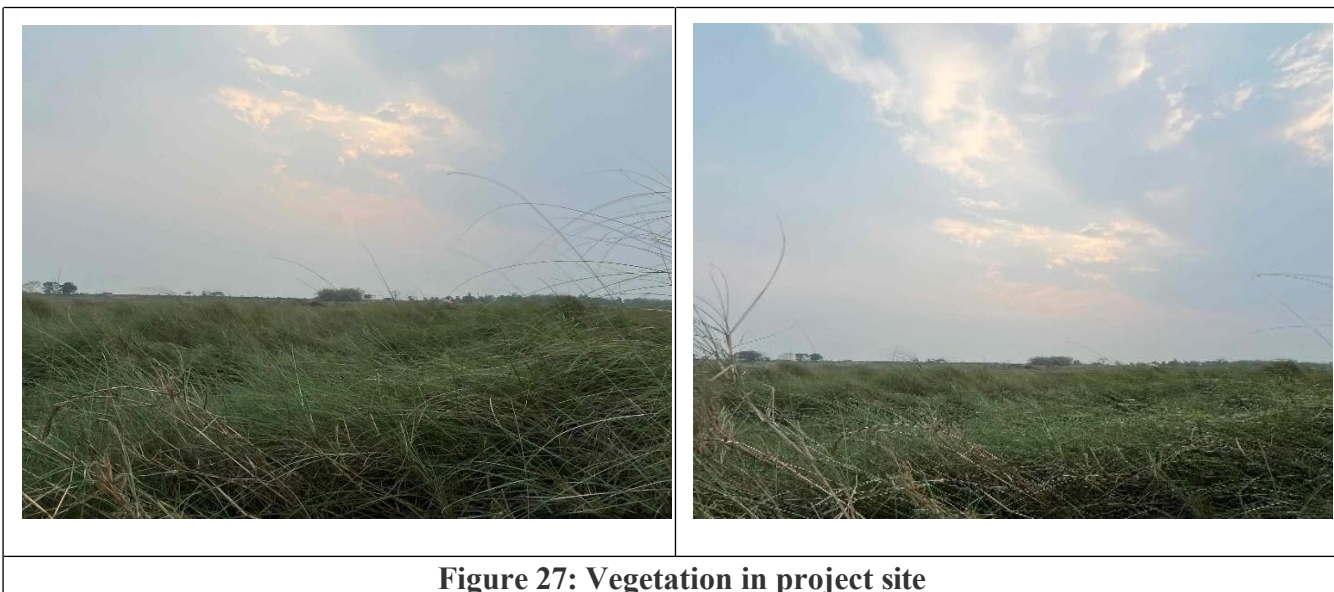
collected and taken to the herbarium for identification. The health status of the vegetation was visually determined.

### **Fauna**

- Different types of animals, including avifauna, available in this area, have been recorded.
- To spot the fauna in the study area and also to identify the fauna by secondary indicators such as pugmarks, scats, fecal pellets, calls and other signs;
- Point sampling along fixed transects (foot trails) was used to observe bird species with binoculars and field guides, and photographs were taken. Each transect was surveyed for over an hour.
- Birds were studied by direct observation with the help of “Olympus 10 x 50 DPS I” binocular and were identified by adopting available literature (Grimmett *et al.* 3198).
- For ecological information, the secondary sources such as local officials & villagers were interviewed.
- Secondary data, up to 10 Km boundary from the project site have been collected from literature, forest department, and discussions with local people & NGO (**Annexure I**).
- Details Study of flora and fauna carried out as per prescribed method addressed in UT SOP protocol participatory and consultative approach was also followed. Field visits were under taken for survey of the vegetation and animals in the study area.

### **Observations**

#### **Project Site (Core Zone)**



**Figure 27: Vegetation in project site**

## Terrestrial Ecology:

### a) Flora:

The floristic survey reveals that the project site possesses different varieties of flora such as: The floristic survey reveals that the project site possesses different varieties of flora (**Table 29**) such as:

- **Trees:** No naturally occurring trees were observed at the project site, except for the presence of a few herbs shrubs and grasses
- **Shrubs:** *Calotropis gigantea* & *Lantana camara*
- **Herbs:** *Achyranthes aspera* & *Amaranthus spinosus*
- **Grasses:** *Imperata cylindrica* (Kans grass), *Desmostachya bipinnata* (Kusha grass)

**b) Fauna:** The fauna (**Table 31**) observed in project site are as follows;

- **Mammals:** *Canis lupus familiaris* and *Funambulus palmarum*
- **Reptiles:** *Calotes versicolor*
- **Avifauna:** *Corvus splendens*, *Dicrurus macrocercus* & *Merops orientalis*
- **Butterflies:** *Danaus chrysippus*, *Euploea core* & *Papilio polytes*

### c) Aquatic Ecology:

There is no water body within the Project site.

## Area between Project site & 10 km of the project site

### Terrestrial Ecology

#### a) Flora

Four locations viz, Project site (A), Damodar River Upstream near Idilpur P village (B), Damodar River Downstream near Hijalna village (C) Ramnabagan Wild life sanctuary (D) Agricultural land (E) (**Figure 27**) were selected to evaluate the flora and fauna. Based on field survey primary data were generated by preparing a general checklist of the plants encountered in this area. There is almost aquaculture land in study area so IVI is not calculated.. Dominant tree species in Study area are Shimul (*Bombax ceiba*), Neem (*Azadirachta indica*), Amlaki (*Phyllanthus emblica*), Aam (*Mangifera indica*), Jam (*Syzygium cumini*), Narikel (*Cocos nucifera*), Khejur (*Phoenix dactylifera*), Tal (*Borassus flabellifer*), Bot (*Ficus benghalensis*), Ashvattha (*Ficus religiosa*), Dumur (*Ficua racemosa*), Palas (*Butea monosperma*), Krishnachura (*Delonix regia*), Amra (*Spondias pinnata*), etc. Dominant families of plants recorded in the study area are Fabaceae, Apocynaceae, Amaranthaceae, Myrtaceae, Poaceae, Euphorbiaceae, Malvaceae, Verbenaceae, Anacardiaceae, Combretaceae, Arecaceae.

The area showed overall 123 plant species from 108 genera and 46 families. A list of dominant flora observed in study area are given in **Table 31**.



**Table 31: Presence of vegetation up to 10 km surroundings of the project site**

S. No.	Scientific Name	Common Name	Family	IUCN Status	Core Zone	Buffer Zone
<b>Trees</b>						
1.	<i>Acacia auriculiformis</i>	Akashmoni	Fabaceae	Least Concern		+
2.	<i>Acacia nilotica</i>	Babul	Fabaceae	Least Concern		+
3.	<i>Aegle marmelos</i>	Bel	Rutaceae	Near Threatened		+
4.	<i>Albizia lebbek</i>	Siris	Fabaceae	Not assessed		+
5.	<i>Azadirachta indica</i>	Neem	Meliaceae	Least Concern		+
6.	<i>Bombax ceiba</i>	Shimul	Bombacaceae	Least Concern		+
7.	<i>Butea monosperma</i>	Palas	Fabaceae	Least Concern		+
8.	<i>Cassia fistula</i>	Amaltas	Fabaceae	Least Concern		+
9.	<i>Casuarina equisetifolia</i>	Jhau	Casuarinaceae	Least Concern		+
10.	<i>Dalbergia sissoo</i>	Sisso	Fabaceae	Least Concern		+
11.	<i>Diospyros malabarica</i>	Gab	Ebenaceae	Not assessed		+

12.	<i>Delonix regia</i>	Krishnachura	Fabaceae	Least Concern		+
13.	<i>Erythrina indica</i>	Coral tree	Fabaceae	Least Concern		+
14.	<i>Eucalyptus globulus</i>	Eucalyptus	Myrtaceae	Least Concern		+
15.	<i>Ficus benghalensis</i>	Bot	Moraceae	Not assessed		+
16.	<i>Ficus hispida</i>	Kakdumur	Moraceae	Least Concern		+
17.	<i>Ficua racemosa</i>	Dumur	Moraceae	Least Concern		+
18.	<i>Ficus religiosa</i>	Ashvattha	Moraceae	Least Concern		+
31.	<i>Garuga pinnata</i>	Jum / Nil Bhadi	Burseraceae	Least Concern		+
20.	<i>Holarrhena pubescens</i>	Kurchi	Apocynaceae	Least Concern		+
21.	<i>Lannea coromandelica</i>	Jhingna	Anacardiaceae	Least Concern		+
22.	<i>Lagerstroemia speciosa</i>	Jarul	Lythraceae	Least Concern		+
23.	<i>Leucaena leucocephala</i>	Subabul	Fabaceae	Not assessed		+
24.	<i>Madhuca longifolia</i>	Mahua	Sapotaceae	Not assessed		+
24.	<i>Mangifera indica</i>	Aam	Anacardiaceae	Data Deficient		+
26.	<i>Manilkara zapota</i>	Sapeda	Sapotaceae	Least Concern		+
27.	<i>Melia azedarach</i>	Mahanim	Meliaceae	Least Concern		+
28.	<i>Michelia champaca</i>	Champak	Magnoliaceae	Least Concern		+
29.	<i>Mimusops elengi</i>	Bakul	Sapotaceae	Least Concern		+
30.	<i>Moringa oleifera</i>	Sajina	Moringaceae	Least Concern		+
31.	<i>Polyalthia longifolia</i>	Debdaru	Anonaceae	Least Concern		+
24.	<i>Phyllanthus emblica</i>	Amlaki	Phyllanthaceae	Least Concern		+
33.	<i>Schleichera oleosa</i>	Kusum	Sapindaceae	Least Concern		+
34.	<i>Shorea robusta</i>	Sal Tree	Dipterocarpaceae	Least Concern		+
35.	<i>Sesbania sesban</i>	Jayanti	Fabaceae	Least Concern		+
36.	<i>Spondias pinnata</i>	Amra	Anacardiaceae	Not assessed		+
37.	<i>Symplocos racemosa</i>	Lodh	Symplocaceae	Least Concern		+
38.	<i>Syzygium cumini</i>	Jam	Myrtaceae	Least Concern		+
39.	<i>Tamarindus indica</i>	Imli	Fabaceae	Least Concern		+
40.	<i>Tectona grandis</i>	Teak	Lamiaceae	Endangered		+
41.	<i>Terminalia arjuna</i>	Arjun	Combretaceae	Least Concern		+
42.	<i>Terminalia chebula</i>	Haritaki	Combretaceae	Least Concern		+
43.	<i>Terminalia bellirica</i>	Bahera	Combretaceae	Least Concern		+
44.	<i>Trema orientalis</i>	Indian Charcoal	Cannabaceae	Least Concern		+
24.	<i>Xeromphis uliginosa</i>	Mainphal	Rubiaceae	Not assessed		+

Shrubs						
1.	<i>Abrus precatorius</i>	Kunch	Malvaceae	Not assessed		+
2.	<i>Adhatoda vasica</i>	Basaka	Acanthaceae	Least Concern		+
3.	<i>Aerva lanata</i>	Chaldhowa	Amaranthaceae	Not assessed		+
4.	<i>Annona squamosa</i>	Custard apple	Anonaceae	Least Concern		+
5.	<i>Cassia tora</i>	Chakunda	Fabaceae	Not assessed		+
6.	<i>Calotropis gigantea</i>	Akand	Apocynaceae	Not assessed	+	+
7.	<i>Clerodendrum viscosum</i>	Bhant/Ghentu	Verbenaceae	Not assessed		+
8.	<i>Dodonaea viscosa</i>	-	Sapindaceae	Least Concern		+
9.	<i>Duranta erecta</i>	Kanta Mehedi	Verbenaceae	Least Concern		+
10.	<i>Helicteres isora</i>	Atmora	Sterculiaceae	Least Concern		+
11.	<i>Hemidesmus indicus</i>	Ananta mal	Apocynaceae	Not assessed		+
12.	<i>Hibiscus sabdariffa</i>	Chukai	Malvaceae	Not assessed		+
13.	<i>Ipomoea carnea</i>	pink morning glory	Convolvulaceae	Not assessed		+
14.	<i>Jatropha curcas</i>	Bag-bherenda	Euphorbiaceae	Least Concern		+
15.	<i>Jatropha gossypifolia</i>	Lal bherenda	Euphorbiaceae	Least Concern		+
16.	<i>Lantana camara</i>	Bhabri	Verbenaceae	Not assessed	+	+
17.	<i>Melastoma malabathricum</i>	Futki	Melastomaceae	Not assessed		+
18.	<i>Nerium indicum</i>	Karabi	Apocynaceae	Not assessed		+
31.	<i>Nyctanthes arbor-tristis</i>	Siuli	Apocynaceae	Least Concern		+
20.	<i>Ochna obtusata</i>	Ramdhan Champa	Ochnaceae	Least Concern		+
21.	<i>Prosopis juliflora</i>	Vilayati babul	Fabaceae	Least Concern		+
22.	<i>Psidium guajava</i>	Peyara	Myrtaceae	Least Concern		+
23.	<i>Ricinus communis</i>	Bheranda	Euphorbiaceae	Not assessed		+
24.	<i>Vitex negundo</i>	Nisenda	Verbenaceae	Least Concern		+
24.	<i>Woodfordia fruticosa</i>	Dhowa	Lythraceae	Least Concern		+
26.	<i>Thespesia lampas</i>	Ban-kapas	Malvaceae	Least Concern		+
27.	<i>Ziziphus oenoplia</i>	Sekul	Rhamnaceae	Not assessed		+
Herbs						
1.	<i>Achyranthes aspera</i>	Apang	Amaranthaceae	Not assessed	+	+
2.	<i>Ageratum conyzoides</i>	Uchunti	Asteraceae	Not assessed		+
3.	<i>Alysicarpus vaginalis</i>	-	Fabaceae	Not assessed		+
4.	<i>Amaranthus caudatus</i>	Ramdana	Amaranthaceae	Not assessed		+
5.	<i>Amaranthus spinosus</i>	Kata-notey	Amaranthaceae	Not assessed	+	+
6.	<i>Amaranthus tricolor</i>	Notey Shaak	Amaranthaceae	Not assessed		+
7.	<i>Ammannia baccifera</i>	Daadmaari	Lythraceae	Least Concern		+
8.	<i>Celosia argentea</i>	Morog phool	Amaranthaceae	Least Concern		+

9.	<i>Centella asiatica</i>	Thankuni	Apiaceae	Least Concern		+
10.	<i>Cleome viscosa</i>	Hulo hudhuria phool	Cleomaceae	Not assessed		+
11.	<i>Clitoria ternatea</i>	Aparajita	Fabaceae	Not assessed		+
12.	<i>Desmodium triflorum</i>	Kudaliya	Fabaceae	Not assessed		+
13.	<i>Eclipta prostrata</i>	Kesuti / Kesari	Asteraceae	Least Concern		+
14.	<i>Euphorbia thymifolia</i>	Swet-kerui	Euphorbiaceae	Not assessed		+
15.	<i>Evolvulus alsinoides</i>	Bisnukanta	Convolvulaceae	Not assessed		+
16.	<i>Hyptis suaveolens</i>	Ganga tulsi	Lamiaceae	Not assessed		+
17.	<i>Leucas aspera</i>	Shwetadron	Lamiaceae	Not assessed		+
18.	<i>Microstachys chamaelea</i>	Bhumir Era	Euphorbiaceae	Not assessed		+
31.	<i>Ocimum basilicum</i>	Ram-tulsi	Lamiaceae	Not assessed		+
20.	<i>Ocimum sanctum</i>	Tulsi	Lamiaceae	Not assessed		+
21.	<i>Oxalis corniculata</i>	Amrul	Oxalidaceae	Not assessed		+
22.	<i>Polygonum barbatum</i>	Bekh-unjubaz	Polygonaceae	Least Concern		+
23.	<i>Sida cordifolia</i>	Brela	Malvaceae	Not assessed		+
24.	<i>Sida rhombifolia</i>	Berela	Malvaceae	Not assessed		+
24.	<i>Sida spinosa</i>	Ban-methi	Malvaceae	Not assessed		+
26.	<i>Solanum nigrum</i>	Kakmachi	Solanaceae	Not assessed		+
27.	<i>Tridax procumbens</i>	Targanda	Asteraceae	Not assessed		+
28.	<i>Vernonia cinerea</i>	Kukshim	Asteraceae	Not assessed		+
<b>Palms</b>						
1.	<i>Borassus flabellifer</i>	Tal	Arecaceae	Least Concern		+
2.	<i>Cocos nucifera</i>	Narikel	Arecaceae	Not assessed		+
3.	<i>Phoenix dactylifera</i>	Khejur	Arecaceae	Not assessed		+
<b>Climbers</b>						
1.	<i>Cardiospermum halicacabum</i>	Shibjhul	Sapindaceae	Least Concern		+
2.	<i>Cayratia trifolia</i>	Amal lata	Vitaceae	Not assessed		+
3.	<i>Coccinia grandis</i>	Kundri / Telakuch	Cucurbitaceae	Not assessed		+
4.	<i>Cryptolepis buchananii</i>	Kankrashringi	Apocynaceae	Not assessed		+
5.	<i>Gymnema sylvestre</i>	Gurmara	Apocynaceae	Not assessed		+
6.	<i>Ipomoea aquatica</i>	Kalmisak	Convolvulaceae	Least Concern		+
7.	<i>Ipomoea pes-tigridis</i>	Languli lata	Convolvulaceae	Not assessed		+
8.	<i>Passiflora foetida</i>	Foetida pasoon	Passifloraceae	Not assessed		+
9.	<i>Momordica dioica</i>	Kakrol	Cucurbitaceae	Not assessed		+

10.	<i>Operculina turpethum</i>	Dudh Kalmi	Convolvulaceae	Not assessed		+
11.	<i>Tinospora cordifolia</i>	Gulanacha	Menispermaceae	Not assessed		+
12.	<i>Trichosanthes cucumerina</i>	Ban-chichinga	Cucurbitaceae	Not assessed		+
<b>Grasses</b>						
1.	<i>Cynodon dactylon</i>	Dube	Poaceae	Not assessed		+
2.	<i>Dactyloctenium aegyptium</i>	Kakpaya ghash	Poaceae	Not assessed		+
3.	<i>Desmostachya bipinnata</i>	Halfa grass	Poaceae	Least Concern	+	+
4.	<i>Imperata cylindrica</i>	Kans grass	Poaceae	Not assessed	+	+
5.	<i>Pennisetum typhoides</i>	Pearl millet	Poaceae	Not assessed		+
6.	<i>Porteresia coarctata</i>	Dhani Ghas	Poaceae	Data Deficient		+
7.	<i>Setaria glauca</i>	Begun	Poaceae	Not assessed		+
8.	<i>Vetiveria zizanioides</i>	Khus Khus	Poaceae	Not assessed		+

**Source: Primary data generated by Ultra-Tech team**

**Note: + Observed in Project site**

**IUCN:** International Union for Conservation of Nature

### **Rare/Endangered/Threatened (RET) Flora**

The observed and listed faunal species have been cross-referenced with the IUCN Red List version 2024-2, This inventory includes assessments of species categorized as endangered, vulnerable, rare, or critically which is the most comprehensive global inventory of conservation statuses for plant species. within the buffer zone. Notably, the buffer zone hosts the *Aegle marmelos* & *Tectona grandis* which is listed as Near threatened & Endangered. Although the core zone does not contain these species.

### **b) Fauna:**

#### **Observation**

#### **1) Vertebrate**

##### **Mammals:**

The domestic animals in the study area mostly comprise of dog, cat and buffalo. The survey revealed that 7 species of mammals were recorded in and around the study area while no wild mammal was observed in this area. Availability of fauna in the vicinity of the sites is presented in **Table 24.** Grey Mongoose belong to (Schedule I) as per Wildlife (Protection) act 3172 & as per amendments. (Conservation plan is attached as Annexure II).

##### **Reptiles :-**

5 species of reptiles were observed out of which which Rat snake, Rusell's viper & Indian cobra belongs to (Schedule I) as per Wildlife (Protection) 3172 & as per amendments (Conservation plan is attached as an annexure-2).

**Amphibians:**

3 amphibians were observed around project site.

**Avifauna:**

During the survey, 37 species of birds were noticed. The dominant birds were green bee-eater, myna, house crow, Black drongo, Rose ringed parakeet, Common Kingfisher, Asian , Common myna It has been observed that the majority of birds were insectivorous in habit preferring insects, worms and arachnids. Except Peafowl none of the other birds are (Schedule I) as per Wildlife (Protection) amendment Act, 2022 **Table 24.**

	
<p><i>Eudynamys scolopaceus</i> (Asian koel)</p>	<p><i>Acridotheres tristis</i> (Common myna)</p>
	
<p><i>Psittacula krameria</i> (Rose ringed parakeet)</p>	<p><i>Dicrurus macrocercus</i> (Black drongo)</p>
<p><b>Figure 29: Birds Observed in study area</b></p>	

## 2) Invertebrates

### Butterflies

Study area comprises of 13 species of butterflies, dominated by *Euploea core*, *Papilio polytes*, *Papilio demoleus*, and *Junonia atlites* (**Figure 30**). Butterfly diversity and community composition are dependent on plants, as their caterpillars are highly specific to host plants on which they feed and metamorphose into the adults. Fairly good butterfly diversity in this area is conspicuous due to presence of wide varieties of flowering trees. Therefore, richness of host plant diversity contributes to butterfly diversity. None of these is (Schedule I) as per Wildlife (Protection amendment) Act, 2022.





	
<p><i>Danaus chrysippus</i> (Plain Tiger)</p>	<p><i>Papilio polytes</i> (Common mormon)</p>
	
<p><i>Papilio demoleus</i> (Lime butterfly)</p>	<p><i>Junonia atlites</i> (Grey pansy)</p>
<p><b>Figure 30: Butterflies observed in Study Area</b></p>	

Table 24: Fauna recorded in the study area

S.No.	Scientific Name	Common Name	Conservation status as per Wildlife Protection Act 3172 (as per Amendments )	IUCN Status	Core Zone	Buffer Zone
<b>Mammals</b>						
1.	<i>Funambulus palmarum</i>	Indian palm squirrel	Not enlisted	Least Concern	+	+
2.	<i>Canis lupus familiaris</i>	Dog	Not enlisted	Not assessed	+	+
3.	<i>Lepus nigricollis</i>	Black Naped Hare	Schedule II	Least		+
4.	<i>Rattus rattus</i>	Black rat	Not enlisted	Least		+
5.	<i>Semnopithecus entellus</i>	Hanuman langur	Schedule II	Least Concern		+
6.	<i>Sus scrofa</i>	Wild Boar	Schedule II	Least		+
7.	<i>Urva edwardsii</i>	Indian Grey Mongoose	Schedule I	Least		+
<b>Reptiles</b>						
1.	<i>Calotes versicolor</i>	Common Garden lizard	Not enlisted	Least Concern	+	+
2.	<i>Daboia russelii</i>	Russell's viper	Schedule I	Least		+
3.	<i>Hemidactylus frenatus</i>	Common house gecko	Not enlisted	Least		+

4.	<i>Naja naja</i>	Indian cobra	Schedule I	Least		+
5.	<i>Ptyas mucosa</i>	Rat snake	Schedule I	Least		+
<b>Amphibians</b>						
1.	<i>Duttaphrynus melanostictus</i>	Asian Common Toad	Not enlisted	Least Concern		+
2.	<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	Schedule II	Least Concern		+
3.	<i>Uperodon taprobanicus</i>	Painted Globular Frog	Not enlisted	Least Concern		+
<b>Avifauna</b>						
1.	<i>Acridotheres tristis</i>	Common Myna	Schedule II	Least		+
2.	<i>Alcedo atthis</i>	Common Kingfisher	Schedule II	Least		+
3.	<i>Amaurornis phoenicurus</i>	White breasted water hen	Schedule II	Least Concern		+
4.	<i>Ardea alba</i>	Large Egret	Schedule II	Least Concern		+
5.	<i>Ardea cinerea</i>	Grey Heron	Schedule II	Least		+
6.	<i>Ardea intermedia</i>	Intermediate Egret	Schedule II	Least		+
7.	<i>Ardeola grayii</i>	Pond Heron	Schedule II	Least Concern		+
8.	<i>Athene brama</i>	Spotted Owlet	Schedule II	Least Concern		+
9.	<i>Bubulcus ibis</i>	Cattle Egret	Schedule II	Least Concern		+
10.	<i>Ceryle rudis</i>	Pied Kingfisher	Schedule II	Least Concern		+

11.	<i>Columba livia</i>	Rock Pigeon	Not enlisted	Least Concern		+
12.	<i>Corvus macrorhynchus</i>	Jungle crow	Schedule II	Least Concern		+
13.	<i>Corvus splendens</i>	House Crow	Not enlisted	Least Concern	+	+
14.	<i>Coturnix coturnix</i>	Common quail	Schedule II	Least Concern		+
15.	<i>Dendrocygna javanica</i>	Lesser Whistling Teal	Schedule II	Least Concern		+
16.	<i>Dicrurus leucophaeus</i>	Ashy Drongo	Schedule II	Least Concern		+
17.	<i>Dicrurus macrocercus</i>	Black drongo	Schedule II	Least Concern	+	+
18.	<i>Egretta garzetta</i>	Little egret	Schedule II	Least		+
31.	<i>Eudynamys scolopaceus</i>	Asian koel	Schedule II	Least		+
20.	<i>Francolinus sps.</i>	Francolin	Schedule II	Not assessed		+
21.	<i>Pavo cristatus</i>	Indian peafowl	Schedule I	Least Concern		+
22.	<i>Gallinula chloropus</i>	Common moorhen	Schedule II	Least Concern		+
23.	<i>Gracupica contra</i>	Asian Pied Starling	Schedule II	Least Concern		+
24.	<i>Halcyon smyrnensis</i>	White throated kingfisher	Schedule II	Least Concern		+
24.	<i>Merops orientalis</i>	Green Bee-eater	Schedule II	Least	+	+
26.	<i>Milvus migrans</i>	Black kite	Schedule II	Least		+
27.	<i>Nectarinia asiatica</i>	Purple Sunbird	Schedule II	Least		+
28.	<i>Passer domesticus</i>	House Sparrow	Schedule II	Least		+

29.	<i>Phalacrocorax carbo</i>	Great Cormorant	Schedule II	Least Concern		+
30.	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	Schedule II	Least Concern		+
31.	<i>Phalacrocorax niger</i>	Little Cormorant	Schedule II	Least Concern		+
24.	<i>Ploceus philippinus</i>	Baya Weaver	Schedule II	Least Concern		+
33.	<i>Psittacula krameri</i>	Rose-ringed Parakeet	Schedule II	Least Concern		+
34.	<i>Pycnonotus cafer</i>	Red Vented Bulbul	Schedule II	Least Concern		+
35.	<i>Spilopelia senegalensis</i>	Laughing Dove	Schedule II	Least Concern		+
36.	<i>Streptopelia decaocto</i>	Indian Ringed Dove	Schedule II	Least Concern		+
37.	<i>Turdoides striatus</i>	Jungle Babbler	Schedule II	Least		+
<b>Butterflies</b>						
1.	<i>Catopsilia pomona</i>	Common emigrant	Not enlisted	Not assessed		+
2.	<i>Danaus chrysippus</i>	Plain tiger	Not enlisted	Least	+	+
3.	<i>Euploea core</i>	Common crow	Not enlisted	Least	+	+
4.	<i>Eurema hecabe</i>	Common grass yellow	Not enlisted	Least		+
5.	<i>Junonia almana</i>	Peacock pansy	Not enlisted	Least		+
6.	<i>Junonia atlites</i>	Grey pansy	Not enlisted	Not assessed		+
7.	<i>Junonia iphita</i>	Chocolate pansy	Not enlisted	Not assessed		+
8.	<i>Melanitis leda</i>	Common evening	Not enlisted	Least		+

9.	<i>Neptis hylas</i>	Common sailor	Not enlisted	Not assessed		+
10.	<i>Papilio demoleus</i>	Lime butterfly	Not enlisted	Not assessed		+
11.	<i>Papilio polymnestor</i>	Blue mormon	Not enlisted	Not assessed		+
12.	<i>Papilio polytes</i>	Common mormon	Not enlisted	Not assessed	+	+
13.	<i>Phalanta phalantha</i>	Common leopard	Not enlisted	Least		+

**Source: Primary data generation by Ultratech team Note:**

***Observed in Project site**

**IUCN: International Union for Conservation of Nature**

### **Rare/Endangered/Threatened (RET) Fauna**

The observed and listed faunal species have been cross-referenced with the IUCN Red List version 2024-2, the most comprehensive global inventory of conservation statuses for animal species. This inventory includes assessments of species categorized as endangered, vulnerable, rare, or critically endangered. Notably, the buffer zone and core zone does not contains any of these species.

## Agriculture

The common crops in the study area are Rice (*Oryza sativa*) & Wheat (*Triticum aestivum*) which are mainly dependent on rainwater, while tube well & bore well in non- monsoon seasons. Apart from these, commercial crops like Potato and several vegetables like brinjal, Ladies finger, Cucurbits, Cauliflower, Cabbage besides various fruits like mango, Banana, papaya etc. are also grown. (Table 33).

**Table 33: Agriculture Crops Grown in the Study area**

Sr. No.	Botanical Name	Common Name	Family
<b>Major field crops cultivated</b>			
1.	<i>Oryza sativa</i>	Rice	Poaceae
2.	<i>Triticum aestivum</i>	Wheat	Poaceae
3.	<i>Corchorus sp.</i>	Jute	Malvaceae
<b>Horticulture crops - Fruits</b>			
1.	<i>Mangifera indica</i>	Mango	Anacardiaceae
2.	<i>Musa sp.</i>	Banana	Musaceae
3.	<i>Carica papaya</i>	Papaya	Caricaceae
4.	<i>Psidium guajava</i>	Guava	Myrtaceae
5.	<i>Artocarpus heterophyllus</i>	Jackfruit	Moraceae
<b>Horticulture crops - Vegetables</b>			
1.	<i>Cucumis sativus</i>	Kheera	Cucurbitaceae
2.	<i>Solanum melongena</i>	Brinjal	Solanaceae
3.	<i>Abelmoschus esculentus</i>	Ladies finger	Malvaceae
4.	<i>Brassica oleracea var. botrytis</i>	Cauliflower	Brassicaceae
5.	<i>Brassica oleracea var. capitata</i>	Cabbage	Brassicaceae
6.	<i>Lycopersicon esculentum</i>	Tomato	Solanaceae
7.	<i>Solanum tuberosum</i>	Potato	Solanaceae
8.	<i>Luffa cylindrica</i>	Nenua	Cucurbitaceae
9.	<i>Momordica charantia</i>	Karaila	Cucurbitaceae
10.	<i>Cucumis melo</i>	Cucumber	Cucurbitaceae

Source: field survey & discussion with local people & Agriculture Contingency Plan

[https://agriwelfare.gov.in/sites/default/files/WestBengal%202-Bardhaman-31.12.2011_0.pdf](https://agriwelfare.gov.in/sites/default/files/WestBengal%202-Bardhaman-31.12.2011_0.pdf)

## Forest

As per toposheet there are no patches of reserve or protected forest within 10 km of project study area.

## National Park & Sanctuaries

There is no National Park however Ramnabagan Wild life sanctuary is present within (4.20 km) from the Project site. It's Eco sensitive Zone present at a distance of (4.10 km). The flora and fauna of Ramnabagan Wildlife Sanctuary are as follows:

**Flora:** Ramna garden, situated at a distance of about 1 km. to the North- West 'of the Burdwan town, with its tall and stately Teak and Sal forest having mesophytic associates are Kadbels, Dumur, Jam etc, is a solace from the din and bustle of urban life It is an old plantation of Tropical Deciduous Plantation created by Maharajadhiraj of Burdwan. Clans of bamboos are also remarkably thrived. This is a soothing solace amidst the din and bustle life just at the outskirts of Burdwan town. The sanctuary is home to a variety of flora, including tall and stately teak and sal trees, along with mesophytic associates like kadbels (*Limonia acidissima*), dumur (*Ficus racemosa*) and jam (*Syzygium cumini*). These trees provide a lush, green canopy that offers a serene escape from the hustle and bustle of urban life.

**Fauna:** Initially, the sanctuary housed Chital, Barking deer and black buck but over the years, the population of spotted deer has grown significantly. Other animals found in the sanctuary include common langurs, blackbucks, leopards, sloth bears, saltwater crocodiles, and various bird species such as Parakits, Cuckoos, Owls, Spotted Dove, Rosy Pelican, Peafowls, Adjutant storks, and emus. The sanctuary also hosts a variety of reptiles, including box turtles and star turtles.

**Source:** <https://www.wildbengal.com/ramnabagan-wls.php>  
[https://wbza.in/bzpa/public/assets/frontend/pdf/annual_report/annual_report_2022-2023.pdf](https://wbza.in/bzpa/public/assets/frontend/pdf/annual_report/annual_report_2022-2023.pdf)

**Table 34: The common bird species observed in Ramnabagan Wildlife Sanctuary**

Order-Psittaciformes		
Family	Name	Scientific name
Psittaculidae	Rose-ringed parakeet	<i>Psittacula krameri</i>
	Plum-headed parakeet	<i>Psittacula cyanocephala</i>
	Red-breasted parakeet	<i>Psittacula alexandri</i>
	Budgerigar	<i>Melopsittacus undulatus</i>
Order-Piciformes		
Megalaaimidae	Lined barbet	<i>Psilopogon lineatus</i>
	Blue-throated barbet	<i>Psilopogon asiaticus</i>
	Coppersmith barbet	<i>Psilopogon haemacephalus</i>
Picidae	Black-rumped flame back	<i>Dinopium benghalense</i>
Order-Columbiformes		
Columbidae	Blue rock pigeon	<i>Columba livia</i>
	Spotted dove	<i>Spilopelia chinensis</i>
	Indian ring dove	<i>Streptopelia decaocto</i>
	Mountain imperial pigeon	<i>Ducula badia</i>

<b>Order- Cuculiformes</b>		
	Common hawk-cuckoo	<i>Hierococcyx varius</i>
	Asian koel	<i>Eudynamys scolopaceus</i>

Cuculidae	Greater coucal	<i>Centropus sinensis</i>
<b>Order-Passeriformes</b>		
Corvidae	Jungle crow	<i>Corvus macrorhynchos</i>
	House crow	<i>Corvus splendens</i>
	Tree pie	<i>Dendrocitta vagabunda</i>
Dicruridae	Black drongo	<i>Dicrurus macrocercus</i>
Passeridae	House sparrow	<i>Passer domesticus</i>
Estrildidae	Red munia	<i>Amandava amandava</i>
	Scaly breasted munia	<i>Lonchura punctulata</i>
Sturnidae	Pied myna	<i>Gracupica contra</i>
	Indian myna	<i>Acridotheres tristis</i>
	Indian hill myna	<i>Gracula religiosa</i>
Dicaeidae	Ticked billed flowerpecker	<i>Dicaeum agile</i>
Nectariniidae	Purple sunbird	<i>Cinnyris asiaticus</i>
	Olive backed sunbird	<i>Cinnyris jugularis</i>
Cisticolidae	Common tailorbird	<i>Orthotomus sutorius</i>
Muscicapidae	Magpie robin	<i>Copsychus saularis</i>
	Indian robin	<i>Copsychus fulicatus</i>
	White-rumped shama	<i>Copsychus malabaricus</i>
Motacillidae	Western yellow wagtail	<i>Motacilla flava</i>
Aegithinidae	Common iora	<i>Aegithina tiphia</i>
Leiothrichidae	Jungle babbler	<i>Argya striata</i>
Pycnonotidae	Red vented bulbul	<i>Pycnonotus cafer</i>
	Red whiskered bulbul	<i>P. jocosus</i>
	Black-capped bulbul	<i>Rubigula melanicteria</i>
Oriolidae	Black-hooded oriole	<i>Oriolus xanthornus</i>
	Eurasian golden oriole	<i>O. oriolus</i>
<b>Order-Coraciiformes</b>		
Alcedinidae	Stork billed kingfisher	<i>Pelargopsis capensis</i>
	White-throated kingfisher	<i>Halcyon smyrnensis</i>
	Common kingfisher	<i>Alcedo atthis</i>
	Lesser pied kingfisher	<i>Ceryle rudis</i>
<b>Order- Pelecaniformes</b>		
Ardeidae	Cattle egret	<i>Bubulcus ibis</i>
	Smaller egret	<i>Egretta garzetta</i>
	Yellow bitten	<i>Ixobrychus sinensis</i>
	Night heron	<i>Nycticorax nycticorax</i>
<b>Order- Gruiformes</b>		
Rallidae	White-breasted waterhen	<i>Amaurornis phoenicurus</i>
<b>Order-Charadriiformes</b>		

Jacanidae	Bronze winged jacana	<i>Metopidius indicus</i>
<b>Order-Strigiformes</b>		
Tytonidae	Burn owl	<i>Tyto alba</i>
Strigidae	Spotted owl	<i>Strix occidentalis</i>
<b>Order-Galliformes</b>		
Phasianidae	Indian peacock	<i>Pavo cristatus</i>
	Golden pheasant	<i>Chrysolophus pictus</i>
	Silver pheasant	<i>Lophura nycthemera</i>
<b>Order Ciconiiformes</b>		
Ciconiidae	Lesser adjutant	<i>Leptoptilos javanicus</i>
<b>Order-Bucerotiformes</b>		
Upupidae	Hoopoe	<i>Upupa epops</i>
<b>Order -Accipitriformes</b>		
Accipitridae	Indian vulture	<i>Gyps indicus</i>
	Indian spotted eagle	<i>Clanga hastata</i>
<b>Order -Casuariiformes</b>		
Casuariidae	Emu	<i>Dromaiusnovaehollandiae</i>

**Source:** <https://sifisheriessciences.com/index.php/journal/article/view/1547/900>

## **Aquatic**

### **Ecology Sampling:**

Water samples within 10km periphery of project site were collected from Damodar River during May 2024 for phytoplankton and zooplankton analyses. Surface water Sampling Locations are given in table 26.

To enumerate phytoplankton, unfiltered surface waters were collected from the water bodies. Phytoplankton samples were immediately fixed in 2% Lugol's iodine solution so as to prevent adverse effects of light and temperature which might cause rapid decay of organisms (APHA 2012). Phytoplankton were identified up to genera level using standard taxonomic keys. For zooplankton, about 40-liter water was filtered through plankton net having mesh size of 75 $\mu$  to represent all the available groups. The samples were fixed immediately with 5 % buffered formalin and subsequently analyzed under microscope in the laboratory with the help of Sedgwick rafter cell.

**Table 35: Surface water Sampling Locations**

Sample No.	Sample Name	Latitude & Longitude
SW-1	Damodar River Upstream	23°13'37.90"N 87°49'6.78"E
SW-2	Damodar River Downstream	23°11'29.12"N 87°54'47.28"E

**Observations****a) Phytoplankton**

Phytoplankton counts, were recorded are presented in (Table 36). Total algal population varied between 508No/ml to 778 No/ml Altogether 22 genera of phytoplankton were recorded (Table 37). Amongst 4 groups, Cyanophyceae is Dominant followed by Bacillario-phyceae, Chlorophyceae & Euglenophyceae in Damodhar river.

**Table 36: Enumeration of Phytoplankton at Damodar river**

SN	Name of sampling locations	Phytoplankton Density (No/ml)	Percent composition of algal groups				SWI
			Bacillariophyceae	Chlorophyceae	Cyanophyceae	Euglenophyceae	
1	Damodar River Upstream near Idilpur P village	778	28	20	48	4	1.8
2	Damodar River Downstream near Hijalna village	508	30	22	42	6	2.1

**Ranges of Shannon Wiener Diversity Index (SWI)**

<1: Indicate poor productive water

1-3 Indicate medium productive water

>3 Indicate good productive water

**Table 37: Phytoplankton genera observed at Damodar river**

Bacillariophyceae	Cyanophyceae	Chlorophyceae	Euglenophyceae
<i>Navicula sp.</i>	<i>Anabaena sp.</i>	<i>Actinastrum sp.</i>	<i>Euglena sp.</i>
<i>Nitzschia sp.</i>	<i>Oscillatoria sp.</i>	<i>Closterium sp.</i>	-

<b>Bacillariophyceae</b>	<b>Cyanophyceae</b>	<b>Chlorophyceae</b>	<b>Euglenophyceae</b>
<i>Cymbella sp.</i>	<i>Spirulina sp.</i>	<i>Cladophora sp.</i>	-
<i>Pinnularia sp.</i>	<i>Lyngbya sp.</i>	<i>Pediastrum sp.</i>	-
<i>Melosira sp.</i>	<i>Merismopedia sp.</i>	<i>Scenedesmus sp.</i>	-
<i>Synedra sp.</i>	<i>Cyclotella sp.</i>	<i>Bulbochaete sp.</i>	-
<i>Gyrosigma sp.</i>	<i>Microcystis sp.</i>	<i>Oedogonium sp.</i>	-

**b) Zooplankton**

Density of zooplankton varied between 722 No/m³ to 860No/m³ (Table 38). Total three groups of zooplankton were recorded. Altogether 8 genera of zooplankton were recorded (Table 39) Rotifera was dominant followed by cladocera & Copapoda Damodar in river.

**Table 38: Enumeration of Zooplankton at Damodar River**

SN	Sampling locations	Zooplankton (No/m ³ )	Percent composition of zooplankton in groups			SWI
			Rotifera	Cladocera	Copepoda	
1	Damodar River Upstream near Idilpur P village	860	54	24	14	2.0
2	Damodar River Downstream near Hijalna village	722	64	20	16	2.2

**Ranges of Shannon Wiener Diversity Index (SWI)**

<1: Indicate poor productive water

1-3 Indicate medium productive water

>3 Indicate good productive water

**Table 39: Zooplankton Genera at Damodar river**

<b>Rotifera</b>	<b>Cladocera</b>	<b>Copepoda</b>
<i>Brachionus sp.</i>	<i>Alonella sp.</i>	<i>Microcyclops sp.</i>
<i>Keratella sp.</i>	<i>Daphnia sp.</i>	<i>Diaptomus sp.</i>
<i>Rotaria sp. sp.</i>	-	<i>Brachionus sp.</i>

The Values of SWI for Plankton (phytoplankton& Zooplankton) indicate medium productive water

**Fish diversity:**

The Damodar River in P.S. Bardhaman, District Purba Bardhaman, West Bengal, supports a rich fish diversity, The dominant orders include Cypriniformes (e.g., *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*), Perciformes (e.g., *Channa striata*), and Siluriformes (e.g., *Wallago attu*, *Mystus spp.*, *Clarias batrachus*, *Heteropneustes fossilis*). These species are ecologically significant and vital for local fisheries. Although the river maintains good biodiversity, it faces pressures from pollution, habitat alteration, and anthropogenic activities, emphasizing the need for continuous ecological monitoring and sustainable management to conserve its fish populations.

**Table 40: List of fish species recorded from Damodar River**

Sr.No.	Scientific name	Local name	Family name
1.	<i>Amblypharyngodon mola</i>	Mourola	Danionidae
2.	<i>Aplocheilichthys panchax</i>	Kanpona	Aplocheilidae
3.	<i>Catla catla</i>	Katla	Cyprinidae
4.	<i>Chanda nama</i>	Chanda	Ambassidae
5.	<i>Chanda ranga</i>	Chanda	Ambassidae
6.	<i>Channa gachua</i>	Chang	Channidae
7.	<i>Channa marulius</i>	Sal	Channidae
8.	<i>Channa punctata</i>	Lata	Channidae
9.	<i>Channa striatus</i>	Sol	Channidae
10.	<i>Cirrhinus mrigala</i>	Mrigel	Cyprinidae
11.	<i>Clarias batrachus</i>	Magur	Clariidae
12.	<i>Danio rerio</i>	Techokha	Danionidae
13.	<i>Glossogobius giuris</i>	Bele	Gobiidae
14.	<i>Gudusia chapra</i>	Khaira	Dorosomatidae
15.	<i>Heteropneustes fossilis</i>	Singi	Heteropneustidae
16.	<i>Labeo bata</i>	Bata	Cyprinidae
17.	<i>Labeo calbasu</i>	Kalbose	Cyprinidae
18.	<i>Labeo rohita</i>	Rui	Cyprinidae
31.	<i>Lepidocephalichthys guntea</i>	Guntey	Cobitidae
20.	<i>Macrognathus armatus</i>	Ban	Mastacembelidae
21.	<i>Macrognathus pancalus</i>	Pankal	Mastacembelidae
22.	<i>Mystus cavasius</i>	Tengra	Bagridae
23.	<i>Nandus nandus</i>	Bheda	Nandidae

24.	<i>Notopterus chitala</i>	Chital	Notopteridae
24.	<i>Notopterus notopterus</i>	Pholui	Notopteridae
26.	<i>Puntius conchoni</i>	Punti	Cyprinidae
27.	<i>Puntius sophore</i>	Punti	Cyprinidae
28.	<i>Puntius ticto</i>	Punti	Cyprinidae
29.	<i>Sperata aor</i>	Aard	Bagridae
30.	<i>Sperata seenghala</i>	Tangra	Bagridae
31.	<i>Trichogaster fasciata</i>	Khalisa	Osphronemidae
24.	<i>Trichogaster lalius</i>	Khalisa	Osphronemidae
33.	<i>Xenentodon cancila</i>	Kenkle	Belonidae

Source: [https://rfppl.co.in/subscription/upload_pdf/ijb2_3249.pdf](https://rfppl.co.in/subscription/upload_pdf/ijb2_3249.pdf)

#### Interpretation:

The project site exhibits moderate biodiversity in terms of both flora and fauna. Biodiversity is expected to improve through the development of a green belt, involving the plantation of various tree and shrub species. Based on an assessment of environmental components and detailed ecological considerations, it is concluded that the project activities are unlikely to cause any significant adverse impact on local flora and fauna. Although no Rare, Endangered, or Threatened (RET) species were recorded within the core zone of the project, endangered and vulnerable plant species such as *Tectona grandis* and *Aegle marmelos* are present in the buffer zone. Additionally, a surface water body, namely the Damodar River, is located nearby, and its water quality is assessed to be medium productive

## ***SOCIO-ECONOMIC ENVIRONMENT***

### **Introduction**

Socio-economic issues are regarded as an environmental element. The emphasis is mainly on the social and economic implications of the building and activity that the planned development is expected to have. It includes variables such as population makeup, access to basic facilities such as accommodation, school, health and health care, profession, water supplies, sanitation, telecommunications and electricity, prevalent local diseases and features such as tourist attractions and archeological monuments. The analysis of these criteria allows recognizing and determining the possible impacts of the project operation in the local community.

### **Objective**

Objectives of Socioeconomic study as follows:-

- Research the population composition and services available in the study area.
- Define and measure the effect of the research region on the socio-economic status.
- Classify all the important detrimental and advantageous social effects of the initiative.
  
- Propose preventive steps to reduce the adverse effects of the project.
- To verify adherence with environmental laws and industry requirements.
- To propose cost-effective steps to be adopted to minimize the anticipated effects.

The area of study for socio-economic evaluation is identified as the area within 500 m. Radius for main and 10 km radius for secondary data around the location of the plant. The classification of the impact zone is based on the guideline document of the Environmental Impact assessment. The Primary and secondary data are used in the socio-economic analysis.

## **Data Collection**

Collection of data is a term that describes a method for processing and gathering data. Systematic compilation of data for a single project from a range of sources, and has been routinely observed, documented and coordinated. Data are the essential inputs to every decision-making phase in the project.

### ***Primary Data Collection***

Primary data means the original data gathered exclusively for this purpose. Data obtained from the field under the guidance and supervision of the investigator. This form of data is usually new and obtained for the first time. It is useful both for current research and for future studies. When gathering primary data in the research field, the following techniques are used.

1. Form of observation
2. Focus group discussion (FGD)
3. Questionnaires and Surveys

### ***Secondary Data Collection***

Secondary data is acquired and registered by someone else before and with a reason other than the present one. Secondary information is collected from a variety of other offices such as: Census offices (2011 Indian Census), Statistical, Health Offices, Department of Land and Revenue, Zilla Parishad and Non-Governmental Organizations.

### ***Concept & Definitions***

- **Study Area:** The area of study, also referred to as the region of impact was identified as the complete core area and a buffer area 10 kilometers away from the periphery of the core area. The research area encompasses both natural and man-made land marks that fall in it.
- **QoL:** The quality of life (QoL) refers to the extent to which a person receives substantial life opportunities. The 'chances' are the product of the chances, the disadvantages and the relationship of personal and environmental influences in each person's life. Pleasure has two components: pleasure experience, ownership, and success of those characteristics.

**Household:** Groups of people who typically work and eat in a shared kitchen are called a household. People in a household can be connected to each other, unrelated to each other or combine both. For a group of people who live in a home, or are related to them, but don't eat in the same kitchen, they don't belong to a common household. An person is regarded as a separate household. One-man households, two-man households or several-man households are probable.

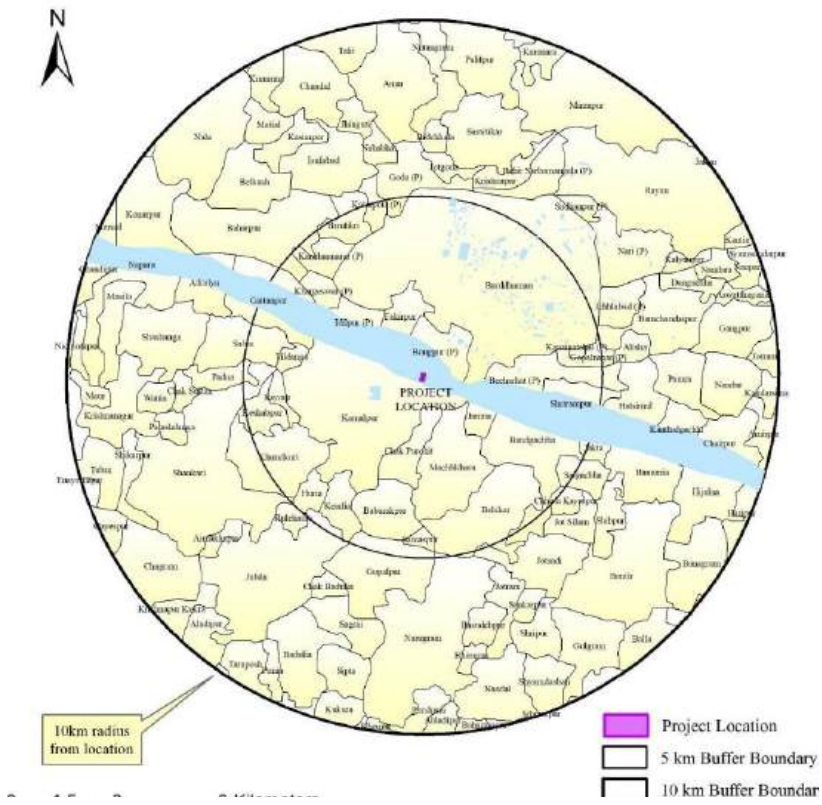
- **Sex Ratio:** Sex in a given population is the ratio of women to men. The term 'number of women for every 1000 males' is used.

- **Literates:** All people aged 7 or over who can read and write in all languages with comprehension, are considered literate. No formal education or minimum educational level is required for a person to be regarded as a literate person. Blind but able to read in braille are therefore regarded as literate.
- **Literacy Rate:** The population literacy rate is defined as the percent for the entire population 7 years of age and older.
- **Labour Force:** The population is the number of individuals in a regional entity working and unemployed. The overall number of jobs and unemployed is the size of the population. A worker is described as a worker who does not work but actively finds work. In general, a nation's employees are both working (around the ages of 14 to 16) and retirement-related (around the ages of 65) who are participating workers, employed or job-seekers. Students, pensioners, street persons, inmates, individuals with
- **Work:** Work is characterized as involvement with or without pay, wages and profit in any economically productive activity. Such intervention may be in essence physical and/or emotional. Job not only requires direct work, but also successful oversight and instruction. Employment in a plantation, family business or some other economic operation can be parttime, full-time or unpaid.
- **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation or milk production even solely for domestic consumption are also treated as workers.
- **Main Workers:** (in the case of six months or more for one year) are referred by those workers who have worked for the majority of the reference period.
- **Marginal Workers:** Workers who have not worked for most (i.e. less than six months) are referred to as Marginal Workers
- **Work participation rate:** the rate of work participation is the ratio of the workforce to their total size (national population of the same age range). In the study, the participation rate of the total working population (main and marginal) is defined as the percentage.
- permanent disabilities and unemployed workers, are people not counted under the labor force.

### Project Location

Mining of riverbed sand from the Damodar River”is situated at IDILPUR , Bardhaman, Purba Bardhaman- 713103





**Figure 24: Villages within 10 Km. Radius Area from Project Site**

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127	Purshuna	124	305	309	77.5	96	97	0	0	236	188	69	121	63	95	150	306
128	Kukura	274	793	739	189	149	146	27	33	652	528	141	211	437	41	360	694
129	Ahladipur	157	394	392	90	87	96	0	0	273	248	121	144	86	121	315	384
130	Sibrampur	216	539	521	129	272	268	30	24	422	291	117	230	366	57	188	449
131	Baharampur	402	1187	1121	249	213	201	0	0	952	735	235	386	537	182	533	1056
124	Khemta	224	618	591	137	153	124	0	0	467	359	151	224	224	153	242	580

Source: Census of India 2011 - <https://data.gov.in/> Open Government Data (OGD) Platform, India

[https://data.gov.in/catalog/villagetown-wise-primary-census-abstract-2011-go?filters%5Bfield_catalog_reference%5D=206583&format=json&offset=0&limit=6&sort%5Bcreated%5D=desc](https://data.gov.in/catalog/villagetown-wise-primary-census-abstract-2011-go?filters%5Bfield_catalog_reference%5D=206583&format=json&offset=0&limit=6&sort%5Bcreated%5D=desc)

## Population

According to recent censuses (2011) Population of study area is (10 Km radius from project site) 241563 in 50804 households. Male population is 129564 and female population is 123199 in the region surrounding the project location. Highest population in study area is in Barddhaman. There are 50804 households in the study area and the number of household in the region surrounding the project location is 387. The dependent population below 6 years is 34739 (13% of the total population) in the study area.

**Table 42: Population Statistics of the study area**

Population density	789/sq.km
Total Population	241563
No of Households	50804
Total area	331.23 sq.km
0-6 age group Population	34739
SC/ ST Population	93785
General Population	158378

(Source: <https://www.census2011.co.in/census/district.html> ).

Figure 42: shows the village-wise population concentration in the study area selected from the project location. Based on the concentration of population within the 10 km radius of the study area, a map of the study area has been prepared. The largest number of inhabitants in the in the village of Barddhaman in the northern regions. The moderate population is concentrated in the middle block of Kamalpur, Pamra, Jubila, Gangpur and lowest population in the village of Gopalpur. The other villages in the study region have a moderate to lower number of population.

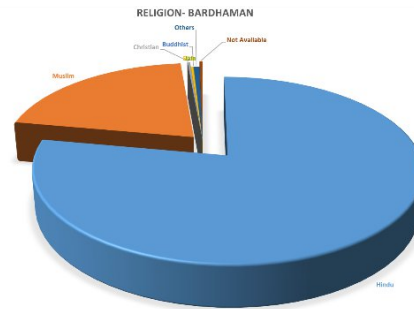
## Religion:

IDILPUR is under Bardhaman police station of Purba Bardhaman district. As per the provisional estimates of the Census India, IDILPUR population in 2011 is 3166, of which male and female are 1040 and 926. The IDILPUR household population is 387. With approximately 6.34 percent, Islam

is the second most common religion in Bardhaman. In Bardhaman, 0.33% of Christmas is accompanied by 0.07% of Jainism, 0.41% of Sikhism and 0.41% of Buddhism. 'Other faith' is stated about 0.16%; 'No such religion' is stated about 0.96%. Figure 4.1 shows the distribution of

religions in the districts of Bardhaman. In this districts Hindu is the religion in majority 78 % and Islam is largest minority among the other religions in the districts of Purba Bardhaman.

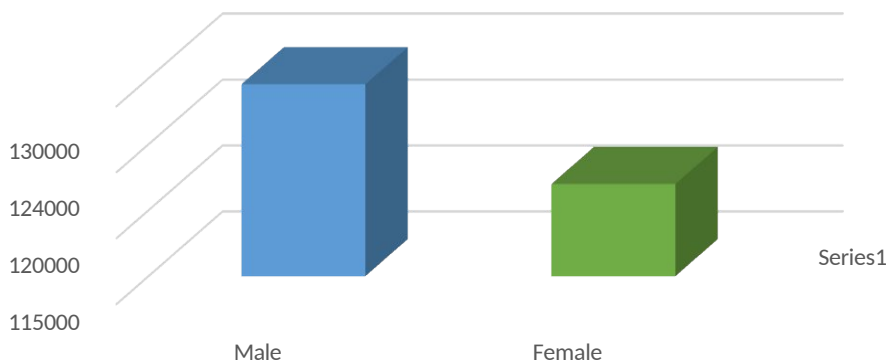
Religion	%
Hindu	77.85%
Muslim	20.73%
Christian	0.27%
Sikh	0.22%
Buddhist	0.02%
Jain	0.02%
Others	0.58%
Not Available	0.30%



**Figure 33: Distribution of Religion in Bardhaman**

**Sex Ratio:**

The sex ratio in the population is the ratio of men to women. The ratio between men and women in the population is anthropology and demography. More figures than any other animal for human beings are available, and the human sex ratio is more studied than for any other animal, but these figures can hardly be analysed. The ratio tends to be 1:1 in most sexually breeding animals. Fisher's theory explains this propensity. For different reasons, however, many animals differ regularly or indefinitely from the same sex ratio. As in figure 4.2 the share of the population between men and women is 52% and 48%.



**Figure 34: Bar-Diagram showing sex ratio of the study area**

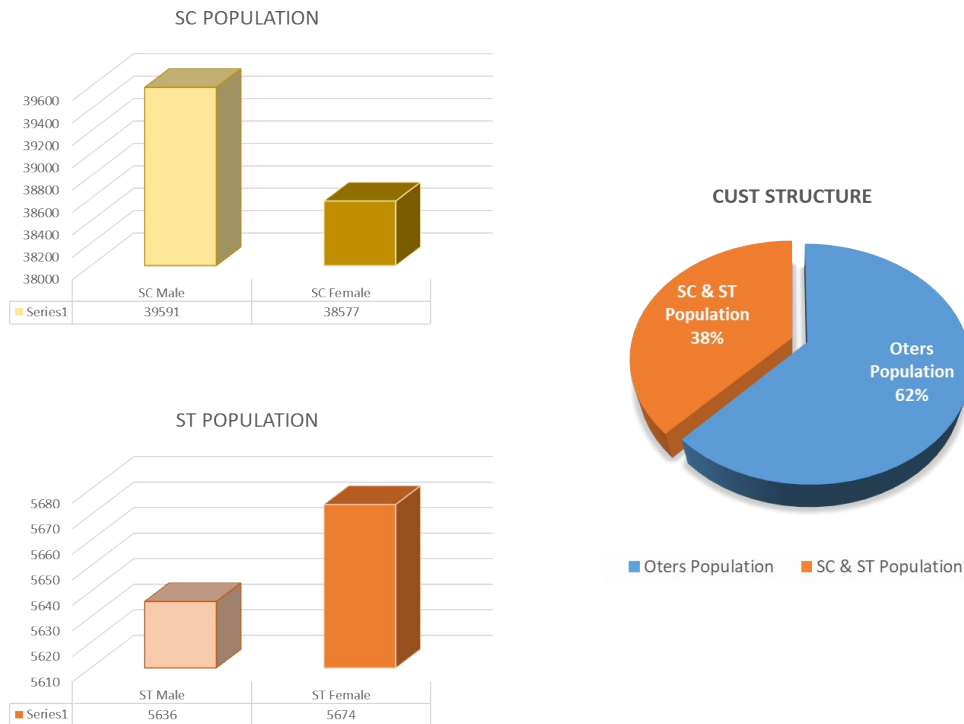
Figure 34: shows that while there is an uneven distribution of population from one village to another, the unusual proportion of population between male and female is the same or nearly the same, indicating a positive and equal sex ratio.

### **Child Population [0-6 Age Group]:**

The population of infants occupies the share of the world's overall population in the 0 to 6 years age range, which is important since the population is frail. Child Population is classified as a population of children aged 0-6 years according to the Indian Census. Since the country's population as a whole and the states, accurate comparative data on education policy and facilities, healthcare system, counts the population of this age group etc. for the population of this age group are very important. Village concentration in the study area around the project site of the 0-6 age group i.e. child demographic. Highest population of 0-6 years in the town of Barddhaman on the north, followed by the village of Gangpur (926) on the south outskirts of the studying district. While the villages of Padua, Jotram and Masila are home to a large number of children (0-6 years of age).

### **SC and ST Population:**

The 2011 Socio-Economic and Cast Census (SECC) was conducted for the 2011 Indian Census. The Government of Manmohan Singh approved the 2011 Socio-Economic and Caste Census after a debate in both Houses of Parliament in 2010. Figure 6.1 indicates the division of the survey area by caste according to the criteria of the Indian Census. The pie diagram in Figure 6.1 reveals that 62% of the total population is in the general caste community. In comparison, 38 per cent of the total population fall under the Schedule Caste and Schedule Tribes classes. According to the 2011 census, the ratio of Scheduled Caste and Schedule tribe population in the study area to the total population is 38 %. In case of the male-female composition, the male SC population (39212) is more than the female SC population (377.512). Whereas, in case of the male-female population share, the female ST population (8297) is more than the ST male population (8064).

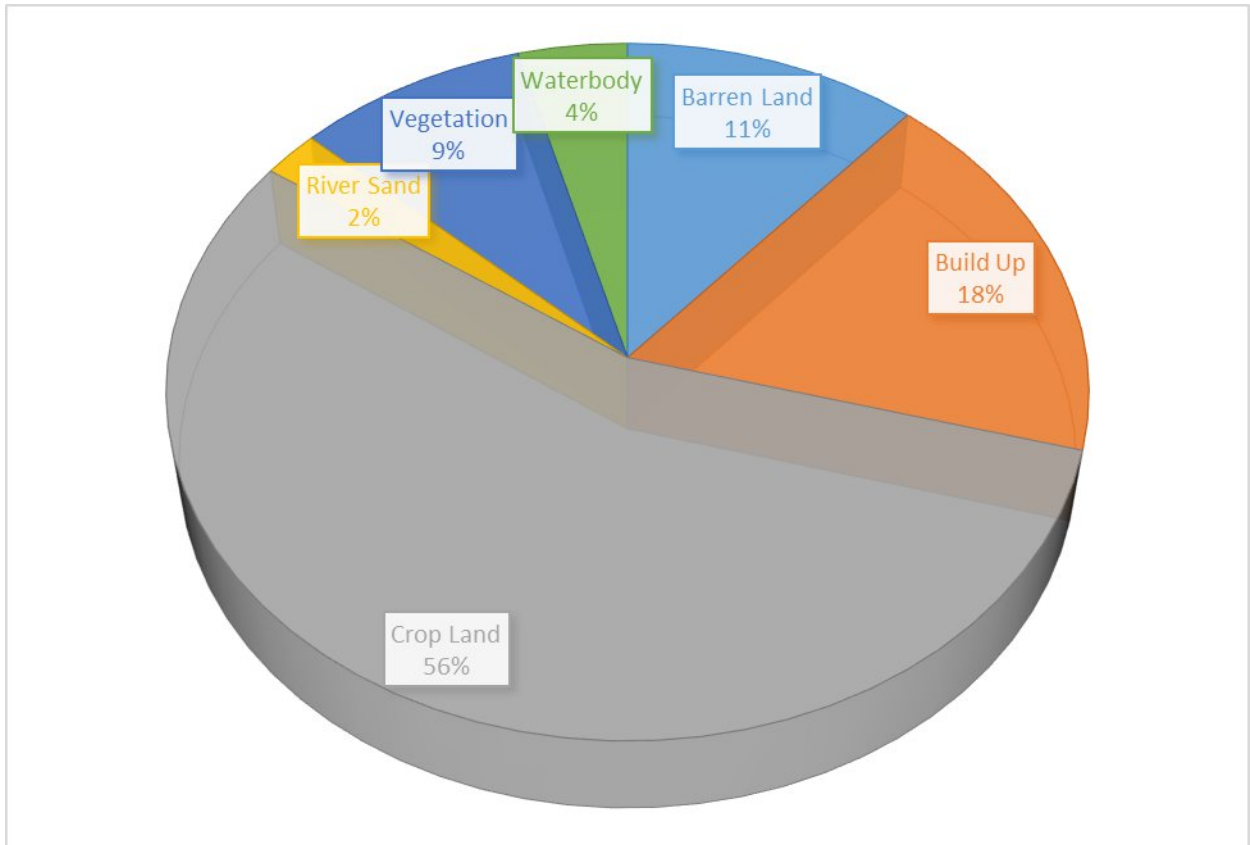


**Figure 35: SC and ST Population Distribution**

### Occupation Structure

The actual number of employees and non-workers within the working system categorizes the entire population. There will be a combined number of staff in two categories, that is to say. Small jobs with main workers. Total employee participation rates are defined as the percentage of total workers in the total workforce. The economic conditions of the research region are the occupational scenario. Within the occupational system, the entire workforce is split into the overall number of staff and non-workers. Total number of workers can be divided into two groups, i.e. Key staff and minor jobs. The rate of participation of total employees shall be

specified as the percentage of total workers in the total population. The occupational scenario is the economic condition of the study zone. While the study area 10 km radius from the project site as per the Indian Census 2011 in the study area, as per total figure 7.1, the 62% of population belongs to working population and 38% of the population belongs to non-working population. In the 62 % of the working population, the main working population is 49% and the marginal working population is 31 % of the working population. In the figure of 7.1. Separate pie- diagrams reflect further subdivisions of the primary and marginal jobs. As per pie diagram in Figure 7.1. Marginal workers are categorized into Cultivators, Laborers, Domestic Enterprises, and Other Workers. Marginal Cultivators, Marginal Agricultural workers, Marginal Household Industry workers and other marginal workers are among the marginal workers in the study area. In the case of the main worker division, seen in the pie diagram in Figure 3.21.



**Figure 36: Pie diagrams showing Main and Marginal population share and their sub- divisions depicting the occupational structure of the study**

**Educational status:**

According to the 2011 census, the average literacy rate in the study area is 64 per cent, while the male literacy rate is 58 per cent and the female literacy rate is 42 per cent in the study area. The average literacy rate of the district is not high compared to the literacy rate of the study area in Barddhaman police station, where the project location (IDILPUR) is situated. Female literacy rates

are poor in the study field, which is a pan-India phenomenon. The status of education has been shown in Figure 36.

DI. of School (Primary): 0342-2662380

DI. of School (Secondary): 0342-2662351

Primary School Council: 0342-2662371 / 2662372

Chairman, School Service Commission: 0342-2624596 / 2622336 / 2467963 (R)

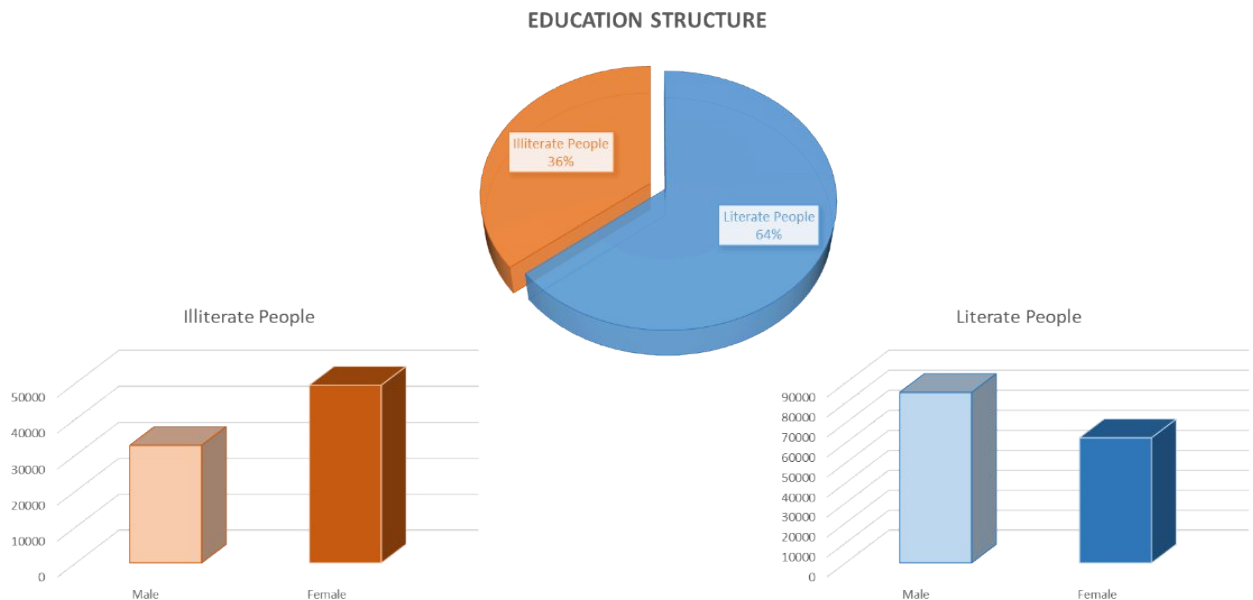
Burdwan Zilla Sakharata Samity: 0342-2664304

District Library Officer: 0342-2466389

Udaychand District Library: 0342-2466389

Regional Officer, Madhyasiksha Parsad: 0342-2662377

Regional Higher Secondary Council: 0342-2663734



**Figure 37: Literates and Illiterate Population distribution**  
**Infrastructure, transport and communication**

This section analyses the infrastructure facilities like water supply, roads, markets, banks, post offices, schools and electrification in the study area.

The project site is located at IDILPUR village situate in Purba Brdhaman district of the state West Bengal. The study area has a fairly well-developed network of transport and communication system. It is served by railway, roadways, inland waterways and airways as well as by post and telegraph service, telephone, telex, exchanges etc.

**By Road:**

Barddhaman is the preferred gateway to the districts of Bankura, Birbhum ( Bolpur, Rampurhat, Suri ), and Purulia. NH 31 (old numbering: NH 2) passes through the city jurisdiction and SH 8 originates from Muchipara in the city. NH 14 (old numbering NH 60) passes through the north-western suburb of Pandabeswar and finally passes through Raniganj and heads away towards Odisha. It happens to be one of the very few cities that have an Asian Highway (AH) passing directly through the city jurisdiction. The AH1 links Japan with Turkey, through Korea, China, Vietnam, Cambodia, Thailand, Myanmar, India, Bangladesh, Pakistan, Afghanistan, and Iran.

Durgapur has bus terminus at Benachiti-I, Benachiti-II (commonly referred to as Prantika), City Center, and Station More. Within the city, private mini-buses operate from Prantika to Station terminus, via different routes through the city, including the popular 8B route. Auto-rickshaws ply between City Center, Benachity, Bidhannagar, Railway Station and other parts of the city in a number of routes. Pre-paid taxis are available in the city from Station and City Center Terminus. Additionally, cab and auto-rickshaw services for the city are offered online. Only one Bus (Abhishek) is available for the Kalyani-Bansberia route and it departs from Benachity at 4:40 am and from Kalyani at 10 am every day.

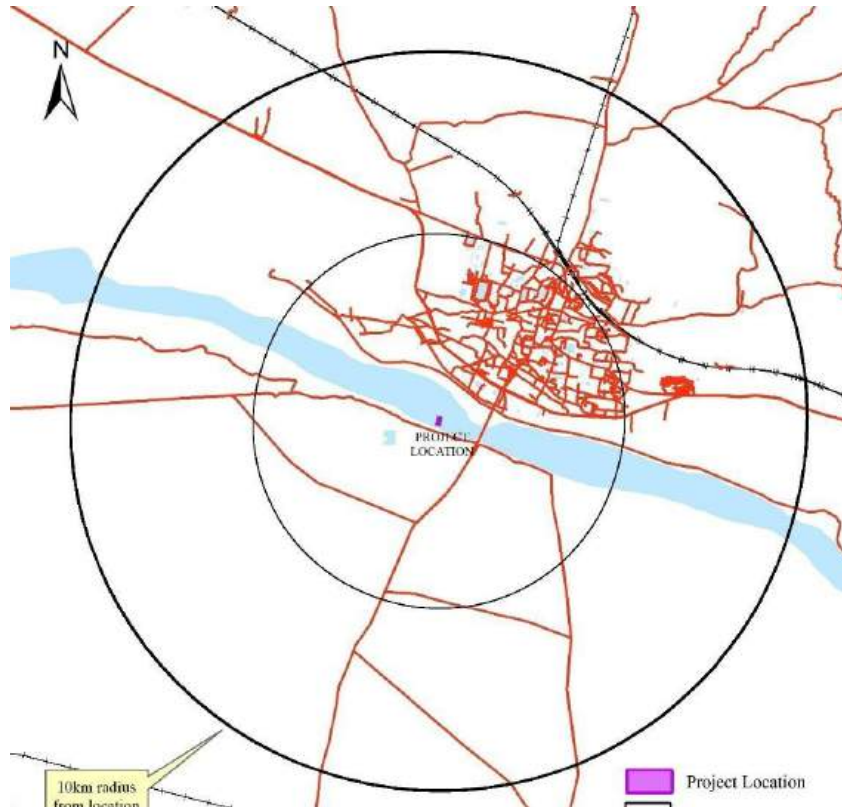
SBSTC and various other private buses ranging from sleepers to premium Volvo's are available from City Centre, Durgapur for Kolkata, Asansol, Barddhaman, Barakar, Bhubaneswar and other nearby cities.

**By Rail:**

Barddhaman is served by Bardwan railway station. It is one of the most important station of Eastern Railways where almost all express trains give a stop, except a few long-distance trains like the Howrah - New Delhi Rajdhani express and Durgam express. It falls in the Bardhaman-Asansol section of Eastern Railways and Howrah-Gaya-Delhi line of Indian Railways.

**By Air:**

The International airport of the Kolkata city is Netaji Subhas Chandra Bose Airport. The airport is roughly 87 kilometers from Barddhaman City. It is located in a place called Dum Dum. [16] The airport has direct flights to New Delhi, Mumbai, Chennai, Bangalore and Hyderabad, which are operated by Indigo, Akasha, Air India and Spicejet.



**Figure 38: Transportation Accessibility of project site**

**Electricity:** Electricity is provided WBSEDCL locates a coal-based thermal power plant near Bardhaman city in Purba Bardhaman district in the Indian state of West Bengal.

**Infrastructure Amenities and Distances:**

Sl. No.	Amenities	Name/ Type	Road distance from project (km)	Aerial distance from project (km)
1	Airport	Netaji Subhas Chandra Bose International Airport	116.43	87
2	Railway Station	Burdwan Junction	6.9	4.1
		Tailt Railway station	11.2	8.9
3	Road	NH-2	4.8	1.5
4	Bank/ ATM	State Bank India	4	2.43
		Allahabad Bank	7.77.5	3.33
		United Bank of India	4.78	2.904
		Bank of Boroda	5.81	4.93
5		Alamganj Police Station	1.82	0.94

6	Police Station	Birhata Traffic Police Station	4.52	3.7
7		Burdwan Sadar Police Station	7.29	3.1
8	Fire Station	Fire Station	3.82	3.42
9	Post Office	Chotonilpur Post Office	2.907	1.24
		Head Post Office - Burdwan	8.01	5.5
		Rajbati Sub Post Office	3.49	3.1
10	Court	City Court	7.4	3.14
11	PCB	West Bengal Pollution Control Board	7.24	3.08
12	DFO	Divisional Forest Office	9.44	7.63
13	Power Plant	WBSEDCL Power Plant	4.24	3.62
14	Pre School	Polempur South Point (High School)	5.23	4.8
		Burdwan Town School	2.1	0.88
		Kidzee Nilpur	8.77	4.31
15	School	Burdwan C.M.S. High School (Church Missionary Society High School)	9.86	7.03
		Burdwan Municipal Girls' High School	10.1	6.68
		Burdwan C.M.S. High School (Church Missionary Society High School)	9.84	5.79
		BARDHAMAN BIDYARTHI BHABAN HIGH SCHOOL	10.18	5.29
		Ananda Marga School	9.8	6.24
16	College	Govt. College Of Education, Burdwan	15.33	9.31
		MUC Womens College	8.31	5.68
		Netaji Subhash Open University (Burdwan Raj College Study Centre)	7.72	4.53
		Burdwan Raj College	9.71	5.08
17	Training Institute	National Institute of Technology	7.75	4.24
		DIST GROUP OF INSTITUTIONS	10.38	5.23
		Sraac Animation	8.08	3.6
18	Medical College	Dr.B.C.Roy College Of Pharmacy & Allied Health Sciences	9.29	6.37
		Paramedical College	9.07	4.5
31	Hospital	Kisholoy Children Hospital	11.24	7.71
		B.C.C.U - RSBY Empannelled Hospital	8.86	3.7
		Burdwan Medical Collage & Hospital	7.1	3.6

Police Station (Sadar Thana): 100/0342-2664466/2664467

Sadar Thana (Women Cell): 0342-2669597

Fire Brigade: 101/0342-2456901

Postal Enquiry: 0342-2468727

Railway Enquiry: 31/0342-2662434

GRP 0342-2662438 RFP: 0342-2662442

Telephone Enquiry: 318

Telephone Assistance: 319

Directory Enquiry: 151/0342-2664111

Trunk Booking: 180

Trunk Assistance: 181

Hospital Enquiry: 0342-2466486

Hospital Emergency Section: 0342-2466486

Blood Bank Hospital: 0342-2463134

St. John Ambulance: 0342-2457461

**Economy Survey**

In the project site and study area, a socio-economic survey has been performed. The key purpose of the survey was to visit the project site and to collect the primary socio-economic data from the research area and to observe the basic facilities available. A good observation of the quality of life of the research area has also been carried out. The project site tour, findings and questionnaire sample 'data collection techniques' were used to gather data on individuals and procedures as part of qualitative analysis. Specific attention was given to the observation of the prevalent socio-economic conditions in the study region and also to the assessment of the population's understanding and response to the programme.

***Objective of the study:***

The objective of the socio-economic analysis is to obtain

- Current requirements in the local project environment.
- Prevalence of the socio-economic status of the surrounding project.
- Understanding, viewpoint and desires of the people regarding the proposed initiative.

### ***Methodology***

This study has been conducted using primary and secondary sources. The main sources of information included socio-economic data collected through a well-structured and pre-tested questionnaire using a sample survey of the population living in the research area. The secondary sources included existing literature, which included reports and studies on the current field. In the socio-economic survey the discussion centered on existing facilities and their aspirations regarding project development, along with age, gender and education, livelihood issues, basic amenities and post-project scenarios, etc.

In order to supplement structured outcomes of questionnaires with quality details the interviews performed using structured questionnaires derived quantitative data, but also widened the conversation with the survey respondents. Thus, both quantitative and qualitative data collection activities were carried out. Five main areas covered the standardized questionnaire:

- a. Social and generational elements
- b. Status of basic services
- c. Status of life
- d. Questions on basic living conditions
- e. View and view on the population.

The respondents were either head of the household or a household member resident in the study field.

### ***Findings and Conclusion:***

The respondents were asked questions in relation to the proposed project, to seek their perspectives, viewpoints and expectations. Opinions are an important way by which individuals in general and communities and the society in particular can comprehend the current mental attitude.

- 49% of respondents were men, while 51% were females, with respect to their sexual structure. According to secondary census, the female population is higher than the male population within the study area, with males dominating in community.
- The average household size was found to be 4 members.
- Education is one of the keys to achievement and growth and, thus, its educational status is very important for people. Any of the interviewees received some formal instruction. Nearly three fourths of respondents received instruction before graduation, while 15 participants completed the SSC/HSC curriculum. The formal schooling of four per cent of respondents is from first to secondary education (class 1-5).
- Questions were posed about the amount of family members earning their income from and jobs. The bulk of respondents are interested in farming and mines.

The municipal council of Grampanchayat provide potable water. Both respondents have houses of the sort Pakka.

- Toilet supply is a major sanitation measure. One of the most serious and frequent concerns is the toilet. Per respondent uses a private bathroom.
  - The respondent inquired about the most urgent issue in the region and addressed the problem of sanitation and road quality. Yet the people were still glad.
  - Interviewees were invited to question their thoughts, opinions and expectations on the project.
- Even many individual inhabitants such as garage for motor vehicles, small stores, vendors for fruit and vegetables, visiting businesses for hotel. Amongst those employed, very low percentage people work in government jobs such as primary and secondary teachers, engineers, and doctors.
- Home is the most significant component of man's basic needs and basic facilities make up an integral part of the house. Basic features are assessed by availability of drinking water, toilet, sanitation, waste disposal, electricity, cooking fuel and other appliances.

Opinions are valuable vehicles through which individuals in general, groups and the society in particular can consider the current mental attitudes. Most of the respondents were aware of the project, which indicates a frequent consultation with the local people by the project promoter. Most of the participants are actively supporting the project, but frequent information flows are required from the group provider as well as the project manager on how the project progresses. Their only demand is for permanent work in the planned project to be offered to local people.

## **CHAPTER 4**

# **ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES**

## ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

### DETAILS OF INVESTIGATED ENVIRONMENT IMPACTS

Mining activities cause adverse impacts on the surrounding environment unless proper environmental management plan is adopted. Selecting suitable sites for mining and also adopting all the guidelines prescribed by Sustainable Sand Mining Guidelines 2016 (SSG), Enforcement & Monitoring Guidelines for Sand Mining, 2020 and WBMMCR 2016 and The West Bengal Sand Mining Policy 2021 can minimize the major possible impacts.

In this chapter, an attempt is made to quantify or quality the possible environmental impacts on various features such as air quality, water use and quality, land-use, ecological considerations, soil quality and socio-economic factors. The above-mentioned aspects have been studied to identify the impacts of the proposed production from the mine. The magnitude and significance of the environmental pollution caused by mining depends on method of mining, scale and concentration of mining activity. On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts. The impact matrix is given in **Table 43**.

**Table 43: Environment Impact Matrix**

Environmental Factors	Activities						
	Open Cast-Operation	Natural Replenishment	Mineral Transportation	Plantation	Employment Generation	Infrastructure development	Traffic Generation
Ambient Air	•		•	!		•	•
Water Resource	•						
Water Quality	•						
Ambient Noise	•		•			•	•
Flora and Fauna		!	•	!			
Soil Quality	•		•	!			
Land-use					!		
Health & Safety	•		•	!			•
Socio-economic	•		!	!	!	•	

• Adverse Impacts

! Beneficial Impacts

A brief description of impacts by the proposed project is given in **Table 44**.

**Table 44: Description of Identifiable Impacts**

Sl. No.	Activities	Description of Impacts
1	Vegetation	<b>Moderate impact:</b> Uprooted plants, damaged to plant parts such as branches, loss of tree species, disturbances to survival, habitat loss
2	Animals	<b>Moderate impact:</b> Loss of aquatic habitats (specially for fish and phytoplankton), decreased species diversity due to loss of sensitive species, loss of spawning grounds for aquatic species and river bank dwelling species, disturbances to food webs, habitat loss for bank dwelling species such as aquatic birds, reptiles, amphibians.
3	Ecosystem stability	<b>Moderate impact:</b> Soil erosion, loss of fertile soil, bank instability and collapse, loss of protective structures provided by trees, changes to topography due to temporary foot paths and transportation network, obstacles to water flow
4	Water quality	<b>Moderate Impact:</b> Pollution by sedimentation, silt loads, vehicular discharge, solid waste dumping by humans, visible impairment of water quality, decreased dissolved oxygen concentration

### ***IMPACT MITIGATION/MINIMISING MEASURES***

Some of the impacts identified in various phases of operation are insignificant and do not warrant much attention whereas some others are important especially with respect to the present context. Therefore, objective is to identify those impacts, which are significant and require a detailed analysis for decision-making or formulating adequate management measures. This section deals with an assessment of impact of various mining activities on the existing environmental conditions. The methodology of assessment is based upon identification and description of the existing project activities as well as environmental components followed by predicting the impact of mining and associated activities on the environment. The environmental components that are likely to be influenced or modified by the continuation of project activities are: (i) Air environment, (ii) Noise and vibration environment, (iii) Water environment, (iv) Land use; (v) Soil environment; (vi) Hydrology; (vii) Geology; (viii) Biological environment, (ix) Socio-economic status of the area, and (x) Land and soil.

The identification of impact and mitigation/minimising measures of the river bed mining in IDILPUR is detailed in **Table 4**.

**Table 24: Environmental impact and Mitigation Measures**

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
<b>A</b>	<b>Land Environment</b>		
A.1	Land use & Land Cover	<ul style="list-style-type: none"> <li>○ Mining of minerals from the river bed will create a void which may affect the stream flow.</li> <li>○ Mining within a river bed may have some impact on the stream's</li> </ul>	<ul style="list-style-type: none"> <li>○ Sand mining activities will be limited to a maximum depth of 3.00 meters below the river bed or the water table, whichever is reached first.</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>physical characteristics, such as channel geometry, bed elevation in stream roughness of the bed, flow velocity, discharge capacity, sediment transportation capacity etc.</p> <ul style="list-style-type: none"> <li>○ Loss of adjacent land and/or structures.</li> <li>○ 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.</li> </ul>	<ul style="list-style-type: none"> <li>○ Dredging will not be allowed.</li> <li>○ The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.</li> <li>○ 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.</li> <li>○ The systematic and scientific removal of sand will allow sedimentation during monsoon and not cause bed degradation.</li> <li>○ Restoration of bank will be ensured at the end of mine closure every year.</li> <li>○ 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 240 meters on the upstream side and 500 meters on the downstream side. This regulation ensures the protection of bridge structures and maintains the integrity of the river ecosystem.</li> <li>○ The proposed river-bed mining is unlikely to change any characteristics of the river as the mined minerals will be replenished every monsoon season.</li> </ul>
A-2	Soil Quality	<ul style="list-style-type: none"> <li>○ 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.</li> </ul>	<ul style="list-style-type: none"> <li>○ The movement of trucks will be restricted to haul roads.</li> <li>○ The roads that will be used for transportation of mined minerals are already constructed.</li> <li>○ The unpaved roads will be strengthened in order to reduce impact on soil quality.</li> </ul>
A-3	Traffic Density	<ul style="list-style-type: none"> <li>○ Sand mining operations may involve the movement of trucks to</li> </ul>	<ul style="list-style-type: none"> <li>○ Traffic management plan will help in avoiding any traffic jams and thus</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>transport sand. This can contribute to increased traffic congestion, particularly on roads leading to and from mining areas.</p> <ul style="list-style-type: none"> <li>○ 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.</li> <li>○ 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.</li> </ul>	<p>concentration of trucks at one place will be avoided.</p> <ul style="list-style-type: none"> <li>○ By reducing the speed and/or volume of traffic on such roads to an acceptably low level.</li> <li>○ Transportation of minerals will be stopped during the opening and closing hours of schools, colleges, and offices.</li> </ul>
<b>B</b>	<b>Air Environment</b>		
B-1	Air Quality	<ul style="list-style-type: none"> <li>○ The extraction and transportation of sand can lead to the release of dust particles into the air, affecting air quality in the vicinity.</li> <li>○ The use of vehicles for sand transportation in the project can lead to the emission of pollutants, contributing to air pollution.</li> </ul>	<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"> <li>○ Water sprinkling will be done on the roads regularly. This will reduce dust emission by 75%.</li> <li>○ 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.</li> <li>○ Proper tuning of vehicles along with pollution certificate to keep the gas emissions under check.</li> <li>○ Plantation of trees along road sides as part of social forestry to help reduce the impact of dust in the nearby villages.</li> <li>○ Vegetation improves air by capturing pollution particles, reducing carbon dioxide and producing oxygen. Photosynthesis in green plant consumes carbon dioxide, plants help in counteracting</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
			<p>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.</p> <ul style="list-style-type: none"> <li>○ Plants with dust scavenging capacity i.e. plants species which have aesthetic value and high pollution tolerance level will be recommended for planting along the roads.</li> </ul>
B-2	Noise Level	<ul style="list-style-type: none"> <li>○ 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 IDILPUR, potentially affecting the residents who will be exposed to increased noise levels. However, considering the relatively low number of trucks (18 tripper trucks/tractors or 36 trips), the incremental noise level is expected to be minimal.</li> </ul>	<ul style="list-style-type: none"> <li>○ Periodical monitoring of noise near sensitive receptors will be done.</li> <li>○ No other equipment's except the transportation vehicles will be allowed.</li> <li>○ The well-tuned vehicles will be used and loud noise will be checked every day which help in reducing noise during operations.</li> <li>○ Plantation will be taken up along the approach roads and vicinity of river bank. The plantation minimizes propagation of noise and also arrests dust.</li> <li>○ By reducing the speed and/or volume of traffic on such roads to an acceptably low level.</li> </ul>
<b>C</b>	<b>Water Environment</b>		
C-1	Hydrology, Hydro-geology and Water Quality	<ul style="list-style-type: none"> <li>○ During river bed mining Ground water table may be intersecting.</li> <li>○ 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.</li> <li>○ Excessive suspended sediment in the water can cause harm to riparian vegetation and disrupt the natural habitat within the stream.</li> <li>○ The extraction of sand from riverbeds can stir up sediment, releasing pollutants that were previously trapped in the riverbed.</li> </ul>	<ul style="list-style-type: none"> <li>○ 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.</li> <li>○ Project activity will be carried out in the non-monsoon season and on dry bed.</li> <li>○ 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.</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		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"> <li>○ Impact on surface water bodies through indiscrete disposal of liquid waste and suspended solids carried by flowing rainwater.</li> </ul>	<ul style="list-style-type: none"> <li>○ The estimated municipal solid waste generated will be 11 kg/day and liquid waste generated by 108 employees will be 0.22KLD. Effective waste management will be implemented through the provision of dustbins and mobile toilets at the project site.</li> </ul>
<b>D</b>	<b>Ecological Environment</b>		
D-1	Flora	<ul style="list-style-type: none"> <li>○ Fugitive emission from vehicle movement will form a layer in leaves thus reducing the gaseous exchange process. This ultimately affects the growth of plants.</li> <li>○ 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.</li> <li>○ 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.</li> </ul>	<ul style="list-style-type: none"> <li>○ 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.</li> <li>○ 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.</li> </ul>
D-2	Fauna	<ul style="list-style-type: none"> <li>○ The operational activities such as population influx, transportation and noise generation may have an adverse impact on fauna.</li> <li>○ 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</li> </ul>	<ul style="list-style-type: none"> <li>○ 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</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>traffic noise and passing vehicles on their survival and breeding success.</p> <ul style="list-style-type: none"> <li>○ 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.</li> <li>○ 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.</li> </ul>	<ul style="list-style-type: none"> <li>○ 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.</li> <li>○ Exhaust silencers and acoustical pipe lagging (wrapping) will be utilized to minimize compressor noise and ensure optimal noise reduction.</li> <li>○ 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.</li> <li>○ No mining will be carried out during the rainy season to minimize impact on aquatic life.</li> <li>○ Sand extraction in vegetated riparian areas will be avoided.</li> <li>○ Undercut and incised vegetated banks will not be altered.</li> <li>○ Large woody debris within the riparian zone will be preserved and left undisturbed. If it needs to be moved, it will be carefully replaced rather than burned.</li> <li>○ Prompt and immediate action will be taken to evenly redistribute any spillage generated during the mining operation over the mined voids.</li> <li>○ Access roads will not encroach into the riparian zones.</li> <li>○ 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.</li> </ul>
<b>E</b>	<b>Social Environment</b>		
E-1	Health	<ul style="list-style-type: none"> <li>○ The socio-health impacts of transportation primarily arise from</li> </ul>	<ul style="list-style-type: none"> <li>○ Appropriate measures will be implemented in each impacted area</li> </ul>

S.no	Aspects	Identification of Impacts	Mitigation/Minimizing Measures
		<p>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.</p>	<p>to minimize significant adverse effects.</p> <ul style="list-style-type: none"> <li>○ Welfare activities should be initiated in the area so as to improve the quality of life of the local people.</li> <li>○ To enhance safety and minimize accidents, only licensed drivers will be hired and reckless driving fully prohibited.</li> <li>○ We will ensure the provision of medical facilities, educational opportunities (with a focus on girls), and access to clean drinking water.</li> </ul>

## **CHAPTER:- 5**

# **ANALYSIS OF ALTERNATIVES**

Selection of suitable site for a project is as important as selecting a technology and suppliers. The proposed area for mining lease is situated in village IDILPUR in Bardhaman district of West Bengal state. The proposed mining area covers an area of 4.99 Ha. On Damodar River. NAMITA ENTERPRISE will excavate Riverbed Sand quarry and the estimated production for the mines are 495236.335 Cum for 5 years.

The proposed IDILPUR Riverbed Sand Mine, which includes the Riverbed Sand Quarry of Leases, is owned by individual lessees and will be operated within the granted lease area.

Therefore, alternate sites have not been assessed. The mining technology is semi-mechanized open cast method in single shift manual mining without any change in technology.

This project is being granted to the respective project proponents by the Chief Mining Officer, Govt. of West Bengal in the approved mineralized zone. This project is away from habitation & located on maximum non-productive land, hence this is best suitable for mining activity. For recovery of mineral the procedure used here is the traditional method and as labor intensive, this is adopted for the site proved as the best practice.

## **CHAPTER 6.**

# **ENVIRONMENTAL MONITORING PROGRAM**

## ***INTRODUCTION***

This chapter presents the details of environmental monitoring, schedule, institutional arrangements for pollution control and cost for environmental protection measures for the proposed project.

## ***ENVIRONMENTAL MONITORING***

The environmental monitoring is important in terms of evaluating the performance of pollution control equipment's installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board/West Bengal Pollution Control Board (CPCB)/(WBPCB). The frequency of sampling and location of sampling will be as per the directives of CPCB/WBPCB.

Environmental monitoring will be conducted on regular basis by the lessees included to assess the pollution level in the surrounding area. Usually, as in the case of the study, an impact assessment study is carried over short period of time and the data can not bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environment.

### ***OBJECTIVE OF ENVIRONMENTAL MONITORING:***

- To verify the result of the impact assessment study in particular with regard to new developments;
- To follow the trend of parameters which have been identified as critical;
- To check or assess the efficacy of the controlling measures
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new installations or through the modification in the operation of existing facilities;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures; and
- To establish a database for future Impact Assessment Studies for new projects.

**The attributes, which require regular monitoring, are specified as mentioned below:**

1. Air Quality;
2. Surface water and ground water Quality;
3. Noise Levels;
4. Soil Quality;
5. Ecological Preservation and Afforestation; and
6. Socio Economic Aspects and Community Development

## ***MONITORING SCHEDULE & PARAMETERS***

A large part of the sampling and measurement activities will be concerned with long term monitoring aimed at providing an early warning of the undesirable changes or trends in the natural environment that could be associated with mining and allied activities.

This is essential to determine whether the changes are a response to a cycle of climatic conditions or due to mining activities.

In particular, a monitoring strategy is required to ensure that all environmental resources, which may be subjected to pollution, are kept under review. Monitoring of the individual elements of the environment is necessary.

To meet the above objectives, an “Environmental Management Cell (EMC)” will be formed, which will be responsible for implementation of EMP and Post operating monitoring. The analysis of the data collected during the preceding month and progress of environmental management system will be reviewed. The following items will be considered under monitoring schedule is given in following **Table 46**.

**Table 46: Post Project Environmental Monitoring Plan**

Attributes	Sampling		Measurement Method	Test Procedure	Responsibility
	Network	Frequency			
<b>Air Environment</b>					
Meteorological Monitoring (Wind Direction, Relative Humidity, Rainfall)	One station at site	Regularly	Mechanical/Automatic Weather Station	Mechanized station	Environmental Officer/ Mines Manager
PM ₁₀ and PM _{2.5}	2 locations in the project impact area (Minimum 1 locations in upwind side, 1 sites in downwind side / impact zone	Twice in a year	IS 5182 (Part-23) 2006, Gravimetric CPCB Guidelines For Ambient Air Monitoring	As per CPCB norms	Environmental Officer/ Mines Manager
SO ₂			IS 5182 (Part-I) 2001, Reaff. 2006	As per CPCB norms	

Attributes	Sampling		Measurement Method	Test Procedure	Responsibility
	Network	Frequency			
NO ₂	and one in core zone)		IS 5182 (Part-Vi) 2006	As per CPCB norms	
<b>Water Environment (Surface and Ground Water)</b>					
pH (at 24 ^o C), Color, Turbidity, Odour, Taste, Total Dissolved Solid, Alkalinity, Chloride, Total Hardness, Sulphate, Nitrate, Iron, Fluoride, Magnesium, Boron, Chromium, Copper, Manganese Nitrate, DO, BOD (except GW), Total Coliforms, E Coli	2 Set of grab Samples for ground and 2 sets of surface water in the vicinity of the project site	Twice in a year	As per IS: 10500: 2012, APHA and IS	As per CPCB norms	Environmental Officer/ Mines Manager
<b>Noise</b>					
Noise levels at Day & night time - Leq dB (A)	2 locations (1 location within Mine boundary, High noise generating areas within the lease	Twice in a year	Using Sound Level Meter (SLM)	As per CPCB norms	Environmental Officer/ Mines Manager

Attributes	Sampling		Measurement Method	Test Procedure	Responsibility
	Network	Frequency			
	and 1 locations of nearest habitation and 1 of nearest road)				
<b>Soil</b>					
pH (at 240C), Color Texture, Moisture, Content (%), Soil Texture, Bulk Density, Water Holding Capacity Chloride, Calcium, Sodium, Potassium, Magnesium, Organic Matter, Available Nitrogen as N, Available Phosphorous, Zinc, Manganese, Lead, Cadmium, Copper, Chromium	2 locations in the project impact area	Twice in a year	As per USDAMethod, APHA and IS	As per CPCB norms	Environmental Officer/ Mines Manager
<b>Socioeconomic</b>					
CSR related	In nearby villages	Yearly	Data collection on	Primary (Questionnaire)	Environmental Officer/

Attributes	Sampling		Measurement Method	Test Procedure	Responsibility
	Network	Frequency			
			the amount spent on CSR activities in the villages	ires) and Secondary Survey.	Mines Manager
<b>Flora and Fauna</b>					
Inventory of Flora and Fauna in the area	In core zone, afforested area	Yearly	Visual Observation and Log Book of Plantation	Through Monitoring (personal survey)	Environment Officer/ Mines manager
<b>Occupational Health of Mine Workers</b>					
Periodical Medical Check Up	-	Schedule given in Section 6.4.2	Medical checkup by Doctor	Medical report	Safety Officer/ Mines Manager

### Occupational Health

#### Check Up

#### Medical

#### Examination

The following medical examinations are recommended

- X - Ray of chest to exclude pulmonary TB, Silicosis etc.
- Lung Function test
- Audiometric test to check hearing losses
- Urine test, blood test, blood sugar etc.
- Eye test

#### Schedule of Health Check Up

The following schedule for medical checkup is recommended:

- Persons working as operators in the mine pit : Once in a Year
- Persons working as worker and supervisory staff: Once in Year
- Persons working outside mine pit: Once in Year

### ***MONITORING METHODS AND DATA ANALYSIS***

All environment monitoring and relevant operational data will be stored in a relational database. Regular data extracts and interpretive reports will be sent to the regulator.

**Air Quality Monitoring and Data Analysis:-** The concentration of air borne pollutants in the workspace / work zone environment will be moistened periodically. If concentrations higher than threshold limit values are observed, the source of fugitive emissions will be identified and necessary measures shall be taken. If the levels are high suitable measures as detailed in EMP shall be initiated. Any abnormal rise will be investigated to identify the causes, and appropriate action will be initiated. Greenbelt shall be developed for minimizing dust propagation.

**Water and Waste water Quality Monitoring and Data Analysis:-** Methods prescribed in "Standard Methods for Examination of Water and Wastewater" prepared and published jointly by American Public Health Association (APHA), Indian Standards, standards prescribed by CPCB are recommended.

Monitoring Equipment and Consumables Regular environmental monitoring will be outsourced to a MoEF&CC/NABL recognized laboratory.

Green belt and affstonested areas Continuous vigilance and monitoring of green belt will be done for its performance and survival rate. Watch and ward personnel will properly guard the plantation. Provisions will be made for fertilizers application and watering on schedule.

**SOCIO-ECONOMICS:-** Gravity modeling (traffic density) studies will be done with the objective to know about the interaction of nearby situated towns. Central Place Hierarchization studies (studies related tochange in amenities/services etc.) would be conducted to know about the socio-economic status of the villages along with the above-mentioned studies at every five-year interval.

**COST PROVISION FOR ENVIRONMENTAL MEASURES:-** The total project cost for the proposed project is about Rs. 96 lacs. Rs 4.8 lakhs (5% of total project cost) as capital cost will be spent on environment protection, management, pollution control and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made. The details of budget allocation during functional phase are given in –

**Table 47: Proposed Expenditure Proposed for Environmental Protection Activities**

Sl. No.	Particulars	Capital Cost in Rs
1.	Environmental Monitoring	50,000/-
2.	Green Belt Development	3,50,000/-
3.	Road Preparation Maintenance	5,00,000/-
4.	Sprinking in haul road	1,00,000

## **CHAPTER 7**

# **ADDITIONAL STUDIES**

## **ADDITIONAL STUDIES**

### ***INTRODUCTION***

The additional studies as suggested in Para 7 & Appendix-III of EIA notification 2006 amended to date are (i) Public Consultation; (ii) Risk Assessment; (iii) Social Impact Assessment and (iv) Rehabilitation & Resettlement (R&R) Action Plan.

The additional studies suggested for IDILPUR sand mine by the State Level Expert Appraisal Committee (SEAC) in the Terms of Reference (ToR) Point no. 3.1(35, 36, 39, 42), 2.1 (13, 14) to be included in EIA/EMP Report are (i) Public Consultation and (i) Risk Assessment/Disaster Management Plan/Occupational Health Impact of Project.

### ***PUBLIC CONSULTATION***

Public consultation will be done after submission of the draft EIA to concern authority.

### ***RISK ASSESSMENT***

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.

Conducting risk assessments enables mine operators to determine and categorize risks into high, medium, and low levels, as mandated by the Occupational Health and Safety Act 2000. These assessments aid in prioritizing risks and provide valuable insights on the necessary safety measures to control them effectively. By implementing safety improvements based on these assessments, mine owners and operators can enhance overall safety measures within the mining operation. The natural/industrial problems may be encountered during the mining operation are (i) Inundation: filling of the mine pit due to excessive rains or upstream dam opening or failure and (ii) Slope failures at the mine faces.

As per proposal made under the mining plan the area will be developed by means of opencast mining method. Extraction of minerals are to be carried out by semi-mechanized/manual mining method and water table will not be intersected during the mining. No high-risk accidents like landslides, subsidence flood etc. are apprehended.

**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 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, Temporary storage of mined sand may be required prior to transportation, during which stacks may be formed for storage purposes.

**Risks of accidents due to Trucks & 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 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.

- Road signs will be provided at each and every turning point up to the main road (wherever required)
- To avoid danger while reversing the vehicles especially at working place/loading points, stopper should be posted to properly guide reversing/ spotting oper .Trained drivers will only be hired.

***DISASTER MANAGEMENT:-***

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 3152, MMR 3161 and Mines Rules 3155, RMMCR 3186, 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.

The probable disaster, its impact and their management measures during sand mining are presented in **Table 48**.

**Table 48: Disaster Management during Sand Mining Project**

Probable Disaster	Impact	Management Measures
<p><b>Sand Loading:</b> The sand is loaded in the trucks using hand shovels and back-hoe.</p>	<ul style="list-style-type: none"> <li>○ There are possibilities of hand injuries while loading with shovels and the hazards associated with being underneath moving buckets.</li> <li>○ There are possibilities that the workers standing on the other side of loading may get injured due to overthrown sands with pebbles.</li> <li>○ There are possibilities of workers getting injured during opening of side covers of the trucks to facilitate and loading.</li> <li>○ There are possibilities of river-bank collapse due to close proximity of sand extraction.</li> <li>○ Chance of workers getting injured due to improper balancing of truck while loading.</li> </ul>	<ul style="list-style-type: none"> <li>○ No sand will be collected within 100m distance from the river banks or 1/3rd of the distance between the bank lines and 7.5m safety barrier from project area. Safe clearance will be mainly determined by the height of the river bank and thickness of sand to be extracted from the close vicinity of that bank.</li> <li>○ Ponding in the river bed shall not be allowed.</li> <li>○ The particular operations, approaching river bed from both the banks will be avoided.</li> <li>○ No foreign material (garbage's) will be allowed to remain/spill in river bed and catchment area, or no Pits/pockets are allowed to be filled with such material.</li> <li>○ The trucks will be brought to a level so that the sand loading operation suits to the ergonomic condition of the workers and the</li> </ul>

Probable Disaster	Impact	Management Measures
		<p>back-hoe.</p> <ul style="list-style-type: none"> <li>○ Side covers (pattas) will be opened cautiously with clear warnings to ensure loader safety. Loading will be conducted exclusively from one side of the truck.</li> <li>○ Workers will be equipped with gloves and safety shoes for loading.</li> </ul>
<p><b>Sand Transport:</b> Sands from the mine lease area are loaded onto 11.50-ton trucks, which then travel a 500m approach road before continuing on a metalled road.</p>	<ul style="list-style-type: none"> <li>○ Road accidents are possible.</li> <li>○ Accident may also occur during movement in the mine (sand dunes).</li> <li>○ Overloading may pose a risk of injury to passersby due to the potential presence of pebbles or large boulders.</li> </ul>	<ul style="list-style-type: none"> <li>○ All transportation within the main working area will be directly supervised and controlled by the management.</li> <li>○ Vehicles must be well-maintained and undergo thorough weekly inspections by a competent individual authorized by the management.</li> <li>○ Road signs will be provided at each and every turning point especially for the guidance of the drivers at the evening/night.</li> <li>○ To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all workers will be removed from all areas for reversing of Lorries, and the vehicle will have audio-visual alarm during reversing.</li> <li>○ Implementing statutory provisions such as fences and providing consistent education and training will significantly reduce accident incidents.</li> <li>○ Overloading is generally prohibited, and the loading of big boulders is not allowed to ensure safety and prevent damage to equipment and storage bunkers.</li> <li>○ The truck will be covered and maintained to prevent any spillage.</li> <li>○ The maximum permissible speed limit will be ensured.</li> <li>○ The truck drivers will have valid driving license.</li> </ul>

Probable Disaster	Impact	Management Measures
<b>Inundation / Flooding</b>	<ul style="list-style-type: none"> <li>○ The sand mines have a high risk of inundation/flooding during the monsoon season, heavy rains in the lean season, or due to upstream dam opening or failure, as the mine area lies over the sand dunes of a riverbed.</li> <li>○ Flooding poses risks to the safety of workers, trucks, and other machinery involved in the operations.</li> </ul>	<ul style="list-style-type: none"> <li>○ Sand mining operations will be suspended during the monsoon months and heavy rains.</li> <li>○ A warning system will be implemented to monitor heavy rains and discharges from upstream dams, if applicable.</li> </ul>
<b>Drowning</b>	<ul style="list-style-type: none"> <li>○ There is a risk of drowning in the deeper parts of the river or in water-filled pits left behind.</li> </ul>	<ul style="list-style-type: none"> <li>○ Safety jackets, floating tube will be kept at the site office to prevent any mishap.</li> <li>○ The workers are not allowed to go to the deeper areas of the rivers.</li> <li>○ The workers are not allowed to fishing in the river during working hours.</li> <li>○ When necessary to cross the river, strict supervision is maintained, and lifelines are used over shallow areas.</li> <li>○ The training of mine personnel shall be provided regularly with respect to environmental protection.</li> </ul>
<b>Heavy Machinery:</b> The machinery refers to the trucks and dumpers	<ul style="list-style-type: none"> <li>○ Accidents during transportation by dumpers, trucks, and other heavy vehicles are primarily caused by mechanical failures, with the possibility of human errors playing a contributing role.</li> </ul>	<ul style="list-style-type: none"> <li>○ Transportation within the applied mining lease working area will be directly supervised and controlled by the management.</li> <li>○ To ensure safety during equipment and vehicle reversing, stoppers will be stationed to provide proper guidance at the working place and loading points. Additionally, a minimum 10-meter radius around the machine will be designated as a restricted area for personnel.</li> <li>○ A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.</li> </ul>

### ***OCCUPATION HEALTH HAZARDS***

At the site, dust is a significant pollutant during excavation and loading activities, posing health risks to workers. Environmental and climatic conditions also contribute to health problems. Addressing occupational health hazards involves understanding the source, exposure pathways, and potential receptors. Occupational hazard due to sand mining mainly comes under the physical hazards. Possible physical hazards and mitigation measures are mentioned below:

<b>Light</b>	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.	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 3155 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized.
<b>Heat and Humidity</b>	Hot and humid conditions in the riverbed mining area can result in temperatures rising to 48°C or above. Heat exposure can lead to direct effects such as burns, heat exhaustion, heat stroke, and heat cramps, while indirect effects include reduced efficiency, increased fatigue, and higher accident rates.	
<b>Eye Irritation</b>	During the high windy days in summer the sand could be the problems for eyes like itching and watering of eyes.	
<b>Respiratory Problems</b>	Excessive airborne dust can pose a health hazard, aggravating respiratory conditions like asthma and causing irritation to the lungs and bronchial passages.	
<b>Noise Induced Hearing Loss</b>	Machinery is the main source of noise pollution at the mine site.	

Need-based EMP, prepared in accordance with the MoEF&CC Office Memorandum vide F. No. 22-65/2017.IA.III dated 30.09.2020.

5.	Facilities for Mine workers	2,83,500
	<b>Total ::</b>	<b>13,08,500/-</b>
	<b>Total Cost of EMP in Rs</b>	<b>13,08,500/-</b>

# **CHAPTER 8.**

# **PROJECT BENEFITS**

## **Project Benefits:-**

This chapter gives a comprehensive description of various advantages and improvements anticipated from the proposed project to the locality, neighborhood, region and nation.

### ***INTRODUCTION***

There will be no adverse effect of mining on the socio-economic status of the people rather the mining activities helps in improvement in the standard of living of the people. The mining activity creates the employment opportunity for the local people and helps generates revenue and this definitely enhance the economic status of the local people. Apart from overall impact of the project on the local people, it is felt necessary to augment facilities in the fields' of education, health and social awareness including concern for environment and eco-system. The various improvements are described below:

### ***IMPROVEMENTS IN THE PHYSICAL INFRASTRUCTURE***

The applied Mining Lease area is located in the backward region in the district. In this locality a good number of people are engaged in agricultural work. The proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a) The proposed mining project will appeal to different entrepreneur to set up their undertaking in the nearby locations.
- b) Excavated mineral will provide a good market opportunity.
- c) As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.
- d) The mining project in the locality helps in improvement of the physical infrastructure like roads, vehicles for public transportation, water and sanitation facility, house and rest shed for the mines worker, safety equipment's for the mines workers etc.

### ***SOCIAL BENEFITS***

With the commitment of the upcoming mine there will be substantial improvement of economy of the local people. Amenities such as education and healthcare will be developing in and around the lease area, which will be available to the local people also. Development in business activity shall lead to infrastructure development in and around the project site.

- a) A multiplier effect will be felt on the creation of direct and indirect employment through the local community like labour contract, transport suppliers. An average of 33 workers per day will be deployed.
- b) The proposed mining project activity does not involve any resettlement and rehabilitation process as the project is freshly designed at representative site where none of the settlement is present.
- c) The operation of the Riverbed Sand mining would help to improve socio-economic condition of people in villages through separate fund allocated for need based fund.
- d) Increased Health related activities: Healthcare promotional activities will be undertaken by the proponents. Health check-up camps will be conducted annually which will increase the general health status of the residents in the nearby villages.
- e) Educational attainments: Educational activities will be promoted by the proponents by providing scholarships to students annually.

***ENVIRONMENTAL BENEFITS***

Green belt development will be carried out which will help in arresting dust and minimizing sound level arising from the mining operation.

***EMPLOYMENT POTENTIAL***

The local labor shall be engaged for the purpose of mining of mineral, loading & unloading of mineral besides, watch and ward and plantation activity with proper maintenance. The total manpower required for mining works will be 33. This will help in the improvement of financial condition of the area.

As already stated, the area has less employment potential except agricultural activities. Due to present mining activity, there is generation of employment both skilled and unskilled. Also there is a requirement of statutory person in Mining Mate and foreman cadre. Local youth will be preferred for employment in the mine. The brief details of employment potential which are directly benefited by this project.

Also, there will be generation of indirect employment due to the various activities related to mining viz. Maintenance activities, tea shops, hotels etc.

The excavation of Riverbed Sand also attracts levy of royalty and contribution in district mineral fund and cess by the State Government which indirectly used in uplift mint of people residing in the area.

There will be no change the present cultural activities, which involves local folk dance, songs and drama etc. Infected due to mining operation there will be improvement in economic condition of the society at large which ultimately helps in improving the overall socio-economic environment.

***BUDGET FOR SOCIAL DEVELOPMENT***

The proposed mining project proponent is aware of the obligations towards the society and to fulfill the social obligations unit will employ semi-skilled and unskilled labor from the nearby villages for the proposed project as far as possible. Unit will also try to generate maximum direct & indirect employment in the nearby villages by appointing local contractors during construction phase as well as during operation phase. The Project proponents will contribute reasonably as part of social development as a part of EMP and will carry out various activities in nearby villages.

Estimated project cost along with analysis in terms of economic viability of the project, is arrived at Rs 96 Lakhs. The total estimated cost of the project is 96 lacs & 1.92 lacs(2% of the total project cost) will be allocated for need based activity for causes of development This covers cost towards land development, new infrastructure facilities like water, power, road etc., cost of mining, pre-project and pre-commissioning expenses, environment care, plantation and social welfare etc. Cost of explorations, mine development planning, auxiliary facilities, support system etc. have also been taken into account activities are shown in **Table 8**, although the heads can be changed on the basis of local demand analysis at the time of Public Hearing and recommendation of SEAC.

**Table 49:- Need Based Activities by the proposed mining project Cost of Project**

<b>S.N.</b>	<b>Particulars</b>	<b>Amount in Lacs</b>
1.	Girls Toilet in nearby school & Water purifure for students	3.68
2.	Free Health Camp & Supply of Medicine to villagers & Ots.	2.00
	<b>Total Cost of Project :</b>	<b>5.68</b>

***DIRECT REVENUE EARNING TO THE NATIONAL AND STATE EXCHEQUER***

This project will contribute additional revenue to the Central and State exchequer in the form of excise duty, income tax, state sales tax or GST, tax for interstate movement, corporate taxes etc. Indirect contribution to the Central and State exchequer will be there due to Income by way of registration of trucks, payment of road tax, income tax from individual as well as taxes from associated units. Thus, the proposed project will help the Government by paying different taxes from time to time, which is a part of revenue and thus, will help in developing the area.

***OTHER INTANGIBLE BENEFITS***

Apart from overall beneficial impact of the project on the local people, the following measures will be taken up by the mine as periphery development project;

- Planting of economic important trees in the open spaces around the mining lease area which is accessible to the local people.
- Encouraging using boiled /cleaned drinking water and mosquito nets.
- Development of socio economic status of the people of the project area.
- Decrease in the rate of migration¹ from the project villages as the employment opportunity will be created in the locality.

## **CHAPTER 9**

# **ENVIRONMENT COST BENEFIT ANALYSIS**

## **ENVIRONMENT COST BENEFIT ANALYSIS:-**

During the scoping stage, the SEIAA did not recommend conducting an environmental cost-benefit analysis for the project. Furthermore, it was not included as a condition in the proposed Terms of Reference granted to the project proponent by the SEIAA/SEAC.

## **CHAPTER 10**

# **ENVIRONMENT MANAGEMENT PLAN**

## ENVIRONMENT MANAGEMENT PLAN

### INTRODUCTION

Success of any Environmental Management Plan (EMP) depends upon the efficiency of the organizational set up responsible for the implementation of the program. The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized.

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.

### COMPONENTS OF ENVIRONMENT MANAGEMENT PLAN

In the minor mineral mining project EMP is dealt only for operational phase as no construction is involved. The design of EMP for operational phase has been aimed to achieve (i) Adoption of practical environmental control measures and implementing them effectively; (ii) Implementation of monitoring program of the surrounding environment; (iii) Institution arrangements to monitor effectively and take suitable corrective steps; and (iv) Implementation of schedule and reporting procedures.

### EMP OPERATION PHASE

The probable source and proposed mitigation measures suggested for minimising the impact in the project cycle are provided in **Table 50**.

**Table 50: Probable Source and Mitigation Measures**

Aspects	Probable Source	Mitigation Measures
<b>Soil Compaction and Settlement</b>	<ul style="list-style-type: none"> <li>○ The frequent movement of trucks on unpaved roads can result in soil compaction, reducing the infiltration rate and impeding the growth of deep-rooted plants.</li> </ul>	<ul style="list-style-type: none"> <li>○ The project will utilize paved roads for vehicle movement. In areas where roads are partially paved, measures will be taken to strengthen them, thereby minimizing the impact on soil quality.</li> <li>○ The vehicles moving to and from</li> </ul>

Aspects	Probable Source	Mitigation Measures
		<p>the site will be regularly checked to prevent oil leakage.</p> <ul style="list-style-type: none"> <li>○ There is no toxic element present in the mineral which may contaminate the soil or river water.</li> </ul>
<p><b>Air Pollution</b> due to dust from moving trucks and vehicular emissions</p>	<ul style="list-style-type: none"> <li>○ In riverbed mining activities, the engines of vehicles used for excavation and transportation of mined materials are the sole source of gaseous emissions.</li> <li>○ Fugitive dust generation during mining</li> </ul>	<ul style="list-style-type: none"> <li>○ Dust screens and water sprinklers are crucial tools employed in mining operations to effectively mitigate the issue of gusting dust.</li> <li>○ To prevent dust emissions in mining areas, regular water sprinkling is employed on the mining grounds and roads. workers in dust-prone areas are equipped with dust masks, ensuring their respiratory safety.</li> <li>○ Plantation will be carried out on approach roads and nearby vicinity of river bank.</li> <li>○ Transportation of mineral will be done in trucks covered with Tarpaulin to avoid fugitive dust emissions.</li> <li>○ To control emissions, regular preventive maintenance of vehicles is conducted, and all transportation vehicles are required to carry a valid Pollution Under Control (PUC) certificate.</li> <li>○ No overloading of vehicles to be allowed to avoid any spillages.</li> <li>○ Periodic air quality monitoring will be carried out to monitor the changes consequent upon mining activities as per the norms of West Bengal State Pollution Control Board.</li> </ul>
<p><b>Noise Pollution</b></p>	<ul style="list-style-type: none"> <li>○ Noise generated by trucks, loaders, and dumpers in the mine lease area.</li> </ul>	<ul style="list-style-type: none"> <li>○ Proper care and maintenance of the equipment's will be carried out.</li> </ul>

Aspects	Probable Source	Mitigation Measures
		<ul style="list-style-type: none"> <li>○ The well-tuned vehicles will be used during operation phase. Fixing of silencers to the trucks will reduce the noise levels.</li> <li>○ Plantation will be taken along the approach roads and vicinity of river bank. Plantation serves a dual purpose by minimizing noise propagation and effectively controlling dust.</li> <li>○ Efficient traffic management includes implementing speed limits on vehicles and educating drivers to minimize horn usage.</li> <li>○ Ambient noise monitoring will be conducted regularly at different locations in and around the mining areas.</li> </ul>
<b>Water Environment</b>	<ul style="list-style-type: none"> <li>○ Surface and ground water, although separate entities, must be recognized and managed as an interconnected system due to their interrelated nature.</li> </ul>	<ul style="list-style-type: none"> <li>○ Mining operations will be conducted at a significant distance above the water table to minimize any potential impact on the water regime. River bed mining will be done up to depth of 3.00 meter from the un-mined bed level at any point in time with proper bench formation;</li> <li>○ Mining will not intersect the river bed water level or ground water table of the area. Therefore, will not disturb the ground water level.</li> <li>○ No water pumping from either ground or surface water sources will be conducted, ensuring the conservation and preservation of water resources.</li> <li>○ There will be no diversion or modification in the river flow as mining will be done in the dry areas.</li> </ul>
<b>Solid Waste</b>	<ul style="list-style-type: none"> <li>○ Waste management is an</li> </ul>	<ul style="list-style-type: none"> <li>○ The trucks will be tarpaulin</li> </ul>

Aspects	Probable Source	Mitigation Measures
<b>Generation</b>	important fact of environment management. solid waste management holds significance from both aesthetic and environmental perspectives	<p>covered so that there is minimal spillage. Apart from this, no other solid wastes will be generated from the said mining operations.</p> <ul style="list-style-type: none"> <li>○ Food waste or any domestic waste will be collected in dustbins and will be properly disposed.</li> <li>○ Toilets will be used by employers on site.</li> </ul>
<b>Social Environment</b>	<ul style="list-style-type: none"> <li>○ For improving the socio-economic environment, proper CSR activities will be taken up in vicinity to uplift the condition of people.</li> <li>○ All workers will be subjected to medical examination as per Mines Rule 3155 both at times of appointment and in every two months.</li> </ul>	<ul style="list-style-type: none"> <li>○ Dust masks will be provided to the workers working in the dust prone areas.</li> <li>○ Comprehensive awareness programs will be implemented to educate individuals about potential occupational health hazards, enabling proactive measures to be implemented for prevention and mitigation.</li> <li>○ Occupational health and safety within the organization will be promoted and develop safer and healthier ways of working will be developed;</li> <li>○ Accident investigations and supervision of unsafe working conditions will identify causes and provide recommendations for remedial action;</li> <li>○ Comprehensive training sessions on health, safety practices, and legislation will be developed and delivered to management, supervisors, and workers.</li> <li>○ Emergency procedures for mine rescues will be developed and coordinated.</li> <li>○ Open communication channels will be established to facilitate regular reporting on health,</li> </ul>

Aspects	Probable Source	Mitigation Measures	
		safety, and risk status to management. This will enable the development and review of comprehensive occupational health and safety strategies and systems, encompassing policies, procedures, and manuals.	
<b>Tree Plantation</b>	<ul style="list-style-type: none"> <li>○ As part of the afforestation plan, nearby villages and connecting roads will undergo plantation initiatives.</li> <li>○ The tree plantation will be done as per these standards. (i) 200 plant per kilometre and (ii) 2400 plant per hectare</li> <li>○ It is proposed to plant <b>1,700</b> numbers of native species during the first <b>2</b> years of plantation period and the remaining <b>3</b> years are allocated for the maintenance of the established plants.</li> <li>○ Along the approach road total area available for plantation is <b>0.15Ha</b>, in which <b>375</b> trees will be planted.</li> <li>○ Along the river bank total area available for plantation is <b>0.12Ha</b>, in which <b>80</b> trees will be planted.</li> <li>○ Remaining plantation in <b>0.41ha</b> area will be done after consultation with gram panchayat and local villagers.</li> </ul>	<ul style="list-style-type: none"> <li>○ Native plants like Acacia, Neem, Babla, Simul, Bamboo and other local species will be planted (<b>Refer Table 10.2</b>).</li> <li>○ The species cultivated in the areas are both dust-tolerant and fast-growing, making permanent plantation feasible.</li> </ul>	
<b>Table 10-2: Tree Plantation Plan</b>			
<b>Scientific Name</b>	<b>Common Name</b>	<b>Number</b>	<b>Probable Pollution Control</b>
<i>Genus Acacia</i>	Acacia	370	Dust, air and noise pollution
<i>Vachellia nilotica</i>	Babla	300	Dust Pollution
<i>Azadirachta indica</i>	Neem	400	Air Pollution
<i>Bambusa Vulgaris</i>	Bamboo	380	Air Pollution
<i>Bombax ceiba</i>	Shimul	240	Air Pollution

**EMP-IMPLEMENTATION FRAMEWORK**

The action plan for mitigation of the environment impact due to the mining activities and the implementing agency is provided in **Table 51**.

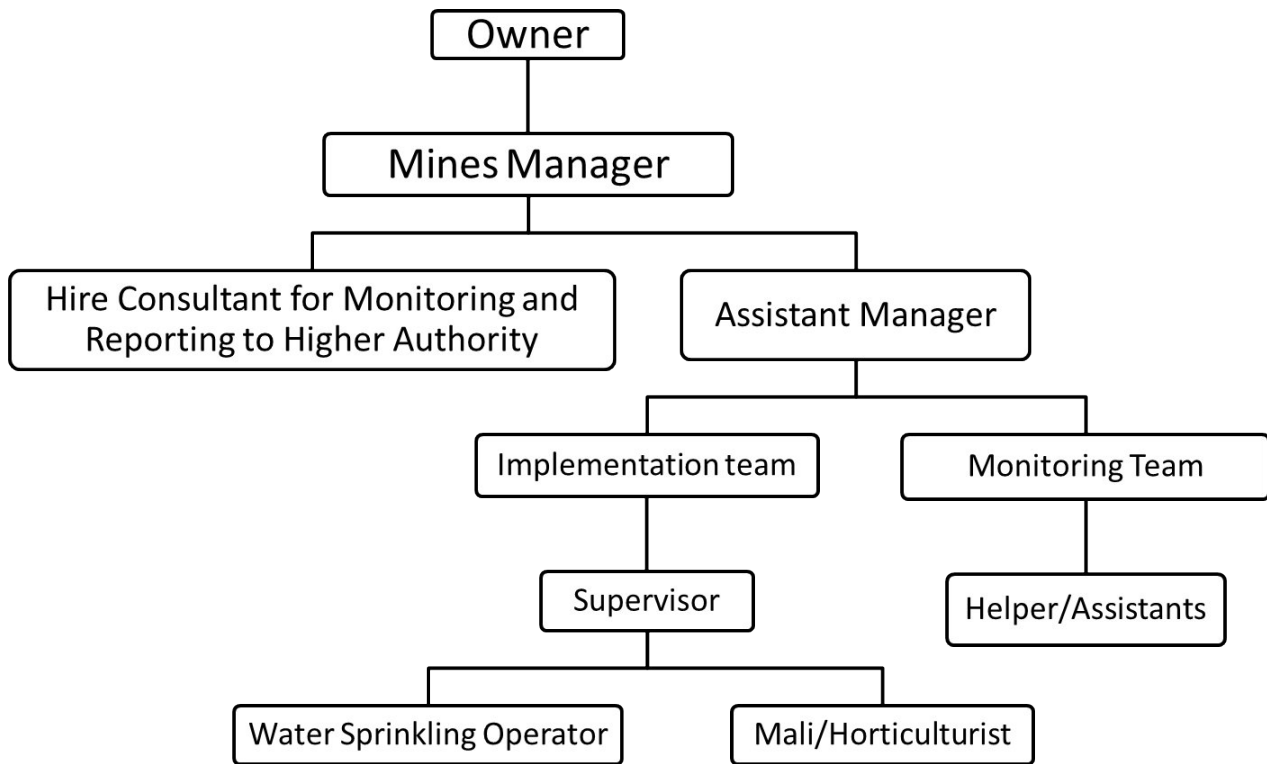
**Table 51: Impact Management and Implementation Framework**

<b>Impact</b>	<b>Management Action</b>	<b>Implementation Responsibility</b>
<b>Soil Compaction and Settlement</b>	<ul style="list-style-type: none"> <li>○ The project will involve movement of vehicles along paved roads. The portion that are partly paved will be strengthened to reduce impact on soil quality. The vehicles moving to and from the site will be regularly checked to prevent oil leakage.</li> </ul>	Mine Operator
<b>Air Pollution:</b> Air pollution arises from vehicular emissions and dust generated by vehicle movement.	<ul style="list-style-type: none"> <li>○ Spraying of water at source of dust emissions.</li> <li>○ Trucks carrying sand will be duly covered with tarpaulin to avoid spilling.</li> <li>○ Regular monitoring would be carried out.</li> </ul>	Mine Operator
<b>Noise Pollution:</b> Trucks, loaders, and dumpers contribute to noise pollution. mine lease area and the route of transportation	<ul style="list-style-type: none"> <li>○ Identification of structures and vulnerable populations affected by increased noise levels, along with the implementation of remedial measures.</li> <li>○ Tree plantation along the transport route helps in minimizing the noise level.</li> </ul>	Mine Operator
<b>Water Pollution:</b> The source of water pollution is	<ul style="list-style-type: none"> <li>○ Mining operations will be conducted at a significant distance above both the water table and river bed water level to minimize any potential impact on the water regime.</li> </ul>	Mine Operator
<b>Solid waste generation</b>	<ul style="list-style-type: none"> <li>○ Solid waste (boulders, clay &amp; silt) that will be generated during mining activities will be utilized for shore management.</li> </ul>	Mine Operator
<b>Social Environment</b>	<ul style="list-style-type: none"> <li>○ For improving the socio-economic environment, proper CSR activities will be taken up in vicinity to uplift the condition of people.</li> <li>○ All workers will be subjected to medical examination as per Mines Rule 3155 both at times of appointment and in every two months.</li> <li>○ Insurance of all employees as per the rules will be carried out.</li> </ul>	Mine Operator
<b>Tree Plantation</b>	<ul style="list-style-type: none"> <li>○ During the mining activities, plantation will be done for three specific reasons (i) Reduce Noise Level; (ii) Absorb Air Pollutants; (iii) Improvement of Soil Quality</li> <li>○ Selection of plant species is to be done on the basis of their adaptability to the existing geographical conditions and the vegetation composition of the</li> </ul>	Mine Operator

Impact	Management Action	Implementation Responsibility
	topography of the region.	

The Environmental Management Cell (EMC) is structured with a core group dedicated to environmental management, comprising expert members. The supporting group includes members from allied disciplines and areas of activities, including top management personnel.

This is shown as **Figure 40**.



**Figure 39: Organizational Set-up for Environment Management Cells**

### ***EMP BUDGET***

Total Project Cost is **2.84cr**. The allocated budget for the **EMP and CER Programme** is **Rs. 13,08,500** and **Rs. 5,68,000** 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**.

The EMP budget is given in **Table 6**.

**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		20,000
		Noise Pollution		20,000
		Soil		10,000
2	Water Sprinkling	Water sprinkling will be done at approach road during the lease period in phases		1,00,000
3	Green Belt	Trees will be planted along the river bank and along the kuccha road during the lease period in phases.		3,24,,000
4	Road maintenance	Repair and maintenance of approach road		5,00,000
5	Emplyees Wealfare	Rest room, Kicthen, Bathroom etc, on the project site		2,83,500
<b>Total EMP Cost</b>				<b>13,08,500</b>

### ***CORPORATE ENVIRONMENTAL RESPONSIBILITY***

The Corporate Environmental Responsibility (CER) Policy aims to promote good corporate governance and socially and environmentally responsible business practices. The allocated budget for the CER Programme is **Rs. 5,68,000** based on a project cost of **Rs. 7.90 cr**. This amount will be spent annually. However, as per the OM 22-65/2017.IA.III dated 30th Sept, 2020, the CER activity may be replaced by other activities i.e., issues raised at the time of public hearing.

**Table 7: CER Budget**

Sl. No.	Considerations	CER Cost in Rs. (1 st year)	CER Cost in Rs. (2 nd year)
1.	Constract Toilet for sutudents of Canchai IDILPUR Tapashili Adibasi Heigh School (HS)	1,34,000	1,34,000
2.	Instalation Water purifuire for sutudents of Canchai IDILPUR Tapashili Adibasi Heigh School (HS)	50,000	1,00,000
3	Medical Camp	50,000	50,000
3.	Plantation work near by School premises	50,000	50,000
<b>Total/Year in Rs.</b>		<b>2,84,000</b>	<b>2,84,000</b>
<b>Total in 2 years</b>		<b>5,68,000</b>	

****The entire CER cost of Rs. 5,68,000 will be invested within 2 years for the mentioned purpose after consultations with local villagers and local administrative**

## **CHAPTER:-11**

# **SUMMARY AND CONCLUSION**

## SUMMARY AND CONCLUSION

### *INTRODUCTION*

The applicant **NAMITA ENTERPRISE, IDILPUR SAND MINE** has obtained Sand mining lease through e-tendering from the Govt. of West Bengal vide Letter of Intent No. **286/143/MM/ 2018**, dated **01/10/2018** over an area of **12.34 acres / 4.99 ha** on Damodar River near Mouza- IDILPUR, P.S- BARDHAMAN, Dist. - Purba Bardhaman, West Bengal, over Plot No.1293(P), 1377(P) & OTHS 14 , J.L No-24.Last Lol vide no. **PBD-54015999)/221/2024/MM/42** was extended by Office of the District Land & Land Reforms Officer, Purba Bardhaman dated **08.01.2024 which is 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**.The validity period of the lease is 5 years from the date of deed registration. Issued ToR letter vide no. **TO24B0107WB5867974N to NAMITA ENTERPRISE, on 15th May, 2024** for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of the EIA Notification; 2006. The Terms of Reference (ToR) issued for the project are provided as **Annex 1**. in the Environmental Impact Assessment (EIA) report. The estimated total reserve within the leasehold area is approximately **39651m³/year**, with sand replenishment planned annually after the monsoon. To protect the riverbanks, mining will occur at a distance of 100m or 1/3rd of the distance between the bank lines, whichever is less. After leaving a safety barrier of 7.5m, a mining area of **4.30Ha** remains, containing the mineable reserve of **120789.35 m³ /year**. The maximum mining depth will be **2.90m**, and the proposed average production capacity is **205 m³/day**.

**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 2.90 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 mechanised. 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 0.04-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.

### Raw Material Required

Inputs	Approx. quantity required	Basis
<b>Water Requirement</b>		
Water for Drinking	0.31 KLD	100litre/capita/day
Dust Suppression & others	3.00KLD	0.002 Liter per plant 2 times a day
Water for green belt development	6.78 KLD	Length of Road (m) x Width of Road (m) x 1litre/m ² x 2times per day)

### ***DESCRIPTION OF ENVIRONMENT***

The baseline data has been collected from March 2024 to May 2024. The details are given below:

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

#### **Particulate Matter 10 (Pm₁₀)**

The results of PM₁₀ of all locations are showing variations from 66.2 µg/m³ to 74.8 µg/m³ in. 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 24.8 µg/m³ to 35.2 µg/m³. 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: 0.04% to 0.49%.

#### **Gaseous Pollutants**

The results of SO₂ of all locations are showing variations from 8.7 µg/m³ to 10 µg/m³ at. However, the results are within the limits of National Ambient Air Quality Standards.

The results of NO₂ of all locations are showing variations from 26.7 µg/m³ to 28.5 µg/m³. However, the results are within the limits of National Ambient Air Quality Standards (NAAQS).

The lowest level of CO was observed (0.04 mg/m³) while the highest value (0.43 mg/m³) was observed. These levels are found to be well within the NAAQS standard of 2.0 mg/m³ for residential and industrial areas.

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 52.6 dB(A) to 53.1 dB(A) which is well within the standard limits of residential area are ~ 55 dB(A). The night time noise result is varying from 44.8 dB(A) to 24.1 dB(A) at IDILPUR which is within the standard limits of residential ~ 24 dB (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 6.84 to 7.1 which are well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 146.to 152 mg/l. Chlorides were found to be in the range of 34.42 mg/l to 42.74 mg/l .Sulphate was found to be in the range of 44.5 mg/l to 49.06 mg/l.

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

**Surface Water results:** The pH of the surficial water is 7.3 (SW1) and 7.4 (SW2) which indicates a slightly alkaline nature. In both the samples, the DO exceeds 5.4 mg/l to 5.8 mg/. The BOD concentration is 3.5 mg/l (SW1) and 4.0 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 1100 MPN/1400ml.

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 4 locations:

pH ranging from 7.12 to 7.35 in the study area. Bulk density of the study area ranges between 1.35 gm/cm³ S4 to 1.39 gm/cm³ at S2 .Electrical conductivity of the soil samples is found to be average and ranges from 318 µmhos /cm to 224 µmhos /cm. Organic carbon of the soil samples varies from 0.42% to 0.46% . Nitrogen content in the surface soil of the study area varies between 136.8 kg/ha at S3 (Chalbalpur) to 144.4 kg/ha at S4.

Available Phosphorus ranges between 41.8 kg/ha to 44.6 kg/ha .Potassium content in the study area ranges between 36.7kg/ha to 72.6kg/ha.Based on the provided data, it can be inferred that the soil in the study area has medium fertility, indicated by medium and low 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.

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**Ecology and Biodiversity Results:**

**Flora:** The flora of Purba Bardhaman district is composed mostly of woody plants. Amongst the flora are: Neem (*Azadirachta indica*), amlaki (*Phyllanthus emblica*), coconut, date palm, tal (Palmyra palm / *Borassus flabellifer*), bat (banyan/ *Ficus benghalensis*), asvattha (pipal/ *Ficus religiosa*), palash (*Butea monosperma*), krishnachuda (*Caesalpinia pulcherrima*) and Aam (mango/ *mangifera indica*). There are some shrubby plants: ashsheoda (orangeberry/ *Glycosmis pentaphylla*), tulsi (basil/ *Ocimum tenuiflorum*) etc.

The common aquatic or marsh weeds found in jheels (lakes) and swamps of the eastern part of the district (in the Bhagirathi Basin) are: bena (*andropogon squarrosos*), water hyacinth (*Eichhornia crassipes*), padma (*nelumbo nucifera*), hogla (*Typha domingensis*) etc. (Census,2011).

**Fauna:** The mammals of the district include Small Indian Civet and Five Striped Squirrel whilst wild boar and monkeys (including hanuman) are seen frequently. Poisonous snakes such as Indian cobra, common krait and Russell's viper, as well as dhamnas and harmless grass snakes are very common. The common avifauna of the district include Purple Heron, Lesser Whistling Teal, Indian robin and common myna. Other bird species include fowls, crows, munia, sparrow, cuckoo, Asian koel, parakeet, woodpecker, kingfisher, owl, vulture, eagle, kite, hawk, stork, duck, pigeon, falcon and heron. The low-lying swampy areas are home to migratory birds in winter.

**Socio Economic Study Results:** The study area encompasses 162 villages within the buffer zone. The study was conducted using a combination of primary surveys and secondary data sourced from the Census of India 2011 report.

**Core Zone:** There is no habitation in the core zone.

**Buffer Zone:** The village area of the study region comprises 87,436 households, based on the Census of India, 2011 data. The details are given below:

**Population:**

Total population of the study area is 3,74,280 in 87,436 households, implying that there is an average of 4 members per household. According to the survey, gender ratio of study area was 973 in 2011.

### **Social Structure**

The proportion of Scheduled Caste (SC) population within the study area is 38.50 out of total population and the percentage of Scheduled Tribes (ST) is 13.68% out of the total population.

### **Literacy**

The total proportion of literates within the study area is 66.50% of total population. Out of 66.50%, the male literacy is 55.0% and the female literacy is 24.0%, within study area.

The project will provide direct employment opportunities for 108 individuals, with a focus on hiring local residents in addition to fulfilling any necessary statutory employment requirements.

### **Traffic:**

Traffic density measurements were conducted continuously for 24 hours using visual observation and vehicle counting in four categories: heavy motor vehicles, light motor vehicles, two/three wheelers, and cycles. To account for low road traffic density, two skilled individuals were deployed during each shift, with one person assigned to each direction for counting the traffic. Hourly counting and recording of vehicles were performed, resulting in the determination of the total number of vehicles in each category per hour.

A summary of the traffic density monitored during survey period is given in Chapter 3.

### ***ANTICIPATED IMPACTS AND MITIGATION MEASURES***

- **Land Environment:** A detailed study was conducted to analyze the characteristics of the study area's land environment, including land use, soil, and vibration. This study aimed to gain a thorough understanding of the study area's land attributes and their potential role in the propagation of pollution.
- **Water Environment:** The proposed mining project has a total water requirement of **5.78KLD** (Kilo Litres per Day). Drinking water needs will be fulfilled by sourcing it from the nearest village. Water for sprinkling and plantation purposes will be obtained through private tankers.
- **Air Environment:** The primary source of air pollution in the area is the road transport network, specifically trucks and dumpers. To mitigate this, regular water sprinkling on the roads will be implemented, resulting in a 75% reduction in dust emissions.
- **Noise Environment:** The proposed mining operations will employ well-maintained equipment, and workers will be provided with appropriate protective gear, including ear plugs and muffs if necessary. Additionally, plantation activities will be undertaken to establish a natural barrier against noise sources.
- **Biological Environment:** Lease area is in a Non-Forest Land. The proposed project will have no adverse impact on the flora and fauna in the area.

- **Socio-Economic environment:** The project will enhance direct and indirect employment in the area. Therefore, overall economic development is likely to improve after the commencement of the project
- **Mine Waste:** As the proposed mine does not generate any waste or mineral rejects, onsite dustbins will be provided for proper management of food waste, which will be regularly cleaned. A compost pit will also be constructed to dispose of food waste. Additionally, mobile toilets will be made available on site.
- **Impacts due to transportation:** The mineral will be transported to the market through tipper trucks/tractORS. Transportation shall be done by thirty-six 11.50T tipper trucks/tractORS. As per the study done, there will not be any congestion due to the proposed project on the road.

### ***ENVIRONMENT MONITORING PLAN***

A systematic environmental monitoring program will be implemented within the mining lease area and a 10 km radius study area. A comprehensive network for monitoring has been developed, considering factors such as pollution sources from mining operations, wind direction, drainage pattern, topography, and the biological environment. Sampling locations have been identified accordingly to ensure comprehensive coverage and accurate assessment of environmental parameters.

### ***ADDITIONAL STUDIES***

**Risk Assessment & Disaster Management Plan:** During the proposed five-year plan period, there is no anticipation or occurrence of high-risk factors such as landslides, subsidence, floods, fires, or tailing dam failures. Consequently, there is no need for an emergency plan for quick evacuation or additional protective measures. Furthermore, as the working area is distant from any local population, no local inhabitants are present.

**Rehabilitation and Resettlement:** There is no human habitation at the project site. So, there will be no rehabilitation and resettlement issue.

### ***PROJECT BENEFITS***

The proposed mining project has a substantial positive impact on the socio-economic environment, supporting the overall development of the area. It contributes significantly to economic growth by generating direct employment for 108 individuals and creating numerous indirect employment opportunities for the local community.

### ***ENVIRONMENT MANAGEMENT PLAN***

To ensure effective environmental protection measures throughout and after the commissioning of the proposed mining project, the preparation of an Environmental Management Plan (EMP) is necessary. The EMP serves as a comprehensive framework for formulating, implementing, and monitoring environmental safeguards. With a project cost of **Rs. 2.84cr.**, the EMP cost is estimated to be **Rs. 13,08,516.**

Budget towards Corporate Environment Responsibility (CER) will be **Rs. 5,68,000** as the annual recurring cost.

By the end of the lease period green belt development programme will be carried out over an area of **0.7161ha**. Local species will be considered for the plantation purpose.

**Among other environmental protection measures, following are listed below:**

- Sprinkling of water for dust suppression on mine haul roads.
- Regular compaction & grading of haul roads and service roads to clear accumulation of loose material.
- Avoid overloading of dumpers and consequent spillage on the roads.
- Good maintenance of vehicles & machinery.

Water sprinklers of fixed type will be provided at the mine approach roads to prevent the generation of dust.

## **CHAPTER : 12**


# **Disclosure of the Consultants Engaged**


I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

**Area Expert of West Bengal in Minor Minerals Sector:- Dr.Tuhin Ray**



Signature:- 


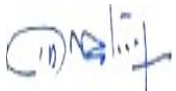


**Period of involvement:- March to May**


S. No.	Functional areas	Name of the experts	Period	Involvement (period and task)	Signature and date
1	AP	Mr. P.Gopinath	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Selection of AQ stations in compliance with CPCB /MoEF&amp;CC guidelines.</li> <li>❖ Interpretation of baseline data w.r.t CPCB standards.</li> <li>❖ Identification of sources of pollution and its in vectorization.</li> <li>❖ Preparation of Management plan with budgetary provision for all the sources of pollution.</li> <li>❖ Suggestion of Operational monitoring program to verify and keep the levels well within the norms from time to time.</li> </ul>	

2	AQ	Mr. P.Gopinath	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Collection of primary data.</li> <li>❖ Quantification of Air pollution sources (point and line sources)</li> <li>❖ Impact prediction using AERMOD View Modelling and its interpretation.</li> <li>❖ Delineating the Incremental load on the existing scenario.</li> <li>❖ Suggesting management plan with budgetary provision.</li> <li>❖ Suggestion of Operational, monitoring program to verify and follow up to keep the levels well within the norms from time to time.</li> </ul>	
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5	SE	Mr. S. Pandian	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Collection of Secondary data (Census of India &amp; District Handbook).</li> <li>❖ Collection of primary data of the study area through Questionnaire method.</li> <li>❖ Compilation and analysis of primary &amp; secondary data to identify the various activities required on need basis.</li> <li>❖ Identification and prediction of Socio-economic impacts.</li> <li>❖ Enumerating the benefits of the project in terms of employment, development, etc.</li> <li>❖ Preparation of Environmental Social Responsibility activities based on the need basis with budgetary provisions in compliance with Companies</li> </ul>	
				act and MoEF&CC guidelines.	
6	EB	Dr. A. Dhamodharan	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Site Visit</li> <li>❖ Conducted ecological survey and identification of flora and fauna.</li> <li>❖ Identification of impacts and suggested mitigation measures.</li> <li>❖ Interpretation of data, preparation of conservation plan for Schedule I species.</li> </ul>	

7	LU	Mr. P.Gopinath	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Collection of Primary and secondary data (Topo sheet, satellite, imaginary, coordinates of known vectors, etc.)</li> <li>❖ Geo-referencing the Primary data with secondary data GIS software.</li> <li>❖ Preparation of Land use and Land cover map.</li> <li>❖ Identification and its Impact prediction.</li> </ul>	
8	GEO	Dr. T. P. Natesan	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Collection of Primary Data</li> <li>❖ Interpretation and Prediction of Impact.</li> </ul>	
9	HG	Mr. R. Alagumuthuselvam	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Collection of Primary Data</li> <li>❖ Interpretation and Prediction of Impact.</li> </ul>	
10	RH	Mrs. K. Vijayalakshmi	March 2024 – June 2024	<ul style="list-style-type: none"> <li>❖ Identification of risk and hazards.</li> <li>❖ Management of Hazard controls.</li> <li>❖ Preparation of Disaster Management Plan with Onsite and Offsite Emergency Plan.</li> <li>❖ Delineating, firefighting facilities and system.</li> <li>❖ Preparation of Occupational</li> </ul>	

				❖ Health and Safety Management Plan with budgetary allocations.	
11	SC	Dr. A. Dhamodharan	March 2024 – June 2024	❖ Soil quality Data and sampling.	

Plot No.48A, 2nd Main Road,  
Ram Nagar, South Extension,  
Pallikaranai, Chennai - 600 100.  
GST NO. 33AADCE6103A2ZH  
PAN NO. AADCE6103A



**Eco Tech Labs Pvt Ltd**

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Website : www.ecotechlabs.in  
CIN : U74900TN2014PTC094895

### TO WHOM IT MAY CONCERN

I Dr. Dhamodharan, Managing Director of Eco Tech Labs Pvt. Ltd. do hereby authorise Dr. Tuhin Ray Proprietor of Ray Techno Solutions, as Area Expert of West Bengal in Minor Minerals sector and hereby authorise him to represent the Sand Mining projects on my behalf.

Thanking you

Yours truly

Dr. Dhamodharan

**Dr. A. DHAMODHARAN**  
(NABET APPROVED EIA COORDINATOR)  
NABET/EIA/22-25/SA 0222  
Environmental Consultant  
Eco Tech Labs Pvt. Ltd  
Plot No.48A, 2nd Main Road, Ram Nagar South Extn.  
Pallikaranai, Chennai - 600 100.

# **Annexure:- 1**

## **TOR Approved Letter**



सत्यमेव जयते

**File No: EN/T-II-I/111/2025**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment**  
**Authority(SEIAA), WEST BENGAL)**

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Dated 28/05/2025



To,

Kanai Chandra Das  
 NAMITA ENTERPRISE, IDILPUR  
 Kanchannagar, Purba Bardhaman , PURBA BARDHAMAN, WEST BENGAL, , 713102  
 kanaichandrad799@gmail.com

**Subject:** Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

**Sir/Madam,**

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Idilpur Sand Mine submitted to Ministry vide proposal number SIA/WB/MIN/533630/2025 dated 26/04/2025.

2. The particulars of the proposal are as below :

<b>(i) TOR Identification No.</b>	TO25B0107WB5773681N
<b>(ii) File No.</b>	EN/T-II-I/111/2025
<b>(iii) Clearance Type</b>	TOR
<b>(iv) Category</b>	B1
<b>(v) Project/Activity Included Schedule No.</b>	1(a) Mining of minerals
<b>(vii) Name of Project</b>	Idilpur Sand Mine
<b>(viii) Name of Company/Organization</b>	NAMITA ENTERPRISE, IDILPUR
<b>(ix) Location of Project (District, State)</b>	PURBA BARDHAMAN, WEST BENGAL
<b>(x) Issuing Authority</b>	SEIAA
<b>(xii) Applicability of General Conditions</b>	no
<b>(xiii) Applicability of Specific Conditions</b>	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the Ministry for an appraisal by the State Environment Impact Assessment Authority(SEIAA) in the Ministry under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority (SEIAA) in the meeting held on 22/05/2025. The minutes of the meeting and all the Application and documents submitted [(viz.

Form-1 Part A, Part B, Part C EIA, EMP]] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The brief and salient features of the project are as follows : This is a proposal for Idilpur Sand Mine (Sand Block No. BARDHAMAN-I/IDILPUR/810(P) & OTHS7/B) over an area of 4.99 Ha. (12.34 Acres) on the Damodar River at Vill/Mouza-Idilpur, JL No-24, Plot No.-810 (P), 812(P), 829 (P), 830(P), 1267(P), 1268(P), 1419(P), 1420(P), PS-Bardhaman, Dist- Purba Bardhaman, West Bengal by Namita Enterprise .

**The project is falling within the DSR potential zone code PBBD_BD1_DA_12(XIIB) and PBBD_BD1_DA_12(XIIA).**

**According to the DSS of the PARIVESH portal, the project area does not touch any CRZ & ESZ. The nearest PA VII – Ramnabagan is at a distance of 5.16 km, RFA – BURDWAN is at a distance of 4.06 km.**

As required under the West Bengal Minor Mineral Concession Rules, 2016, the PP got a composite ‘Mining Plan with Progressive Mine Closure Plan’ prepared for riverbed sand mining at the site by an RQP. The revised Mining Plan has been approved by the State Government on 15.01.2025 and the approved plan has been uploaded at the PARIVESH portal by the PP.

The PP has uploaded the copy of the valid LoI, pre-feasibility report and cluster certificate from the competent authority. **The sand block is forming cluster with adjacent 3 (three) no. of sand blocks of BID IDs 2017_WB_370 of M/s. Namita Enterprise, MIN_EBUR_53 of M/s. WBMDTCL and MIN_EBUR_23 of M/s. WBMDTCL.**

6. The SEIAA, in its meeting held on 22/05/2025, based on information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of specific and general conditions as detailed in Annexure (1).
7. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the State Expert Appraisal Committee (SEAC) hereby decided to grant Terms of Reference for instant proposal of M/s. Kanai Chandra Das (M/s. Namita Enterprise) under the provisions of EIA Notification, 2006 and as amended thereof.
8. **Potential impact study in the EIA should be done considering the cumulative effect of all the mines in the cluster situation, if any.**
9. The Ministry reserves the right to stipulate additional conditions, if found necessary.
10. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
11. **The ToR is valid for a period of 4 years from the date of issue. EIA/EMP to be submitted before the expiry of the ToR for consideration of EC applications.**
12. This issues with the approval of the Competent Authority.

## Annexure 1

### Specific Terms of Reference for (Mining Of Minerals)

#### 1. A. Standard Terms Of Reference

S. No	Terms of Reference
1.1	1. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.

S. No	Terms of Reference
	<p>2. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.</p> <p>3. All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.</p> <p>4. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).</p> <p>5. Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.</p> <p>6. Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.</p> <p>7. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.</p> <p>8. Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.</p> <p>9. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.</p> <p>10. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p> <p>11. Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&amp;R issues, if any, should be given.</p> <p>12. A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.</p> <p>13. Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.</p> <p>14. Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.</p> <p>15. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.</p> <p>16. A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with</p>

S. No	Terms of Reference
	<p>cost implications and submitted.</p> <p>17. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.</p> <p>18. A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.</p> <p>19. Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.</p> <p>20. Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).</p> <p>21. R&amp;R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&amp;R Plan, the relevant State/National Rehabilitation &amp; Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectorial programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&amp;R and socio-economic aspects should be discussed in the Report.</p> <p>22. One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p> <p>23. Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p> <p>24. The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.</p> <p>25. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.</p> <p>26. Description of water conservation measures proposed to be adopted in the Project should be</p>

S. No	Terms of Reference
	<p>given. Details of rainwater harvesting proposed in the Project, if any, should be provided.</p> <p>27. Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.</p> <p>28. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.</p> <p>29. Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.</p> <p>30. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.</p> <p>31. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.</p> <p>32. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.</p> <p>33. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.</p> <p>34. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.</p> <p>35. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.</p> <p>36. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.</p> <p>37. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.</p> <p>38. Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.</p> <p>39. Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.</p> <p>40. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.</p> <p>41. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.</p>

S. No	Terms of Reference
	<p>42. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.</p> <p>43. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.</p> <p>44. Besides the above, the below mentioned general points are also to be followed:-</p> <p>a. Executive Summary of the EIA/EMP Report (enclosed as <b>Annexure – A</b>).</p> <p>b. All documents to be properly referenced with index and continuous page numbering.</p> <p>c. Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.</p> <p>d. Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&amp;CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.</p> <p>e. Where the documents provided are in a language other than English, an English translation should be provided.</p> <p>f. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.</p> <p>g. While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&amp;CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.</p> <p>h. Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&amp;CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.</p> <p>i. As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.</p> <p>j. The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.</p>

#### 2. B. Additional Terms Of Reference Imposed By Seac –

S. No	Terms of Reference
2.1	<p><b>1) The potential impact study in the EIA should be done considering the cumulative effect of all the mines in the cluster situation, if any.</b></p> <p>2) Surface and ground water hydrology should be included in the EIA report.</p> <p>3) Drone videography of the entire project area explicitly showing the entire project site along with the existing tree plantation/green belt. Minimum 2 minute video to be submitted.</p> <p>4) Photographs of the site mentioning the geo-coordinates.</p> <p>5) Standard practice of management of the intermediate storage area should be submitted.</p> <p>6) Means of access and egress between the embankment and the sand quarry may be clearly earmarked. The Project Proponent must commit that no hard toping or paving of any haulage route within the riverbed will be attempted.</p> <p>7) A plan on the management and handling of sand during the period of intermediate stockpiling should be submitted.</p> <p><b>8) The PP has to do tree plantation in an area equivalent to 33% of the lease area @2500 trees / ha within first two years from the starting of the mining operation. A Progressive Greenbelt Plan may be prepared.</b> The project area being entirely on the riverbed, afforestation/ vegetation should be attempted alongside the village roads or other public land. This may be done with prior</p>

S. No	Terms of Reference												
	<p>approval of the local self-governing bodies. If no public land is available for the purpose the Project Proponent shall arrange for land with his personal means. To enhance success/ survival rate the plantation shall be attempted during the first two years of the project life and the plantation so done shall be taken care of during the rest of the project life. Species of the plant selected should be self-sustaining in that particular region. Spatial year wise progressive plantation programme to be submitted.</p> <p>9) Plan showing spatial year wise distribution of the proposed greenbelt has to be submitted along-with supporting documents of administrative approval/s.</p> <p>10) EIA should also include detailed study of the baseline condition and impact on aquatic flora and fauna.</p> <p>11) The project cost may include the auction bid value, estimated royalty to be paid, cost of any infrastructure built like office space, stockyard, etc. The calculation/documents to estimate the project cost should be submitted. The planned expenditure for components like need-based activities may be derived based on the project cost.</p> <p>12) A need-based EMP may be prepared in accordance with the MoEF&amp;CC Office Memorandum vide F. No. 22-65/2017.IA.III dated 30.09.2020. Record of communications made in this regard with the identified/ intended beneficiaries (schools/ institutions etc) may also be uploaded. Evidence of the activities should be provided by photographs with geo-coordinates. The activities should be completed within the first two years of the project life and submitted in a table format showing the proposed expenditure under individual heads separately for two years.</p> <p>13) A study report on base flow level measured at 5 points with date and supporting photographs should be submitted. It should be committed that mining will be done at least 1m above the base flow level. Accordingly, if required, the excavation plan may also be revised.</p> <p>14) Management plan including the final closure plan of haul road to be submitted.</p> <p>15) Study and protection plan of the aquatic life available both during the mining and non-mining seasons should be provided. A comprehensive biodiversity study on the site of the whole cluster should be done.</p> <p>While applying for environmental clearance, the PP shall upload in the PARIVESH portal, the EIA/EMP report along with the documents/ submissions/ clarifications sought hereinabove. The West Bengal Pollution Control Board shall arrange public hearing as per EIA Notification, 2006 on submission of draft EIA/EMP prepared by the Project Proponent as per the above-mentioned ToRs. All the issues mentioned in the 'Public Hearing Report' and public consultation must also be addressed and incorporated in the final EIA / EMP report. The project proponent is requested to pursue the matter with the WBPCB for organizing the public hearing/consultation on submission of the draft EIA/EMP report as per the provision of EIA notification 2006 &amp; its amendments. The project proponent is requested to submit the final EIA/EMP prepared as per the above-mentioned ToRs and incorporating all the issues raised during Public Hearing / Public Consultation to the SEAC for further consideration of the proposal for environmental clearance.</p> <p><b>The ToR is valid for a period of 4 (four) years from the date of issue.</b></p> <p>The contact details of the proponent and the name of the consultant are given below –</p> <table border="0"> <tr> <td>Name of the Contact person with</td> <td>Kanai Chandra Das (Namita Enterprise) Proprietor,</td> </tr> <tr> <td>Designation</td> <td>Idilpur Sand Mine</td> </tr> <tr> <td>Correspondence Address</td> <td>Fakirpur, Kanchannagar, Purba Bardhaman, Pin-713102</td> </tr> <tr> <td>Email</td> <td>kanaichnadr799@gmail.com/tfp2009@gmail.com</td> </tr> <tr> <td>Telephone Number / Mobile Number</td> <td>8617261563</td> </tr> <tr> <td>Name of the Environmental Consultant</td> <td>Not engaged</td> </tr> </table>	Name of the Contact person with	Kanai Chandra Das (Namita Enterprise) Proprietor,	Designation	Idilpur Sand Mine	Correspondence Address	Fakirpur, Kanchannagar, Purba Bardhaman, Pin-713102	Email	kanaichnadr799@gmail.com/tfp2009@gmail.com	Telephone Number / Mobile Number	8617261563	Name of the Environmental Consultant	Not engaged
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Email	kanaichnadr799@gmail.com/tfp2009@gmail.com												
Telephone Number / Mobile Number	8617261563												
Name of the Environmental Consultant	Not engaged												

### 3. Annexure - A

S. No	Terms of Reference
3.1	<p><b>Annexure - A</b>  <b>Executive Summary</b>  The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:</p> <ol style="list-style-type: none"> <li>1) Project name and location (Village, District, State, Industrial Estate (if applicable).</li> <li>2) Products and capacities. If expansion proposal, then existing products with capacities and reference to earlier EC.</li> <li>3) Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative).</li> <li>4) Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.</li> <li>5) Measures for mitigating the impact on the environment and mode of discharge or disposal.</li> <li>6) Capital cost of the project, estimated time of completion.</li> <li>7) Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km. other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary).</li> <li>8) Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population.</li> <li>9) Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.</li> <li>10) Likely impact of the project on air, water, land, flora-fauna and nearby population.</li> <li>11) Emergency preparedness plan in case of natural or in plant emergencies.</li> <li>12) Issues raised during public hearing (if applicable) and response given.</li> <li>13) Environment Management Plan (EMP) as per Office Memorandum issued by the MoEF &amp; CC vide F. No. 22-65/2017-IA.III dated 30.09.2020 with proposed expenditure.</li> <li>14) Occupational Health Measures.</li> <li>15) Post project monitoring plan.</li> </ol>

Signature Not Verified

Digitally Signed by : Shri Dharmdeo Rai  
IFS  
Member Secretary, SEIAA

Date: 31/05/2025

# ANNEXURE:- 2

**LOI**



GOVERNMENT OF WEST BENGAL  
OFFICE OF THE DISTRICT LAND AND LAND REFORMS OFFICER  
PURBA BARDHAMAN

P.O. RAJBATI, PURBA BARDHAMAN, PIN CODE: 713104

Phone no.0342-2530641

e-mail:[dlopurbaburdwan@gmail.com](mailto:dlopurbaburdwan@gmail.com)

Memo No:PBD-54015(99)/215/2024/MM/ 44

Date 08/01/2025

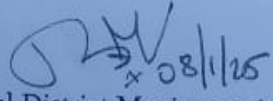
To

Namita Enterprise  
H1 Bidder of Idilpur Sand Block,  
(Auction Id: 2017_WB_369)  
Fakirpur, P.O- Kanchannagar  
Dist- Purba Bardhaman  
Pin- 713102

Sub:Extension of validity of LoI issued vide memo no:292/306/MM/AUCTION 22/18  
dated 26.03.2018

In reference to the above stated subject matter, this is to inform him that as per the order of the I&CE Department issued vide memo no: 610-ICE/O/MIN/GEN-MIS/27/2021 dated 20.10.2022 the validity of the LoI issued vide this office memo no: 292/306/MM/AUCTION 22/18 dated 26.03.2018 is hereby extended.

As per the above mentioned order of I & CE Department the LoI shall remain valid till 60(sixty) days after the disposal of EC application by SEIAA.

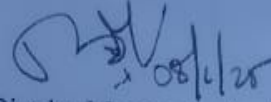
  
Additional District Magistrate And  
District Land & Land Reforms Officer,  
Purba Bardhaman

Memo No: PBD-54015(99)/215/2024/MM/ 44/1 (3)

Date 08/01/2025

Copy to:

- 1.The Secretary to the Govt. of West Bengal, Industry Commerce and Enterprises, Shilpa Sadan, 6th Floor, 4, Abanindranath Tagore Sarani (Camac Street), Kolkata-700016
- 2.The Chief Mining Officer, Court Road, Asansol, Paschim Bardhaman
- 3.The BL&LRO, Bardhaman-I, Purba Bardhaman

  
Additional District Magistrate And  
District Land & Land Reforms Officer,  
Purba Bardhaman



GOVERNMENT OF WEST BENGAL  
OFFICE OF THE DISTRICT LAND & LAND REFORMS OFFICER  
PURBA BARDHAMAN

P.O. RAJBATI, BARDHAMAN. PIN CODE: 713104

Phone no.0342-2530641 / Fax no.0342-2533348/e-mail: dlroburdwan@gmail.com

Memo. No.:292/306...../MM/AUCTION 22/18

Dated:26/03/2018

To  
NAMITA ENTERPRISE  
FAKIRPUR, POST-KANCHANNAGAR, DISTRICT-PURBA BARDHAMAN, PIN-713102

Sub: Letter of Intent (LOI) with reference to e-auction bearing ID No. 2017_WB_369 conducted on 20/12/2017 for grant of mining lease for sand in sand block BARDHAMAN-I/IDILPUR/810(P)&OTHS7/B located in plot No.s 810(P), 812(P), 829(P), 830(P), 1267(P), 1268(P), 1419(P), 1420(P). in Mouza-IDILPUR J.L. No. 24, P.S. BARDHAMAN District Purba Bardhaman over an area of 12.34 acres ( 4.99 hectares).

Background

1. The District Committee for Competitive Bidding of Minor Minerals (henceforth the District Committee) Purba Bardhaman, pursuant to rules 38 and 41 of the west Bengal Minor Minerals Concession Rules, 2016 and the West Bengal Minor Minerals (Auction) Rules, 2016 (hereinafter auction rules) issued notice inviting tender dated 07/12/2017 to commence the e-auction process for grant of mining lease for sand in respect of sand block BARDHAMAN-I/IDILPUR/810(P)&OTHS7/B located in plot No.s 810(P), 812(P), 829(P), 830(P), 1267(P), 1268(P), 1419(P), 1420(P). in Mouza-IDILPUR J.L. No. 24, P.S. BARDHAMAN District Purba Bardhaman over an area of 12.34 acres ( 4.99 hectares). The e-auction process was conducted in accordance with the said Rules and also the tender document for the said sand block which was duly published in Government's e-procurement portal as per extant rules and NAMITA ENTERPRISE has been declared as successful bidder under Rule 9 (8) of the said Auction Rules.

2. As required under Rule 10(1) of the said Auction Rules, NAMITA ENTERPRISE has made payment of Rs. 3688500/- (THIRTY SIX LAKH EIGHTY EIGHT THOUSAND FIVE HUNDRED ONLY), through GRN No 19-201718-017531304-2(SBI) dated 19/02/2018, along with EMD of Rs. 493600.00/- (FOUR LAKH NINETY THREE THOUSAND SIX HUNDRED ONLY), through GRN No 19-201718-015108299-2(SBI) dated 10/01/2018, towards one-third of the bid amount as first instalment.

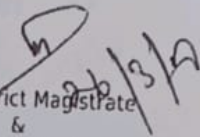
Letter of Intent

Accordingly, pursuant to Rule 10 (3) of the said auction Rules, this letter of intent is hereby issued for grant of mining lease for sand in respect of sand block BARDHAMAN-I/IDILPUR/810(P)&OTHS7/B located in plot No.s 810(P), 812(P), 829(P), 830(P), 1267(P), 1268(P), 1419(P), 1420(P). in Mouza-IDILPUR J.L. No. 24, P.S. BARDHAMAN District Purba Bardhaman over an area of 12.34 acres (4.99 hectares). in favour of NAMITA ENTERPRISE for a period of 5 (five) years subject to the following terms and conditions:

Terms and Conditions

1. This letter of intent and subsequent grant of aforementioned mining lease shall be subject to the provisions of the MMDR Act, 1957, West Bengal Minor Minerals Concession Rules, 2016 and West Bengal Minor Minerals (Auction) Rules, 2016 as amended from time to time and NAMITA ENTERPRISE shall be granted the mining lease only upon satisfactory completion of the requirements stipulated in the said Rules.
2. The balance amount of bid money shall be payable in three installments with a gap of maximum 45 days each from the date of 1st installment (Sub rule (2) of Rule 10 of auction rules).
3. NAMITA ENTERPRISE (henceforth the successful bidder) shall furnish a Mining Plan along with Mine Closure Plan as per model format issued by the Commerce and Industries Department under letter No. 420-CI/O/MIN/GEN-MIS/16/2016(PT.) dated 28/07/2016, duly approved by the competent authority within one month from the date of issue of the Letter of Intent (LoI).
4. The successful bidder shall furnish Financial Assurance amounting Rs. 74908 (SEVENTY FOUR THOUSAND NINE HUNDRED EIGHT ONLY) in any of the forms mentioned under Rule 18(2) of the West Bengal Minor Minerals Concession Rules, 2016 before execution of the deed of lease.
5. The successful bidder shall furnish performance security, being 10% of the bid amount in the form of bank guarantee before execution of the deed of lease mentioned under Rule 11 of the West Bengal Minor Minerals Auction Rules, 2016.
6. The successful bidder shall submit Environmental Clearance (E.C.) in respect of the above mentioned sand block duly issued by District Level Environment Impact Assessment Authority (DEIAA) or State Level Environment Impact Assessment Authority (SEIAA) or Ministry of Environment, Forests & Climate Change (MoEF&CC) as the case may be as per Environment Impact Assessment Notification 2006, as amended.
7. The successful bidder shall also obtain all other consents, approval, no-objections and the like as required under applicable laws for execution of deed of lease.
8. The successful bidder shall be bound to follow the guidelines stipulated in the Sustainable Sand Mining Management Guidelines, 2016 issued by the Ministry of Environment, Forest and Climate Change, Government of India for undertaking mining operation in the concerned sand block after registration of the duly executed mining lease.
9. The successful bidder have to furnish a Draft Mining Lease Deed in the format as specified in Form - D of the West Bengal Minor Minerals Concession Rules, 2016.
10. The Draft Mining Lease Deed should be prepared in durable papers neatly and sufficient space should be kept in between two lines in order to permit, if necessary, correction therein.
11. The Deed of Lease, after execution, shall be registered by the successful bidder at his own cost and no mining operation should be started before registration of the Deed.
12. The successful bidder shall have to incorporate all the conditions as mentioned in the West Bengal Minor Minerals Concession Rules, 2016 in the Draft Lease Deed.
13. The successful bidder shall have to comply with all the statutory requirements before presenting the Deed of Lease for execution before the appropriate authority.
14. The successful bidder shall have to collect corner coordinate of mine block for preparation of mine plan from the office of the under signed.

This Letter of Intent (LoI) shall remain valid for a period of one month from the date of its issuance and if the successful bidder is unable to fulfil all the above conditions within this period he may submit an application addressed to the District Magistrate for extension of time. Such application may be submitted to this end for due processing. The District Magistrate being the Chairperson of the District Committee, reserves the right to extend the validity of Letter of Intent (LoI) for such reasonable period as it deemed fit.

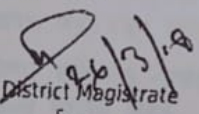
  
Addl. District Magistrate

&  
District Land & Land Reforms Officer  
Purba Bardhaman

Memo No: 292/306...../MM/AUCTION 22/18  
Copy forwarded for information to:

Date: 26/08/2018

1. The District Magistrate & Collector, Purba Bardhaman, West Bengal
2. The Jt. Secretary to the Govt. of W.B., Department of Large Industries and Enterprises, 4 A.N. Tagore Sarani, Camac Street, Kolkata-700016
3. The Chief Mining Officer, Court Road, Asansol, Paschim Bardhaman.
4. The B.L. & L.R.O. _____

  
Addl. District Magistrate

&  
District Land & Land Reforms Officer  
Purba Bardhaman

# **ANNEXURE:- 3**

## **Cluster Certificate**

GOVERNMENT OF WEST BENGAL  
OFFICE OF THE DISTRICT LAND AND LAND REFORMS OFFICER  
PURBA BARDHAMAN

P.O. RAJBATI, PURBA BARDHAMAN, PIN CODE: 713104  
Phone no.0342-2530641

e-mail:dlr@purbahardwan@gmail.com

Memu No: 5401S(99)/230/2024/MM/ 359

Date: 10/03/2025

### Cluster Certificate

This is to certify that the Sand Block: BARDHAMAN-I/IDILPUR/810(P) & OTHS.7/B, Auction Id: 2017_WB_369, H1 Bidder: Namita Enterprise, covering an area amounting to 4.99 Hectare(12.34 Acre), under Police Station: Bardhaman, Mouza Idilpur, J.L. No:24 and situated at plot no:810(P) & Ors.7 is clustering with other 3 (Three) sand Blocks.

The Geo-Coordinates of the sand block: BARDHAMAN-I/IDILPUR/810(P) & OTHS.7/B, Auction Id: 2017_WB_369 as per the Revised Mine Plan is given below:

Boundary Points	Latitude	Longitude
A	23°13'32.77"N	87°48'58.79"E
B	23°13'30.72"N	87°49'04.05"E
C	23°13'20.53"N	87°49'01.13"E
D	23°13'22.49"N	87°48'56.50"E

It has been observed that below mentioned 3 (Three) sand blocks are found within 500 meter radius from the project site.

Sl No	Name of the Lease Holder/ H1 Bidder	Name of the Sand Block/ Auction Id	Status of the Sand Block
01	Namita Enterprise	2017_WB_370	EC Pending Sand Block
02	M/S WBMDTCL	MIN_EBUR_53	Auctioned on 20.01.2025
03	M/S WBMDTCL	MIN_EBUR_23	Auctioned on 24.01.2025

Environmental Clearance may please be granted in accordance with the merit of the Block.

*[Signature]*  
10/03/2025  
Block Land & Land Reforms Officer,  
Bardhaman-1, Purba Bardhaman  
Block Land & Land Reforms Officer  
Sector-1 (Sadar), Purba Bardhaman, W.B.

*[Signature]*  
10/03/25  
Additional District Magistrate and  
District Land & Land Reforms Officer,  
Purba Bardhaman

BID - V - 11066000.00

# **ANNEXURE:- 4**

## **Mining Plan Approval Letter**

GOVERNMENT OF WEST BENGAL  
Office of the Chief Mining Officer  
COURT ROAD, ASANSOL-713304,  
DISTT. - PASCHIM BARDHAMAN

Tele Fax: 0341-2252407  
e-mail : [cmo.dmm-wb@nic.in](mailto:cmo.dmm-wb@nic.in)

Memo. No. 028/CMO/Sand/EBdn/S/656

Dated:- Asansol the 15th January, 2025.

To  
Mr. Kanai Chandra Das (Authorized Signatory),  
Namita Enterprise (Project Proponent),  
Vill. Fakirpur, P.O. Kanchannagar,,  
Dist. Purba Bardhaman, PIN 713102, West Bengal,

**Subject-** Approval of Revised "Mining Plan" for mining of River-bed Sand' (Mineral) in respect of Idilpur Sand Mine, bearing I.D. Bardhaman-I/Idilpur/810(P) & Ors.7/B, in Mouza Idilpur, over Plot No.s 810(P), 812(P), 829(P), 830(P), 1267(P), 1268(P), 1419(P), 1420(P), J.L. No. 24, under P.S. Bardhaman-I, in Distt. Purba Bardhaman, over an Area of 12.34 Acres (4.99 Hectares), allotted to Namita Enterprise (Project Proponent).

**Ref.-** Office of District Land And Land Reforms Officer Memo. No. PBD-54015(99)/194/2024/MM/962, Dated 16.12.2024.

Sir,

In terms of Sub rule 2(b) under Rule 4 of the West Bengal Minor Minerals Concession Rules, 2016, I hereby approve the above mentioned Revised "Mining Plan" in respect of Idilpur Sand Mine, bearing I.D. Bardhaman-I/Idilpur/810(P) & Ors.7/B, allotted to Namita Enterprise (Project Proponent).

01. This Revised "Mining Plan" is approved without prejudice in any other laws applicable to the Mine from time to time whether made by Central Govt., State Govt. or any other authority and the Revised "Mining Plan" is approved without prejudice to any order or direction from any court of competent jurisdiction.
02. It is also clarified that the approval of your aforesaid Revised "Mining Plan" does not in any way imply the approval of the Govt. in terms of any other provisions of Mines & Minerals (Development & Regulation) Act, 1957 and West Bengal Minor Minerals Concession Rules, 2016, framed thereunder and any other laws.
03. It is also clarified that this approval of Revised "Mining Plan" under West Bengal Minor Mineral Concession Rules, 2016 is subject to the provision of Sustainable Sand Mining Management Guidelines, 2016, Enforcement & Monitoring guidelines for Sand Mining, 2020 and other relevant statutes, orders including those issued by Hon'ble Courts of Law (including National Green Tribunal) as may be applicable to the project area from time to time.
04. It is further clarified that approval of the aforesaid Revised "Mining Plan" is subject to the provisions of the Environment Impact Assessment Notification, 2006 as amended.
05. The approved Revised "Mining Plan" is valid for entire duration of lease period.
06. A copy of Environmental Clearance shall be submitted to this office when the same will be issued by the State Level Environment Impact Assessment Authority (SEIAA), West Bengal.

Yours faithfully,

*[Signature]*

Mining Officer  
Govt. of West Bengal

Dated:- Asansol the 15th January, 2025.

Memo. No. 028/CMO/1/Sand/EBdn/S/656

Copy forwarded for information & necessary action to:-

1. The ADM (LR) & DL & LRO, Purba Bardhaman.
2. Sri Arun Kr. Das (QP). Engaged by Ray Techno Solutions Bhatua, Rajhat, Hooghly, WB. 712123.

*[Signature]*  
Subhadeep Kumar Ghosh  
Mining Officer  
Govt. of West Bengal

# **ANNEXURE:- 5**

## **Lab Report & Onsite Meterological**

# Lab Report



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Urvashi Malhar, Phase II, MEAV-25, Bengal Ambuja Housing Complex, City Centre, Durgapur-713216

Contact : 0343-2543019, 9732580459, 9433158173, email : greenvision.dgp@gmail.com, Website : www.greenvisiondurgapur.com



TC-15288

Client : Bangpur-Fakirpur-Idilpur Sand Mine, Purba Radhaman, 713103.

Monitoring Period : Pre Monsoon Season (March'2025 to May'2025)

PM10						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	65.2	76.3	3.0	75.7	71.2	100
AAQ2	68.6	79.2	2.6	78.8	74.8	100
AAQ3	71.2	80.6	2.8	80.0	77.2	100
AAQ4	66.8	74.6	2.5	74.2	71.5	100
AAQ5	62.4	68.3	2.8	68.0	66.2	100
AAQ6	69.0	75.5	3.0	74.8	73.4	100

PM2.5						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	31.3	36.2	1.9	34.2	34.0	60
AAQ2	32.8	36.8	2.2	35.4	35.2	60
AAQ3	34.2	37.8	2.0	33.8	35.8	60
AAQ4	31.7	35.4	1.8	34.0	34.5	60
AAQ5	30.4	32.7	2.0	33.2	32.8	60
AAQ6	33.0	35.6	2.4	34.8	35.0	60

SO2						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	8.4	9.7	0.8	9.6	9.6	80
AAQ2	7.8	8.4	1.0	8.2	8.7	80
AAQ3	8.6	9.8	1.2	9.5	9.6	80
AAQ4	9.2	10.4	1.0	10.2	10.0	80
AAQ5	9.0	10.2	0.9	10.0	9.7	80
AAQ6	8.0	8.8	0.8	8.6	9.0	80

NO2						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	26.4	28.2	1.2	27.5	27.8	80
AAQ2	25.7	27.0	1.0	26.8	26.7	80
AAQ3	26.0	27.4	0.8	27.0	26.8	80
AAQ4	27.2	28.6	0.9	28.4	28.3	80
AAQ5	26.8	28.0	1.0	27.6	27.8	80
AAQ6	27.5	28.8	0.9	28.5	28.5	80

City Office : 84/10, Roy Bahadur Road, Behala, Kolkata-700 034, Ph. : 9433158173

Branch Office : Durgachak, Haldia, Purba Medinipur, Ph. : 8101647425 M.N. Sarkar Road, Mahananda Para, Siliguri-734001



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CO						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	0.38	0.41	0.03	0.4	0.4	2
AAQ2	0.42	0.45	0.04	0.43	0.43	2
AAQ3	0.4	0.42	0.04	0.41	0.41	2
AAQ4	0.4	0.43	0.05	0.42	0.42	2
AAQ5	0.36	0.39	0.03	0.38	0.38	2
AAQ6	0.38	0.4	0.04	0.38	0.39	2

Si						
	Min	Max	STDEV	Percentile 98	Mean	NAAQS
AAQ1	0.38	0.45	0.02	0.46	0.42	--
AAQ2	0.36	0.42	0.03	0.41	0.4	--
AAQ3	0.42	0.47	0.03	0.46	0.46	--
AAQ4	0.4	0.49	0.02	0.48	0.44	--
AAQ5	0.42	0.48	0.04	0.46	0.46	--
AAQ6	0.44	0.5	0.02	0.49	0.49	--

98 Percentile						
	PM10	PM2.5	SO2	NO2	CO	Si
AAQ1	75.7	34.2	9.6	27.5	0.4	0.46
AAQ2	78.8	35.4	8.2	26.8	0.43	0.41
AAQ3	80.0	33.8	9.5	27.0	0.41	0.46
AAQ4	74.2	34.0	10.2	28.4	0.42	0.48
AAQ5	68.0	33.2	10.0	27.6	0.38	0.46
AAQ6	74.8	34.8	8.6	28.5	0.38	0.49

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## SOIL

Parameters	Unit	S1	S2	S3	S4
Soil Colour	---	Brownish	Brownish	Brownish	Brownish
pH	---	7.24	7.35	7.12	7.18
Electrical Conductivity	umhos/cm	204.0	224.0	208.0	198.0
Moisture	%	4.2	4.6	3.8	4.0
Clay	%	32	30	34	28
Silt	%	28	30	30	34
Sand	%	40	40	36	38
Infiltration Rate	Cm/hr	1.22	1.26	1.3	1.28
Bulk Density	Gm/cm ³	1.35	1.38	1.36	1.39
Porosity	%	42.2	44.0	43.4	41.8
Nitrogen as N	Kg/ha as P	140.2	136.8	144.4	138.5
Phosphorus	Kg/ha as P	43.0	42.2	44.6	41.8
Potassium as K	Kg/ha as K	63.7	68.5	70.2	72.6
Organic Carbon	%	0.43	0.45	0.46	0.42
Organic matter	%	0.8	0.76	0.75	0.78

## NOISE

Monitoring Location	Day						Night					
	Lmax	Lmin	Leq	L10	L50	L90	Lmax	Lmin	Leq	L10	L50	L90
N1	56.2	48.4	53.0	55.4	53.6	51.2	46.4	40.3	42.8	44.2	41.0	40.3
N2	52.7	45.6	49.7	51.6	49.8	47.6	47.2	41.5	43.7	45.3	42.7	41.4
N3	53.0	46.8	50.5	52.4	50.7	48.4	45.8	39.8	42.5	44.4	42.6	41.8
N4	55.4	49.2	53.1	55.2	53.4	51.6	45.1	40.0	42.2	44.8	42.5	41.1
N5	52.6	47.4	50.7	52.0	50.2	48.5	46.0	41.2	43.1	45.0	43.2	41.7
N6	54.5	48.0	51.8	53.4	51.0	49.2	48.2	42.6	44.8	46.6	45.0	43.8

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## Ground Water

Parameters	Unit	GW1	GW2	GW3	GW4
pH (at 25°C)	-	6.91	7.02	6.84	7.1
Turbidity	N.T.U.	0.52	0.57	0.62	0.5
Conductivity(at 25°C)	μS/cm	546.0	572.0	558.0	584.0
Total Dissolved Solid (TDS)	mg/L	393.0	406.0	402.0	426.0
Total Hardness as CaCO ₃	mg/L	146.0	152.0	150.0	148.0
Chloride as Cl	mg/L	34.42	39.16	37.86	42.74
Total Alkalinity as CaCO ₃	mg/L	134.0	146.0	142.0	136.0
Bicarbonate as HCO ₃	mg/L	134.0	146.0	142.0	136.0
Calcium as Ca	mg/L	37.02	41.28	38.94	44.18
Magnesium as Mg	mg/L	11.4	12.2	11.9	14.3
Sulfate as SO ₄	mg/L	44.52	47.24	45.23	49.06
Nitrate as NO ₃ ⁻	mg/L	2.2	2.4	2.0	2.8
Fluoride as F	mg/L	0.26	0.3	0.24	0.32
Sodium as Na	mg/L	42.16	44.82	44.0	46.38
Potassium as K	mg/L	9.74	10.84	10.06	11.86
Phenolic Compounds as C ₆ H ₅ OH	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Iron as Fe	mg/L	0.2	0.22	0.2	0.24
Aluminium as Al	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Total Chromium as Cr	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Copper as Cu	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Lead as Pb	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Cyanide as Cn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium as Cd	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic as As	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc as Zn	mg/L	0.12	0.14	0.14	0.15
Mercury as Hg	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Manganese as Mn	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

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## Surface Water

Parameters	Unit	SW1	SW2
pH (at 25°C)	-	7.24	7.36
Turbidity	N.T.U.	22.4	26.2
Conductivity(at 25°C)	μS/cm	704.0	722.0
Total Dissolved Solid (TDS)	mg/L	508.0	527.0
Total Suspended Solid (TSS)	mg/L	14.0	18.0
Total Hardness as CaCO ₃	mg/L	198.0	212.0
Chloride as Cl	mg/L	50.36	54.72
Total Alkalinity as CaCO ₃	mg/L	210.0	224.0
Bicarbonate as HCO ₃	mg/L	210.0	224.0
Calcium as Ca	mg/L	43.2	45.8
Magnesium as Mg	mg/L	17.4	20.5
Sulfate as SO ₄	mg/L	50.6	58.2
Nitrate as NO ₃ ⁻	mg/L	3.4	3.8
Fluoride as F	mg/L	0.36	0.42
Sodium as Na	mg/L	52.2	56.4
Potassium as K	mg/L	9.8	11.0
Phenolic Compounds as C ₆ H ₅ OH	mg/L	< 0.001	< 0.001
Iron as Fe	mg/L	0.74	0.82
Total Chromium as Cr	mg/L	< 0.005	< 0.005
Copper as Cu	mg/L	< 0.005	< 0.005
Lead as Pb	mg/L	< 0.005	< 0.005
Cyanide as Cn	mg/L	< 0.001	< 0.001
Cadmium as Cd	mg/L	< 0.05	< 0.05
Arsenic as As	mg/L	< 0.005	< 0.005
Zinc as Zn	mg/L	< 0.005	< 0.005
Mercury as Hg	mg/L	< 0.001	< 0.001
Manganese as Mn	mg/L	< 0.005	< 0.005
Oil & Grease	mg/L	< 2.0	< 2.0
DO	mg/L	5.4	5.8
COD	mg/L	16.0	18.2
BOD	mg/L	3.5	4.0
Total Coliform	MPN/100 ml	1100.0	1400.0

City Office : 84/10, Roy Bahadur Road, Behala, Kolkata-700 034, Ph. : 9433158173

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# One site Meterological Data

Burdwan Onsite Met data (Mar - May 2024)							
Month	Day	Hour	Temp	Wind Speed (km/hr)	Humidity	Wind Direction (Degree)	Hourly Precipitation
3	1	24	24.2	7	82	305	0
3	1	1	24.1	7	81	305	0
3	1	2	24	7	80	305	0
3	1	3	24.2	7	79	305	0
3	1	4	24.4	7	81	305	0
3	1	5	24.8	7	82	305	0
3	1	6	34.1	7	80	305	0
3	1	7	34.3	7	79	260	0
3	1	8	34.5	7	80	260	0
3	1	9	35.9	7	78	260	0
3	1	10	35.9	7	77	260	0
3	1	11	35	7	77.5	260	0
3	1	12	35	6	77	260	0
3	1	13	34.8	6	77.5	260	0
3	1	14	34.6	6	78	147	0
3	1	15	34.5	6	77	147	0
3	1	16	34.3	6	78	147	0
3	1	17	34	6	79	147	0
3	1	18	34	6	78	147	0
3	1	31	33.5	6	79	147	0
3	1	20	33.3	8	80	122.5	0
3	1	21	33.3	8	81	122.5	0
3	1	22	24.4	8	80	122.5	0
3	1	23	24.2	8	81	122.5	0
3	2	24	24.1	8	82	122.5	0

3	2	1	24.1	8	81	122.5	0
3	2	2	24	8	80	147	0
3	2	3	24	7	82	147	0
3	2	4	24.8	7	81	147	0
3	2	5	33	7	80	147	0
3	2	6	33.6	7	79	147	0
3	2	7	33.8	7	78	147	0
3	2	8	34	7	77	147	0

3	2	9	34	6	77.5	122.5	0
3	2	10	34.4	6	78	122.5	0
3	2	11	34.8	6	77	122.5	0
3	2	12	35	6	80	122.5	0
3	2	13	35	6	79	122.5	0
3	2	14	34.9	6	78	122.5	0
3	2	15	34.6	6	77	122.5	0
3	2	16	34.2	6	77.5	122.5	0
3	2	17	34	8	77	122.5	0
3	2	18	33.8	8	78	122.5	0
3	2	31	33.7	8	77	147	0
3	2	20	33.5	8	78	147	0
3	2	21	33.2	8	79	147	0
3	2	22	33	8	80	147	0
3	2	23	24.5	8	81	147	0
3	3	24	24.4	7	79	147	0
3	3	1	24.2	7	80	147	0
3	3	2	24.1	7	81	147	0
3	3	3	24	7	82	147	0
3	3	4	24.2	7	81	147	0
3	3	5	24.4	7	82	310	0
3	3	6	24.8	6	81	310	0
3	3	7	34.1	6	79	310	0
3	3	8	34.3	6	78	310	0
3	3	9	34.5	6	77	310	0
3	3	10	35.9	6	77.5	310	0
3	3	11	35.9	6	77	350	0

3	3	12	35	6	78	350	0
3	3	13	35.2	6	79	350	0
3	3	14	35.2	8	77	350	0
3	3	15	35	8	78	350	0
3	3	16	34.9	8	79	350	0
3	3	17	34.6	8	77	122.5	0
3	3	18	34.2	8	78	122.5	0
3	3	31	34	8	79	122.5	0
3	3	20	34	8	77	122.5	0
3	3	21	33.7	7	81	122.5	0
3	3	22	33.4	7	80	122.5	0
3	3	23	33.2	7	81	122.5	0
3	4	24	33	7	82	122.5	0
3	4	1	33.1	7	81	122.5	0

3	4	2	33.4	8	80	122.5	0
3	4	3	33.6	8	82	122.5	0
3	4	4	33.8	8	81	122.5	0
3	4	5	34	8	80	122.5	0
3	4	6	34.3	8	81	122.5	0
3	4	7	34.6	8	79	122.5	0
3	4	8	34.8	8	78	122.5	0
3	4	9	34.9	8	77	122.5	0
3	4	10	35	8	78	122.5	0
3	4	11	35.2	8	79	122.5	0
3	4	12	35.6	8	78	122.5	0
3	4	13	35.4	8	77	122.5	0
3	4	14	35.1	8	77.5	122.5	0
3	4	15	34.9	9	77	122.5	0
3	4	16	34.7	9	77.5	122.5	0
3	4	17	34.4	9	77	122.5	0
3	4	18	34.2	9	78	122.5	0
3	4	31	34	9	79	122.5	0
3	4	20	34	9	78	122.5	0
3	4	21	33.9	9	77	122.5	0
3	4	22	33.8	9	78	122.5	0
3	4	23	33.3	9	79	310	0
3	5	24	33.2	9	80	310	0
3	5	1	33	10	79	310	0
3	5	2	33.3	10	80	310	0
3	5	3	33.5	10	81	310	0

3	5	4	33.7	10	82	310	0
3	5	5	33.9	10	79	310	0
3	5	6	33.9	10	81	310	0
3	5	7	34	10	79	310	0
3	5	8	34.2	10	78	310	0
3	5	9	34.5	10	77	310	0
3	5	10	34.8	10	77.5	310	0
3	5	11	35	10	77	100	0
3	5	12	35.3	10	78	100	0
3	5	13	35.2	11	77	100	0
3	5	14	35	11	77.5	100	0
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3	23	12	38	8	78	247.5	0
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3	31	8	37.7	9	78	350	0
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4	7	3	37.3	5	82	122.5	0
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5	6	2	33.6	9	88	350	0
5	6	3	33.9	9	87	350	0
5	6	4	34.1	9	88	350	0
5	6	5	34.4	9	87	350	0
5	6	6	34.7	9	86	350	0



5	7	12	36.5	8	82	282.5	0
5	7	13	36.7	8	81	282.5	0
5	7	14	36.9	8	82	282.5	0
5	7	15	37.8	8	81	282.5	0
5	7	16	37.5	8	80	282.5	0
5	7	17	37.1	8	83	282.5	0
5	7	18	36.9	7	84	282.5	0
5	7	31	36.5	7	83	282.5	0
5	7	20	36.2	7	84	305	0
5	7	21	36	7	83	305	0
5	7	22	35.8	7	84	305	0
5	7	23	35.6	7	85	305	0



5	9	5	35.4	8	87	282	0
5	9	6	35.9	8	86	282	0
5	9	7	36.1	8	87	282	0
5	9	8	36.8	8	88	282	0
5	9	9	37.2	8	86	282	0
5	9	10	37.6	8	85	282	0
5	9	11	37.9	8	84	147	0
5	9	12	38	8	82	147	0
5	9	13	38.1	8	81	147	0
5	9	14	37.8	9	82	147	0
5	9	15	37.5	9	81	147	0
5	9	16	37.3	9	80	147	0

5	9	17	37.1	9	81	282	0
5	9	18	36.8	9	80	282	0
5	9	31	36.5	9	81	282	0
5	9	20	36.2	9	82	282	0
5	9	21	35.9	8	83	282	0
5	9	22	35.7	8	84	282	0
5	9	23	35.4	8	85	282	0
5	10	24	35.1	8	86	282	0
5	10	1	35	8	87	282	0
5	10	2	35.2	8	88	282	0
5	10	3	35.6	7	87	282	0
5	10	4	35.9	7	88	282	0
5	10	5	36.3	7	87	247.5	0
5	10	6	36.7	7	86	247.5	0
5	10	7	36.9	7	88	247.5	0
5	10	8	37.2	7	87	247.5	0
5	10	9	37.5	7	85	247.5	0
5	10	10	37.7	7	84	247.5	0
5	10	11	37.9	7	83	247.5	0
5	10	12	38	7	82	247.5	0
5	10	13	37.9	7	81	247.5	0
5	10	14	37.4	7	82	247.5	0
5	10	15	37	7	81	247.5	0
5	10	16	36.7	7	80	247.5	0
5	10	17	36.3	7	83	305	0
5	10	18	36.1	7	84	305	0
5	10	31	35.8	7	83	305	0

5	10	20	35.5	7	84	305	0
5	10	21	35.2	7	83	305	0
5	10	22	34.9	7	84	305	0
5	10	23	34.6	6	85	305	0
5	11	24	34.1	6	86	305	0
5	11	1	33.8	6	87	305	0
5	11	2	33.5	6	88	305	0
5	11	3	33.4	6	87	100	0
5	11	4	33.6	6	88	100	0
5	11	5	33.9	6	87	100	0
5	11	6	34.3	6	86	100	0
5	11	7	34.8	6	88	100	0
5	11	8	35.1	6	87	100	0
5	11	9	35.7	6	85	100	0



5	12	15	37.4	5	81	305	0
5	12	16	37.1	5	80	305	0
5	12	17	36.8	5	83	305	0
5	12	18	36.5	5	84	282	0
5	12	31	36.2	5	83	282	0
5	12	20	35.9	6	84	282	0
5	12	21	35.4	6	83	282	0
5	12	22	35.1	6	84	282	0
5	12	23	34.8	6	85	282	0
5	13	24	34.5	6	86	282	0
5	13	1	34	6	87	282	0
5	13	2	33.9	6	88	282	0



5	14	8	34.8	7	87	282.5	0
5	14	9	35.2	7	85	282.5	0
5	14	10	35.4	7	84	282.5	0
5	14	11	35.7	7	83	282.5	0
5	14	12	35.9	7	82	305	0
5	14	13	35.5	6	81	305	0
5	14	14	35.3	6	82	305	0
5	14	15	35	6	81	305	0
5	14	16	34.8	6	80	305	0
5	14	17	34.4	6	83	305	0
5	14	18	34.1	6	84	305	0
5	14	31	33.9	6	83	305	0



5	16	3	24.5	6	87	100	0
5	16	4	24.7	6	88	100	0
5	16	5	24.9	6	87	247.5	0
5	16	6	33.2	6	86	247.5	0
5	16	7	33.6	6	88	247.5	0
5	16	8	33.9	7	87	247.5	0
5	16	9	34.1	7	85	247.5	0
5	16	10	34.5	7	84	247.5	0
5	16	11	34.8	7	83	247.5	0
5	16	12	35.2	7	82	247.5	0



5	17	20	33.2	9	84	350	0
5	17	21	33	9	83	350	0
5	17	22	24.8	9	84	350	0
5	17	23	24.6	9	85	350	0
5	18	24	24.4	9	86	350	0
5	18	1	24.1	9	87	350	0
5	18	2	24	8	88	350	0
5	18	3	24.2	8	87	350	0
5	18	4	24.8	8	88	350	0
5	18	5	33.4	8	87	350	0



5	31	11	35.1	9	83	247.5	0
5	31	12	35.5	9	82	247.5	0
5	31	13	35.4	9	81	282	0
5	31	14	35.2	9	82	282	0
5	31	15	34.9	9	81	282	0
5	31	16	34.6	9	80	282	0
5	31	17	34.1	8	83	282	0
5	31	18	33.9	8	84	282	0
5	31	31	33.4	8	83	282	0
5	31	20	33.2	8	84	147	0
5	31	21	33	8	83	147	0
5	31	22	24.8	8	84	147	0



5	21	6	33.1	8	86	282	0
5	21	7	33.5	8	88	282	0
5	21	8	33.8	8	87	282	0
5	21	9	34.1	8	85	282	0
5	21	10	34.3	8	84	282	0
5	21	11	34.6	8	83	282	0
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5	21	13	35	8	81	350	0
5	21	14	34.7	8	82	350	0
5	21	15	34.4	8	81	350	0



5	22	21	24.6	6	83	305	0
5	22	22	24.2	6	84	305	0
5	22	23	24	6	85	305	0
5	23	24	31.9	6	86	305	0
5	23	1	31.5	5	87	305	0
5	23	2	31.3	5	88	282.5	0
5	23	3	31.5	5	87	282.5	0
5	23	4	31.8	5	88	282.5	0
5	23	5	24.1	5	87	282.5	0
5	23	6	24.4	5	86	282.5	0
5	23	7	24.8	5	87	282.5	0
5	23	8	33.3	5	88	282.5	0



5	24	14	34.2	7	82	350	0
5	24	15	33.9	7	81	350	0
5	24	16	33.6	7	80	350	0
5	24	17	33.2	7	83	350	0
5	24	18	24.9	7	84	122.5	0
5	24	31	24.6	7	83	122.5	0
5	24	20	24.2	7	84	122.5	0
5	24	21	24	7	83	122.5	0
5	24	22	31.8	7	84	122.5	0
5	24	23	31.4	7	85	122.5	0
5	24	24	31.1	7	86	122.5	0
5	24	1	31	7	87	122.5	0



5	26	7	24.9	7	87	305	0
5	26	8	33.3	7	88	305	0
5	26	9	33.7	7	86	305	0
5	26	10	34.1	7	85	305	0
5	26	11	34.8	7	84	305	0
5	26	12	35	7	82	305	0
5	26	13	34.9	7	81	305	0
5	26	14	34.6	7	82	305	0
5	26	15	34.3	6	81	305	0
5	26	16	33.8	6	80	305	0
5	26	17	33.5	6	82	305	0
5	26	18	33.1	6	84	305	0



5	28	24	31.5	8	86	350	0
5	28	1	31.1	8	87	350	0
5	28	2	31	8	88	350	0
5	28	3	31.4	8	87	350	0
5	28	4	31.8	8	88	350	0
5	28	5	24.1	8	87	350	0
5	28	6	24.6	8	86	247.5	0
5	28	7	24.8	8	87	247.5	0
5	28	8	33.1	8	88	247.5	0
5	28	9	33.5	8	86	247.5	0
5	28	10	33.8	8	84	247.5	0
5	28	11	34.2	9	83	247.5	0



5	29	17	24.5	8	83	100	0
5	29	18	24.3	7	84	100	0
5	29	31	24.1	7	83	100	0
5	29	20	31.8	7	84	100	0
5	29	21	31.5	7	83	100	0
5	29	22	31.2	7	84	100	0
5	29	23	31	7	85	100	0
5	30	24	31.8	7	86	100	0
5	30	1	31.5	7	87	282	0
5	30	2	31.3	7	88	282	0
5	30	3	31.5	7	87	282	0
5	30	4	31.7	7	88	282	0

5	30	5	31.9	8	87	282	0
5	30	6	24.8	8	86	282	0
5	30	7	24.5	8	87	282	0
5	30	8	24.9	8	88	282	0
5	30	9	33.2	8	86	282	0
5	30	10	33.5	8	84	282	0
5	30	11	33.9	7	83	100	0
5	30	12	34	7	82	100	0
5	30	13	34.1	7	81	100	0
5	30	14	33.8	7	82	100	0
5	30	15	33.6	7	81	100	0
5	30	16	33.2	7	80	100	0
5	30	17	33	7	83	247.5	0
5	30	18	24.7	9	84	247.5	0
5	30	31	24.5	9	83	247.5	0
5	30	20	24.1	9	84	247.5	0
5	30	21	31.9	9	83	247.5	0
5	30	22	31.5	9	84	247.5	0
5	30	23	31.2	9	85	247.5	0
5	31	24	31	9	86	247.5	0
5	31	1	30.9	9	87	247.5	0
5	31	2	30.5	9	88	305	0
5	31	3	30.4	9	87	305	0
5	31	4	30.8	9	88	305	0
5	31	5	31.1	9	87	305	0
5	31	6	31.5	9	86	305	0
5	31	7	31.8	8	87	305	0
5	31	8	24.1	8	88	305	0
5	31	9	24.4	8	86	305	0
5	31	10	24.9	8	84	305	0

5	31	11	33.5	8	83	305	0
5	31	12	34.2	8	82	350	0
5	31	13	34	7	81	350	0
5	31	14	33.9	7	82	350	0
5	31	15	33.5	7	81	350	0
5	31	16	33.2	7	80	350	0
5	31	17	24.9	7	83	350	0
5	31	18	24.6	7	84	350	0
5	31	31	24.3	6	83	350	0
5	31	20	24	6	84	350	0
5	31	21	31.9	6	83	350	0
5	31	22	31.5	6	85	122.5	0
5	31	23	31.1	6	88	122.5	0

# **Annexure:-6**

**Certification of NABET Accreditation & NEBL  
Certification of Laboratory**



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**ECO TECH LABS PVT. LTD.**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

48, 2ND MAIN ROAD, RAM NAGAR SOUTH EXTENSION, PALLIKARANAI, CHENNAI, TAMIL NADU,  
INDIA

in the field of

**TESTING**

Certificate Number: TC-13860

Issue Date: 11/06/2024

Valid Until:

10/06/2026

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.  
(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Entity: ECO TECH LABS PVT. LTD.

Signed for and on behalf of NABL



N. Venkateswaran  
Chief Executive Officer



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**GREEN VISION**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

MEAV/25, URVASHI MALHAR, PHASE-II, BENGAL AMBUJA HOUSING COMPLEX, DURGAPUR, WEST  
BENGAL, INDIA

in the field of

**TESTING**

Certificate Number: TC-15288

Issue Date: 12/01/2025

Valid Until: 11/01/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.  
(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Entity: GREEN VISION

Signed for and on behalf of NABL



  
Anita Rani  
Director

  
N. Venkateswaran  
Chief Executive Officer