DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

for

EXTRACTION OF RIVERBED SAND DEPOSITION

From

Taldiha Sand Mine (Sand Block - 0115KB001)

Mouza – Taldiha, **JL No. –** 345,
District – Bankura, **State –** West Bengal,

Production Capacity: 2,42,187.85 Cu. M. of Sand (For 5 Years)

Lease Area: 3.65 Ha (Non – Forest)

Screening Category: B1

LESSEE:

AMIYA RANJAN DAS
Village – Brahmandiha, Post Office – Gargaria, Police Station – Sarenga,
District – Bankura, West Bengal- 722150

TOR LETTER NO.: *EN/T-II-1/150/2025*

SEIAA Proposal No.: *SIA/WB/MIN/539966/2025*

Prepared by:

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(Baseline Data: March, 2023 – May, 2023)

July 2025

Job No.: ENV – 22/1 **Issue: 01**

UNDERAKING BY THE CONSULTANT

This is to certify that we, M/s Indian Mine Planners & Consultants having NABET Accreditation no. **NABET/EIA/23-26/RA 0322 [Sl. No. 1 (a) (i), Cat 'A']** dated April 17, 2024 have prepared in EIA/EMP report of **"Taldiha Sand Mine (Sand Block-0115KB001"** for extraction of **0.85 Cr Cft**. Of sand from the Kangsabati riverbed over an area 3.65 Ha. At Mouza: Tahdiha, JL No. – 345; P.S.: Sarenga, District: Bankura on behalf of AMIYA RNJAN DAS (Project Proponent) as per TOR prescribed by SEIAA West Bengal vide letter No. I/495305/2024 dated 12.03.2024. The information and data provided in the EIA/EMP report is true to its form and is verified by the respective EC & FAE's in due course of time.

Dr. N. B. Chanda
EIA Coordinator & Managing Partner
M/S Indian Mine Planners & Consultants
Date: 8.1.2024

DECLARATION BY THE APPLICANT

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

EIA Coordinator:
Name: Dr. N.B. Chanda
Signature and Date: 26.07.2023
Period of involvement: March 2023 onwards

Functional area Experts:

S No 1.	Functional area	Functional Area Experts	Involvement (period and task**)	Signature & Date
	AP	Dr. N B Chanda	• Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards. • Identification of sources of air pollution comprising dust, gaseous emission due to mining & other activities • Identification of Impacts & suggestion of mitigation measures Period March 2023 onwards	
2.	AQ	Dr. A S Shannigrahi	• Quantification of emission particulars • Air quality modeling for prediction of post project impact on the air quality of the study area • Analysis of the Isopleth generated • Arriving at the post project cumulative concentration at the AAQ monitoring locations Period March 2023 onwards	
3.	WP	Dr. N B Chanda	• Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards. • Identification of Water requirement & Source • Preparation of water balance diagram • Identification of Water polluting sources • Impact of the project on the water	

			quality, both surface and groundwater • Suggestion of Mitigation measures to control water pollution Period March 2023 onwards	
4.	SW + HW	Sanjib Chattopadhyay	• Quantification of mineral & waste from mining operation • Waste disposal method evaluation • Providing dump management plan • Providing Surface Runoff Management Structure Requirements. • Identification of Hazardous waste and its details of disposal Period March 2023 onwards	
5.	SE	Mrs. Nidhi Singh Rathod	• Identification of villages in the study area and finalization of demographic profile of the villages within the study area. • Perusal of socio economic report done by client • Validation and incorporation of relevantportions in the report. Period March 2023 onwards	Nidhi Singh Rathod
6	EB	Prof. Tapan Mishra	• Perusal of existing data relevant to this project. • Studying the details of flora and fauna, separately for core, buffer zone and forest area based on primary field survey. • Identification of species • Indicating the Schedule of the fauna present in the study area • Assessment of impact on Biological environment and suggestion of mitigative measures • Collecting & providing details of existing and proposed Green belt development /plantation in the core zone Period March 2023 onwards	Tapan Kr. Mishra
7	HG	Debashish Ghosh	• Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures • Perusal of site specific ground water table details for the core zone and the study area. • Studied the hydrological aspects of surface and groundwater in study area	

			• Estimation of stage of ground water development as per CGWA norms • Study about impact on the hydrology due to mining operation • Suggesting mitigative measures like RWH for enhancement of ground water level Period March 2023 onwards	
8	GEO	Dr. N B Chanda	• Study of geology of the ML area and the surrounding areas. • Provide details about Mineralcomposition Period March 2023 onwards	
9	SC	G C Das	• Study of soil profile • Fixing of Soil sampling locations and perusal of analysis results. • Assessment of Impact on soil and suggesting plantation scheme. March 2023 onwards	
10	NV	Sanjib Chattopadhyay	• Identification of baseline monitoring stations and study of the monitored data with respect to the applicable standards. • Predict the noise level and vibration level due to proposed mining operation based on scientific evaluation. • Suggesting the Mitigation measures to control noise pollution • Suggesting the Mitigation measures to control ground vibration Period March 2023 onwards	
11	LU	G C Das	• Collection of Remote sensing satellite data to study the land use pattern. • Primary field survey and limited field verification for land categorization in thestudy area • Preparation of Land use map using Satellite data of the project area separately for the core zone. Period March 2023 onwards	
12	RH	Debasish Basu	• Identified Major risks involved in the project Mitigation measures suggested to avoid risk. • Preparation of onsite and offsite emergency management plan. Period March 2023 onwards	

MINE PLANNERS & CONSULTANTS
QCI-NABET Environment Consultant Organization
ISO 9001 : 2015

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ABBREVIATION	DEFINITIONS
AAQ	Ambient Air Quality
bgl	Below Ground Level
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
dB	Decibel
DO	Dissolved Oxygen
EAC	Expert Appraisal Committee
EIA	Environmental Impact Assessment
EMC	Environmental Management Cell
EMP	Environment Management Plan
EPA	The Environment Protection Act
GLC	Ground Level Concentration
Ha	Hectare
Ham	Hectare Meter
HFL	High Flood Level
KLD	Kilo litre Per Day
Km	Kilo Meter
Leq	Equivalent Noise Level
LFL	Low Flood Level
LOS	Level of Service
MoEF	Ministry of Environment and Forest & Climate
NABET	National Accreditation Board for Education and
NGO	Non-Governmental Organisation
NH	National Highway
NOC	No Objection Certificate
OSHA	Occupational Safety and Health Administration
PCU	Passenger Car Unit
PP	Project Proponent
PM	Particulate Matter
PUC	Pollution Under Control
QCI	Quality Council of India
RL	Reduced Level
SEAC	State Expert Appraisal Committee
SPCB	Sate Pollution Control Board
TOR	Term of Reference

CHAPTER – 1: INTRODUCTION

This chapter contains the general information of the proposed project such as the background of the project, the profile of the project proponent, name and contact address with e-mail, project consultants, the purpose of the project, brief description of the project, with its importance, applicable environmental regulations, objectives and methodology for EIA studies, and the scope of the EIA study.

1.1. Preambles

The Environmental Impact Assessment (EIA) is the management tool to ensure the Sustainable development and it is a process used to identify the environmental, social, economic impact of a project for decision making. It is a decision-making tool which guide the decision makers in taking appropriate decisions for New Project.

EIA is an assessment is to possible impact positive or negative that a proposed project may have on the environment, together consisting of the natural, social & economic aspects.

The study involves, impacts on the environment, measuring effects and proposed control measures & management to secure, healthy environment in report with public consultation and comments and then final EC grant to project to informing public about decision later on.

The Environmental Impact Assessment has been prepared to assess the current environmental scenario of the area and then based on the proposed mining activities to carry out Environmental management plan. The plan will identity and address the impacts, where these are adverse in nature and thereafter to design mitigation measures to manage such impacts in a manner as to conserve environment and ecology of the area.

As per new EIA Notification Dated 14th Sept. 2006 & further amendments there on. It is necessary to obtain Environmental Clearance for any new project/industry or enhancement/expansion of project/industry from MoEF&CC, Govt. of India, New Delhi.

As per the Environment Impact Assessment (EIA) notification dated 14th September 2006 and its subsequent amendments, the proposed mining project falls under Mining of Minerals 'Category B1, 1(a) as the total area is less than 100 ha. This EIA report addresses the environmental impacts of the proposed mining project and proposes the mitigation measures for the same.

1.2. Identification of the Project Proponent

The proposed Taldiha Sand Mine unit comes under Mouza – Taldiha, JL No.: 345, Plot No.: 231, P.S. – Sarenga, of Bankura district of West Bengal.

Amiya Ranjan Das, is currently the highest bidder in the e-bidding process conducted by the government of West Bengal. He has been involved in the mining business for many years. The applicant is currently investing necessary funds for the scientific and systematic development of mines and implementing other measures essential to protect the quality of the environment and human health. The address of the proponent is provided below:

Name of the Applicant	: AMIYA RANJAN DAS
Address of the Applicant	: Village – Brahmandiha, Post Office – Gargaria, Police Station – Sarenga, District – Bankura, West Bengal- 722150
Period of Lease	: 5 Years

1.3. Identification of the Project Site

The proposed Taldiha Sand Mine (Sand Block 0115KB001) comes under Mouza – Taldiha, JL No.: 345, Plot No.: 231, P.S. – Sarenga, of Bankura district of West Bengal. Geographically the ML area extends from latitude 22° 42' 11.70" N to 22° 42' 08.44" N and longitude 86° 59' 37.70" E to 86° 59' 35.11" E. The elevation of the river sand bed is 79 m AMSL. The proposed area falls in SOI top sheet No.(73 J/14). The study area map is shown in ***figure 1.1***. The study area of the proposed project comprises 10 Km radius around the mining lease boundary. The map showing the core zone (Mine lease area) and Buffer zone (10 km radius from the lease boundary) is shown in ***figure 1.2***.

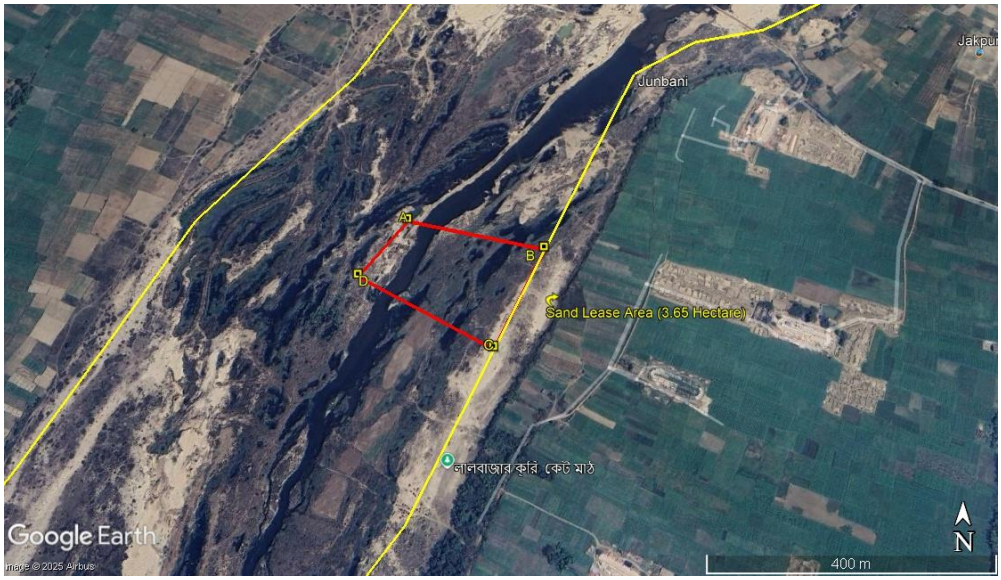


Figure 1.1: The study area map.

The Mine Lease area is approx. 58.50 Km of aerial distance from the district headquarters at Bankura. The proposed ML area can be approached by its own conveyance from SH 09, which is 11.4 Km away from the ML area on the North bank of Kangsabati River.

The Letter of Intent (LOI) for the proposed lease area was issued by the Office of the District Magistrate & Collector, Bankura, Government of West Bengal . LoI was granted via Memo No. 797 dated 10.02.2017 and validity of LoI was extended via Memo No. 1206/MM/LR/LOI/SAND/2022 dated 02.11.2022. and the copy of the same is attached as **Annexure III**.

The mining plan for Block was prepared under the Rule – 4(2) of the West Bengal Minor Mineral Concession Rule (WBMMCR) 2016 by Sanjay Kumar Pandey, Qualified Person. The mining plan for the Mine lease (ML) area has been approved by Senior Geologist, Dte. of Mines & Minerals Unit, Purulia, This Mining Plan is Approved Valid for Entire lease Period. PURULIA /MO / 135 Dt 16.04.2025. **(Refer Annexure I)**.

1.4. Brief Description of Nature, Size and Location of the Project

The proposed collection and excavation of sand from the mining lease area having an area of 3.65 Ha each comes under Mouza – Taldiha, JL No.: 345, Plot No.: 231, P.S. – Sarenga, of Bankura district of West Bengal. The life span of the proposed mine block is 5 years with an estimated production of 2,42,187.8592 sand. The mining block areas are falling under dry river bed and this is not an in-stream mining and blasting is not applicable for the sand mining projects. The proposed method of mining is semi mechanized open cast mining. The details of the project proponent and project is given in Table 1.1.

Table 1.1: Salient Features of the Project Site.

S. NO.	PARAMETERS	DESCRIPTION
1.	**Name of the Project**	Taldiha Sand Mine (Sand Block 0115KB001)
2.	**Mining Lease Area**	3.65 Ha
3.	**Location of the Project Site**	**Mouza:** Taldiha **Plot No.:** 231; **J. L. No.:** 345 **P.S.:** Sarenga; **District:** Bankura, WB
4.	**Latitude & Longitude**	**DGPS Coordinates** **Latitude** **Longitude** A N 22° 42' 11.70" E 086° 59' 37.70" B N 22° 42' 10.09" E 086° 59' 45.53" C N 22° 42' 04.55" E 086° 59' 42.73" D N 22° 42' 08.44" E 086° 59' 35.11"

S. NO.	PARAMETERS	DESCRIPTION
4.	**Toposheet Number**	73J/14
5.	**Type of Land**	River Bed
6.	**Elevation**	79 m MSL
7.	**Project Cost**	4.29 Cr
8.	**Man Power**	42 Personnel (Skilled & Un – Skilled Labours)
9.	**Water Demand & Source**	4.0 KLD
10.	**Mineable Reserves**	2,42,187.8592 Cu. M
11.	**Targeted Production**	60,144 Cu. M Maximum production annual
13.	**Production Capacity**	**Geological Reserve:** 2,93,956.40 Cu. M. **Minable Reserve:** 2,42,187.8592 Cu. M **Production:** 60,144 Cu. M. (1st Year) 45,510.9648 Cu. M. (2nd – 5th Year)
14.	**Type of Mining**	Opencast Semi Mechanized Method
15.	**Seismic Zone**	Seismic Zone – III (As per 1893:2002)
16.	**End Use of Product**	For construction of Buildings and Roads
17.	**Nearest Town**	Durgapur City (6.86 Km in NE direction)
18.	**Nearest Airport**	Kazi Nazrul Islam Airport: 103 Km
19.	**Nearest railway Station**	Nearest railway station is at Chandrakona Road Railway Station at 35.7 km towards north-west.
20.	**Nearest Highway**	SH – 9: 11.4 km towards NW of Kangsabati River
21.	**Nearest Sanctuary/National Park/Eco-Sensitive Zone / Conservation Reserve,**	NA
22.	**Nearest reserve forest (with name and its distance from the proposed project site)**	No part of the proposed lease area falls under forest.
23.	**Local geology of the area**	The applied lease is River bed.

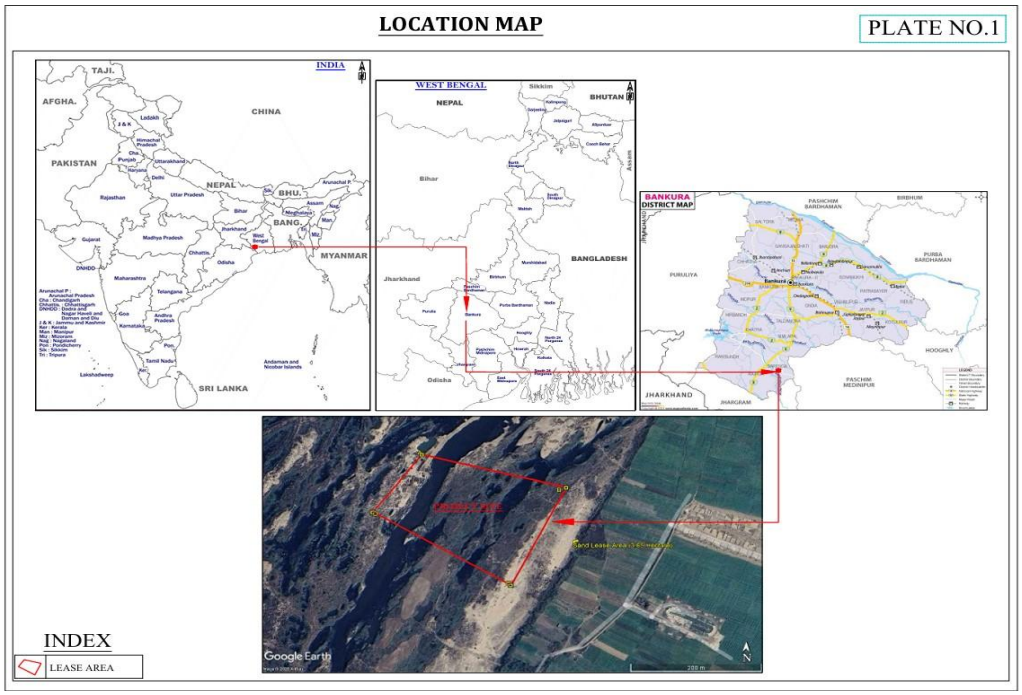


Figure 1.2: Location Map of the Mining Lease Area.

1.5. Scope of the Study

The scope of the study includes a detailed characterization of the environment in an area of 10 Km radius of the Mine Lease Area for various environmental parameters like Ambient Air, Water, Noise, and Land, Biological and Socio-economic aspects.

1.6. Preparation of EIA

The EIA includes the following details:

1. Study of the reports like Geological report, Pre-Feasibility Report (PFR) or mining plan made available by the client.
2. Present Environmental Setting
3. Identification, prediction and evaluation of Anticipated Environmental Impact due to the proposed mine and related facilities.

The environmental impacts would be anticipated in core and buffer zone on:

- Topography and drainage,
- Climate,
- Water quality (Surface/Ground),
- Hydro-geological Regime,
- Air quality,

- Noise Levels,
- Soil Quality,
- Flora and Fauna,
- Traffic density survey,
- Land-Use,
- Socio-Economic Conditions,
- Habitat,
- Health, culture, human environment including public health, occupational health and safety
- Sensitive Places/Historical Monuments.

1.7. Compliance for Terms of References (TOR)

The project proposal was submitted to State Level Environment Impact Assessment Authority West Bengal for its appraisal. Based on which, SEAC meeting held on 25th July 2025 for Terms of Reference (TOR). Based on which, SEAC meeting held on 74th meeting held on 24.06.2025, subsequent to the discussions held on SEIAA on 09.06.2025, for Terms of Reference (TOR). Based on the data provided, TOR of proposed Sand mining project has been issued by SEIAA, vide File no EN/T-II-1/150/2025 dated 25.06.2025 (**Refer Annexure - II)**. The compliance of TOR is described below in Table 1.2.

Table 1.2: TOR Compliance

SL. No	TOR	Compliance
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.	This is a new Mining Project.
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	Copy of document in support of the fact that the Proponent is the rightful lessee of the mine is enclosed with EIA report as **Annexure III.**

SL. No	TOR	Compliance
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.	All documents including mine plan, EIA are compatible with one another in terms of mine area, production levels, waste generation and its management if any, mining technology etc. All documents are in the name of the lessee. Approved mining plan enclosed as **Annexure IV.**
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.	All coordinates of the mine area, superimposed on High Resolution Imagery / Toposheet, Topographic sheet is Presented in Chapter 1 of this EIA Report as Figure No. 1.1 and 1.2, also present in **Annexure V** (High Resolution Google Earth Image). Geology of the area is presented in Chapter 2 of this EIA report. Land Use/Land Cover analysis for mine lease and study area using remote sensing techniques has been conducted and LU/LC map shown in is present in Chapter 3 of this EIA report.
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.	The topographic map of the study area is not available due to involvement of International Boundary. Refer **Annexure V.**
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.	The Letter of Intent was issued by Deputy Secretary of Department of Industry, Commerce & Enterprise, Govt. of West Bengal.

SL. No	TOR	Compliance
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.	Lessee is an individual owner of the mine lease however a well laid down Environment policy to take care of any infringement /deviation/ violation of the environmental or forest norms/ conditions applicable for the mine lease is proposed in the EIA report in Chapter 10.
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.	Method of mining for the sand mine is open cast semi mechanized method (No drilling and blasting involved) discussed in Chapter 2, with this EIA report.
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.	The study area of the proposed project comprises of 10 km radius around the mining Lease boundary. Map showing study area (10km radius from the lease boundary) is given in chapter-1 of EIA Report. EIA contains the data regarding proposed production for the life of mine and the same has

SL. No	TOR	Compliance
		been incorporated in Chapter-2.
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.	The proposed mine lease area is river bed land. The study area comprises of Fallow land, Agricultural land, Water Bodies, cropland, Barren Lands, Human Settlements and other Ecological features involved. LU & LC Statistics presented.
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&R issues, if any, should be given.	Not applicable, as there is no overburden in the proposed Sand mining activity. No R&R involved.
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.	The proposed mine lease area is river bank land. There is no forest/tree clearance involved in the proposed project. However, Letter of Intent for mining lease area was issued by the Office of the Additional District Magistrate & District Land and Land Reforms Office, Bankura, Government of West Bengal LoI was granted via Memo No. 797 dated 10.02.2017 and validity of LoI was extended via Memo No. 1206/MM/LR/LOI/SAND/2022 dated 02.11.2022 **(Annexure-III)**

SL. No	TOR	Compliance
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.	The proposed mine lease area is river bank land. There is no forest/tree clearance involved in the proposed project. However, Letter of Intent for mining lease area was issued by the Office of the Additional District Magistrate & District Land and Land Reforms Office, Bankura, Government of West Bengal LoI was granted via Memo No. 797 dated 10.02.2017 and validity of LoI was extended via Memo No. 1206/MM/LR/LOI/SAND/2022 dated 02.11.2022 (Annexure-III)
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.	Not applicable The area does not come under tribal area, hence, "Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006" is not applicable.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No Reserve Forest is falling within 10 km radius of the proposed mining activity.
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 cost implications and submitted.	In this proposed mining activity, there is no impact on wildlife. Biological Study for the project has been conducted. Impact and Mitigation measures are incorporated in Chapter – 4.
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	There are no National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant Reserves (existing as well as proposed) in the core area.

SL. No	TOR	Compliance
	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.	
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.	There is no schedule – I fauna present in the study area. A detailed biological study is discussed under Chapter – 3.
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli 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	Not Applicable. The proposed project does not fall within 10 Km radius of any "**Critically Polluted**" area and Also The project area does not fall in "Aravalli hill" ranges.

SL. No	TOR	Compliance
	Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	
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)	The proposed project does not fall within CRZ area. Not Applicable.
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & 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 sectoral 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&R and socio-economic aspects should be discussed in the Report	There will be no resettlement or rehabilitation involved in the project area, hence compensation details are not applicable.

SL. No	TOR	Compliance
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 PM 10, particularly for free silica, should be given.	One season data of ambient air quality, water quality, noise level, metrology, soil and flora and fauna has been collected during Winter season March 2023 to May 2023. Details are given in Chapter – 3.
23.	Air quality modelling 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 modelling 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	The detailed air Quality modelling is provided in Chapter 4.

SL. No	TOR	Compliance
	pre-dominant wind direction may also be indicated on the map	
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.	The daily fresh water requirement is 1.9 KLD. Water.
25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	The total requirement of water will be 4.0 KLD, which will be met from nearby village; NOC need to be obtained from Gram Panchayat.
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Water requirement will be met from the Nearby village. But later on, when the mine sump will be developed and water will get accumulated in the sumps, then ground water will be drawn only for drinking & sanitation purpose and rest of the requirement will be fulfilled from water accumulated in the mine sump, thereby conserving the natural water resources.
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.	Mining will be done as per approved Mine Plan and applicable Rules & Regulation, so that there is no damage on ground water recharge potential due to sand mining. ➢ There will be no change in surface water quality as river. ➢ Ground water quality will not be affected due to mining activities as it is restricted to 2.0 m depth or as per the depth mentioned in the approved Mining Plan. ➢ The mining will not be allowed below the water table. ➢ Regular monitoring of water samples will be done as precautionary measures.

SL. No	TOR	Compliance
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.	The proposed mining will be done well above the ground water table. Hence no adverse impact on ground water table. The hydro geological data is given in Chapter – 3.
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.	The proposed mine lease area itself is in the river bed. But there is no diversion of the any stream. Hence there is no impact on the water course.
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.	The site is at an elevation of 79 m MSL. The slicing of the sand will be done up to 2.0 mts only. No obstruction of the water table.
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	Plantation programme is given in Chapter – 10.

SL. No	TOR	Compliance
	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.	
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.	There is no major impact on local transport as 2 Trucks per day will be required for transport of mined out material from proposed project. The LOS value from the proposed mine is excellent and good for all villages. Traffic Management Study is mentioned in Chapter – 3. (Annexure X)
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	Onsite shelter and facilities will be provided to the mine workers as per Approved Mining Plan & as per Mines Rules.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number	The propose mine is in the river bed, the reclamation of the mined – out areas will be gradually filled up with sand and gravel carried out by water, during the monsoon. Hence

SL. No	TOR	Compliance
	of sections) should be given in the EIA report	rehabilitation of the mined – out area is not applicable.
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.	All safety measures prescribed under mining laws will be followed strictly. All workers will be medically examined in pre-placement phase. Periodical medical examination as per Mines Rule 1955 should be done. The persons working in dusty environment should be examined every year as per the DGMS circular No. 01 of 21.01.2010. Medical examination will be as per the medical fitness prescribed under Form P and PI of the Mines Rule 1955, amended by Mines (amendment) Rules, 1989. The details of Occupational health impact of project are described under Chapter 10.
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.	The workers' health check-up will be done in every six months. Medical camp will be organized in impact zone Under CSR activity.
10.	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.	Measures of socio-economic influence to the local community have been furnished and described under Chapter – 4.
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,	Environmental Management Plan is address in Chapter 10.

SL. No	TOR	Compliance
	occupational health impacts besides other impacts specific to the proposed Project.	
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.	The issues and Suggestions raised during the Public Hearing has been incorporated in Chapter 7.
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.	There is no litigation against the applicant and the lease area in any court of law to the best of our knowledge.
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.	Total Project Cost – ₹ 4.29 crores for five Years. The Cost for Environmental Protection Measures Capital Cost- ₹ 5.15 lakhs per annum.
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster management Plan have been furnished.
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.	The project proponent has proposed to provide financial assistance of 2% of project cost for the development of social infrastructure of the area. Following measure will be taken to improve the social infrastructure of the study area: ➢ Preventive medical care and educational facilities for rural population shall be promoted. ➢ Priority will be given to local people for employment. Indirect employment through contractual services shall be provided.

SL. No	TOR	Compliance
		➢ Extending general benefit by way of development work in the villages through respective Gram Panchayat. ➢ Supplementing Govt, efforts in health monitoring camps, social welfare and various awareness programmes among the rural population. ➢ Assisting social forestry programme.
44.	Besides the above, the below mentioned general points are also to be followed: - a) Executive Summary of the EIA/EMP Report b) All documents to be properly referenced with index and continuous page numbering. 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. d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. e) Where the documents provided are in a language other than English, an English translation should be provided. f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	a) Executive summary has been incorporated. b) Documents have been numbered in continuation and properly referenced w.r.t. Table of Contents (Index), c) The data presented in the report especially in table, along with the period in which the data was collected and the source has been incorporated. d) Analysis/testing reports of water, air, soil, noise has been incorporated. e) Compliance made. f) The relevant questionnaire will be incorporated in the final EIA. g) All instruction mentioned in O.M. No. J-11013/ 41/ 2006- IA. II (I) dated 4th August, 2009 are being complied with. h) There is no change made in the basic scope and project parameter. i) This is new project. Hence, not applicable. j) All Surface plan, Geological cross section plan, k) Conceptual plan has been incorporated EIA Report.

SL. No	TOR	Compliance
	g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-l 1013/4l/2006-IA. II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. 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&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. i) As per the circular no. J-l 1011/618/2010-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. 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) actions of the mine pit and	

SL. No	TOR	Compliance
	external dumps, if any, clearly showing the land features of the adjoining area.	
	ADDITIONAL TERMS OF REFERENCE	
1.	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	The PP commits to provide the drone videography of the entire project area. These reports will be submitted periodically and will also be incorporated into the half-yearly compliance report.
2.	Means of access and egress between the embankment and the sand quarry may be clearly earmarked. The Project Proponent must commit that no hard toing or paving of any haulage route within the riverbed will be attempted.	Means of access and egress between the embankment and the sand quarry is submitted as **Annexure IX** (Transportation Route Map).
3.	A plan on the management and handling of sand during the period of intermediate stockpiling should be submitted.	Management and handling plan of sand is addressed in Chapter 7 of Approved Mining Plan.
4.	**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. 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 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	Provision has been made to plant minimum of about 3012 saplings such as Babul, Acacia, Sonajhuri, Kadam, Jhau etc. or as will be specified by local forest department suitable to the available land for plantation.

SL. No	TOR	Compliance
	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.	
5.	Plan showing spatial year wise distribution of the proposed greenbelt has to be submitted along with supporting documents of administrative approval/s.	Year wise distribution of the proposed greenbelt has been provided as Annexure 11.
6.	Being a mine in operation, the plantation created so far may be submitted with geotagged photographs.	The PP commits to provide the plantation created with geotagged photographs. These reports will be submitted periodically and will also be incorporated into the half-yearly compliance report.
7.	EIA should also include detailed study of the baseline condition and impact on aquatic flora and fauna.	The detailed study of the baseline condition have been furnished under chapter -3 and impact on aquatic flora and fauna have been described under chapter-4.
8.	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.	The Project cost may include the auction bid value, estimated royalty to be paid, cost of any infrastructure built like office space, stockyard, etc has been provided as Annexure-XIII
9.	A need-based EMP may be prepared in accordance with the MoEF & 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.	AMIYA RANJAN DAS.is committed to make the expenses up to a maximum limit of 2% of the total project cost. AMIYA RANJAN DAS. undertakes that, all the expenditure will be made in due consultation and recommendation of the district authorities. The main objective of this expenses shall be peripheral development and

SL. No	TOR	Compliance
	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.	environment protection. An undertaking in this regard is being furnished in Annexure – VIII.
10.	A study report on base flow level measured at 5 points with date and supporting photographs may 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.	The detail study report on the base flow level measurements conducted at five designated points, accompanied by respective dates and supporting photographs are providing in Annexure – XII. Mining will be restricted at the depth of **2.0 m** only, as base flow is encountered at about **3.0** m depth.
11.	Management plan including the final closure plan of haul road to be submitted.	The maintenance of Haul Roads will be conducted diligently, with water sprinkler trucks scheduled to spray water twice a day to mitigate dust pollution effectively. Furthermore, tree plantation initiatives will be implemented as per availability to further alleviate noise pollution concerns. It is important to note that the management of Haul roads has already been integrated into Chapter 7 of the Approved Mine Plan and reiterated in various sections of the Final Environmental Impact Assessment (EIA) Report.
12.	Study and protection plan of the aquatic life available both during the mining and non-mining seasons should be provided. The study should be done by some reputed institute.	The PP commits to provide a study report detailing and protection plan of the aquatic life available both during the mining and non-mining seasons. These reports will be submitted periodically and will also be incorporated into the half-yearly compliance report.

CHAPTER – 2: PROJECT DESCRIPTION

2.1. Brief Description and Nature of the Project

The project is proposed for the excavation of river bed sand from the Kangsabati River. The proposed project is a new minor mineral mining project. It is an opencast semi mechanized method mining project to excavate sand from the river bed.

The proposed activity of River sand mining is located at Mouza – Taldiha, Plot No. – 231, J.L. No. – 345, P.S: Sarenga, District – Bankura, West Bengal, over an area of 3.65 Ha. The lease area falls in Survey of India Toposheet (SOI) No 73J/14 The life of mine was estimated to be 5 years.

2.2. Need of the Project

River channels and their flood plains are important sources of construction grade aggregate materials like sand. The durability of river-borne coarser elastics and their sorting by fluvial action make them best suitable raw materials/ingredients for building constructions. The market demand for the materials extracted from river is high throughout the country for construction of infrastructure projects.

Sand deposition at various places in river channel will hinder the flow of water flow and excess deposition of sand can changed the shape of the river bed. Because of this, during monsoon season, the water level of river may rise above the high flood level and may triggering heavy and devastating floods. Such disasters may damage large tracts of land laying on both the banks of the river especially the agricultural lands. Hence, it is necessary to remove the materials so that the river gets channelized.

Apart from this the project will also serve the following:

- Generate various employment opportunities especially to the local people hosting the mining project.
- Economic development of the state by contributing to state exchequer.

2.3. Location of the Project Site and Connectivity

Sl. No.	Permanent Features	Description of the Area & Distance from the Area (Arial Distance)
1.	**Project site Location**	**Mouza:** Taldiha, **Plot No.:** 231, **J.L. No.:** 345, **P.S:** Sarenga, **District:** Bankura, West Bengal.
2.	**Site Coordinates (Middle Axis)**	22° 42' 11.70" N & 86° 59' 37.70" E 22° 42' 08.44" N & 86° 59' 35.11" E
3.	**Village/District/State**	**Mouza:** Taldiha **District:** Bankura **State:** West Bengal
4.	**Maximum temperature**	32˚C
5.	**Minimum temperature**	6˚C
6.	**Annual rainfall (total)**	>2000 mm
7.	**Plant site elevation above MSL**	Ground elevation level – 79 m AMSL
8.	**Present land use at the site**	Govt. land of 3.65 ha (Riverbed)
9.	**Nearest highway**	NH 14 – 35.30 km, East bank of the river.
10.	**Nearest Railway Station**	Chandrakona Road Railway station – 35.7 Km
11.	**Nearest Airport**	Kazi Najrul Ishlam Airport – 103 Km
12.	**Nearest major water bodies**	On the bank of Kangsabati River
13.	**Nearest town/City**	Nearest Town & District Headquarters: Town – Sarenga City is 6.40 KM NE
14.	**Nearest village**	Taldiha Village (900 mt.)
15.	**Nearest Dispensary and Govt. Hospital, Educational facility**	Sarenga Hospital (7 Km in NE) Lalbazar Primary School at 525 m in South
16.	**Nearest Religious/Worship Places**	Shitalatala Mandir: 0.50 KM (SE)
17.	**Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)**	None - Within 10 km of Project Site
18.	**Reserved / Protected Forests**	None - Within 10 km of Project Site
19.	**Defence Installations**	None Within 10 km of Project Site

2.4. Geomorphology of the Study Area

The district forms an intermediate tract in between the alluvial plain and the complex plateau of Chhota Nagpur and presents a variety of landforms. The principal rivers of the district have a gradual descent from northwest to south- east almost parallel to each other following the natural trend of the landscape having flow of water with their origin in the western upland tract. According to genesis and evolution of landforms, the district can broadly be divided into two divisions viz.

1. Dissected plateau being the eastern fringe of Chhotanagpur region in the west and
2. The undulating alluvial plain in the east. On the basis of surface forms and stage of development these two groups are further subdivided into the following geomorphic units (Soils of Bankura District, Soil Survey Report No. 491).

Dissected Plateau interspersed with Valleys

a) Moderate to strongly sloping land having residual isolated hills, hillocks and piedmonts occurring in the western part of the district. The surface has been denuded leaving exposed areas of bare hard rocks. Archaean rocks composed of gneiss, schists and granites occupy most of the areas. Quartz veins and pegmatites with phyllites occur in the south west in Rani bandh, Raipur and Khatra areas. Soils developed on hillocks are shallow to moderately deep, gravelly sandy loam and severely eroded.

b) Gently to moderately sloping lands interrupted by mounds and valleys lie adjacent to the western hill-tract. The latitudinal spurs from the west parallel to the rivers gradually merge into the alluvium in the east. At places, gneissic rocks are exposed. The soils occurring on low mounds and hillocks of low magnitude and piedmont are shallow to very deep and gravelly sandy loam to sandy clay loam.

c) Western upland tract having gneissic rocks underneath is covered with alluvium and lateritic mass. Soils occurring on this gently sloping tract are deep to very deep and sandy loam to clay loam. d. The highly gullied lands are mostly marked along the courses of the streams and rivulets in the west. On descending slopes, they carry the loose material to the lower reaches creating eroded ravine area.

Undulating Alluvial Plain

a. To the east of the dissected piedmont the upper undulating alluvial plain extends up to the western part which is under Joypur Police Station jurisdiction. Soils are mostly derived from decomposed rocks deposited by the streams. The Older Alluvium of middle Pleistocene age occupy comparatively larger land mass and is coarse in texture with

reddish colour. The Older Alluvium is capped by lateritic rocks.

b. The Younger Alluvium of sub-Recent to recent age contains assorted material which covers the eastern part of the district. Such alluvium is thick and is running into several scores of meters. The level topography results in the formation of extensive alluvial tract in the east.

Flood plains are mostly confined along the, main rivers and streams. Most of the rivers have steep banks in their upper reaches and allow sudden discharge to move down stream where the low banks fail to contain the water causing floods. Thus, riverbed aggradation and heavy rainfall accelerate the rate of formation of the flood plains. The soils are medium fine to fine in texture.

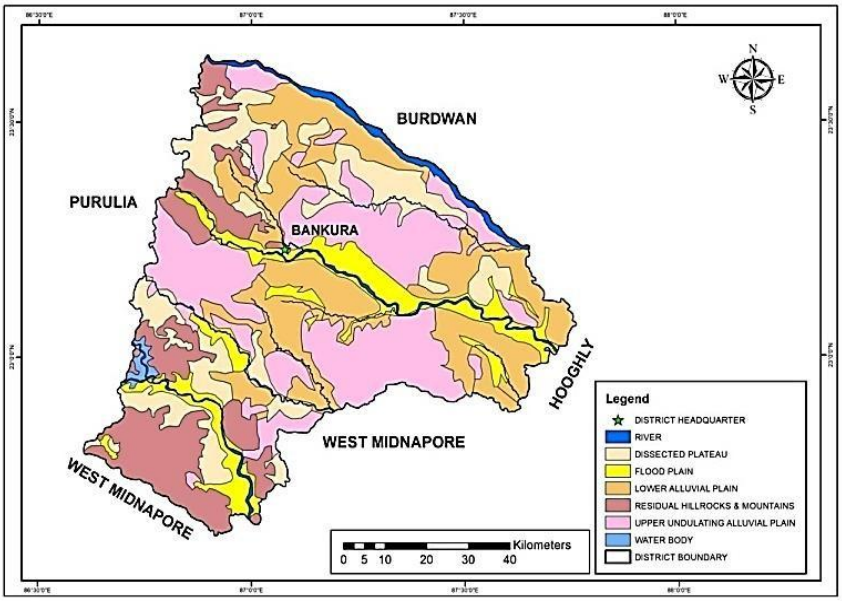


Figure 2.2: Geomorphological Map, Bankura District, West Bengal

2.5. Geology of the Study Area

The district is divisible geologically into three north-south trending wide belts (Figure 2.3). The westmost one comprises metamorphic of Archaean age and Chhotanagpur Gneissic Complex, Singhbhum Group of rocks and anorthosites belonging to Proterozoic age. In the northern part occurs Gondwana Supergroup of rocks with commercial coal seams as an extension of the famous Raniganj Coalfield. The central part is occupied by laterite and older alluvium of Pleistocene age, whereas the easternmost part is made up of Quaternary sediments and Recent alluvium. The diverse litho-units along with geological formations and age are presented Table 2.1. A prominent limonitic east-west shear zone occurs in Porapahar area. Number of lineaments (N-S, NE-SW, NW-SE) of indefinite identities have been picked up from satellite imagery

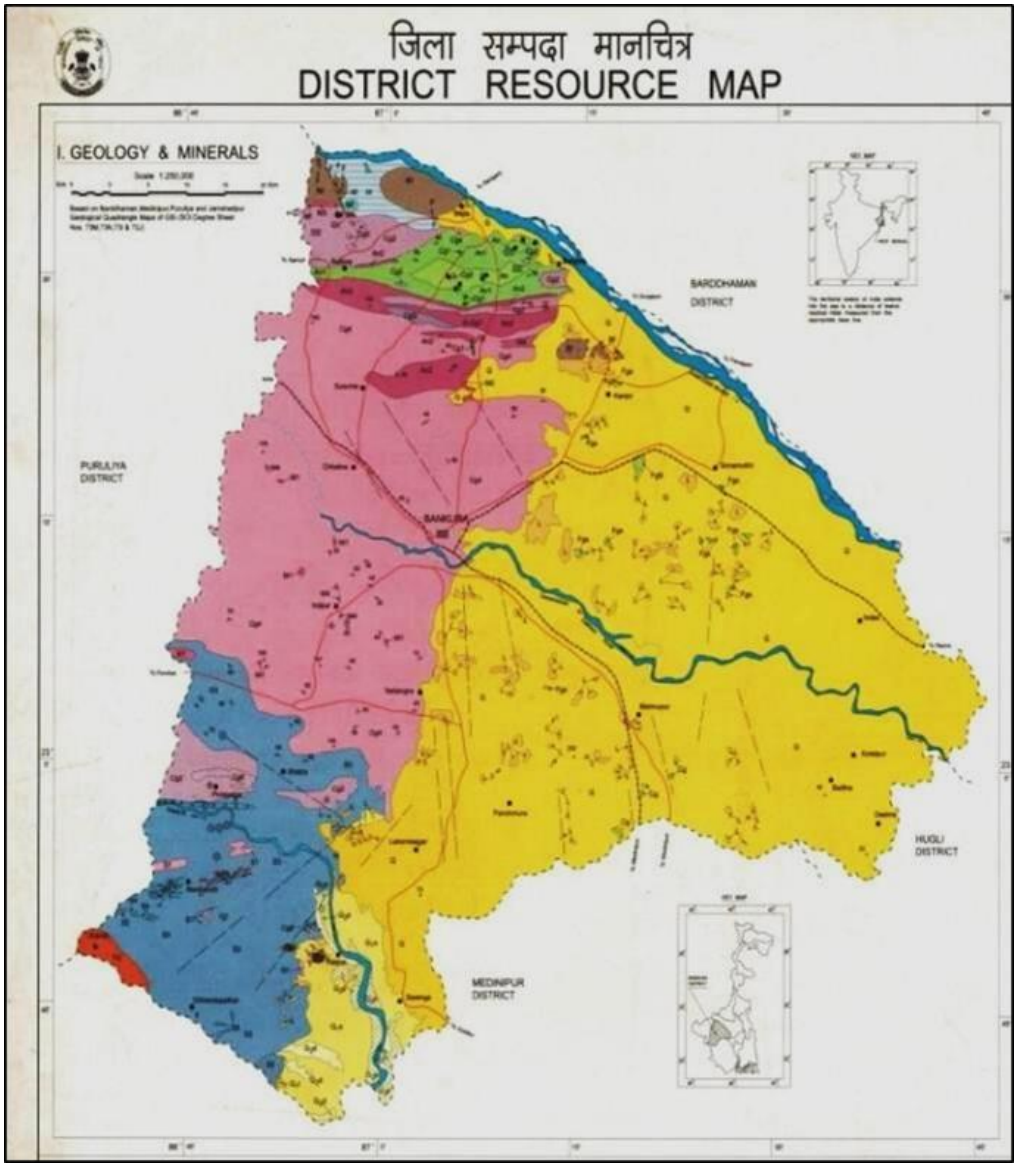


Figure 2.3: Geological Map of the Bankura District, West Bengal

Table 2.1: Geological succession of the Bankura District, West Bengal

AGE		GEOLOGIC UNIT	LITHOLOGY
Pleistocene To Recent	Quaternary	Kasai Formation	Sand and silt
		Daintikri Formation	Alternating layers of sand, silt and clay
		Sijua Formation	Clay impregnated with caliche
		Lalgarh Formation	Ferruginous sediments with rock fragments
		Unclassified Quaternary	Sand, silt and clay (un-oxidized or occasionally oxidized)
Cenozoic (undiff.)			Laterite
Tertiary			Clay and grit Ferruginous gritty sandstone and shale

	Gondwana Supergroup		Mahadeva Formation	Red sandstone, red clay
			Panchet Formation	Sandstone, shale
		Damuda Group	Raniganj Formation	Sandstone, shale, coal
			Barakar Formation	Sandstone, shale, coal and fireclay
Proterozoic				Quartz vein
				Kuilapal granite
	Singhbhum Group			Hornblende schist and epidiorite
				Quartzite
				Mica schist, occasionally garnetiferous
				Calc-gneiss and granulite
				Garnet-staurolite schist with kyanite
				Garnetiferous phyllite
	Anorthosite suite of Bankura-Purulia			Anorthosite
				Gabbroic anorthosite
				Pyroxenite / pyroxene granulite
Archaean (?) Proterozoic	Chhotanagpur Gneissic Complex			Dolerite
				Granite gneiss
				Felspathic schist
				Pink granite / biotite-granite gneiss
				Hornblende-biotite-granite gneiss
				Hornblende schist
Archaean	Unclassified Metamorphics			Quartzite, quartz schist
				Phyllite and mica schist
				Garnetiferous sillimanite-biotite schist
				Amphibolite, hornblende schist and epidiorite

2.6. River & Drainage

The rivers of the area flow from the north-east to the south-west in courses roughly parallel to one another. They are mostly hill streams, originating in the hills in the west. The rivers come down in floods after heavy rains and subside as rapidly as they rise. In summer, their sand beds

are almost always dry. Kangsabati River forms the northern boundary of the district with Bardhhaman district for about 72 kilometres (45 mi) and then flows into Bardhhaman district. Floods in the Kangsabati rarely do much damage to the district. Sali River which drains the northern part of the district is an important tributary of the Kangsabati .

Amongst the other rivers flowing through the district, the most important is Kangsabati River. It has many branches or old beds in Onda and Sarenga police station areas. The main tributaries of Kangsabati River are the Gandheswari, the Kukhra, and the Birai. Other major rivers are Shilavati River and Kangshabati River, both of which enter the district from Purulia district, run along a short course in the territory and then enter Paschim Medinipur district. Gandheswari River is a tributar of Kangsabati River and flows in Bankura district. Flowing south-west of Susunia Hill and north of Bankura it joins the Kangsabati near Bhutsahar. It is subject to sudden flooding during rains. There are some small but picturesque water falls along the course of the Shilavati near Harmasra, and along the course of the Kangshabati in the Raipur area. Amongst the minor rivers in the district are Jaypanda, a tributary of Shilavati, and Bhairabbanki.

Mejhia Beel is a large swamp formed by the overflow of the Kangsabati . There are several small tanks or artificial lakes developed by the former rajas, in and around Sarenga.

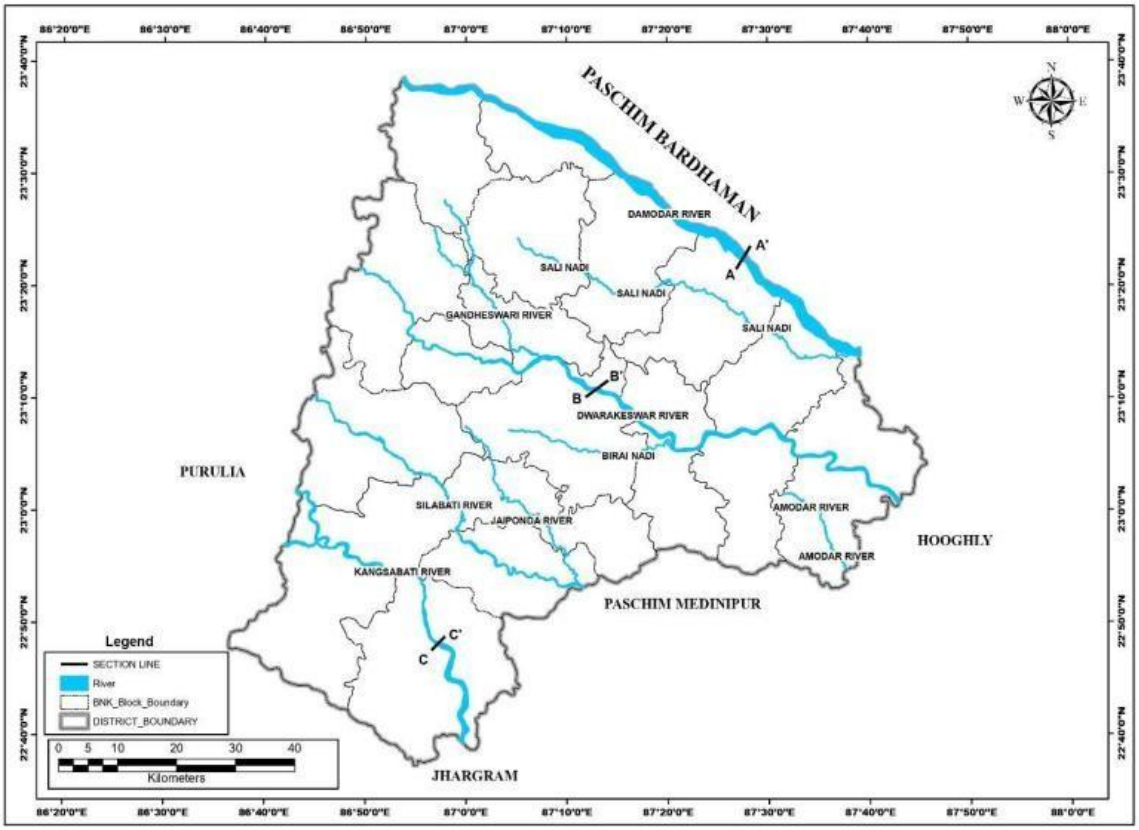


Figure 2.4: The Drainage and Hydrology Map of the Bankura District, West Bengal

2.7. Hydrology

The river system of district Bankura primarily consists of Kangsabati, Dwarakeswar and Damodar and their tributaries of which Gandheswari, Silai and Kumari are the most important. All the rivers have a south-easterly flow and the rivers are almost parallel to each other. Kangsabati River rises in hilly country of Palamau district of Chhotonagpur and before it touches the Bankura it receives the water of many smaller hill streams including those of the Barakar, its principal tributary. The Kangsabati rises from neighbouring Purulia district, flows through the middle of Bankura and divides it into two halves. The Salavati, popularly known as Silai, is the largest tributary of Kangsabati, the Jaypanda is the principal tributary of the Salavati. The Kangshabati or the Kasai is the third largest river in the district, which rises in the hilly terrain of Jhalda C.D. Block in the adjoining district of Purulia and enters Bankura district in Khatra C.D. Block and after flowing for about 56 kms it enters Midnapur district at the south east corner. Also, some other rivers or tributaries, like Gandheswari, Sali, Arkasha, Birai, Bodai etc. plays important role of the district's irrigation. All the rivers are seasonal; hence the district is drought prone. Drainage map of Bankura district is furnished as Figure 2.5

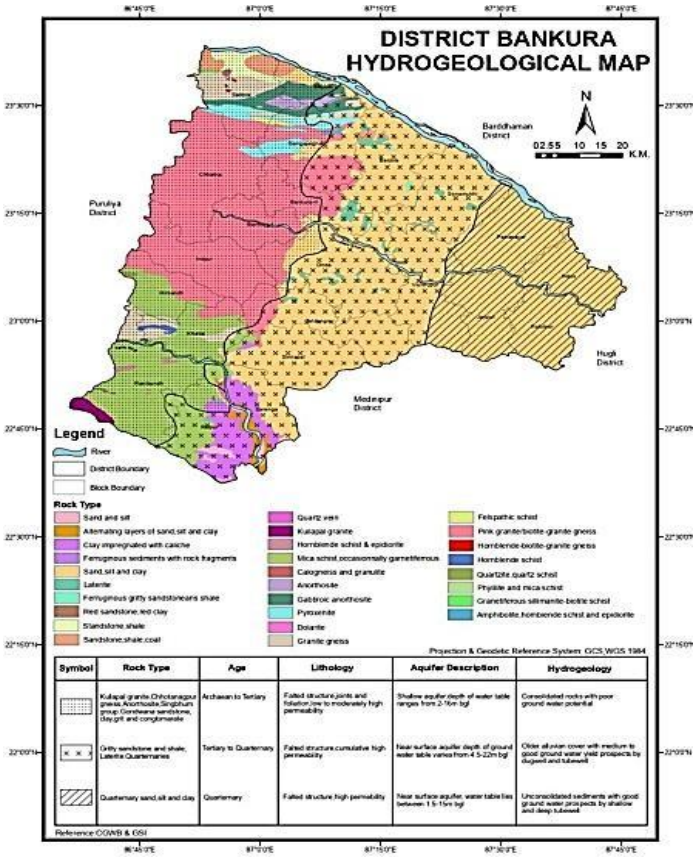


Figure 2.5: Hydrogeological map of the Study area in Bankura District, West Bengal

2.8. Soil Type

Soil of Bankura district can be broadly grouped into three principal types viz. (1) Red Soil (2) Alluvial Soil and (3) Laterite Soil. Typical red soil has limited distribution in the south central, south-eastern and south western parts of the district around Sarenga, Kotulpur and Raipur blocks respectively. They are the red coloured sedentary soil (i.e. those formed from residual parent materials) found mainly on laterites supporting Sal vegetation. They are also found along the margins of small hills bare of vegetation. They are free from CaCO3, low in base exchange capacity and have a highly unsaturated base. They may be derived from laterites by a process of silicification by ascending ground water but cannot be grouped either as laterites or laterite soil.

Brown soils from a group within this class which are also sedentary in nature, mainly derived from rocks like sandstone, granite gneiss and schists. The alluvial soils, which have wide distribution in the east-central and southeastern parts of the district, are grouped according to soil association as Kangsabati – Rajmahal riverine, Kangsabati flatlands, Kangsabati highlands etc.

The older alluvial amongst them is unaffected by floods and siltation and show profile development, whereas the younger or newer alluvial, found mostly in the Kangsabati flatland areas are enriched by silt deposition during floods. Such areas are characterised by high water table, a heavy sub-soil and occurrence of brown concretion at lower depths. According to the textural types, soils of the district can be classified under the following types: (1) Sandy (2) Sandy Loam (3) Loam (4) Sandy Clay Loam (5) Clay Loam (6) Clay. Clay, clay dominated loam and loamy soils are mostly confined to the flood plains of the Kangsabati and the Kangsabati rivers through sporadic occurrences. This type of occurrences is also seen in other small river valleys. The district as a whole is covered generally by sandy loam. where rice, jute and sugarcane are extensively grown. Due to clayey nature of the soil moisture retention capacity is high. The soil map of the district is shown in Figure 2.6.

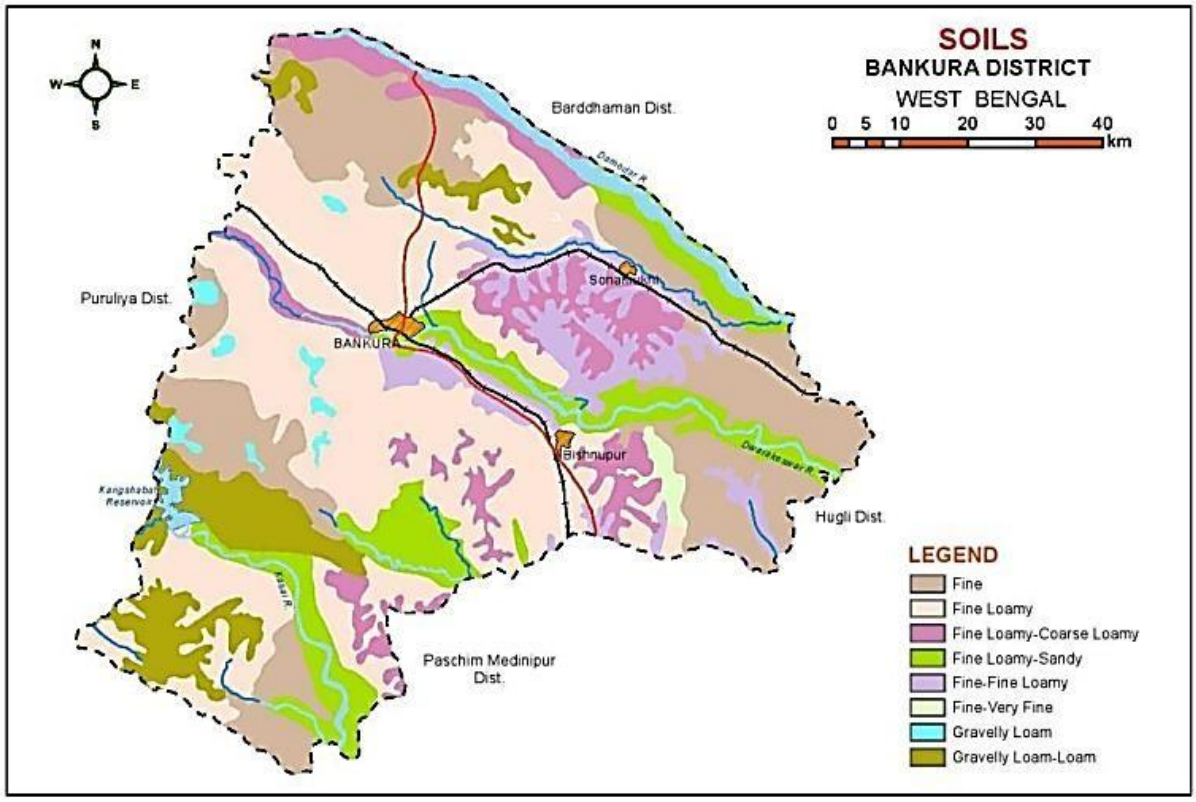


Figure 2.1: Soil Map, Bankura District, West Bengal

2.9. Climate and Rainfall Across the District

District Bankura belongs to humid tropical monsoon climatic region. According tom District Meteorological Department, there are very minor variation of temperature, rainfall and relative humidity in all over the district viz. north to south and west to east.

The district of Bankura experiences an extreme climate with high range of temperature. The climate of the district is characterized by oppressive heat and high humidity in summer with average daily maximum temperature varies between 26ºC and 39ºC. Winter is generally dry and cold with average winter temperature around 15º C. The year may be divided into four seasons. The cold season is from about the middle of November to the end of February. The period from March to May is the summer season. The south west monsoon season commences about the beginning of June and lasts till the end of September. October and the first half of November may be termed as post monsoon season.

The annual average rainfall ranges between 130 cm and 140 cm. The average winter temperature is 15°C and the average summer temperature is about 30°C. The average annual rainfall in the district is 1481.5mm. The variations in the annual rainfall within the district and from year to year are not large. The rainfall during the monsoon season – June to September – constitutes 74 percent of the annual rainfall; July and August are the rainiest months. The

district receives a mean annual rainfall varying from 1334.3 mm. to 1780.2 mm. The information on annual rainfall for the five years from 2016 to 2020 for the district Bankura is given in Table 2.2. Average rainfall of the district explained graphically in Figure 2.7.

Table 2.2: Annual rainfall (in mm) recorded in Bankura District

Month	2016	2017	2018	2019	2020	Average
Jan	6.1	0	0	0	24.5	6.12
Feb	10.2	0	0.1	33.8	0.z	8.88
Mar	15.6	16.9	9.1	23.2	65.9	26.14
Apr	0.8	27.9	149.6	69.5	113.2	72.2
May	101.3	76.3	76.5	175.9	199.5	125.9
June	175.1	228.8	235	113.8	325.4	215.62
July	264.8	634.2	328.9	226	286.8	348.14
Aug	445.5	330.4	315.4	319.6	342.3	350.64
Sep	268.9	186.1	151	264.3	112.7	197.2
Oct	46.9	249.1	27.6	173.1	55.9	110.52
Nov	0.7	25.3	0.5	11.6	4.6	8.54
Dec	0	5.2	40.6	12.3	0	11.62
Yearly Total	1335.9	1780.2	1334.3	1426.1	1531.1	1481.5

Source: Website of Indian Meteorological Department, Govt. of India

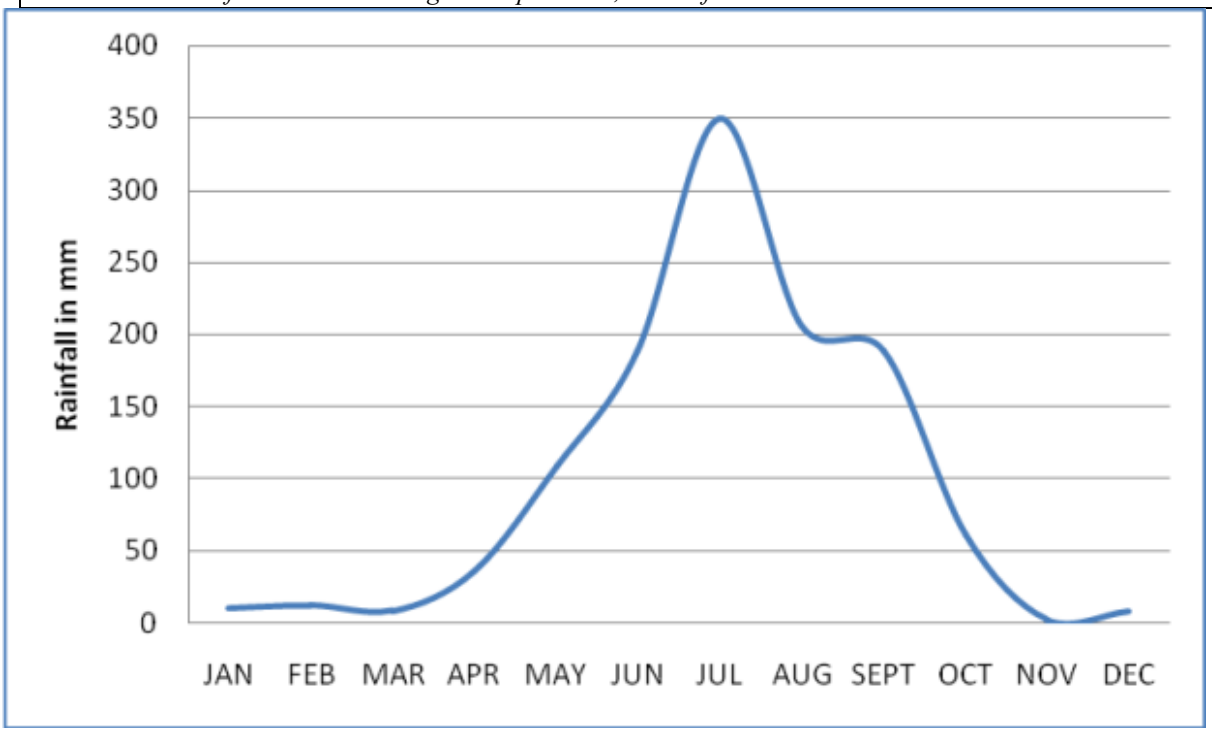


Figure 2.2: Annual Rainfall Data of the Bankura District, West Bengal (*Source: IMD Database*)

2.10. Seismicity of the Study Area

The district is broadly having three types of landforms, upland peneplain in the western part, undulating upper alluvial plain in the middle and lower alluvial plain in the north eastern part of the district. The uplands in the west accounts for around 25% of the total area are sloping,

very often devoid of vegetation and prone to runoff and erosion. The area has shallow acidic soil with poor fertility and low water holding capacity. In the uplands which cover an area of 1,76,915 ha, cultivation of paddy is not remunerative. Seismologically, the district comes under seismic Zone –III.

The seismic hazard map of India was updated in 2000 (Figure 2.8) by the Bureau of Indian Standards (BIS). There are no major changes in the zones in West Bengal with the exception of the merging of Zones I and II of the 1984 BIS map. Western sections of the northern districts of Jalpaiguri and Cooch Behar lie in Zone V. The remaining parts of these two districts, along with the districts of Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, Malda, 24 North Parganas and 24 South Parganas lie in Zone IV. The rest of the state along with the city of Kolkata lies in Zone III. The maximum area of the district falls under the Seismic Zone III and rest of the part fall under Zone II, indicating the district under safe earthquake–prone zone.

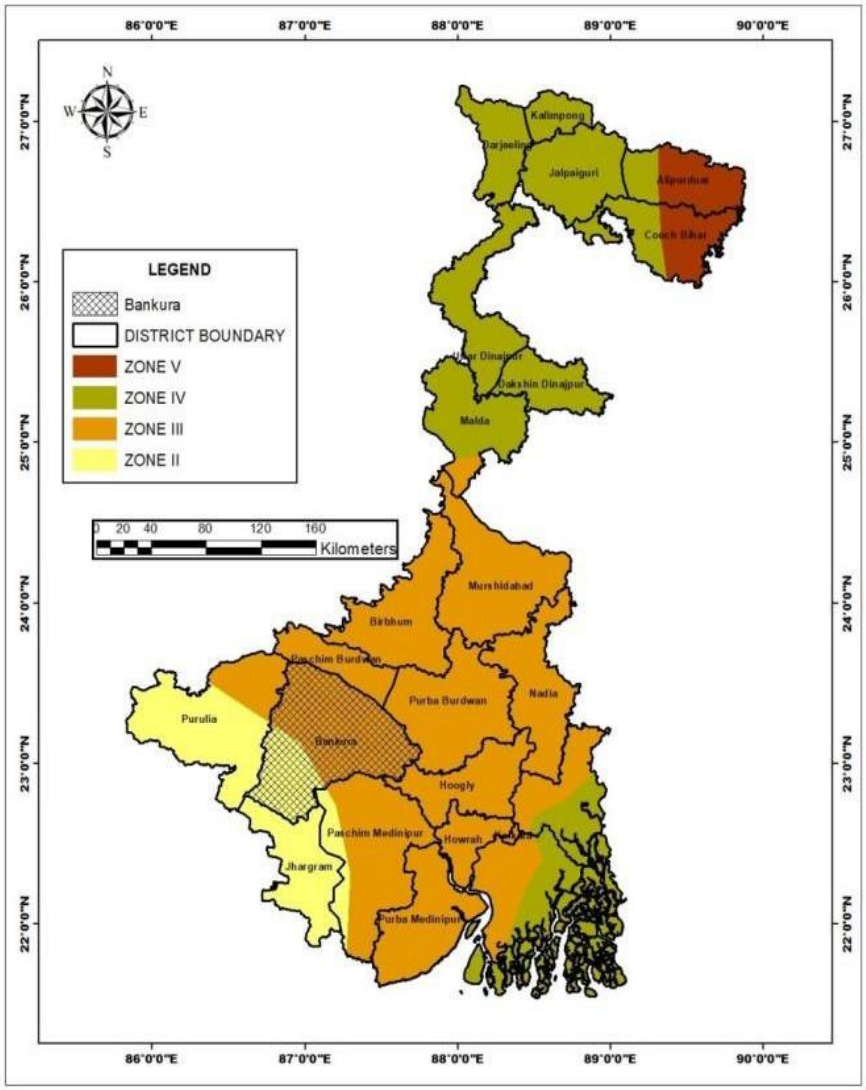


Figure 2.8: Seismic Map of the State of West Bengals (*Source: Amateur Seismic Centre (ASC), Pune, 2022*)

2.11. Reserve Estimation for Riverbed Deposits

The proposed project is river bed mining project, so entire deposit lies within the river bed area. The measurement of Geological reserve is estimated by the actual measurement of average mineable area of the Lease area by multiplying with the thickness of available sand deposit i.e. 3 metres (as per Approved District Survey Report). All the quantity estimated are under proved category as per UNFC, 2012.

Geological reserve: According to the Ministry of Environment and Forest (MOEF), Government of India, Sustainable Sand Mining Management Guidelines - 2016 and West Bengal Minor Mineral Concession Rules, 2016, mining of river bed sand is restricted to 2 m depth of the river bed. So in the present scenario, the geological reserve of Sand is estimated only up to the depth of 2 m only (as per Approved Modified District Survey Report).

Area – 36,500 m2, Depth – 2 m,

Geological Volume of Reserve = Area X Depth = 36,500 m2 X 2.00 m = 73,000 m3.

Mineral Blockage:

I. ***Reserved Volume Blocked in Mine Limit (For Safety Zone):***

7.5 m wide peripheral belt for safety zone around the Mine boundary of the mining area (according to MMR, 1961) has been blocked for mining which is: 5,699 m2.

So, total volume of reserve blocked within safety zone (upto 2 m depth) is (5,699 m2 X 2 m) = 11,398 m3.

II. ***Reserved Volume Blocked for Other Blockage Area (Slope in the Boundary Area):***

On an average distance between the river banks is 660m and 1/3 rd of the distance between the river bank lines are about 220m distance from the river bank line. Here 1/3 rd of the distance between the bank lines is not considered as 100m distance from river bank line is less than 220m. Here 100m distance from river bank line does not cross the safety zone of the lease area. Slope will be maintained 45°. Present day river water flow does not cross any portion of the lease area. Length of the 7.5 m berm inside the lease boundary is 729 m.

So, total volume of reserved for Other Blockage Area (Slope in the Boundary Area) is = **(729 m X 2 m X 2 m X 0.5) =1,458 m^3**.

Total Blocked Volume of Reserve (i + ii)

= (11,398 m3 + 1,458 m3) = 12,856 m3.

MINEABLE RESERVE

Geological Volume of Reserve = 73,000 m3.

Blocked Volume of Reserve = 12,856 m3.

Mineable Volume of Reserve

= (Geological Volume of Reserve – Blocked Volume of Reserve)

= (73,000 m3– 12,856 m3) = 60,144 m3.

60,144 m3 = 60,144 X 35.3147 ft3 = 21,23,967 ft3

(1 m3 =35.3147 ft3).

Table 2.3: Considerations for Resource & Reserve Calculation of the Lease Area

Total Area (in square metre)	Depth (in m)	Geological Volume of Reserve (Ares X Depth) (in cubic metre)	Volume Blocked in 7.5 m Mine Limit (For Safety Zone) (5,699 m^2 X 2.00 m) (in cubic metre)	Volume Blocked Volume of Reserve for Slope in the Boundary Area (729 m X 2 m X 2 m X 0.5 m) (in cubic metre)	Total Blocked V0lume of Reserve (In 7.5m Mine Limit and for Slope in the Boundary Area) (in cubic metre)	Mineable Volume of Reserve (Geological Volume of Reserve - Total Blocked V0lume of Reserve) (in cubic metre)
36,500	**2.0**	**73,000**	**11,398**	**1,458**	**12,856**	**60,144**

Table 2.4: Geological Reserve of the Lease Area.

Year	Total Volume of the Area (Cum)	Replenishment Rate (%)	Geological Resource (Cum)
1	73,000	100	**73,000**

2	73,000	75.67	**55,239.10**
3	73,000	75.67	**55,239.10**
4	73,000	75.67	**55,239.10**
5	73,000	75.67	**55,239.10**
Total Geological Resource			**2,93,956.40**

As the river bed sand extraction will be done through single bench of 2 m height, the whole material is mineable. Replenishment rate of Kangsabati River bed deposits is 75.67% (as per Modified District Survey Report) and the mineable reserve has been estimated based on 75.67% replenishment rate from second year. So, in the 1st year depth of mining will be 2 m and from 2nd year to 5th year depth of mining will be (2 X 0.7567) = 1.5134 m.

Table 2.5: Minable Reserve of the Sand Deposit.

Year	Total Volume Inside 7.5 m Berm after maintaining 45° slope (Cum)	Replenishment Rate (%)	Mineable Reserve (Cum)	Annual Production (Cum)
1	60,144	100	**60,144**	**60,144**
2	60,144	75.67	**45,510.9648**	**45,510.9648**
3	60,144	75.67	**45,510.9648**	**45,510.9648**
4	60,144	75.67	**45,510.9648**	**45,510.9648**
5	60,144	75.67	**45,510.9648**	**45,510.9648**
Total Mineable Reserve			**2,42,187.8592**	**2,42,187.8592**

Note: Tables in the previous page are in-situ figures. Actual figures of sand production may be correlated in accordance with in-situ density and bulk density of produced sand. Depth and volume of mining has been reduced from second year onward in order to depict the replenishment rate. Since Replenishment is a dynamic process, the depth of mining at any point of time may be considered at higher level based on published replenishment rate but limited to maximum of 3m (According to the Ministry of Environment and Forest (MOEF), Government of India, Sustainable Sand Mining Management Guidelines - 2016 and West Bengal Minor Mineral Concession Rules, 2016, mining of river bed sand is restricted to 2m depth of the river

bed or 1 metre above ground water level only, whichever is less). Here as per approved Modified DSR of Bankura, the ultimate depth of mining will be upto 2 m depth.

In the 1st year depth of mining will be 2.00 m and from 2nd year to 5th year depth of mining will be (2 X 0.7567) = 1.5134 m. Extraction/ collection work of river sand is usually carried out for eight months in a year. The work remains suspended for the rest four months of the year due to seasonal monsoon rainfall and other related problems. Therefore, considering the number of working days in a month to be 25 days and 8 hours per day. So, the total working days in a year would be = (25 X 8) = 200 days.

Considering 240 working days annually, barring the monsoon season, maximum production will be = (60,144 cum / 240) = 250.60 cum per day of the river bed material. The maximum annual production capacity of this mine is 60,144 cum sand.

Considering the carrying capacity of the trucks/ dumpers to be deployed is of average 10 m^3 (10 Ton), the total no. of trips to be made by the dumpers/trucks would be about = (250.60/ 10) $m^3 \cong$ 50 trips per day.

However, the Competent Authority may prescribe the quantity of sand to be extracted by the Mining Contract Holder as per the terms and conditions of the contract taking into account the impact on the ecology and environment of the surrounding areas. However, the quantity of sand allotted for extraction under the Mining Contract will be within the mineable reserve of sand available per year as depicted above.

Method of Mining: Presently the said mine is working with the conventional open cast with bench system method with the semi mechanized mode of operation. Based on the mode and method so adopted and taking into the consideration of geological parameters of the sand body, the mining pit is designed such that the height of the bench is kept at about 2.00 meters maximum and maintains 45ºpit slope. However, only 2.00 m benches have been considered for present mining.

- Mode of operation (mining) is a manual open cast supplemented with semi- mechanised operation
- Extraction of sand will be done by both manual labours and small capacity machineries like excavators and tractors for excavation and transportation of the excavated sand.
- The extracted sand will be temporarily stored in the stacking area which then further will be transported to the desired location as per MDO.

- The bench height will be 1m, at final stage the slope of the bench will be maintaining 45° slope
- Loading of excavated and sorted sand materials into tippers with the help of manual mode or by small capacity excavator.

Progressive Mine Closure Plan: The "West Bengal Minor Mineral Concession Rule 2016" dated 29th July 2016 has made it mandatory to incorporate "Progressive Mine Closure Plan" in Mining Plan (Approved Mine Plan, Chapter III, page no. 436).

The Kangsabati River is a meandering perennial river and therefore during the monsoon season, considerable amount of mineral (Sand) is transported by the flow of river water. This mining contract is for river bed sand only. The sand is to be extracted from the provided lease in a specific method as discussed in previous sections. The voids created because of this mining will get filled gradually with the sediments carried by the river flow and would be replenished every year. This process of replenishment is slow in the dry season due to lack of rainfall. The restoration of this riverbed to its original position through natural process is more congenial to the aqua-marine environment than the reclamation with earth/silt etc. brought from elsewhere. Since the river will regain its original position through natural process after closure of the mine on expiry of the contract period, a progressive mine closure plan would not be necessary in this case.

Reasons for closure: The progressive mine closure plan has been prepared in compliance with West Bengal Minor Mineral Concession Rules 2016 under MMDR Act 1957. No immediate closure is planned as sufficient reserves are available to carry on the activities. There is market potential in domestic demands.

Statutory Obligations: The lessee is bound to submit the progressive mine closure plan either with Mining plan or Scheme of Mining. Lessee is bound to follow the terms and conditions as will be stipulated in the lease deed. In addition to it the rules pertaining to the Protection of Environment i.e., Environment Protection Act. Environment Rules and other associated rules for the protection of environment will have to be followed. All other rules pertaining to the mining existing at that time will be followed during the course of mining activities.

Machinery Requirements: The proposed mining activity in Kangsabati riverbed will be strictly restricted to manual opencast method of mining. Involvement of any heave machineries are strictly not advisable. The table 2.3 shows the list of machineries that are advisable in the mining contract area.

Table 2.2: List of Machineries involved in MLA.

S.No.	Type of Machinery	Number	Fuel Consumption per hour (Litres) per machine
1.	Excavator	3	9
2.	Tipper Truck	4	12
3.	Water Sprinkler Truck	2	6

Proposed Manpower: There is no permanent influx of the population anticipated, as the workers will be hired locally from nearby villages. Unemployment is very pervasive in the study area. The project will provide employment in the study area to approximately 12 & 28 semi-skilled and Unskilled laborers from local people directly and 1 person indirectly including Mines Manager, in the project. It is expected that a large part of the investment in this project will be direct / indirect role on local population. Hence there will be an overall improvement of socio – economic status of the people of surrounding areas.

2.12. Project Cost

The total cost of project would be approx. 4.29 crores for 5 Year. There is budgetary provision that 5 % of project cost will be allocated for Environmental Management Plan and 2 % of the project cost will be allocated for Corporate Environmental Responsibility and 2% Health and Hygiene for causes of poor people of nearby villages. Health and Hygiene will be allocated for health check – up once in six months. Extra budgetary provisions will be allocated to lady workers.

Table 2.8: Split Up of Project Cost of Taldiha Sand Mine (Sand Block 0115KB001)

Sl. No.	Description	Rate	Amount (in Rupees)
1	Bid Amount	Total Bid Amount – Rs. 11,100,000/-	11,100,000/-
2	Royalty (including Cess, DMF, GST etc.) of **85,52,792 cft** (2,42,187.8592) Cubic Metre sand material	@ Rs. 3.60 / cft	3,07,90,051.2/-
3	Miscellaneous (Temporary Labour Room, Temporary Toilet etc.)		10,09,948.8/-
Total (Rs.)			**4,29,00,000/-**

CHAPTER – 3: DESCRIPTION OF THE ENVIRONMENT

3.1. General

This chapter provides the description of the existing environmental status of the study area with reference to the environmental attributes like land, air, noise, water, biological and socio-economic status. The study area covers the area falling within 10 km radius from the boundary of the project area. One time baseline monitoring was conducted for the study. Google image of 10 km study area of the project site is given in Figure 3.1.

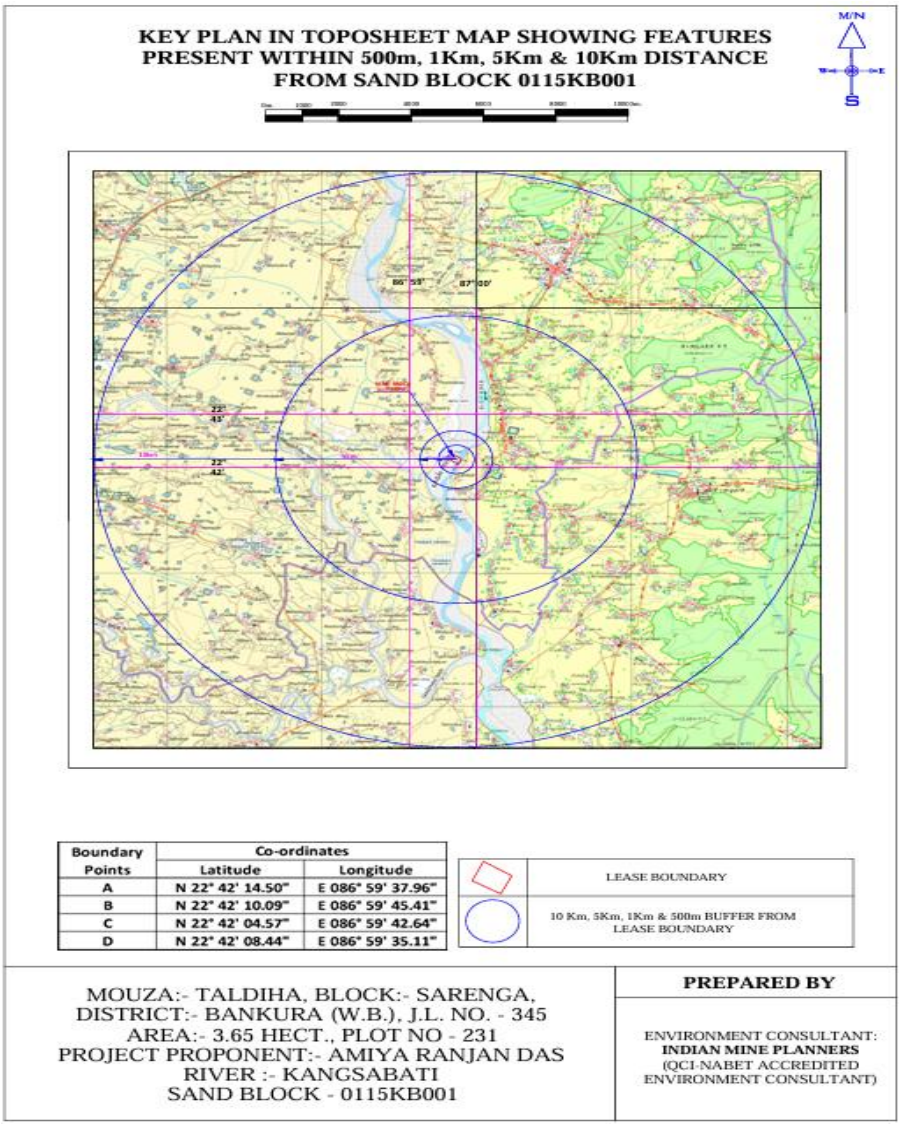


Figure 3.1: The map showing the core zone (Mine lease area) and Buffer zone.

3.2. Methodology

The methodology for conducting the baseline environmental survey is based on the Standard Terms of reference issued by MoEF&CC for non-coal mining projects. Baseline information with respect to air, noise, land and water quality in the study has been collected by primary sampling/field studies during the study period. Baseline status of the biological and socio-economic environment were also studied.

Baseline data has been collected out during the Summer Season (March, 2023 to May, 2023) by M/s N D International, Kolkata [NABL Accredited Lab, Certificate No. TC – 5910] in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Team of Experts visited the study area for Social & Biological Environment study. The following attributes shown in the Table 3.1 below are gathered by M/s Indian Mine Planners and Consultants, Kolkata through field investigations regarding the preparation of EIA/EMP for the proposed mining area with related facilities.

Table 3.1: Salient Features of Baseline Environmental Studies.

Attribute	Parameter	Frequency of Monitoring
Micro – Meteorological Studies	Wind Details like speed, direction, Temperature, Relative Humidity and Rainfall	3 months data has been collected to assess Air Pollution impacts on the surrounding environment.
Ambient Air Quality	PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2), Oxides of Nitrogen (NO_X)	3 months data has been collected to assess baseline Air Quality status of the area.
Noise Quality Data	Noise levels	1 middle month data has been collected to identify noise producing areas.
Water Quality, Soil Quality Data and Land Use pattern	Physical & Chemical parameters along with Measurement of heavy metals and land use parameters.	To establish baseline Water Quality, Soil Quality for future reference and Land Use Pattern in the area.
Socio – Economic & Demographic Studies	Socio – Economic parameter	To know the present Socio-Economic status of the study area.

3.3. Land Use / Land Cover of the Study Area

3.3.1. Introduction

Remote sensing is the science of acquiring information about the Earth's surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and processing, analysing, and applying that information. Satellite remote sensing technology has found its acceptance worldwide for rapid resource assessment and monitoring. Satellite images have been utilized for land use and land cover mapping.

Land use/land cover data refers to data that is a result of classifying raw satellite data into "land use and land cover" (LULC) categories based on the return value of the satellite image. The term "land use" (LU) relates to the human activity or economic function associated witha specific piece of land, whereas the term "land cover" (LC) relates to the type of feature present on the surface of the earth. The study area is considered as 10 km from the project site Mejia Block in Bankura District of West Bengal.

3.3.2. Objectives

→ Delineation of Land use/ Land cover categories for the whole study area.

→ Generation of digital cartographic database using secondary data sources

3.3.3. Site Inspection and Data Interpretation

A recognition analysis to obtain a broad understanding of the area of analysis was undertaken. In order to evaluate the accessibility of the area as well as the trend and the distribution of vegetation and its composition, knowledge on current field conditions was important. Ground validation means the creation of a link between detected, labelled, identified and satellite imagery objects and objects. In satellite imagery for identification, it correlated the presence of a certain species of plants on the ground with its tonality. The figure 3.3 below shows the land use land cover of the study area based on our detailed site inspection. The study area covers a vast majority of Agricultural Land, Tea Garden, Barren Land as shown in Table 3.2.

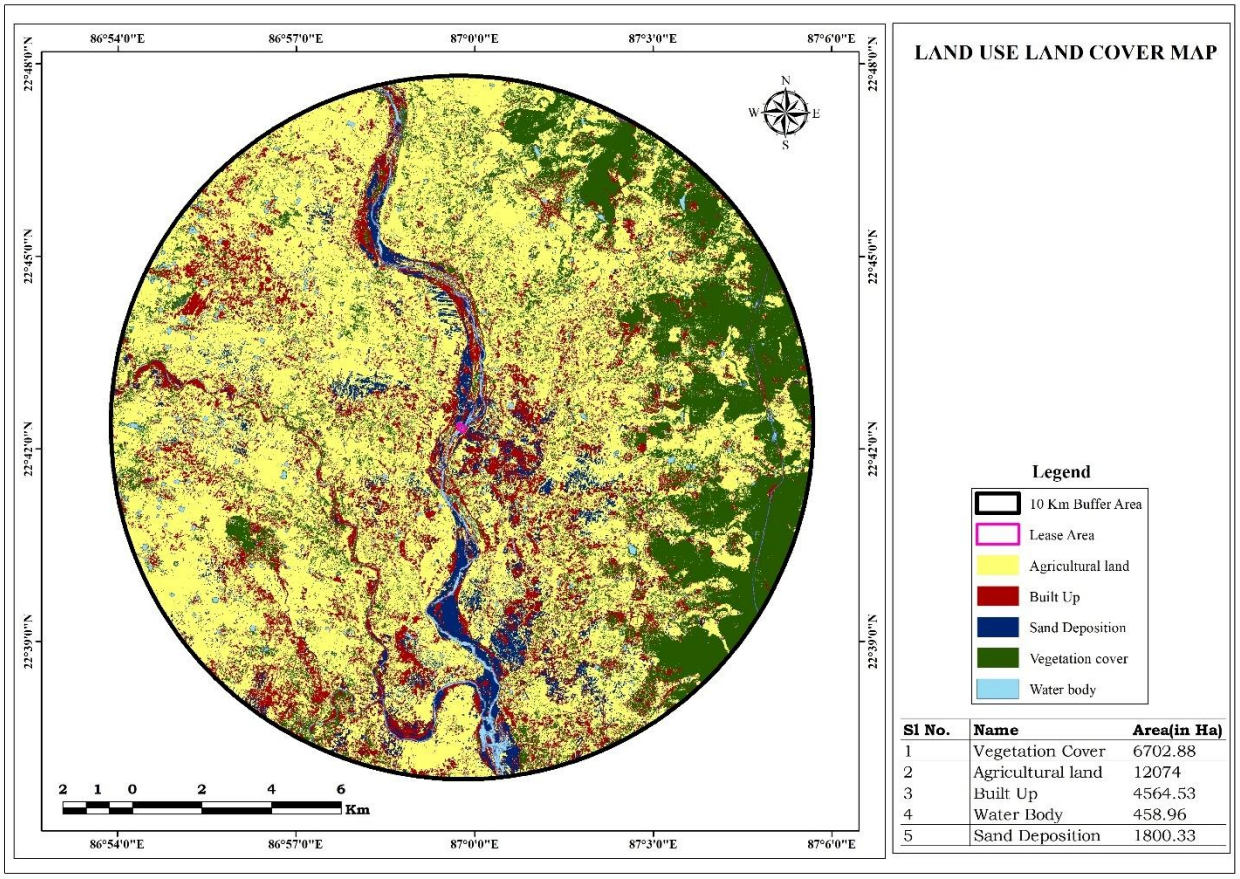


Figure 3.2: Land use Land Cover of the Study Area.

Table 3.2: Land use Land cover statistics of the Study Area.

S. No.	FEATURE	AREA (Km²)	AREA PERCENTAGE (%)
1.	Vegetation Cover	67.02	26.18
2.	Agricultural Land	120.74	47.16
3.	Built Up	45.64	17.82
4.	Water Body	4.58	1.78
5.	Sand Deposition	18.00	7.03
TOTAL		**255.98**	**100**

The site of the sand mining project is located on the Kangsabati River. The site of the project is located in the Bankura District of the state of West Bengal. The river is a rain fed in nature and its bed mostly consists of sand and gravels of various sizes along with sand as shown in Figure 3.1. It is also predicted that this pit will naturally be filled with sand during the time of monsoon, based on the amount of rainfall obtained by the region and the volume of river flow. During the monsoon flood, the water level increases by 2.0 – 3.5 m during short periods.

Table 3.2 shows the land use land cover statistics of the study area covering a distance of 10

km. The LU LC map in Figure 3.3 shows that the analysis consists of 5 area groups (Dense Vegetation, Crop Land, Water Body, Built-up Area and Barren Land). The Major portion of the study area is covered with Cropland and Barren Land which roughly covers 85% of the study area. In the remaining 15% area consists of water bodies and Built Up area most of it with few portions of Dense Vegetation.

3.4. Micro Meteorological Data

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.

Since, the meteorological parameters exhibit significant variation in time and space, meaningful interpretation can only be done through a careful analysis of reliable data collected very close to the site. The micrometeorological data has been archived the Climatological table from the IMD Database from the year 1981 – 2010. The station details have been provided in table 3.3 followed by the climatological data sheet in table 3.4.

Table 3.3: Micrometeorological Station Details (*Source: IMD Database*)

Name of Station	Bankura
Location of the Station	Bankura Town, Bankura District, West Bengal
Latitude	23° 14′
Longitude	87° 4′
Height above M.S. L.	97.37 m
Based on Observation	1991 – 2020

Table 3.4: Climatological data of Bankura Station from the year 1981-2010 as per the IMD Database

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Record High (°C)	33.1	39.3	43.5	46.7	47.4	46.1
Record Low (°C)	4.8	7.2	10.2	16.0	16.6	20.4
Avg. High (°C)	25.6	29.2	34.6	37.7	37.6	35.6
Avg. Low (°C)	11.7	15.5	20.2	24.3	25.7	26.1
Monthly Total Rainfall (mm)	19.4	18.6	27	58	115.8	271.3
Number of Rainy days	1.4	1.5	2.1	3.9	6.8	11.9

Avg. Relative Humidity (%)	77	70	60	65	72	80
Avg. Vapor Pressure (hPa)	13.5	15.7	19.0	25.8	30.5	33.0
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Record High °C	41.2	39.8	39.0	39.0	37.0	33.6
Record Low °C	18.6	20.0	19.2	16..0	10.5	5.9
Avg. High °C	32.8	32.7	32.8	32.1	29.9	26.5
Avg. Low °C	25.7	25..7	25.5	23.0	17.7	13.0
Monthly Total Rainfall (mm)	391.8	349.2	245.9	108.3	11.2	9.3
Number of Rainy days	16.4	15.4	11.8	5.1	0.9	0.8
Avg. Relative Humidity (%)	86	87	87	84	80	79
Avg. Vapor Pressure (hPa)	33.4	33.6	32.7	23.8	20.1	14.9

3.4.1. Temperature

The average monthly maximum and minimum temperature recorded at IMD station Bankura is presented in Table 3.5. The recorded monthly maximum temperature usually ranges from 35.0 °C to 42.0 °C recorded mostly from March to September and recorded monthly minimum temperature usually ranges from 4 °C to 15 °C recorded mostly from November to February. The average monthly maximum temperature is 36.5 ° C in summers and average monthly minimum temperature is 11 °C in winters. The month wise temperature variations are given in Figure 3.3.

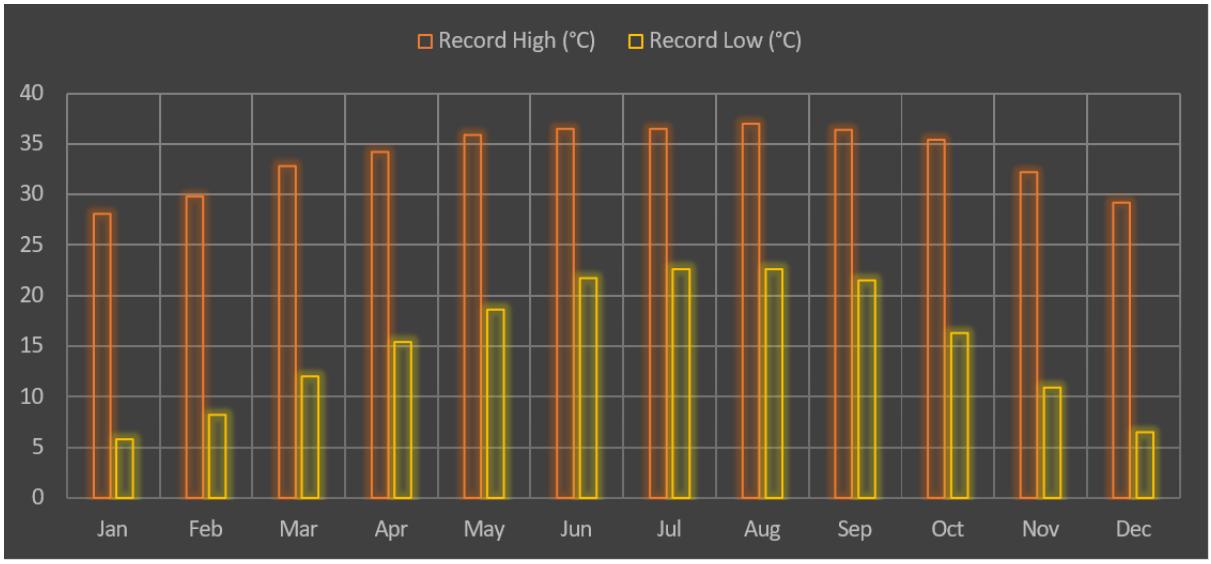


Figure 3.3: Recorded Highest & Lowest Temperature at Bankura (IMD: 1981-2010).

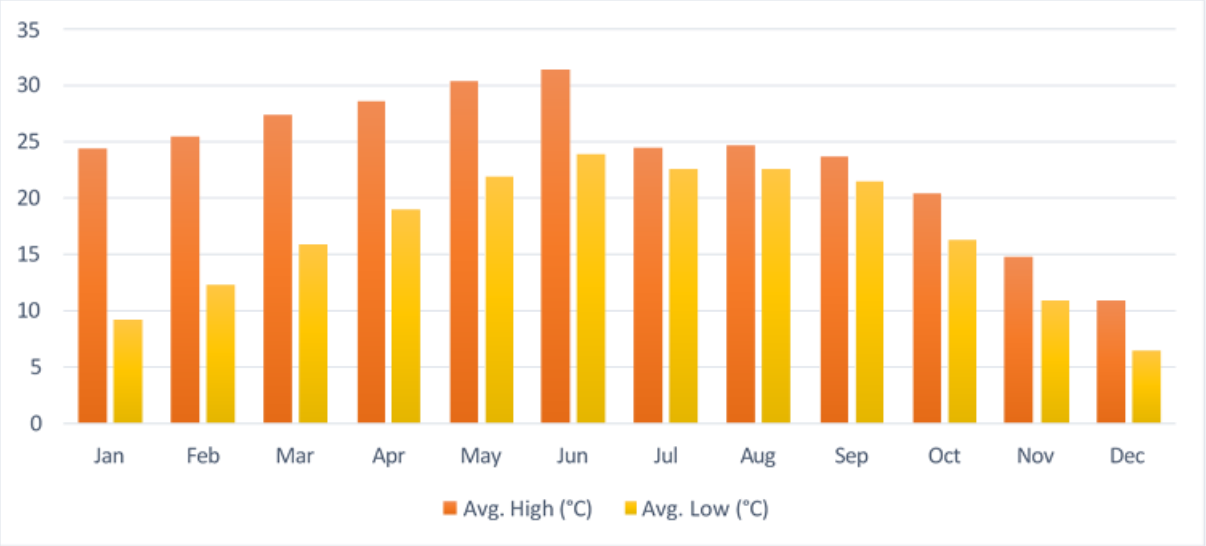


Figure 3.4: Average Highest & Lowest Temperature at Bankura (IMD: 1981-2010).

3.4.2. Rainfall

The average annual rainfall as per IMD Climatological Table (1981-2010) at Bankura is 150.5 mm of which heaviest rainfall usually ranges from 300 – 400 mm which is received in the months of June, July, August and September. The average monthly rainfall recorded at IMD station Silchar is summarized in Table 3.4. The rainfall as received in various months of the year is given in Figure 3.7. The Last 5 years precipitation was also extracted from the IMD Database as shown in table 3.6.

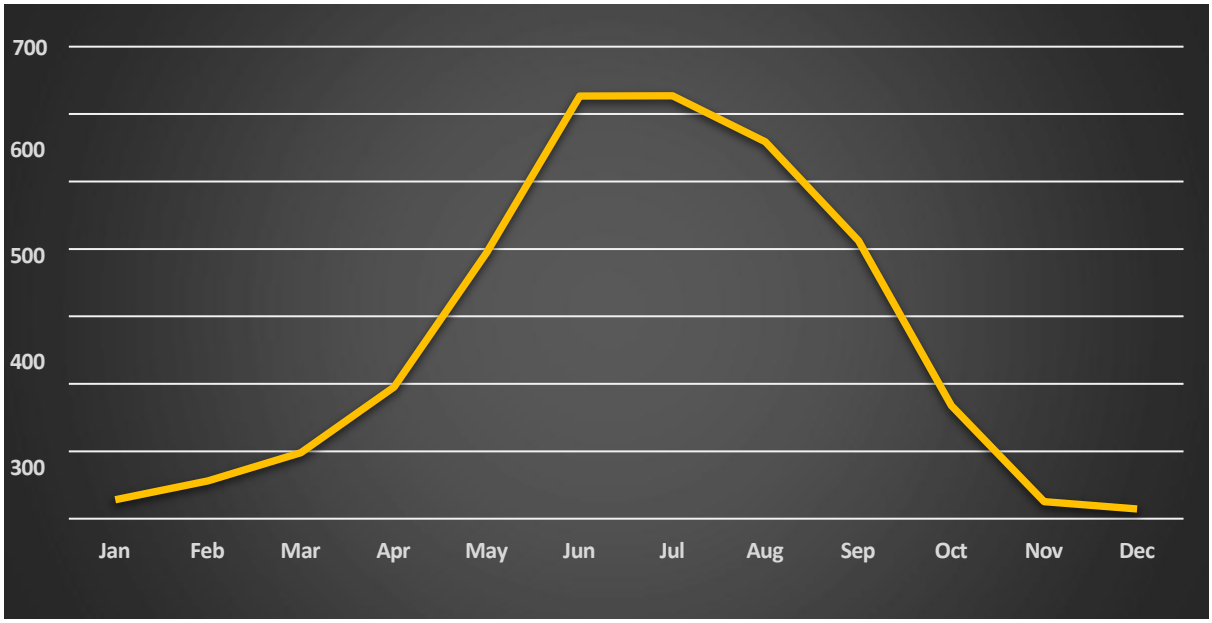


Figure 3.6: Monthly Total Precipitation recorded at Bankura (IMD: 1981-2010)

Table 3.5: Monthly Precipitation (in mm) of Bankura District over the last 5 years (*Source: IMD Database*)

Month	2017	2018	2019	2020	2021	2022
January	0.00	0.00	24.5	0.00	4.30	30.0
February	0.1	33.8	0.3	2.0	43.80	62.8
March	9.1	23.2	65.9	9.3	82.40	0.0
April	149.6	69.5	113.2	53.2	565.90	6.6
May	76.5	175.9	199.5	254.7	460.40	120.3
June	235.0	113.8	325.4	440.7	336.10	136.7
July	328.9	226.0	286.8	481.0	451.50	148.1
August	315.4	319.6	342.3	151.2	346.60	403.8
September	151.0	267.3	112.7	466.0	526.70	193.9
October	27.6	173.1	55.9	195.0	186.50	97.6
November	0.5	11.6	4.6	38.1	65.30	0.00
December	40.6	12.3	0.0	54.8	10.80	0.0
Total	**1334.3**	**1426.1**	**1531.1**	**2146**	**3080.30**	**1199.8**

3.4.3. Humidity

The relative humidity is generally high throughout the year, with highest during the morning and comparatively low relative humidity recorded afternoon. The month wise humidity variations are given in Figure 3.8. The average humidity of the district usually is around 80% annually with 27 hPa vapor pressure and during the summers, it ranges from 80 – 85%. With average vapor pressure of 30 – 33 hPa.

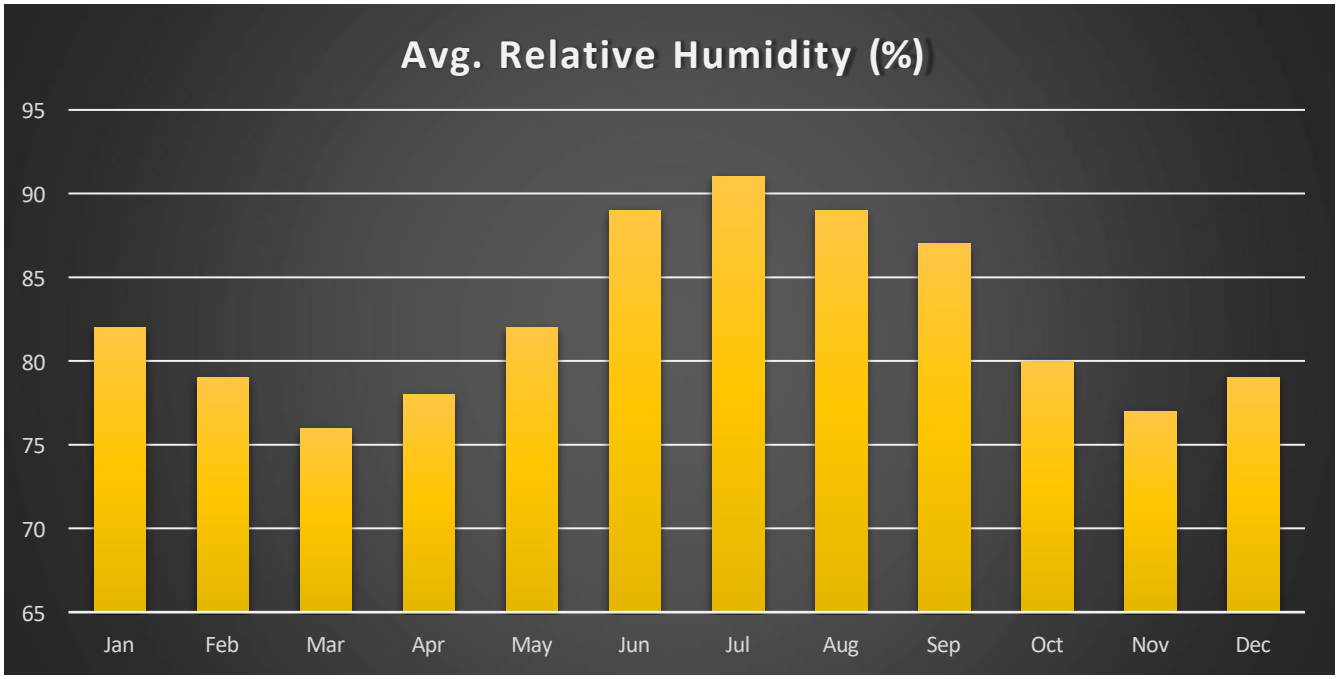


Figure 3.6: Average Relative Humidity recorded at Bankura (IMD: 1981-2010)

3.5. Ambient Air Quality

The ambient air quality (AAQ) 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.

The parameters monitored during the study period were particulate Matters (PM_{10}), particulate Matters ($PM_{2.5}$), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_x). The results of monitoring carried out for study period March 2023 to May 2023 representing summer season are presented later in this section.

3.5.1 Methodology opted for AAQ Investigation

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality monitoring network. The designs of monitoring network in the air quality surveillance programme have been based on the following considerations:

- Meteorological conditions on synoptic basis;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status; and
- Representatives of likely impact areas.

The ambient air quality monitoring was carried out at 6 locations. The location and description of AAQM stations is shown in Table 3.7 and Figure 3.9 below.

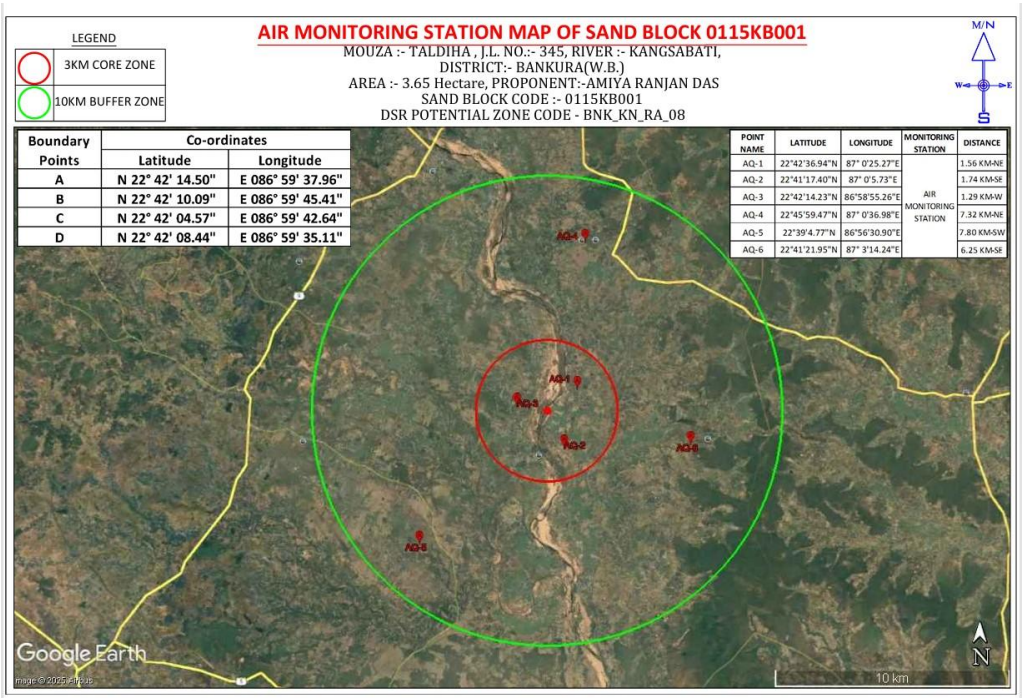


Figure 3.8: Ambient Air Quality Sampling Locations in the Study Area.

Table 3.6: AAQ Sampling location within the Study Area

Location Code	Latitude	Longitude	Distance & Direction w.r.t. Project Site
AQ-1	22º42′36.94″ N	87º0′25.27″ E	1.56 km-NE
AQ-2	22º41′17.40″ N	87º0′5.73″ E	1.74 km SE
AQ-3	22º42′14.23″ N	86º58′55.26″ E	1.29 km-W
AQ-4	22º45′59.47″ N	87º0′36.98″ E	7.32 km-NE
AQ-5	22º39′4.77″ N	86º56′30.90″ E	7.80 km-SW
AQ-6	22º41′21.95″ N	87º3′14.24″ E	6.25 km SE

Ambient air quality monitoring has been carried out with a frequency of two days per week during study period. The baseline data of air environment was monitored for parameters mentioned below as per the MoEF&CC guidelines and point no. 44 of granted TOR bearing vide letter no. EN/T – II – 1/193/2024 dated 23rd January 2025:

- Particulate Matter (PM_{10});
- Particulate Matter ($PM_{2.5}$)
- Sulphur Dioxide (SO_2);
- Oxides of Nitrogen (NO_x);
- Free Silica (Si);

The techniques used for ambient air quality monitoring and minimum detectable levels are given in Table 3.7 followed by site photographs showing the AAQ sampling done by the ND International team under the supervision of IMPCON Experts in Figure 3.9.

Table 3.7: Methodology adopted for the analysis of AAQ Samples

Parameters	Technique	Technical Protocol	Minimum Detection Limit
Particulate Matter (PM_{10})	Gravimetric Method	IS 5182 Part 23	5.0 µg/m^3
Particulate Matter ($PM_{2.5}$)	Gravimetric Method	CPCB Guideline	3.0 µg/m^3
Sulphur Dioxide (SO_2)	Improved West and Geake	IS 5182 Part 2	4.0 µg/m^3
Oxides of Nitrogen (NO_x)	Modified Jacob and Hochheiser	IS 5182 Part 6	5.0 µg/m^3
Free Silica (Si)	Spectrophotometric Method	IS 15388: 2003	3.0 µg/m^3

Figure 3.9: AAQ and Meteorological Sampling in various sites Project Site.

3.5.3 Interpretation of AAQ Data

The analysis of ambient air quality data for three months consequently indicates excellent ambient air conditions at the site as well as around the site upstream as well as downstream. Particulate matter PM_{10} is within the limits prescribed. SO_2 and NO_2 are well below the limits prescribed. Hence overall scenario of the study area for ambient air quality is good. The pollutant (Particulate Matter, NOx, SO_2 and Si) transport of from project site to nearby area are predicted by the USEPA recommended AERMOD model.

The proposed mining project includes activities like approach roads, haul roads, excavation and transportation of sand. These operations generally result in the generation of dust and thereby pose health hazards. However, it is proposed that adequate control measures will be provided at every stage of operation, such as water sprinkling at loading, unloading points and on haul roads before transportation, to reduce the fugitive dust emissions. US EPA, 2006 Revision of emission factor for AP – 42 was used to calculate the emission of PM_{10} released into the atmosphere during transportation of sand by trucks operated on the haul road. Transportation of the sand and gravel by trucks used per hour on the haul road was calculated by the area source, with the combination of line sources with each truck loaded with sand transported over the haul road of the mining area. It was assumed that the truck would carry 10 tons of sand and 177 trips would be done per day as per the approved mining plan. Area source emission factors considered for the loading & transportation is 0.00000078 g/sec/m^2 of PM_{10}

and: 0.000000023 g/sec/m^2 $PM_{2.5}$ generations. The Dispersion AERMOD View model was used for the prediction of impact with one-hour meteorological data of the study periods. The model predicted data are presented below, which indicates that around up to 10 km area from the project site shows 5.31µg/m^3 of increment of PM_{10} concentration and 0.157 µg/m^3 of increment of $PM_{2.5}$ concentration. This elevated concentration, is negligible effects on sounding environments as shown in Figure 4.2 & 4.3 of Chapter 4. The anticipated Impacts on Air Environment are summarized in Table 4 3.

3.6. Ambient Noise

A noise survey has been conducted in the study area covering residential transportation, commercial and calm zones. The main objective of noise monitoring in the study area is to establish the baseline noise level, which is needed for assessing the impact of total noise, which is expected to be generated in the proposed project activities. Noise is measured in terms of the loudness of the sound. A sound is a form of energy that propagates through an elastic medium at a speed that is determined by the properties of that medium. Since loudness of sound is important to the effects of noise on people, the dependence of loudness upon frequency must be taken into account in environmental noise assessments. Several methods have been developed by researchers using the frequency spectrum of sound to arrive at the loudness index or the given sound. For measuring the intensity of the sound, "A sound level meter" is used, which gives the intensity of sound in terms of dB (A).

3.6.2 Identification of Sampling Location

A preliminary site survey has been undertaken to identify the major noise generating sources in and around the mining 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 eleven locations in the study area for summer season (March 2023 – May 2023). The noise levels at each location were recorded for 24 hours. The environment setting of noise monitoring locations is given in Table 3.14 and shown in Figure 3.13.

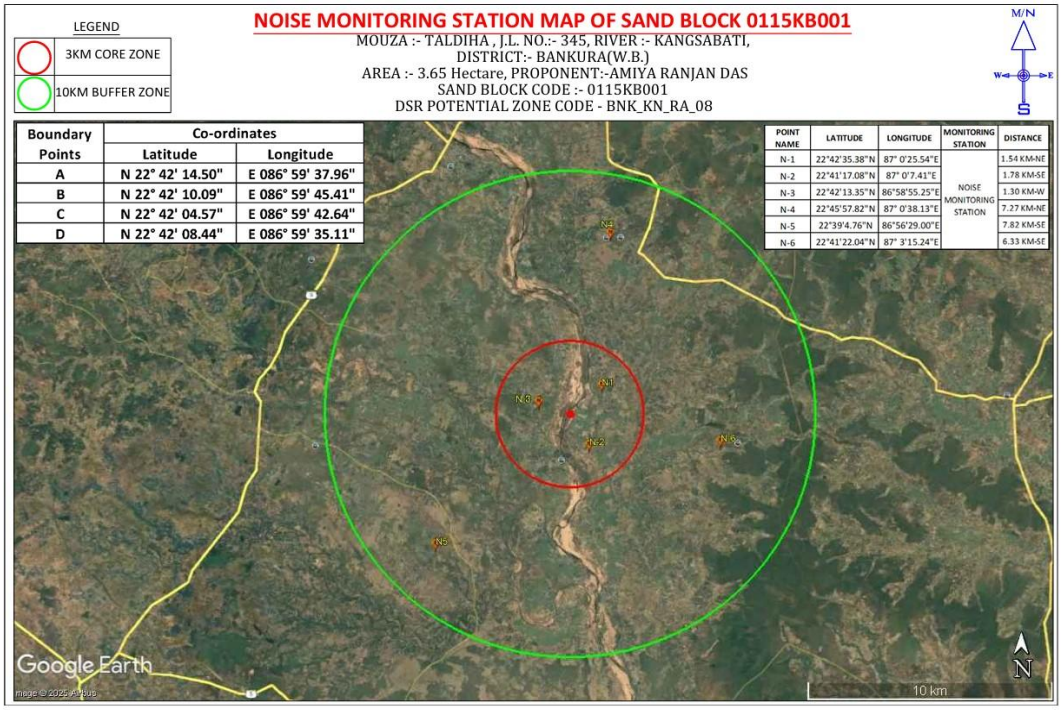


Figure 3.9: Noise Sampling Location in the Study Area

Table 3.11: Ambient Noise environment sampling locations.

Location Code	Latitude	Longitude	Distance & Direction w.r.t. Project Site
N-1	22° 42'35.38"N	87° 0'25.54"E	1.54 km-NE
N-2	22° 41'17.08"N	87° 0'7.41"E	1.78 km-SE
N-3	22° 42'13.35"N	86° 58'55.25"E	1.30 km-W
N-4	22° 45'57.82"N	87° 0'38.13"E	7.27 km-NE
N-5	22° 39'4.76"N	86° 56'29.00"N	7.82 km-SE
N-6	22° 41'22.04"N	87° 3'15.24"N	6.33 km-SE

3.6.2 Methodology for Data Collection

Sound Pressure Level (SPL) measurements were measured at all locations. The readings were taken for every hour for 24 hours. The day noise levels have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at all the locations covered in 10 km radius of the study area.

Noise levels were measured using integrated sound level meter manufactured by Lutron SL – 4001 Digital Sound Level Meter. The sound level meter consists of a calibrated microphone, electronic circuits, and a display. The microphone detects small air pressure variations associated with sound and converts them into electrical signals. The aforementioned signals are then processed using the instrument's electronic circuitry with frequency range of 31.5 to 8000 Hz. This instrument is capable of measuring the Noise level analysis.

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 becausesound from noise source often fluctuates widely during a given period of time. Table 3.12 below shows the National Ambient Noise Standards followed by site photographs showing the Ambient Noise sampling done by the ND International team under the supervision of IMPCON Experts in Figure 3.13.

Table 3.12: 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	45
D	Silence	50	40

Figure 3.12: Ambient Noise Sampling in across study area.

Noise pollution in the study area is associated with Industrial activities and vehicular traffic. To judge the ambient noise level of the area, noise levels were recorded at 8 locations in dB (A). The details of the location are given in Table 3.14. Monitoring results of the Noise level recorded at 8 locations are given in the table below.

Table 3.14: Monitoring results of the Noise level in and around project site.

Noise Level dB (A) L_{eq}						
LOCATION	**DAY TIME**			**NIGHT TIME**		
	Max	**Min**	**Average**	**Max**	**Min**	**Average**
Project site	45.1	36.8	41.23	42.6	38.2	39.775
Andal Gram	48.8	37.6	42.5	43.2	34.7	37.37

Sarama	52.3	41	45.76	43.2	38.1	38.26
Ramchandrapur	48.5	36.8	43.0	42.6	36.4	39.02

Note:

1) Daytime is from 6.00 am to 10.00 pm and Night time is from 10.00 pm to 6.00 am.
2) Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones.

3.6.3 Interpretation of Ambient Noise Data

The values of noise observed in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded between as 36.8 dB (A) & 52.3 dB(A) respectively. The maximum & minimum noise levels at night time were found to be 34.7 dB(A) & 43.2 dB(A) respectively It is observed that the noise levels are well within the prescribed Ambient Air Quality Standards with respect to Noise.

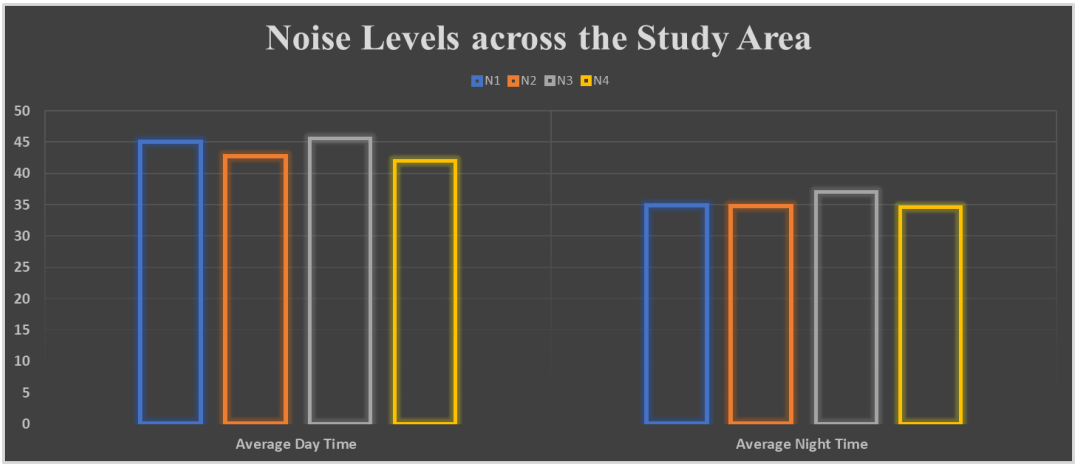


Figure 3.11: Noise Level in and around Study Area

3.7. Traffic Management Plan

3.7.1. Transportation Route

The minerals excavated will be loaded directly into trucks and transported to the concerned market. The transportation route is shown in the map as given below:

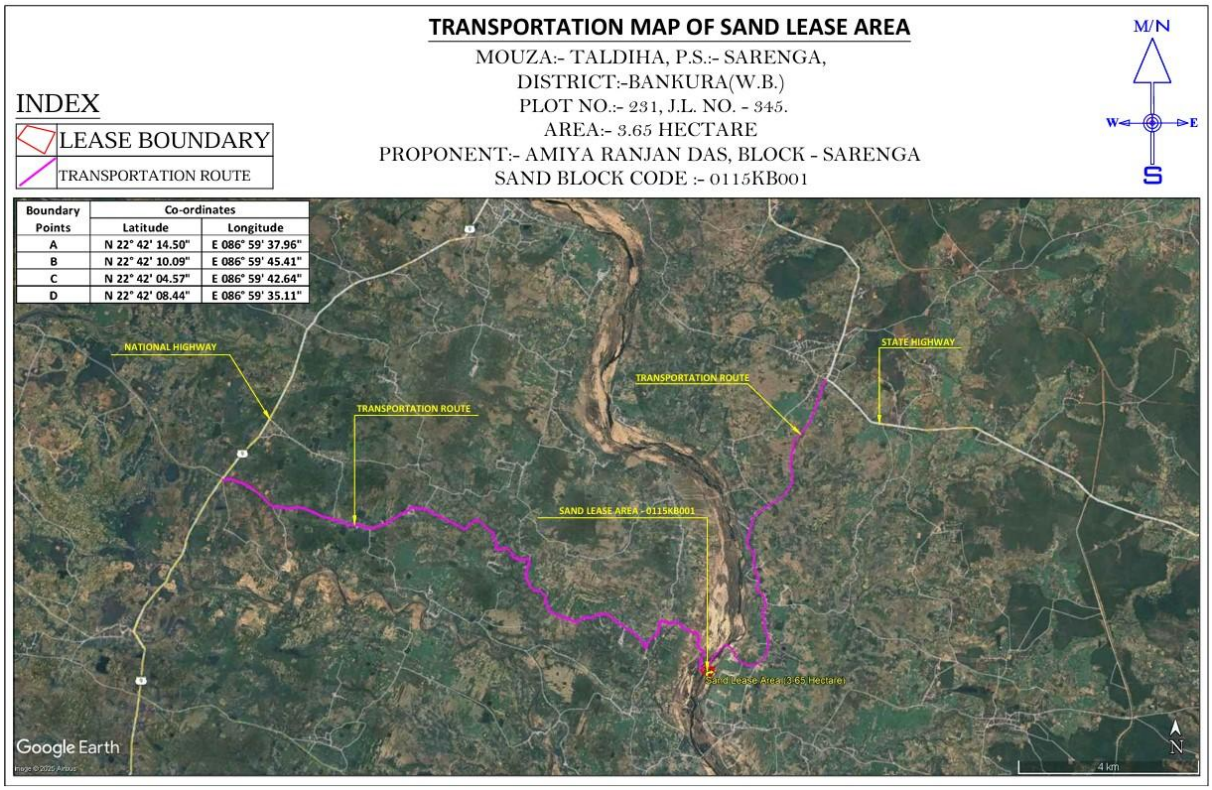


Figure 3.12: Transportation Route Map of the Proposed Lease Area.

3.7.2. Transportation Analysis (Existing)

Then depending on the capacity of the mine site, the number of trucks that will be added to the present scenario will be compared to the carrying capacity. Traffic density measurement were made continuously for 24 hours by visual observation and counting of vehicles under five categories, viz., heavy Commercial Vehicles, light Commercial vehicles, cars, Two-Wheeler and Three-Wheeler. As the mining site is well connected to the State Highway – 9 via unpaved village road of about 6.5 km. For that, two skilled persons were deployed near the SH – 9 for a day on dated. Total numbers of vehicles per hour has been calculated. The results of measurements are given in the table below.

Table 3.15: Existing Traffic Scenario (As per IRC 106: 1990)

Sl. No	Vehicles Distribution	Number of Vehicles Distribution/Hour	Passenger Car Unit (PCU)	Total Number of Vehicles (PCU)/Day
1.	Heavy Commercial Vehicles	2057	3.0	6171
2.	Light Commercial Vehicles	1121	1.5	1681.5
3.	Cars	1997	1.0	1997
4.	Two – Wheeler	1881	0.5	940.5
5.	Three – Wheeler	773	1.0	773
Total		**7,829**		11,563 / 24 = **482 PCU /hour**

Table 3.16: Existing Traffic Scenario & LOS at Project Site

Sl. No	ROAD	V (Volume in PCU/hr)	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1	SH-9	482	1500	0.32	C

3.7.3. Interpretation of Traffic Study

The existing Level of Service (LOS) is ''C'' i.e., Good.

V= Volume of Vehicles in PCU's/Hour & C= Capacity of Road in PCU's/Hour.

Table 3.17: Standards as per IRC: 64-1990

V/C	LOS	Performance
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/Average/Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very Poor

Table 3.18: Modified Traffic Scenario & LOS

Sl. No	ROAD	Increased PCU's / State Highway	V (Volume in PCU/hr)	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1	SH – 9	50	482 + 50	1500	0.35	C

From the above analysis it can be seen that the Transportation load on SH – 14 will increase and the LOS will remain same after start of mining operation also, hence, there will be little change on the proposed evacuation roads due to additional traffic. However, Traffic management has been proposed as given below.

3.7.4. Management of Traffic and Sand excavation

- Roads will be repaired regularly and maintained in good conditions.
- Haul roads will be sprinkled with water to keep the dust suppressed.
- A supervisor will be appointed to regulate the traffic movement near the site.
- Speed breakers will be constructed near accident prone areas to calm the traffic and its speed.

- Signage will be erected at the sensitive & precarious places to caution or provide information to road users.
- According to approved mining plan a total of 2,42,187.8592 Cum sand will be excavated for 5 years.
- 60,144 Cum sand will be excavated annually
- Considering 240 working days annually, barring the monsoon season, maximum production will be = (60,144 cum / 240) = 250.60 cum per day of the river bed material.
- 250.60 cum sand per day will be carried out by 9 Tipper, Through 9*2=18 trips.

3.8. Soil Characteristics

The soil sample is collected from the core zone and buffer zone since the project is not likely to affect the land use outside core zone. Samples are collected through hand auger boring up to a depth of 15 to 30 cm. The location of sampling was given in Table 3.16 followed by Figure 3.17 showing the sampling locations across the study area.

Table 3.14: Soil Characterization sampling locations along the Study Area

Location Code	Latitude	Longitude	Distance & Direction w.r.t. Project Site
S-1	22° 42'21.31"N	86°59'58.84"E	0.66 km-NE
S-2	22° 41'41.95"N	87°0'8.06"E	1.16 km-SE
S-3	22° 41'37.20"N	86°58'29.55"E	2.23 km-SW

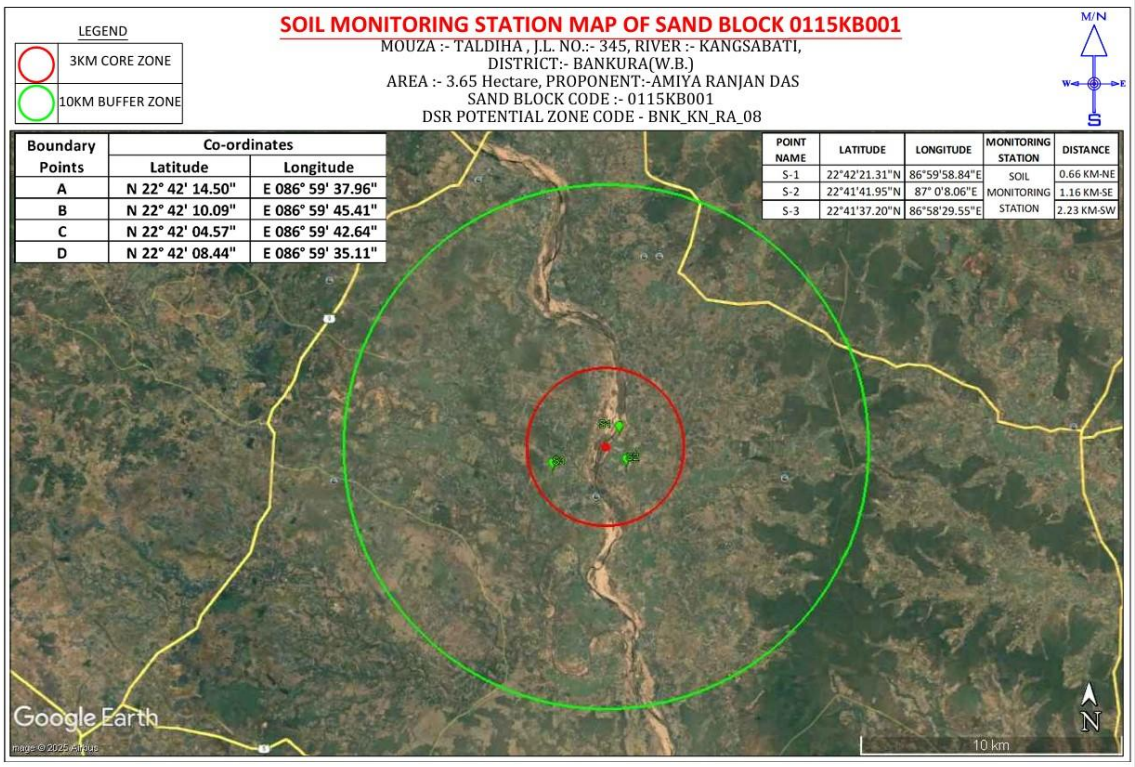


Figure 3.12: Soil Sampling Location across the Study Area

3.8.1 Interpretation of Soil Characterization Data

Soil samples were collected from surrounding the study area and around project site that are likely to be impacted from the project. Soil quality analysis done for parameters like texture, moisture, organic matter, conductivity, pH, bulk density, and NPK values. The soil sample was collected in presence of the functional area experts and analyzed by NABL accredited laboratory.

***Figure 3.17*:** Soil Sampling across the Study Area.

3.9. 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.

The information required has been collected through primary surveys and secondary sources.

3.9.1 Methodology

Site Investigation was undertaken and monitoring locations were finalized based on:

→ Drainage pattern;

→ Location of residential areas representing different activities/likely impact areas; and

→ Likely areas, which can represent baseline conditions.

The samples were analyzed essential parametersas per the drinking water specification IS 10500: 2012.

Samples for chemical analysis were collected in polyethylene carboys. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analysed for projecting the existing water quality status in the study area. Selected water quality parameters for water resource of the study area have been used for describing the water environment and assessing the impacts. About 4 Nos Sampling location area presented in Table 3.19. ground water samples and 8 no. (Table 3.20). surface water samples were collected in the study area to assess the water quality. Water samples are drawn from the hand pumps being used by the villagers for domestic needs. The sampling locations for both surface water & ground water are shown below.

Table 3.16: GPS Coordinates of Ground water Sample collection location

Location Code	Latitude	Longitude	Distance & Direction w.r.t. Project Site
GW-1	22°42'18.14"N	86°0'36.66"E	1.64 km-NE
GW-2	22°41'4.31"N	86°59'22.00"E	2.04 km-SW

Table 3.17: GPS Coordinates of Surface water Sample collection location

Location Code	Latitude	Longitude	Distance & Direction w.r.t. Project Site
SW 1	22°42'55.37"N	87°0'8.00"E	1.64 km-NE
SW 2	22°40'49.23"N	86°59'49.62"E	2.47 km-NW

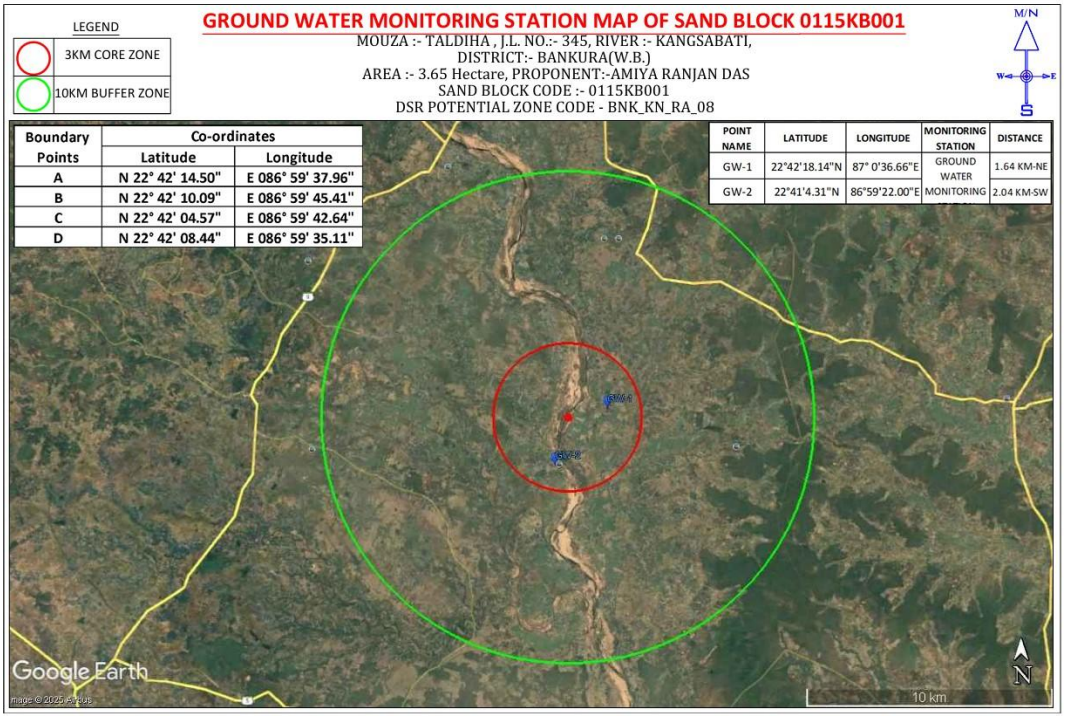


Figure 3.14: Ground water sampling locations across the study area.

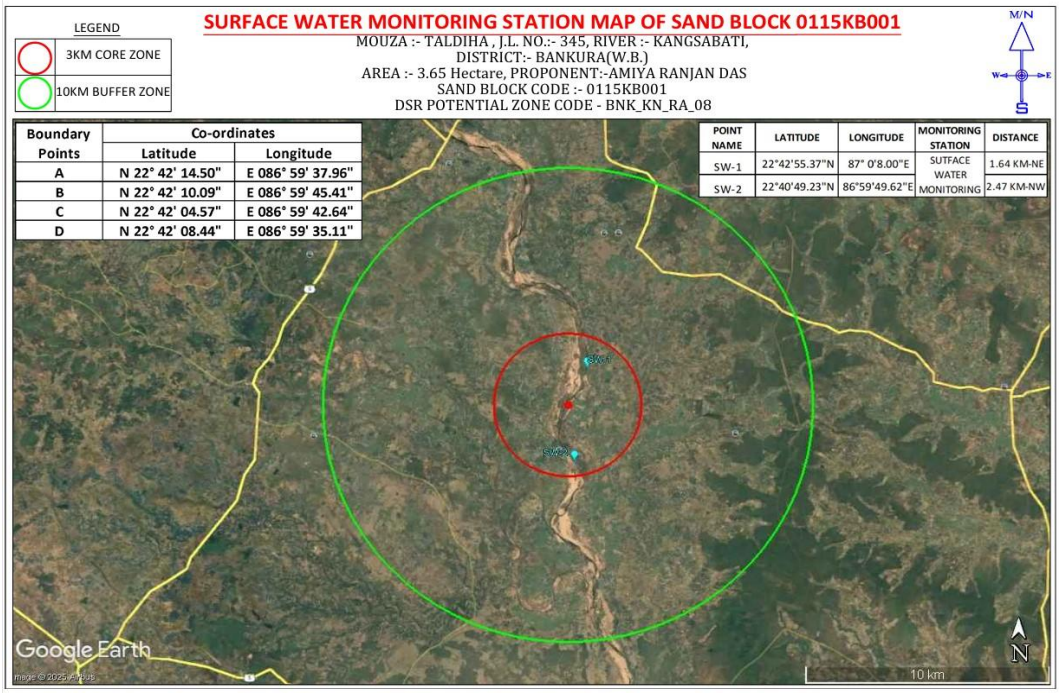


Figure 3.15: Surface water sampling location across the study area.

3.9.2 Interpretation of Water Quality Data

Groundwater samples collected from three locations within a 10 km radius of the proposed site showed all parameters well within the drinking water standards specified in IS 10500 and IS 2296: Class C. So, all sites of water are suitable for drinking purposes. The Physico – Chemical

characteristics of ground water samples presented in Table below followed by site investigation photographs.

Figure 3.16: Surface water sampling across the study area.

Figure 3.17: *Ground water sampling across the study area;*

3.10. Eco – Biodiversity

In view of the need for conservation of environmental quality andbiodiversity study, the study of Eco – biological environment is one of the most important aspects for Environmental Impact Assessment. Ecological systems show complex inter-relationshipsbetween 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.

3.10.1 Objectives

- To evaluate the diversity of local within project site (Core Zone and buffer Zone).
- To enlist the major agricultural crops, plantations and cultivated species.
- To document the major fauna both invertebrate and vertebrate occurring in the selected 10 km study area.

3.10.2 Methodology

Ecological study was done collecting baseline data to understand the present status of ecological settings of the area. Different types of habitats with varied vegetation covers are encountered in different ecological condition of the study area.

Random quadrats were laid to study the floral components in the study area in the following manner. The quadrat sizes laid were as follows –

(a) 10m x 10m in agricultural lands

(b) 25m X 25m in Degraded Forest lands

(c) 10m X 10m in tree plantation areas

Aquatic flora was studied in line transacts along the aquatic bodies.

Each studied location for vegetation study was marked with GPS and coordinates (latitude and longitude) were noted with site characteristics. In each location at least 2 quadrats were laid but in forest area 3 quadrats were laid. In total 33 quadrats and transacts were laid and studied out of which 6 were in degraded forest area of Ramnabagan Wildlife Sanctuary, 3 transacts on three locations of Kangsabati river including mining location, 4 in cultivation areas, 2 in tree plantation area and 18 in human habitations and agricultural lands. Basing on the study, list of species for each habitat type were prepared.

Faunal study was done by interrogating people residing in the forest fringe area of Ramnabagan Wildlife Sanctuary, fishermen, and few forest officials and field level staff of Durgapur Forest Range Office, Bardhhaman Division. Some interaction with fishermen also provided the study team. These fishermen regularly go for fishing in the river flowing through the reserved forest area. During the study some bird species were viewed and identified. For some birds and other

faunal species emphasis was given mostly on the observation of the local inhabitants and forest staff rather than direct observation of the study team.

3.10.3 Preliminary Observations

The land use pattern of this vast landscape has been framed from the Satellite Imagery and Toposheet and duly authenticated. Ground truth was also done in different location marking it with GPS coordinates. The land use / land cover pattern of the study area, may be classified into following categories: (i) Crop Land (ii) Open areas without scrubs (iii) Settlements and (iv)Water bodies. The study area is mostly covered with rainfed crops and is under paddy cultivation. A small area is irrigated by ground water for Boro paddy cultivation. A good amount area is also used for cultivation of vegetables etc. The species of herbs, shrubs and trees found in the sampled plots of study area are depicted in the table below.

3.10.4 Land Cover of the Study Area

The land use pattern of this vast landscape has been framed from the Satellite Imagery. Ground truthing was also done in different locations marking it with GPS coordinates. The land use / land cover pattern of the study area, may be classified into following categories: (i) vegetation (ii) croplands (iii) Degraded Forest area (iv) Human settlements (v) Barren land and (vi) Water bodies.

i. The study area is mostly covered with rainfed crops and is under rice cultivation. A small area is irrigated by ground water for rice cultivation. Small scale cultivation of various types of vegetable were also observed.
ii. Low lying area of the study area is almost flooded by Kangsabati river almost every year. A good amount area is also used for rice cultivation.
iii. Open areas without scrubs are also seen mostly in the riverbank of Kangsabati river. These are plain grass lands with various grass and herb species. These grasslands are mostly used as grazing lands.
iv. Degraded forest area within the study site was studied in the areas of Ramnabagan Wildlife Sanctuary. The area is mostly in the Durgapur city where once a sanctuary stood still. There are few patches of wild areas with many indigenous species of wild plants in some places of the study area. These patches may be considered to be the remnants of the forest cover which has been retained even after fragmentation of the forest cover. These small patches serve as refugia for small wild fauna and flora. In most of these place's plantations of exotic species like teak has been done.
v. Varied types of settlements were observed in the study area mostly dominated by Bengali and Hindi speaking people. The study area has some semi-urban areas. There are also a

number of rural settlements scattered within the 10 km radius of the project area. Rural settlements dominate over the urban and semi-urban areas in terms of area covered.

Figure 3.18: *Land Use Land Cover of the Study Area*

3.10.6 Aquatic Ecosystem

These are lotic water bodies (water bodies with fresh flowing water). Many studies emphasise that phytoplankton and zooplankton population can be used as indicators of water pollution. The rate of growth and development of plankton depends on various biological as well as abiological factors such as light, temperature, available nutrients, oxygen concentration, pH, etc. The phytoplankton from the basic trophic level and are succeeded by the zooplankton as the next level. The population of zooplankton is influenced by the physicochemical characteristics of the body of water and it also changes according to the changes of the variation in the seasons. Here the studies were done mostly during pre-monsoon time.

Study of Phytoplankton: Preparation of Phytoplankton Inventory- For studying diversity of phytoplankton, a known amount of water was filtered through bolting Plankton net (No.25) and preserved in 5 % formalin. Phytoplankton's are to be identified following standard literatures (Anand, 1998) and from help of experts. A Sedgewick-Rafter counting cell was used for numerical analysis of phytoplankton following APHA (1992) and their abundance was expressed as number of individuals per litre of sample collected.

Study of Zooplankton: For qualitative and quantitative study a known amount of water was filtered through bolting silk Plankton net (No. 20) and preserved in 70% alcohol. The zooplanktons are to be identified following standard literature and with the help of experts. A Sedgewick rafter-counting cell was used for numerical analysis and their abundance has been expressed as number of individuals per litre of sample solution.

Observations: The part of river Kangsabati where proposed mining activity will be done has a narrow water stream of flowing water. Aquatic life specific to this narrow river stream is given below. As states above the fish species available are recorded according to the available information collected from local fishermen. The species mostly collected from the river are Punti (Puntius ticto), Mourala (Amblypharyngodon mola), Mysus tengara (tangra) , Notopterus notopterus (Pholui), etc. Sometimes they can also catch a carp fish like mrigel (Cirrhinus cirrhosis), which is very rare. 10 species of phytoplankton and 8 species of Zooplankton were identified. All the species could not be identified to the species level and therefore, only generic names are given.

List of Phytoplankton's

Table 3.26A: Phytoplankton's species list within study area of proposed Mining Lease Area.

Sl. No.	Scientific name of phytoplankton	Class
1	*Aphanothece sp. Nag.*	Myxophyceeae
2	*Arthrospira platensis (Nordst.) Gomont.*	Myxophyceeae
3	*Atasia braviciliata Matv.*	Euglenophyceae
4	*Chamaesiphon sp. A.Br.*	Chlorophyceae
5	*Characium nasutum Rabenh.*	Chlorophyceae
6	*Characium sp. A.Br. ex Kutz.*	Chlorophyceae
7	*Chlorella sp.*	Chlorophyceae
8	*Gleocapsa sp.*	Myxophyceeae
9	*Microcyctis aeruginosa Kutz.*	Myxophyceeae
10	*Microcystis pulverea (Wood) Forti.*	Myxophyceeae

List of Zooplankton

Table 3.26 B: Zooplankton's species list within study area of proposed Mining Lease Area

Sl. no.	Scientific Name
1	*Brachionus caudatus*
2	*Brachionus diversicornis*
3	*Brachionus quadridantatus*
4	*Ceriodaphnia sp.*
5	*Daphnia sp.*
6	*Filinia sp.*
7	*Keratella sp.*
8	*Moina sp.*

3.10.5 Terrestrial Ecosystem

Flora: Degraded Forest patches on the Beliatore hills of this area can be categorised under Bankura. Tree species dominating in this region are mostly *Artocarpus heterophyllus, Betula anoides, Castonopsis Sp, Gmelina arborea, Michelia champaca, Toona ciliate, Schima Wallichii* etc. During rapid study 77 species of tree, bamboo, shrub, herb and grass species were identified. But there may be much more species within the study area. Most of the domesticated species (both plants and animals)

Bamboo species like Bamboo forests are not natural but occur in patches sporadically in jhum fallows. The common bamboo species are *Dendrocalamus hamiltonii* and *Melocanna bambusoides*. Some other species less frequently found are *Bambusa pallida, Bambusa tulda*, etc. The dominant grass genera in the grasslands are *Panicum sp., Paspalum sp., Imperata sp., Axonopus sp., Sporobolus sp., Saccharum sp., Chrysopogon sp., Oplisminus sp.* and others along with sedges in water-logged areas. Some of these grass species are also present in degraded forests. Besides, this degraded forest floor is also covered with the species like *Eupatorium adenophorum, Lantana camera, Rubus species, Isachne himalaica* etc.

A list of the plant species is given in Table 3.26 (3.26A & 3.26B). The forest fringe area has invasive species like *Eupatorium odoratum, Lantana camara* and *Hyptis suaveolens.* The lists of flora of the study shows that there is no rare, endangered and threatened (RET) species. Therefore, no special conservation effort needs to be taken for maintaining biological composition of the area.

Table 3.27A: Tree and under tree species list within study area of proposed MLA.

Sl. No.	Scientific Name	Local name	Family
1.	*Terminalia catappa*	Kat badam	Combretaceae
2.	*Albizzia lebbek*	Shirish	Mimosaceae
3.	*Azadirachta indica*	Neem	Meliaceae
4.	*Swietenia mahagoni*	Mehagoni	Meliaceae
5.	*Tamaridus indica*	Tamarind	Casaelpiniaceae
6.	*Artocarpus heterophyllus*	Kathal	Moraceae
7.	*Alstonia scholaris*	Chatim	Apocynaceae
8.	*Anthocephalus chinensis*	Kadam	Rubiaceae
9.	*Aegle marmelos*	Bel	Rutaceae

Table 3.27B: Shrub, Herb and Grass species list within study area of proposed MLA.

Sl. No.	Scientific Name	Local name	Family
1.	*Dioscorea bulbifera*	Khamalu	Dioscoreaceae
2.	*Dioscorea floribunda*	Panalu	Dioscoreaceae
3.	*Desmodium gangeticum*	-	Fabaceae
4.	*Duranta erecta*	Duranta	Verbenaceae
5.	*Euphorbia pulcherima*	-	Euphorbiaceae
6.	*Clerodendron infortunatum*	Ghentu	Verbenaceae
7.	*Croton bonplandianum*	Chuchhuri	Euphorbiaceae

Figure 3.24*: Some of the local Flora identified during the exploration of Study Area.*

Fauna: The wild faunal species composition of the study area is given in Table 3.24 (3.24A, 3.24B and 3.24C). This is also not an exhaustive list of the faunal elements of the study area. There are 10 mammalian species, 12 bird species and 10 fish species found in the wild habitats of the area under study. No evidence of habitats or migratory path of large mammals were observed or recorded from statements of the forest dwellers in the study area. The list shows that there is no Schedule – I faunal species and therefore, needs no special conservation effort.

Table 1.28A: Some bird species reported from this region

Sl. No	Species name	Family
1.	White-browed Piculet	*Sasia ochracea*
2.	Speckled Piculet	*Picumnus innominatus*
3.	Crimson-breasted	*Dendrocopos*
4.	Great Barbet	*Psilopogon virens*
5.	Oriental Magpie – Robin	*Copsychus saularis*
6.	Lineated Barbet	*P. lineatus*
7.	Golden-throated Barbet	*P. franklinii*
8.	Blue Tailed Bee Eater	*Merops philippinus*
9.	Blue-throated Barbet	*P. asiaticus*
10.	Coppersmith Barbet	*P. haemacephalus*
11.	Common Kestrel	*Falco tinnunculus*
12.	Vernal Hanging Parrot	*Loriculus vernalis*
13.	Short-billed Minivet	*Pericrocotus*
14.	Drongo	*Dicrurus remifer*

Table 3.28B: Small wild mammal species reported from this region

Sl. No	Species name	Family
1.	Rhesus Macaque	*Macaca mulatta*
2.	Capped Langur	*Trachypithecus pileatus*
3.	Indian Muntjac	*Muntiacus muntjak*
4.	Wild Pig/ Wild Boar	*Sus scrofa*
5.	Indian Fox/Bengal Fox	*Vulpes bengalensis*
6.	Jungle Cat	*Felis chaus*
7.	Indian Grey Mongoose	*Herpestes edwardsii*
8.	Chinese Pangolin	*Manis pentadactyla*
9.	Porcupine	*Hystrix brachyura*
10.	Indian Fruit Bat	*Pteropus giganteus*

Table 3.28C: Fish species reported from Kangsabati river and local Fish Farmers

Sl. No	Species name	Family
1.	Rice-paddy eel	*Pisidonophis boro*
2.	Ray-finned fishes	*Homaloptera biliniata*
3.	Large razor-belly minnow	*Salmostoma bacaila*
4.	Barila	*Barilius shacra*
5.	Korang	*Barilius vagra*

6.	Bengal loach	*Botia Dario*
7.	Darikhana	*Rasbora daniconius*
8.	Rohu	*Labeo rohita*
9.	Katla	*Katla katla*
10.	Kajoli	*Ailia coila*

3.11. Socio – Economy

Socio – Economic has been recognized as an important component of environment. It focuses primarily on the social and economic effects that are likely to occur as a result of the construction and operation of the proposed mining activities in the area. It includes various factors, viz. demographic structure, availability of basic amenities such as housing, education, health and medical services, occupation, water supply, sanitation, communication and power supply, prevailing diseases in the region as well as features such as places of tourist attraction and monuments of archaeological importance. The study of these parameters helps in identifying predicting and evaluating the likely impacts due to project activity in the surrounding region. Any developmental activity exerts direct, indirect, positive and negative impacts on the socio-economic environment of the region. In this project site of "*Taldiha Sand Mine (Sand Block 0115KB001)",* the study area of 3KM is considered as a Core Zone and a 10 KM radius is considered as a Buffer Zone. During our exploration and primary data collection, a total of 10 villages along the Southern side of the Kangsabati river and some portions of DVC, DTPS Colony, Maya Bazar area, NSPCL, DSP Steel Plant are also coming under the core zone of this lease area along the Northern part of the Kangsabati river.

3.11.1 Objectives

Objectives of Socio – economic study as follows:

- To study the demographic structure and facilities available in the study area.
- To identify and assess the impact on socio-economic status of the study area.
- To identify all potential significant adverse and beneficial social impacts of the Project.
- To recommend the mitigation measures to reduce the adverse impact of the project.
- To verify compliance with the environmental regulations and industry's standards.
- To recommend cost effective measures to be implemented to mitigate the expected impact.

3.11.2 Data Collection

Primary Data Collection: Primary data means original data that has been collected specially for the purpose. The data collected from the field under the control and supervision of an investigator. This type of data is generally afresh and collected for the first time. It is useful for current studies as well as for future studies. While collecting primary data collection in study area following methods are uses.

1. Observation Method
2. Focus group discussion (FGD)
3. Surveys and questionnaires

Secondary Data Collection: Secondary data is usually the "Data gathered and recorded by someone else prior to and for a purpose other than the current project". Secondary data are collected from different offices or Govt. websites like Census offices (India Census 2011), Statistical department, Health offices, Land and Revenue department, Zilla Parishad and Non-Governmental organizations.

3.11.3 Demography

According to the 2011 Census Database, a total of 13 number of villages residing in side the 3 km buffer zone from the project site. In this 3KM core zone 5629 household presents with total population of 25,974 person as per census 2011 data. Out of above mention 13 village the Maliara village population is the highest i.e., 7,918 persons. Jangpur and Janakpur near the project area have more female population than male. The average above mention 13 village Male and Female ratio is 1.05 and 18.31 percentage of the total population are children population age less than 6-year-old present in this 3km Core Zone.

Table 3.28: Demography of the Study Area

S.N.	Name of Villages	No. of Households	Total Population		0 – 6 Age Pop.	SC Population		ST Population	
			Male	Female		Male	Female	Male	Female
CORE ZONE (3 KM RADIUS)									
1.	Jangpur	248	606	646	229	150	144	48	34
2.	Jalanpur	207	518	464	180	118	120	37	26
3.	Japamali	657	1649	1483	573	376	331	121	85
4.	Janakpur	106	225	230	83	55	51	17	12
5.	Banjora	305	765	764	280	183	174	59	41
6.	Sarama	150	379	327	129	85	82	27	19
7.	Dighalgram	187	489	426	168	110	105	35	25
8.	Maliara	1728	4057	3861	1450	950	944	301	211

9.	Kuldiha	211	497	462	176	115	102	37	26
10.	Pingrui	753	1724	1668	621	407	355	131	92
11.	Purbatore	33	73	61	25	16	12	5	4
12	Napara	414	938	894	335	220	221	70	49
13.	Methyali	630	1428	1340	507	332	321	106	74

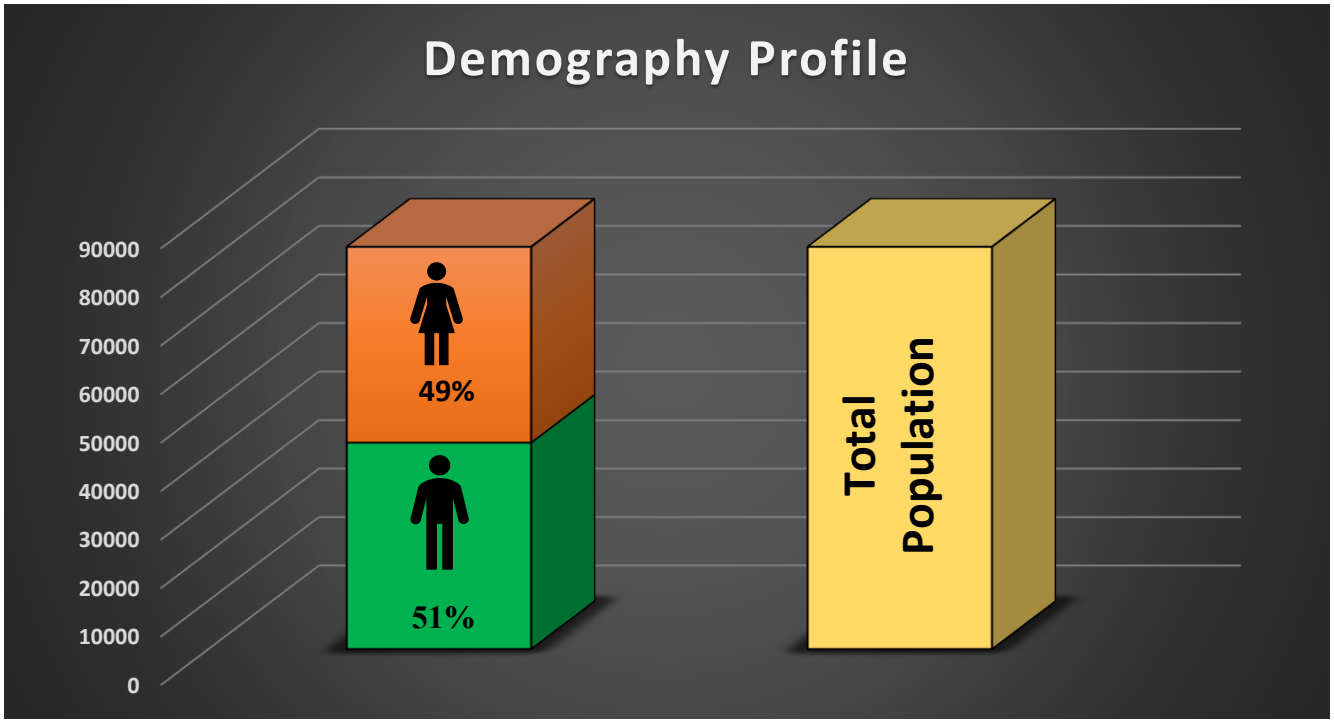


Figure 3.21 Demographic Profile

3.11.4 Education

According to census 2011; In the study area, the average literacy rate is 65.6%, whereas out of total literate population the male literacy is 69.88% and female literacy is 53.23% in the study area. The average literacy rate of the state (76.26%) is high as compared to the literacy rate of study area, The female literacy rate is low in the study area, which is a Pan India phenomenon. The education status has been mentioned in the Table 3.29.

Table 3.29: Literacy Statistics in Study Area

Total Households in the Study Area: 5,629			
Population	**Person**	**Male**	**Female**
Total	25,974	13,348	12,626
Literate (3 KM)	17,039	11,907	5,132
Illiterate (3 KM)	8,665	6,055	2,610

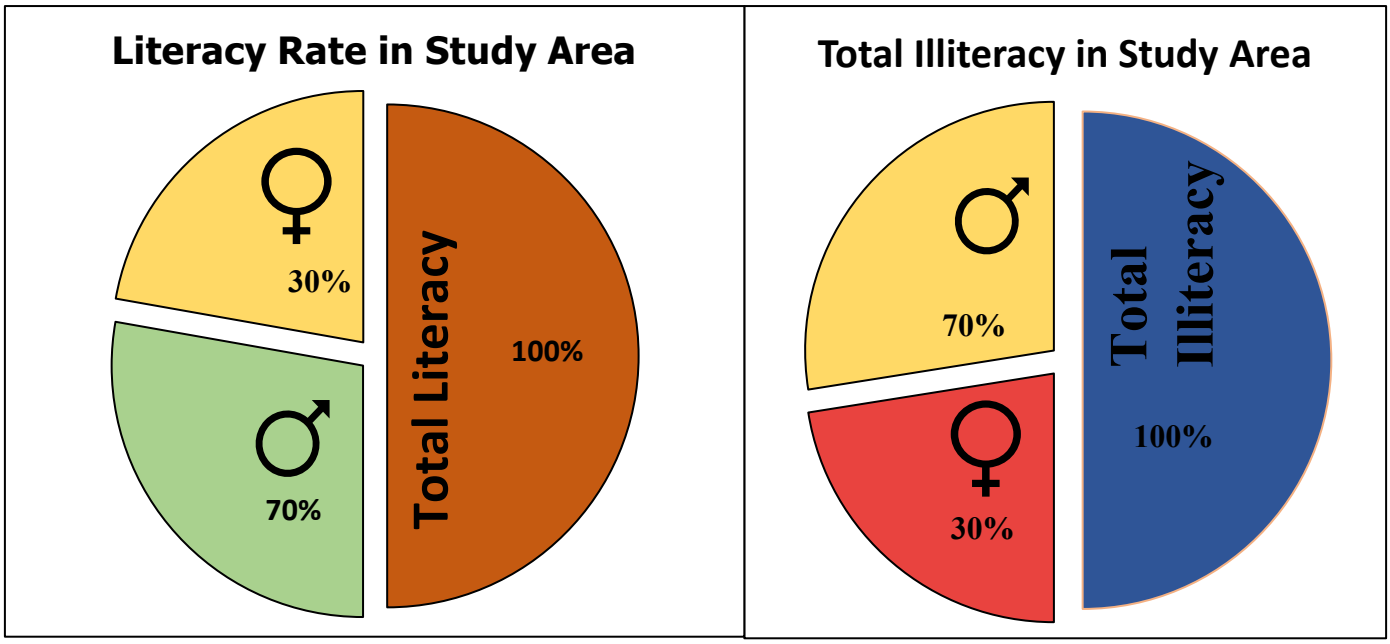


Figure 3.22: Educational Statistics in Study Area

There are about 13 L.P. Schools, 7 M.E. Schools and 8High School present in our study area. The Japamali High School is about 2.5 km away from the downstream of the mining lease area. Several other school statistics indicates that the locality does encourage and promote female education among the upcoming generations despite what the scenario of 2011 Census Data is representing. Almost all schools in our study area are Bengali medium and run by qualified members of Faculties

Figure 3.23: *Educational Statistics Survey at Maliara High school and Japamali High School*

3.11.5 Economic Status

Agriculture and daily wage labours are the predominant occupation in the study area. Considering agricultural production, Paddy, Betel Nut and rice are the predominant crops. Some small-scale fisheries or fish farming are also spread in the study area. As dairy offers quick returns and near stable prices, banks may finance liberally ensuring tie-up arrangements

with Dairy farms/societies. Banks may also encourage farmers to take up calf rearing and fodder cultivation, as viable activities with financial assistance. Total Workers category of the total population present in 3 km buffer zone are 2958 Persons i.e., 43.89 % of the total population, out of which 2286 persons i.e., 33.92% are further specified in Main Workers category. Aforementioned main workers category further specified by 67.15% of Male population main worker and 32.85% are female main worker. The specific Main workers category sub-divisions are presented in figure 1. 79.0 % Main workers are cultivators followed by other workers category of 13%. The Marginal Workers category of the total population present in 3 km buffer zone is 672 persons i.e., 9.97 % of the total populations and 22.71% of the Total worker category. The specific marginal workers category sub-divisions are presented in figure 3.29.

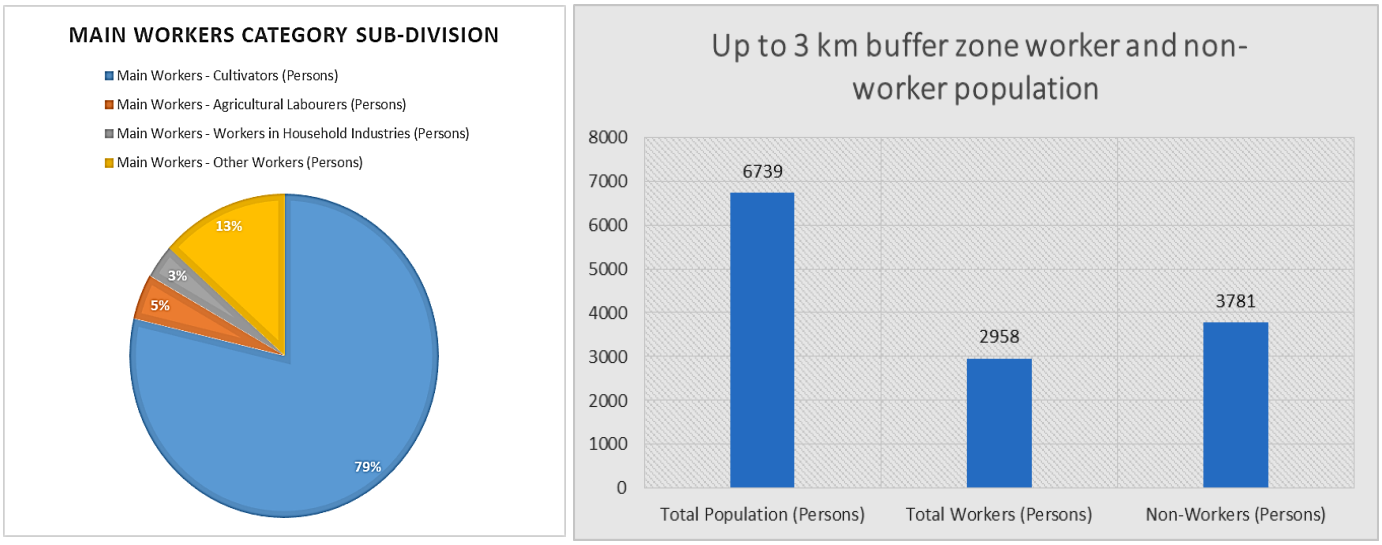


Figure 3.24: *Economic Statistics*

Figure 3.25: *Study area Exploration by IMPCON Officials regarding Employment Status.*

3.11.6 Health Care

There are no hospitals present in our study area but it contains 2 PHC's. The Japamali PHC and Mejia Block PHC is closest from Downstream of project site. The PHC's have 2 qualified doctors posted on duty with a bed no ranging from 6 – 8. As per interactions with locals, the diseases like common fever, malaria, diarrhoea, seasonal flu are the usual challenges they face on their routine. The *Durgapur city* is very close from the proposed project site (4.5 KM East) where all the serious patients like T.B, Cancer, Diabetes etc., are sent for getting intensive care.

Figure 3.31: PHCs Available near the Study Area

3.11.7 Infrastructure, Transport & 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, Block – Sarenga, District Bankura. Study area and project site is well connected by road to District place. The Basic amenities are all available in the area staring from PHE, School, Market, PHC etc. Electricity is provided by DVC and WBSEDCL. Telecom services are handled and run by the BSNL telecom and other private companies. Broadband and wireless internet services are provided by Government as well as private mobile operators like BSNL, Idea, Airtel, Vodaphone and Reliance Jio etc.

CHAPTER – 4: ANTICIPATED IMPACTS & MITIGATION MEASURES

4.1. General

This chapter deals with the expected impacts and the respective mitigation measures of the project on the environment during its lifetime, which has two phases, that is the construction phase and operation phase. It indicates the levels up to which the proposed sand mining projects will benefit the project site by preventing or minimizing adverse environmental impacts.

4.2. Introduction

Identification of impacts and mitigation measures of the same in EIA study helps in quantification and evaluation of impacts. During baseline study several impacts can be identified but it is necessary to identify the critical impacts both positive and negative on various components of the environment that are likely due to the proposed sand mining projects.

The environmental impacts can be categorized as either primary or secondary. Primary impacts arethe ones that are caused directly due to the project activity on environmental attributes, whereas secondary impacts are indirectly induced. The construction and operation phase of the project activity comprises various activities, each of which may have either positive or negative impact on some or other environmental attributes. The proposed project activities would impart impact on the environment in two distinct phases:

- During construction phase - Temporary or short -term impact
- During operation phase - May have long term impact

The construction and operation phase of the project comprises of various activities each of which willhave an impact on some or other environmental parameters. Various impacts during the construction and operation phase on the environmental parameters have been studied to estimate the impact on environment. The details on impact of the project activity on each of the above environmental attributes are discussed in the following sections.

4.3. Impact Assessment during the Construction Phase

Since the project is sand mining activity, no major construction activities are proposed. Therefore, there will not be any environmental impact in terms of construction phase.

4.4. Impact Assessment during the Operating Phase

4.4.1. Impact on Land Environment

- On the Kangsabati River bed, the sand mining does not carry any overburden / waste.
- There will not be any land degradation due to sand mining.
- The mining lease area is bearing no soil cover exposure; hence storage of top soil will not be required.
- There is no overburden / waste left to manage at the end of mining activity, the entire mineral is saleable.
- The sand is loose deposit, hence blasting and drilling are not required.
- The Mining lease area doesn't involve any forest & agricultural land.
- There is no vegetation within the mining lease area.
- The topography of the river bed will temporarily change due to the mining of sand which leads to depression within the lease area.
- Since the mining will be executed only within the mining lease area, there will not be any change in the topography of outside the mining lease area.
- The proposed mining project will not change or divert the natural drainage.
- Some minor erosion of the river bank due to haulage road and unsystematic mining operations will.
- The unsystematic mining operations can result in the instability of natural slope.
- There will be temporary change in the land use due to excavation process, however the area will be naturally reclaimed in the subsequent monsoon seasons.
- Mining activities increases the depth which increases the flow velocity of river and then bank erosion.
- The propose project falls under the seismic zone – III (Moderate Intensity zone). Since this project will not have physical infrastructure to be constructed, no impact of seismicity is envisaged in this project.Further, this project will not change/alter the seismic behaviour of the area.
- Spillage/leakage of oil, diesel etc. from the DG sets, vehicles and equipment's results in land/soil contamination.

4.4.2. Impact on Air Environment

a) Anticipated Impacts on Air Environment:

- The major sources of air pollution from the proposed mining project are dust generation due to extraction, loading and haulage of mineral and wind erosion of

exposed material.

- Impacts on ambient air due to the emissions from operation of DG sets only during power failures.
- Exhaust emissions from vehicles and equipment deployed during the operation phase is alsolikely to result in an increase in the levels of SO_2, NOx, PM, CO and un-burnt hydrocarbons.
- The dust generation will affect the health of the workers as well as the nearby habitation/local population.

- **Meteorological data**

The meteorological data at hourly interval during the month of March 2023 to May 2023 on wind speed, wind direction, dry & wet bulb temperature, humidity, cloud cover and rainfall was processed as per the guidelines of CPCB/MoEF for prediction of impacts from the area source. Data was obtained from authorized source / government agency for the dispersion modelling. It was observed that north followed by North east was pre-dominant wind during Post monsoon season as shown in wind rose below and 0.14 % calm condition was observed during study period. Average wind speed was 11.10 m/s. Impact of the pollutants was anticipated in North and North East side under influence South and South Western winds. Ambient air quality locations were selected based on the long-term wind rose pattern of the area. The wind rose diagram of March 2023 to May 2023 is given in Figure 4.1. Four ambient air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM_{10} & $PM_{2.5}$ was envisaged in southwest side at very short distance from the site.

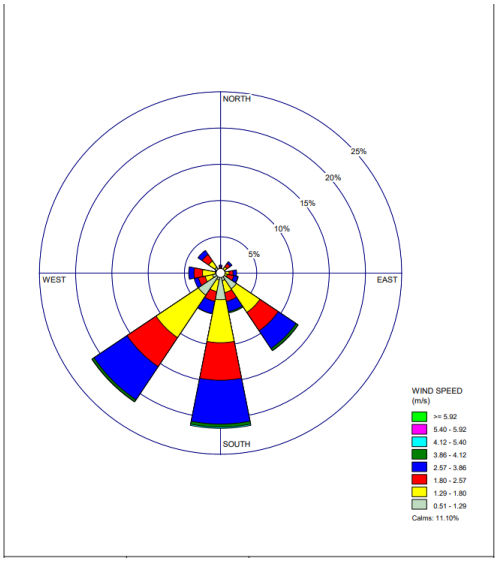


Figure 4.1: Windrose Diagram (March 2023 – May 2023)

4.4.3. Impact on Water Environment

- The mining process will not distract and utilize the surface & ground water.
- The water flow in the study area is rain fed in nature and its level increases aggressively during the monsoon period only, rest of the year the river bed remains open for mining.
- There will not be any impact on the quality of ground water since the depth of water table in the tube well outside the area is 20m from general pit level.
- Affects the recharge potential of ground water, as the thickness of the natural filter (sediments) reduces it will lead to less infiltration
- Spillage/leakage of oil, diesel etc. from the DG sets, vehicles and equipment's results in the surface/ground water contamination and this will also affect the health of the population by the consumption of contaminated water
- Seepage of wastewater and storm water will lead to contamination of water.
- Washing of vehicles on river bed will contaminate river water leading to water pollution.

4.4.4. Impact on Noise Environment

- As the mining project is proposed for open cast manual mining operation and sand available in the study area are loose deposit, there will not be any blasting or drilling activities required.
- Impact of noise due to vehicular movement and machineries/equipment.
- Noise generation due to the operation of the DG sets during the power failures.
- These noise generation will create a negative environmental impact on the workers and local population close to the project site.

4.4.5. Impact on Eco – Biodiversity

There will be no major adverse impact of this mining activity on the biological environment of the study area. Minor impacts of sand mining activity on biological environment may mostly confine to the area where storage and transport of the sand will be done. In the mining plan no such area has been identified. Some impacts on human health may be due to enhanced air-borne particulate matter. The source of solid particulate matter (SPM) of different sizes will be mostly the stacks of sand. Trucks for carrying sand may also add SPM in the air due to vehicular pollution.

Another negative impact that can affect the species composition of the aquatic species Kangsabatiriver, particularly in the area from where sand will be mined is decline in species

number of both aquatic fauna and flora. Dependence of some people on the fishing, may be affected to some extent due to riverbed mining. During mining operation aquatic flora may be eliminated locally. As aquatic fauna like fish etc., is mostly dependent on aquatic flora, it is very likely that there will negative impact on fish availability during mining.

4.4.6. Impact on Socio – Economics

- For the mining work, an average of 42 construction workers will be required in the project sites, which will be met from skilled and un-skilled labourers from the local population as far as possible. Thus, the project can provide employment to local workers for a period of 5 years.
- There is no human settlement in or around the mining block areas, hence no clearance of human settlement is required for the mining operation.
- The project site falls in the riverbed of Kangsabati River which is free of any Human Settlements.
- The Japamali Market and Banjora market are in few hundred metre range of the project site.
- There will be a significant increase in traffic density which might interrupt daily activities among the local community.
- The Proposed Mining have opted for manual method which will have health related impacts on the workers.

4.5. Mitigation Measures during Operational Phase

4.5.1. Impact Mitigation measures on Land Environment

- Present land use pattern of the proposed mining lease area is river bed and at the conceptual stage the land use pattern will remain the same, hence will not be changed.
- The excavated area will be replenished by sand in the subsequent monsoon seasons.
- Mining activity will be completely stopped in the monsoon season and during night hours.
- Safety zone will be left from the bank of the river and water line for the stability of the river bank.
- Barrier zones will be maintained from the banks for stability of the river banks.
- Extraction of minor mineral (Sand) will be done through opencast manual mining method.
- Mineral will be removed in 1-3 m layer only forming in one slice /strips and the width shall be more than 6 m the bench height or 3 times of widest m/c used

- All hazardous wastes such as the spent oil/lube oil shall be securely stored, under a shed foreventual transportation and disposal to the authorized hazardous waste dealers.
- No DG sets are required for the mining activity since it will be strictly restricted to Daytime and manual mode of operations.

4.5.2. Impact Mitigation measures on Air Environment

- Checking of vehicles and machinery to ensure compliance to Indian Emission Standards Transportation vehicles and machinery to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_x and SO_x within the limits established by CPCB.
- Dust suppression by water sprinkling in and around the project mining lease area.
- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow.
- Appropriate spill control measures and labelling / handling procedures shall be maintained
- Vehicles with valid PUC shall be used for transporting the minerals to avoid the exhaust emission.
- A greenbelt development plan is prepared with local species. The greenbelt on the periphery will reduce the dust levels
- Regular monitoring of the air quality as per the monitoring plan detailed in Chapter 6 of this EIA report, shall be adopted during the operation phase, to ensure that, the air quality is within the desired limits prescribed by CPCB.
- However, the operation activities will be for a period of 5 years and hence, its impact on the existing ambient air quality will be reversible. Dust emissions are likely to be confined within the mining lease areas.

4.5.3. Impact Mitigation measures on Noise Environment

- No noise polluting work shall be carried out in the night hours.
- Provision of PPE"s for the workers.
- Vehicles to be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them
- Green belt and garden trees reduce noise, traffic related pollution and heat island effect
- If any DG sets required at site, then it shall be provided with acoustic enclosure

- Proper lubrication, muffling and modernization of equipment shall be used to reduce the noise during operation phase
- Regular monitoring of the noise levels as per the monitoring plan detailed in Chapter 6 of this EIA report, shall be adopted during the operation phase, to ensure that, the noise levels are within the desired limits prescribed by CPCB.

4.5.4. Impact Mitigation measures on Water Environment

- Provision of temporary toilets for laborers at the study area.
- Domestic waste water will be treated into septic tank followed by soak pit outside of the block area with a safe distance and no wastewater will be allowed to be get discharged into the water body.
- The depth of the water table in the tube well outside the proposed mining lease area is 20 m from the general pit level. The proposed mining during the 5 years shall be done 3m from the surface. Therefore, the mining operation expected to be 4.10 m above the water table,hence mining will not intersect the ground water table.
- No mining will be done in the water line, only dry river bed mining will be done.
- No other mining of minor mineral shall be done within 500 m meter distance from any irrigation dams and bridge on national Highway.
- Bench will be advanced parallel to the banks of the river.
- Mining will be stopped in the area where water line is encountered.
- Barrier zones will be maintained from the banks for stability of the river banks.
- Separate area will be allocated for the washing of vehicles to avoid the seepage of contaminated water into the water body.
- All hazardous wastes such as the spent oil/lube oil shall be securely stored, under a shed foreventual transportation and disposal to the authorized hazardous waste dealers.
- The oil, diesel etc. from the vehicles and equipment's will be stored in a secured area andappropriate spill control measures and labelling / handling procedures shall be maintained.

4.5.5. Impact Mitigation measures on Eco – Biodiversity

There is no information in the mining plan regarding the stacking area and road for transport of minerals from the river bed. Therefore, designing proper biological method pollution mitigation plan on both the sides of the road on which mineral transport is not possible. However, it is suggested that at least 4125 trees of the following species may be planted on

both the sides of the road of transport as well as in the stacking area to arrest most of the SPM which may be generated during mining and transport process. The plant species suggested are indigenous tree species with broad leaves or thick canopy. Mostly quick growing species are being suggested as the mining operation will be for 5 years only. There is no need for any sort of compensatory afforestation as no natural habitat like forests or plantations will be cleared.

4.5.6. Impact Mitigation measures on Socio - Economy

- Employing local people for construction work.
- Providing proper facilities for sanitation for the construction workers such as temporary toilets.
- Barricades, fences and necessary personnel protective equipment shall be provided to the construction workers.
- The health of workers will be checked for general illness; first time upon employment and thereafter at periodic intervals, as per the local laws and regulations.
- Immigration in search of employment will be controlled.
- Expectations in fair pay, employee care, social responsibility commitments etc. will be timely met.
- Training will be provided to non-workers and unskilled workers.
- Awareness program to motivate people for savings and investment.
- Awareness program related to health and the Govt. Welfare schemes.

CHAPTER – 5: ANALYSIS OF ALTERNATIVE SITE

5.1. No Project Scenario

No – Project scenario is not applicable as the Sand from the lease area has to be mined out to make it available for infrastructure and developmental activities. Moreover, the riverbed sand is a natural resource which gets replenished every year. So, scientific removal of riverbed sand for infrastructure activities will not have any major impact on the environment. In addition, scientific removal of the riverbed sand will also ensure growth the local economy and provide employment opportunities to the local people.

5.2. Analysis of Alternative Site

Mining of riverbed sand depends on its availability depending on the mineral deposition of the area. The proposed project is for the scientific removal of riverbed sand from the Dwarakeswar River Bed. The sand is very well exposed in the proposed mining area. The rate of mining will be based on the replenishment study report prepared by the Department of Mining and Geology, West Bengal.

5.3. Alternative Technology

Sand is very well exposed in the proposed mining area and open cast is the only method which can be followed to work the deposits.

The proposed mining lease area will undergo semi mechanized opencast method of mining by using conventional semi mechanized excavation of sand from the riverbed of Dwarakeswar and the mining of sand will be carried out from the open. The depth of working will be 3.0 m to facilitate semi mechanized working. Mining will be carried out in granted mining lease area as per the Approved Mining Plan. The proposed technology was approved by the Department of Mines & Geology, Govt. of West Bengal and the technology will not undergo any changes or modifications during the operational phase of the mining activities.

CHAPTER – 6: ENVIRONMENTAL MANAGEMENT PROGRAM

6.1. Introduction

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding area are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program. The objectives of

monitoring is to:

- Verify effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Conform statutory and corporate compliance; and
- Identify unexpected changes

6.2. Environmental Monitoring and Reporting Procedure

Post Monitoring of various environmental parameters will be carried out on regular basis to ascertain the following:

- Status of Pollution within the mine site and in its vicinity.
- Generate data for predictive or corrective purpose in respect of pollution.
- Examine the efficiency of pollution control system adopted at site.
- To assess environmental impacts.

Monitoring will be carried out at site as per the norms of CPCB. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC and consent to operate issued by SPCB.

Six monthly compliance reports will be submitted to MoEF&CC, regional office on 1st of June and 1st of December. Quarterly compliance Report for conditions stipulated in Consent to Operate will be submitted to SPCB on regular basis. 4. Post study monitoring programme is summed up in Table 6.1.

Table 6.1: Environmental Monitoring Programme

Aspects	Parameters to be monitored	Frequency of Monitoring	Locations
Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2, Silica	Once in 6 months	2 locations within the project site and 2 locations outside the project site.
Noise Levels	L_{eq}, L_{day}, L_{night}	Once in 6 months	2 locations within the project site and 2 locations outside the project site.
Soil Quality	Soil Profile, Chemical Constituents,	Once in 6 months	2 locations within the project site.
Water Quality	As per IS:10500-2012	Once in 6 months	4 locations outside the project site, 2 surface water and 2 ground waters.

6.3. Budgetary Provision for Environmental Management.

The monitoring of the environment parameters will be outsourced and carried out by the lab of SPCB or a lab approved by MoEF/NABL. The cost of environmental monitoring is worked out and is detailed in Table 6.2.

Table 6.2: Cost of Environment Monitoring

Sl. No.	Particulars	No. of locations	Rate per location	No. of samples per year per location	Total Rate
1	Ambient Air	4	₹ 12,500	2	₹ 1,00,000.00
2	Noise level	4	₹ 12,500	2	₹ 1,00,000.00
3	Soil	2	₹ 12,500	2	₹ 1,00,000.00
4	Ground Water	2	₹ 12,500	2	₹ 1,00,000.00
5	Surface Water	2	₹ 12,500	2	₹ 1,00,000.00
Total (in Rs)					**₹ 5,00,000.00**

6.4. Conclusion

Post Environmental monitoring is an essential step in the EIA process. Environmental indicators could contribute to designing and evaluating monitoring programs, thus improving the establishment of the cause-effect relationship and the reporting and communication of environmental data.

The Environmental Monitoring Cell will coordinate all monitoring programmes at the site and data thus generated will be furnished as per statutory requirements. The frequency of reporting will be on half yearly basis to the WBSPCB and to the Regional Office of MoEF, West Bengal. The Environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

CHAPTER – 7: ADDITIONAL STUDIES

7.1.ADDITIONAL STUDIES

The draft EIA as per the EIA notification dated 14/09/2006 and subsequent amendments is being submitted to SPCB for conducting a public hearing for the proposed mining within the ML area located in Hinjuri Mouza of Bankura district of West Bengal. The report will be updated after conducting the public hearing by SPCB with the concerns/suggestion of people and stake holders who would attend the public hearing.

7.2.Corporate Environment Responsibility (CER)

In order to improve the quality of life of nearby villagers of the proposed project area, amount of Rs. 0.0858 Crore which is 2% of the total Project cost (Rs. 4.29 Crore of Project Cost shall be spent under the guidance of District/Local authorities as per MoEF&CC Notification for CER activity dated 01.05.2018 and 30.9.2020) As a corporate responsibility following measures along with budget provision is proposed for improving the conditions of persons in and around the project area. (**Refer: Annexure: VII**)

7.3. Risk Assessment

Risk is the probability of harmful consequences or expected losses resulting from the interaction between natural or human induced hazards and vulnerable conditions. Risk assessment is a methodology to determine the nature and extend of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, livelihood and the environment on which they depend. The objectives of risk assessment are:

- → Assessing risk levels due to the mining of sand.
- → Identification of the risk mitigation measures to bring the potential risk within the acceptable range.
- → To suggest general safety improvement measures.
- → To identify emergency scenarios and suggest mitigation measures.

It is necessary to manage the risk to minimize the after effects or losses to be confronted. Risk management refers to the practices, policies and procedures designed to minimize or eliminate the unacceptable risk. It is helpful to think of risk management as being a process of

determining the exposure to risk, and the initiating action to either minimize or eliminate the risk. The Risk Assessment and Management Plan is to be implemented to eliminate the risk and its consequences on the proposed sand mining project. Risk analysis is done for the following reasons:

⇒ Forecasting any unwanted situation.
⇒ Estimating damage potential of such situation.
⇒ Decision making to control such situation.
⇒ Evaluating effectiveness of control measures.

7.4. Hazard Identification

Hazard identification is a tool for conducting the risk assessment for the identification and detailing of hazards that exists. The hazard identification is done prior to the consequence analysis and serves as the core base of information on which risk assessment is based. The basic principle of risk analysis depends on the type, cause, consequences and frequency of expected risk. The hazard and risk assessment aim to identify key Environmental, Health and Safety hazards, risk associated with the operational phases of the sand mining project.

7.4.1. Natural Hazards

Extreme Weather (Cyclone/Storm/Storm Surge): The effect of extreme weather would most likely be a disruption of vital services such as water, sewer, power and transportation; damage to and disruption of emergency response facilities, resources and systems. As per the Vulnerability atlas of cyclone frequency and wind hazard map, the project sites fall in the High Damage Risk Zone – B as per BMTPC as shown in Fig 7.3 below.

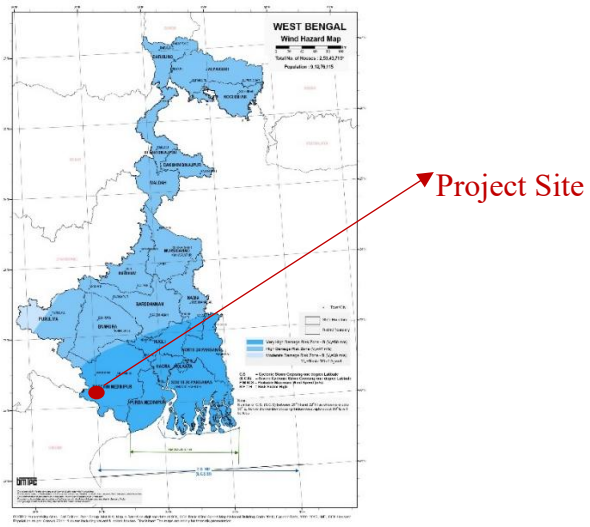


Figure 7.3: Wind Hazard Map of West Bengal (Source: BMTPC)

Flooding: Floods constitute one of the most potentially serious hazards. District authorities will be handling such situations. The project location is a very vulnerable point for flood. The area witnessed many floods related problems as the river almost every year overflows. The area receives an average of more than 3000 mm of rainfall annually.

Earthquake: An earthquake is the sudden motion or trembling in the earth caused by an abrupt release of slowly accumulating strain. This sudden release results in ground shaking, surface faulting, and/or ground failures. According to the Seismic Zoning Map of India and BMTPC, the proposed project site falls in Moderate Damage Risk Zone (Zone – III).

7.4.2. Technological Hazards

The proposed project is not including any process or manufacturing activity. Proposal is about the sand mining project for the construction purposes.

7.5. Anticipated Risk Impacts & Mitigations

7.5.1. Likelihood Assessment

For the purpose of risk assessment, the risk likelihood levels have been used. The Risk Likelihood Levels are given in Table 7.2.

Table 7.2: Likelihood Assessment

Risk Levels	Likelihood	Qualitative Description
A	**Almost certain**	The event is expected to occur; event will occur on an annual basis or more frequent
B	**Likely**	Probably that will occur; event has occurred several times before at similar developments
C	**Possible**	May or may not occur; event may occur once during the life of the development
D	**Unlikely**	The event may occur at some time but is unlikely; heard of happening from time to time at similar developments
E	**Rare**	The event may occur in exceptional circumstances; not heard of at similar developments

7.5.2. Consequence Assessment

For the purpose of the risk assessment, the risk consequence levels have been used. The Risk Consequence Levels are given in Table 7.3.

Table 7.3: Consequence Assessment

Risk Levels	Consequence	Qualitative Description
1	**Insignificant**	***People:*** Event does not result in injury (no medical treatment required) ***Environment:*** No damaged ***Property:*** No damage
2	**Minor**	***People:*** Reversible injury or illness ***Environment:*** Minor impact of short duration or short-term damage ***Property:*** Minor damage
3	**Moderate**	***People:*** Irreversible disability or impairment to one or more persons ***Environment:*** Short – term damage resulting in complaints, localized impact ***Property:*** Moderate damage
4	**Major**	***People:*** Severe injuries to one or more persons, single fatality ***Environment:*** Significant impact locally and potential for off-site impacts ***Property:*** Major damage
5	**Catastrophic**	***People:*** Multiple fatalities or irreversible injuries ***Environment:*** Significant impacts to regional ecosystems and threatened species potential for widespread off-site impacts ***Property:*** Significant loss

7.5.3. Standard Risk Assessment Matrix

The standard risk assessment matrix for the proposed mining of sand from Damodar river at Bankura District in West Bengal is developed on the basis of the risk likelihood and consequences levels. The Standard Risk Assessment Matrix is given in Table 7.4.

Table 7.4: Standard Risk Assessment Matrix

RISK MATRIX	**CONSEQUENCES**				
Probability	Catastrophic (Irreversible, permanent) (5)	Major (Long term) (4)	Moderate (Medium term) (3)	Minor (Short term, manageable) (2)	Insignificant (Manageable) (1)
Almost certain (5)	Extreme (25)	Extreme (25)	High (15)	Medium (10)	Medium (10)
Likely (4)	Extreme (20)	High (16)	High (12)	Medium (8)	Low (4)
Possible (3)	High (15)	High (12)	Medium (9)	Medium (6)	Low (3)
Unlikely (2)	Medium (10)	Medium (8)	Medium (6)	Low (4)	Low (2)

RISK MATRIX	CONSEQUENCES				
Probability	Catastrophic (Irreversible, permanent) (5)	Major (Long term) (4)	Moderate (Medium term) (3)	Minor (Short term, manageable) (2)	Insignificant (Manageable) (1)
Rare (1)	Medium (5)	Low (4)	Low (3)	Low (2)	Low (1)

7.5.4. Risk Assessment Matrix & Mitigation Measures

The major probable hazards during the operation phase are natural calamities such cyclone, shore erosion, earthquake etc. and other calamities like the spillage or leakage of fuel/oil, mining equipmentand machinery etc. The risk assessment matrix and its mitigation measure are given in Table 7.5.

Table 7.5: Risk Assessment and its Mitigation Measures

Anticipated Hazards	Significance of Impact	Mitigation Measures
Accidents due to Vehicular Movement	High (12)	• All transportation within the main working should be carried out directly under the supervision and control of the management. • The Vehicles will be maintained/ repaired and checked thoroughly by the competent person. • A statutory provision of constant education, training etc. will go a long way in reducing the incidents of such accidents. • Overloading will not be permitted and will be covered with tarpaulin. • The maximum permissible speed limit will be ensured. • The truck drivers will have valid driving license.
Material handling and Loading	High (12)	• The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers. • The loading should be done from one side of the truck only to avoid over throw of materials. • The workers should be provided with gloves and safety shoes during loading • All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered As Low as Reasonably Practicable (ALARP) conditions which are adequately safe and healthy.

Anticipated Hazards	Significance of Impact	Mitigation Measures
Natural Hazard (Earthquake, Flood, Cyclone)	Medium (10)	• Management practices shall be adhered to the Natural Disaster, Strategy/Emergency, Response Procedures. • Ensure emergency supplies are located above foreseeable flood level • Management practices shall be adhered to the Natural, Disaster Strategy/Emergency, Response Procedures.
Health and Hygiene	Medium (8)	• Provide medical centre for medical care required in theevent of a disease outbreak. • Necessary precautions shallbe adopted to prevent and manage the source of spreading.

It can be concluded that, the risks assessed during the operation phase of the proposed mining project of sand at Subarnarekha River. The project proponents are proposed to implement all the mitigation measures to prevent the impact or consequences of the risk expected to be happened in the project site.

7.6. Disaster Management Plan

Disaster Management planning is an integral and essential part of loss prevention strategy. The natureof the proposed project is such that these are minimal chances of accidents. The project operations do not entail any risk or hazard. However, there still remains a small possibility that disaster may occur. Effective action has been possible due to existence of pre – planned and practiced procedures for dealing with emergencies. The Disaster Management Plan to be implemented in the event of an emergency and also sets out the procedures and measures to be taken into account in the event of loss of containment and consequence thereof in the proposed sand mining projects. It is intended to apply these regulations:

- To develop a Disaster Management Plan (DMP) that should be concise and informative so that members of the emergency control organization should be able to quickly refer to the action plan to determine important functions that are being carried out;
- To manage an emergency by use DMP just as reference material for training and shall be made applicable;
- To reduce damage to property, machinery, public and environment;
- To develop a state of readiness for a prompt and orderly response to an emergency and toestablish a high order of preparedness (equipment, personnel) commensurate with the risk;

- To provide an incident management organogram with clear missions and lines of authority (incident command system, field supervision, unified command);
- To ensure an orderly and timely decision-making and response process (notification, standard operating procedures);
- To maintain good public relations.

CHAPTER – 8: PROJECT BENEFITS

8.1. Introduction

This chapter gives a comprehensive description of various advantages and benefits anticipated from the proposed project to the locality, neighbourhood, region and nation as a whole.

The Sand has become a very important mineral for our society due to its many uses. It can be used for making concrete, filling roads, building sites etc. The role of Sand is very vital with regards to the protection of the coastal environment. It acts as a buffer against strong tidal waves and storm surges by reducing their impacts as they reach the shoreline. This sand is taken from the bed of Kangsabati River which is a replenishing resource. The mined-out material from this mine can be good source of construction material to nearby market. Provide gainful employment generation through development of the associated down-stream industry i.e., stone-crushers, screening plants, washeries, transport services etc. Serve as source of revenue for the State.

8.2. Benefits in Physical Infrastructure

This project will provide various improvements in the physical infrastructure of adjoining area such as:

- Improved Road communication system in villages in adjoining area.
- Strengthening of existing community facilities through the existing Community Development Programme;
- Awareness program and community activities, like health camps, medical aids, family welfare programs, immunization camp sports & cultural activities, plantation etc.

8.3. Benefits in Social Infrastructure

The proposed project is expected to provide employment to local people in different activities such as Mining, sizing, transportation and plantation activities. The project activity will not have any major impact on the environment. Since the project site falls in a riverbed, The Plantation program for greenbelt will be carried out by the project proponent with coordination with the Local Government. The project proponents have Corporate Environmental Responsibility initiatives which will have a positive impact on socio economic fabric of the region.

8.3.1. Employment Potential

The local labour shall be engaged for the purpose of mining of mineral, loading & unloading of mineral besides, watch and ward and plantation activity with proper maintenance on assumption that one man on and average can extract load & unload 5 to 6 tonnes of material per man-day and the same amount will be handled through machines. Approximately 12 – 28 semi-skilled and Unskilled laborers from local people will be employed directly and 2 – 3 persons indirectly including Mines Manager, in the project. This will help in the improvement of financial condition of the area. There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities.

8.3.2. Health Benefits

The Project proponent will undertake awareness program and community activities like health, camps, medical aids, family welfare camps, AIDS awareness program etc. Periodic medical check-ups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this will assist to lift the general health status of the residents of the area around mines.

8.3.3. Plantation Program

Plantation will be done by the project proponent by coordinating with the local government to mitigate the ill-effects of mining and to improve the vicinity and environment of mine and it surrounding area. The management will give emphasis on plantation and will also motivate local persons for plantation during rainy season. This will also increase the consciousness in workers and nearby villagers for greenery. Fruit trees can contribute towards their financial gains.

Apart from all the above-mentioned benefits there will be other benefits to the region in terms of upgradation of lifestyle, overall area development etc.

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification vide Gazette Notification No. S.O. 1533 Dt: 14th September, 2006 and amendments thereof, Appendix III, Generic Structure of EIA, SL. No. 9, "Environmental Cost Benefit Analysis" is applicable only, if the same is recommended at the Scoping stage.

As per the TOR points issued SEIAA WEST BENGAL in vide File no EN/T-II-1/193/2024 dated 06.01.2025 for the proposed project, the Environmental Cost Benefit Analysis is not mentioned.

CHAPTER – 10: ENVIRONMENTAL MANAGEMENT PLAN

10.1. Introduction

The above said mining lease for Sand consists of 3.65 hectares of land in Kangsabati Riverbed which is located in Mouza – Taldiha, P.S.-Sarenga, District – Bankura (West Bengal). The proponent will start the mining in the mining lease as per the approved mining plan after environmental clearance and grant of the mining lease. The mining activity will follow simple manual method of extraction (sand) and the site already have an unpaved road on the downstream side of the Lease Area.

Mining activities in the areas involve excavation of sand, transportation of Mineral etc. These activities lead to generation of air borne dust, which can cause air pollution in and around the area; if appropriate control measures are not taken. Similarly mining causes land degradation, noise and water pollution etc.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits, a comprehensive environmental management plan has to be prepared. Any effort to control adverse impacts will be incomplete without appropriate control measures for reclamation of land affected due to mining and dumping. One of the balanced approached for development of mineral resources is total utilization of all the products. It aims at making use of all the products generated during mining so that no working is left out either as pollutants or as scars on earth surface. Usually, the environmental management plan is prepared for site development and for development stage, during operation phase and for post operation phase. This area is being worked for the last many years. Therefore, management plan operation phase and post operation phase are discussed.

10.2. Impact on Air Quality

The main pollutant in airs suspended particulate matter (SPM), which is generated during various activities of mining such as, extraction of sand from the riverbed and movement of transport vehicles. The ambient air quality with respect to the study zone of 10 km radius around the mine site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning and vehicular traffic. The prime objective of baseline air quality monitoring is to assess existing air quality of the area.

This will also be useful in assessing the conformity to standards of the ambient air quality during the mining operations. The air quality which got adverse impact by transportation will be minimized by water spray on the approach roads twice in a day during summer and once in winter. The excavation of sand will also generate negligible amount of dust. The pollution created by diesel operated machinery will be minimized by adopting good quality silencers and proper maintenance of vehicles.

10.3. Control of Dust Pollutants

The environmental control measures proposed to control the fugitive dust includes:

- Haul road will be maintained regularly. Water tankers with spraying arrangement will be used for regular water sprinkling on the haul roads to ensure effective dust suppression.
- Speed limits will be prescribed for transport vehicle Regular maintenance of transport vehicles;
- Sand carrying trucks will be effectively covered by tarpaulin to avoid escape of fines to the ambient air.
- Dumpers will not be overloaded to prevent spillage on the road.
- Plantation/ green belt development along approach/ transportation roads; and controlling of SO_2 & NO_2 Levels. The source of SO_2 & NO_2 would be due to vehicular emissions. This can be controlled by:
    a) Periodic maintenance of the trucks/dumpers used in transport of sand will be done as per manual and/or at regular interval to reduce smoke emissions.
    b) Ambient air quality monitoring will be carried out as per CPCB norms except monsoon season.

10.4. Control of Noise Pollution

Noise will be produced at the mine due to movement of transport vehicles only. This will be temporary and insignificant as the noise generated by the mining activity is dissipated within a small zone around the mine. As the mining process involves only extraction of sand from the riverbed manually, there is no major noise generation. In the mine, no machinery will be used. Major noise sources are transportation vehicles. The noise produced due to vehicle will not be continuous throughout the day.

10.5. Water Management

There is no wastewater generation in the sand mining. The only water contaminant is rainwater Run-off during the monsoon season. Mining will be carried out in dry river bed and it will remain above the ground water table. There will be no impact due to the proposed mining on the water environment and the water flow pattern does not disturb the turbidity and velocity. The impact on the aquatic flora & fauna due to the proposed opencast excavation is insignificant as it involves only scooping of sand from the dry river bed which will not disturb the aquatic life present in the river.

Water pollution control measures: In order to ensure that the project activities shall not affect the Water environment, the following measures will be taken up:

- Mining will be closed during the monsoon season and at the time of floods. This will help in replenishment of sand in the river bed.
- Sand will be collected in slices up to depth of 2.0m or above the ground water level.
- Mining will be restricted minimum 7.5m away (inward) from river bank to minimize effect of river bank erosion and to avoid consequent channel migration.
- River stream will not be diverted to form in active channels.
- Ground water levels will be monitored regularly in and around sand mining project.
- Mining will be started from north western side and advanced towards eastern side across the river uniformly. In order to maintain safety and stability of river banks, a minimum distance of 7.5 m is left as safety zone.
- Mining at the concave side of the river channel will be avoided to prevent bank erosion.
- Meandering segment of river will be selected for mining in such a way to avoid natural eroding banks and to promote mining on naturally building meander components.
- Water Quality Monitoring for the ground waters, river water and other surface waters shall be carried out seasonally to ensure that the water quality is not affected by the project activities.

10.6. Land Use Pattern

The proposed project involves mining of sand from dry bed of the Kangsabati River. The minor mineral excavation activities will form small pits in the river bed temporarily. These pits are filled back naturally by the sediments brought by the river during monsoon. Thus, no reclamation is required as there will not be any change in the land use pattern.

Land environment control measures:

- Mining in 3.65 ha will be carried out leaving 7.5 m as undisturbed as safety barrier around the mine pits.
- The annual production will be less than replenishment rate of the river.
- Mining will be restricted minimum 3m away (inward) from river bank to minimize effect of river bank erosion and to avoid consequent channel migration
- Mining at the concave side of the river channel will be avoided to prevent bank erosion Plantation will be carried out along the banks of the river to control erosion of banks.
- Slopes of the mine pits will be maintained below 35°.

10.7. Management of Biological Environment

There is no loss of forest resources like medicinal plants, endangered & rare species. as no deforestation takes place since excavation is done on the deposited stone aggregate of a river. The mining will be carried out in dry bed and will not disturb the aquatic life in the river. Since there is no pollution of the river water due to the proposed activity the aquatic biodiversity is not affected. There will be no habitat fragmentation or blocking of migratory corridors for the proposed mining.

10.8. Plantation Programme

As the mine lease area is located within the riverbed, it is not suitable for plantation and green belt development, no plantation is proposed in haul roads of the lease area. However, plantation of local species of shrubs and trees will be carried out along the banks of the river near the mine lease area to form a green belt which will help in reducing the erosion of the river banks and also to act as a dust arresting screen. Plantation will also be carried out along the mineral transportation roads in the nearby villages. About 4220 saplings per annum will be planted in during plan period. Also, plantation will be carried out in the available free government areas with in the study area. Species Suggested for Mixed Plantation of species like:

- *Albizzia lebbek*
- *A. procera*
- *T. chebula*
- *Aquillaria agallocha (Agaru)*
- *Bambusa vulgaris*
- *Betula anoides*
- *Terminalia arjuna*
- *Azadirachta Indica*
- *Terminalia myriocarpa*
- *Phullanthus embeliica*
- *Delonix regia*
- *Tectona grandis*
- *Bombax ceiba*
- *Mesua assamica*
- *Alstonia scholaris*

10.9. Socio – Economic Environment

The project activities shall not have any adverse impacts on any of the common property resources of the village communities, as the mine lease area is not being used for any purpose by any section of the society in this region. There is no Resettlement & Rehabilitation involvement in this project. There is no land acquisition in this project. The project is expected to yield a positive impact on the socio-economic environment, it will help for improving direct and secondary employment opportunities for the local people.

10.10. Employment Potential

Besides the direct and indirect employment to 12 – 28 persons, the company will provide vocational skill training to the unemployment youth of the neighbouring villages through outside agencies. Local villagers residing in the nearby villages shall be employed as semiskilled workers.

10.11. Occupational Health & Safety Measures

There is no environmental pollution due to the proposed mining as it is proposed to be a semi mechanised excavation of sand from the banks of Kangsabati River. Hence there will be no major occupational health hazards. Periodic Medical Examination shall be conducted to the workers, wherein a detailed examination and health survey including routine tests shall be conducted and records shall be maintained.

- Employee will be adequately trained and educated for involvement and commitment in to the implementation of health and safety guidelines.
- Monitoring the effects of mining activities on safety and health and conducting regular performance reviews through periodical health check-ups.
- Provision of all necessary resources for safety and health of employees and contractors engaged in mining.
- Setting of safety and health objectives based on comprehensive strategic plans and measure performance against these plans.
- Implementing safety and health management system and assessing the effectiveness through periodic audits.
- Organizing regular health check-up of the employee.

Site Services: Temporary office shed, Rest shelters, water supply and first aid facilities will be provided at site. Mostly local people will be employed in the mine.

Safety Provision: All provisions in safety rules and regulation will be maintained by providing required safety equipment to the employees. The lessee will provide safety shoes, safety helmets to all the employees. The safety precautions will be followed as per the provisions of Mines Rules and standards.

Table 10.1: Budgetary Allocation for Safety

S.No.	Items	Capital Cost (INR)	Recurring Cost (INR)
1.	Measures prevent accidents during mining	15,000.00	2,000.00
2.	Measures prevent accidents during mineral transportation	10,000.00	2,000.00
3.	Measures prevent accidents during trucks /Dumpers	10,000.00	2,000.00
4.	Measures prevent dangerous incident during inundations	10,000.00	2,000.00
5.	Medical examination schedule	15,000.00	2,000.00
Total		**60,000.00**	**10,000.00**

10.12. Budget Allocation for EMP Implementation

Annual budget for EMP is very essential for successful implementation of EMP. As there are no pollution control systems, no capital cost of Pollution Control systems is envisaged. Costs will be annual operating costs as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The budget will take into consideration the following expenses:

- Field cost for monitoring of parameters.
- Cost of any defined outsourcing.
- Cost of chemicals, consumables and transport for data generation.
- Man power cost for environmental cell.
- Any other cost as per EC condition.

It is necessary to include the environmental cost as a part of the budgetary cost component. For this, a sum of Rs. 10.82 lakhs/annum approx., is allocated for environmental protection activities. This will include cost of water sprinkling, plantation, environmental monitoring etc which is further explained in the table 10.2 below.

Table 10.2: Budgetary Allocations for EMP

S. No.	Activity	Particulars	Number	Per Unit Rate	Frequency	Cost (INR)
1.	Green Belt	Plantation of Saplings	3,284	100	1	3,28,400.00
2.		Barbed Wire in RM	3,284	35	1	1,14,940.00
3.		Tanker for Watering Plant	1	30	1000	30,000.00
4.	Dust Suppression	1000 L capacity tankers	1	30	1000	30,000.00
5.	Environmental Monitoring Plan	Ambient Air	4	12500	2	1,00,000.00
6.		Noise level	4	12500	2	1,00,000.00
7.		Soil	2	12500	2	50,000.00
8.		Ground Water	2	12500	2	50,000.00
9.		Surface Water	2	12500	2	50,000.00
10.	Occupational Health and Safety	Medical Health Camp	1	50,000	3	1,50,000.00
11.		Safety Gears	290	150	1	43,500.00
12.		Site Facilities	1	12,000	3	36,000.00
Total Expenses of EMP						**10,82,840.00**

10.13. Environmental Policy

The environment policy right from mine preparation to its operations will be based on:

- Compliance of applicable regulatory requirements;
- Conservation of natural resources;
- Maintaining a safe working environment;
- Providing high environmental expertise and know-how; and
- Regular training and refresher courses so as to achieve continuous improvement of environment.

In fulfilment of this commitment, they shall maintain continuing efforts to:

- Comply with all applicable safety, health and environment laws and regulations.
- Enhance Health, Safety and Environment (HSE) awareness among employees and associated.

- Stakeholders through effective communication and training.
- Investigate all workplace incidents and illness in order to promptly correct any unsafe conditions or practices.
- Integrate HSE considerations into business planning and decision making.
- HSE responsibility among our employees in their practices, and promote and value their involvement in achieving the goals of this policy.
- Increase shareholder value through HSE excellence.

10.14. Environmental Safeguards

The regular water sprinkling will be provided over the approach road and all other dust creating points and places to minimize the dust during mining and other operations. For the safety of the laborers the personal protective devices will be provided and proper training will be provided for environment and safety. The height and width of the benches and face slope are proposed as per Metalliferous Mines Regulation 1961. Regular health check-ups will be provided with periodically organized occupational health surveillance program for the workers. Insurance/ Group insurance will be provided for all laborers as per rules. Vehicular emissions will be checked by adopting good quality of silencers and by maintain wide and smooth roads. The noise level/pollution will be maintained within the permissible limit. Plantation as per approved planning will be provided in the lease area to increase the aesthetic environment of the lease area and nearby the lease area. The lessee will also follow the conditions imposed in the Environment Clearance for environment protection measures, ESR, CSR, etc.

CHAPTER – 11: EXECUTIVE SUMMARY

The proposed project is the extraction of sand of Taldiha Sand Mine (Sand Block 0115KB001) by AMIYA RANJAN DAS. located at Mouza – Taldiha, JL No.: 345, Plot No.: 231, P.S. – Sarenga, of Bankura district of West Bengal. The proposed project has been issued **letter of intent (LOI)** by office of the District Magistrate & Collector Bankura, Government of West Bengal Memo No. 797 dated 10.02.2017 and validity of LoI was extended via Memo No. 1206/MM/LR/LOI/SAND/2022 dated 02.11.2022. Area granted is 3.65 Hectare for a period of about 5 years. The area is located in Survey of India Toposheet No. – 73J/14 and Geographically the ML area extends from latitude 22° 42' 11.70" N to 22° 42' 08.44" N and longitude 86° 59' 37.70" E to 86° 59' 35.11" E. Toposheet of the area is attached. The area is non-forest land in nature. The elevation of the river sand bed is 79 m AMSL.

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereafter, the proposed mining project is categorized as category 'B1' project. The proposed project activity will be carried out from Kangsabati River, Dist. – Bankura of West Bengal.

The mining plan has been prepared by Sanjay Kumar Pandey (Qualified Person) and approved for five years by Sr. Geologist, G. P. Branch, S. B. Unit, Bankura, Govt. of West Bengal.

Salient Features of the Project

S. No	Parameters	Description		
1.	**Mineral**	Sand		
2.	**Name of the Mining lease**	Taldiha Sand Mine (Sand Block - 0115KB001)		
3.	**Project Location**	**Mouza:** Taldiha **JL No.:** 345; **Plot No.:** 231;		
4.	**Police Station**	Sarenga		
5.	**District**	Bankura		
6.	**State**	West Bengal		
7.	**Toposheet Number**	73J/14		
8.	**Topography**	No – Forest land (River course).		
9.	**Location/ Site (GPS Co – Ordinates)**	**Boundary Pillar No.**	**Latitude**	**Longitude**

		A	N 22° 42' 11.70"	E 086° 59' 37.70"
		B	N 22° 42' 10.09"	E 086° 59' 45.53"
		C	N 22° 42' 04.55"	E 086° 59' 42.73"
		D	N 22° 42' 08.44"	E 086° 59' 35.11"
10	**Ground Elevation**	**Highest Elevation:** 79 m AMSL **Lowest Elevation:** 65 m AMSL		
11.	**Capacity of Proposed Production**	60,144 Cu. M. Annually		
12.	**Drilling Blasting**	The mining does not require any drilling and blasting in mining activities.		
13.	**Method of Mining**	Open cast semi mechanized method		
14.	**Lease Period**	5 Years contract period.		
15	**Lease Area**	3.65 Hectares		
16	**Land Use Pattern of the Lease Area**	Govt land of 3.65 Ha.		
17.	**Geological Reserve**	2,93,956.40 Cu. M. (As per Approved Mining Plan)		
18.	**Mineable Reserve**	2,42,187.8592 Cu. M (for 5 Years)		
19.	**Manpower to be involved**	Total = 42 manpower.		
20.	**Water requirements and source**	Drinking purpose 2 KLD Others 2.5 KLD Total = 4.0 KLD Source: Nearby Villages		
21.	**Solid Waste Generation**	There will not be any generation of solid waste for the proposed riverbed sand mining project.		
21.	**Cost of the Project**	₹ 4.29 Cr		
22.	**Budgetary Provision for EMP**	5% of project cost is allocated for Environmental Management Plan		
23.	**Corporate Environmental Responsibility (CER) cost**	2% of project cost annually is allocated for CER cost		

Ambient Air Quality

Particulate Matter (PM_{10}):

The maximum value for PM_{10} was observed as 58 µg/m^3 at Near project site (AQ1) while 24 hours applicable limit is 100 μ g/m_3 for industrial and mixed-use areas. The area observes average PM_{10} concentration in the range of 45 µg/m^3 - 60 µg/m^3 with the lowest concentration of 46 µg/m^3 recorded at Village Waria (AQ4).

Particulate Matter ($PM_{2.5}$):

The maximum value for $PM_{2.5}$ was observed, as 64 µg/m^3 at Project Site (AQ1), while 24 hours applicable limit is 60 µg/m^3 for industrial and mixed-use areas. The area observes average

$PM_{2.5}$ concentration in the range of 40 µg/m^3 – 65 µg/m^3 with the lowest concentration of 40 µg/m^3 recorded at Waria (AQ4).

Sulphur Dioxide (SO_2):

The maximum value for SO_2 was observed, as 26 µg/m^3 at project site (AQ1) while 24 hours applicable limit is 80.00 µg/m^3 for industrial and mixed-use areas. The area observes average SO_2 concentration in the range of 8 µg/m^3 – 30 µg/m^3 with the lowest concentration of 8 µg/m^3 recorded at Sarama (AQ3). All the villages have observed value well under the prescribed limit.

Nitrogen Oxides (NO_2):

The maximum value for NO_2 was observed as 17 µg/m^3 at Sarama & Waria (AQ3 & AQ4) while 24 hours applicable limit is 80 µg/m^3 for industrial and mixed-use areas. The area observes average NO_2 concentration in the range of 5 µg/m^3 - 20 µg/m^3 with the lowest concentration of 7 µg/m^3 recorded at village Sarama & Pingrui (AQ2 & AQ3). All the villages have observed value well under the prescribed limit.

Free Silica (Si):

The maximum value for Si was observed as 10.5 µg/m^3 at Waria (AQ4) while 24 hours applicable limit is 50 µg/m^3 for industrial and mixed-use areas. The area observes average Si concentration in the range of 2.0 µg/m^3 – 15.5 µg/m^3 with the lowest concentration of 2.1 µg/m^3 recorded at village Pingrui (AQ2). All the villages have observed value well under the prescribed limit.

Noise Quality:

Ambient noise levels were measured at 04 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 54.6 Leq dB and 38.1 Leq dB respectively and minimum and maximum level of noise during night time were 44.7 Leq dB and 36.5 Leq dB respectively.

Water Quality:

Ground water

1. During the monitoring period analysis of ground water shows that pH ranges from 6.5 to 6,8;
2. The Total dissolve solid (TDS) concentration was found to be ranging in between 28 mg/l to 250 mg/l.
3. Total Hardness as $CaCO_3$ was observed to the ranging from 12 mg/l to 228 mg/l.

4. Bacteriological studies revealed the absence of E. Coli & Coliforms.
5. The ground water quality at the study area is found under the limits of drinking water standards.

Surface water

1. Analysis of the result indicates that the pH ranges in between 6.5 to 7.1 which are well within the prescribed standard of 6.5 to 8.5 of CPCB.
2. The Turbidity concentration was found to be ranging in between 1 NTU to 5 NTU.
3. Total BOD concentration was found to be ranging from 2.8 mg/l to 3.5 mg/l.
4. The surface water quality in the study area does not indicate any industrial contamination.

Soil Quality

The average pH of the soil in the study areas is sandy clay soil type was observed. The project site soil sample shows 30 – 40 % of sand sample and 40 – 50 % are clay content.

1. The data shows that value of permeability ranges from 13.0 – 15.0 cm/h at the study area indicating that soil samples have a good permeability.
2. The conductivity at Project Site is minimum 213 µs/cm, which is the highest in the study area. The overall conductivity ranges from 200 – 213 µs/cm.
3. Moisture content value ranges from 20% to 22%.
4. The average concentration of Nitrogen, Phosphorus and Potassium in the soil samples varies from 0.05% to 0.15%, 0.20 to 0.25 mg/g, 0.23 to 0.24 mg/g respectively.

Ecology and Biodiversity

There are no Ecologically Sensitive Areas present in the study area but some Reserved Forests are present in the buffer area of the project site.

Socio-economy

The implementation of the sand mining project at over an area of 3.98 Ha situated in Mouza – Taldiha JL No.: 34, Plot No.: 1189(P) P.S. – Bishnupur, of Bankura district of West Bengal will throw opportunities to local people for both direct and indirect employment. Human settlements are very close to the project area. It is expected that same will improve to a great extent due to proposed mining project and associated activities.

Environmental Management Plan (EMP)

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

- No labour camps will be established on site.
- No cooking, or burning of woods will be allowed in the nearby area.
- Prior to commencement of mining, a short awareness program will be conducted for labours to make them aware of way of working and various precautions to be taken while at work. Such program will be repeated occasionally.
- In the event of any some causality or injury to any animal occurs, proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild animals, if exists mining operations will be avoided in the area.
- It will be ensured that noise produced due to vehicles movement while carrying stone is within the permissible noise level.
- No piling of Stone will be done in adjoining area.
- If wild animals are noticed crossing the area, they will not be disturbed or chased away, instead the labours will move away from their path.

Environment Monitoring Program

S. No.	Activity	Schedule
Air Pollution Monitoring		
1.	Ambient air monitoring of parameters specified by MoEF (PM_{10}, SO_2 & NO_2).	Twice in a Year except monsoon
Water Pollution Monitoring		
2.	Monitoring water quality surface water from the river	Twice in a Year except monsoon
3.	Monitoring of one sample of tube well and open well at mine / nearby location. Parameters are essential parameters as per IS: 10500:2012.	Twice in a Year except monsoon
4.	Monitoring of water spray requirements	Log-sheet of water spray will be maintained on daily basis
Noise Quality Monitoring		
5.	Noise in the ambient atmosphere in mining lease	Twice in a Year except monsoon
Greenbelt Maintenance		
6.	Monitoring schedule for Greenbelt development as per mining plan	Yearly

Soil Quality Monitoring		
7.	Soil at six locations	Twice in a Year except monsoon

The proposed project is expected to provide employment to local people in different activities such as mining, sizing (sieving) transportation and plantation activities. The revenue generated from the production and sale of mineral will also add to the exchequer of government, which in turn will help in the growth of state economy. Excavated material will cater the huge increasing demand of mineral in the fast-growing construction industry of Assam and nearby states etc.

CHAPTER – 12: DISCLOUSRE OF THE CONSULTANT

This EIA report is prepared on behalf of the proponents, AMIYA RANJAN DAS by the environmental Consultant, "M/s. Indian Mine Planners and Consultants" (IMPCON). The head office of IMPCON is at Kolkata.

Indian Mine Planners & Consultants (IMPCON) was established in 2007 with the prime objective of guiding for total mining solution in Mine Planning for the Mine Entrepreneurs of Government, Public Sectors and Private Sector bodies engaged in the field of mining of Coal, Metallic and non- Metallic deposits. The services are provided by the energetic and highly experienced mine planners and guided by the dynamic, pragmatic, qualified and experienced advisors in the field of mining with an aim to ensure safety, productivity and sustainable mining with due regard to quality and environment.

Currently, IMPCON is an ISO 9001:2015 Certified Company & a QCI – NABET accredited Environment Consultant Organisation (ECO), Accredited Prospecting Agency (APA) & Mining Plan Preparation Agency (MPPA) from Jan-2021 and Accredited Exploration Agency (AEA) for Mineral sector.

IMPCON caters to the need of existing as well as new Mining Entrepreneurs for preparing the geological reports, mining feasibility reports, mining plan, detailed mine design, environment impacts assessment (EIA) reports etc. A group of advisors from various disciplines with over 40 years of experience from organizations like Geological Survey of India, Various subsidiaries of Coal India Limited (CIL) including Central Mine Planning & Design Institute Limited (CMPDIL), Steel Authority of India Limited (SAIL), Indian School of Mines etc. provide their valuable guidance.

IMPCON also delivers advisory services in all aspects of geological exploration, geo-technical services, hydro-geology, mine planning & detailed design, electrical installations and maintenance, possible improvement areas of mechanical performance of the high-capacity mining machineries, civil and infrastructural job planning, choice of equipment's for mining, manpower, planning and finally total economics for project viability.

EIA TEAM:

NAME	Type (In-House/ Empaneled)	Designation 1	Designation 2	Sector I	FA1	FA2	FA3	Remarks
Dr. N. B. Chanda	In-House	EC	FAE	1(A)	AP(A)	WP(A)	GEO(A)	Approved with an
Dr.A.S. Shannigrahi	Empaneled		FAE	1(A)	AQ(B)			Approved
Mr. Gopal Chandra Das	Empaneled		FAE	1(A)	LU(B)	SC(B)		Approved with an Alert
Dr. Tapan Kumar Mishra	In-House		FAE	1(A)	EB(A)			Approved
Ms. Nidhi Singh Rathod	In-House		FAE	1(A)	SE(A)			Approved with an Alert
Mr. Debashish Basu	Empaneled		FAE	1(A)	RH(A)	NV(A)		Approved
Mr. Golam Shahid	Empaneled		FAE	1(A)	HW(A)			Approved with an
Mr. Shyamananda Panja	Empaneled		FAE	1(A)	HG(A)			Approved with an
Mr. Arpan Chakraborty	In-House		TM	1(A)	LU	SC		Approved (To work under Gopal Chandra Das)
Mr. Debabrata Bhadra	In-House		TM	1(A)	LU	SC		Approved (To work under Gopal Chandra Das)

LABORATORY PARTNER:

INDICATIVE CONSULTANT INDIA is a multinational organisation located in India and Japan. Their laboratory is accredited by NABL, ISO 9001:2015 Certified and recognised by other governmental departments. The Details of their laboratory are:

Name of and address of the Laboratory	Scope of services	Accreditation status
INDICATIVE CONSULTANT INDIA Address: Hpl Link Road, Basudevpur, Khanjanchak, Haldia, Medinipur East, West Bengal, India	Monitoring and Analysis of: • Ambient Air Quality • Noise Quality • Soil Quality • Ground Water Quality	Accredited by NABL, Certificate No. **TC-5910** **Validity**: 06th June 2026

12.1. Related all documents are attached as Annexures.

ANNEXURE I: Mining Plan Approval Letter

GOVERNMENT OF WEST BENGAL
OFFICE OF THE MINING OFFICER IN-CHARGE OF PURULIA ZONE
DIRECTORATE OF MINES & MINERALS,
G.P. BRANCH CAMPUS, NORTH LAKE ROAD,
P.O. & DIST.- PURULIA,723101.
Ph. No. – 03252-222340, Email id: moprl2.dmm-wb@bangla.gov.in

Memo No. 135 /MO/ Purulia
XI/BNK/14/SAND/25

Dated, Purulia the, 16th April, 2025.

To.
The Additional District Magistrate &
District Land & Land Reforms Officer,
PO & Dist. – Bankura
PIN-722101

Sub.: Approval of "Revised Mining Plan" for mining of 'River-bed Sand' of Amiya Ranjan Das, H1 bidder sand block (Sand Block ID: 0115KB001) in Mouza- Taldiha, Plot No. 231, J.L. No. 345, P.S.- Sarenga, District- Bankura, West Bengal over an area 3.65 hectares.

Ref. Your Memo No. 196/MM/LR/25 dt. 18.03.2025.

Sir,

In terms of Sub rule 2 (b) under Rule 4 of the West Bengal Minor Minerals Concession Rules, 2016 along with Order No. **397 MD/2C-672/2022** dt. **03.09.2024**, I hereby approve the above mentioned **'Revised Mining Plan'** for **'River-bed sand'** in Mouza- Taldiha, Plot No. 231, J.L. No. 345, P.S.- Sarenga, District- Bankura, West Bengal over an area 3.65 hectares, subject to the following conditions: -

01. i) 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 Government authority.

ii) 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 Government in terms of any other provisions of Mines & Minerals (Development & Regulation) Act, 1957, West Bengal Minor Minerals Concession Rules, 2016 and West Bengal Sand (Mining, Transportation, Storage and Sale) Rules, 2021, framed there - under and any other laws.

ANNEXURE II: TOR Grant Letter

सत्यमेव जयते

File No: EN/T-II-1/150/2025
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), WEST BENGAL)
***

Dated **25/06/2025**

To,

AMIYA RANJAN DAS
Brahmandiha, P.O.- Gargaria, P.S.-Sarenga, Dist- Bankura, BANKURA, WEST BENGAL, 722150
dasamiyaranjan779@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 Taldiha Sand Mine (Sand Block - 0115KB001) submitted to Ministry vide proposal number SIA/WB/MIN/539966/2025 dated 31/05/2025.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25B0107WB5367163N
(ii) File No.	EN/T-II-1/150/2025
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Taldiha Sand Mine (Sand Block - 0115KB001)
(viii) Name of Company/Organization	AMIYA RANJAN DAS
(ix) Location of Project (District, State)	BANKURA, WEST BENGAL
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	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) under the provision of EIA notification 2006 and its subsequent amendments.

ANNEXURE III: Letter of Intent

Government of West Bengal
Office of the District Magistrate & Collector
Bankura

Memo No. 1206 /MM/LR/LOI/SAND/2022 Date: 02/11/2022

To
Sri Amiya Ranjan Das
S/O- Late Nirad Baran Das
Vill- Brahmandiha, P.O- Gargaria
P.S- Sarenga, District- Bankura
PIN- 722 150.

CORRIGENDUM

Sub:- Extension of validity of Letter of Intent in reference to e-auction conducted on and from 04/10/2016 to 06/10/2016 for grant of mining lease for sand in sand block 0115KB001 (Name of the Sand block) located in Plot No. 231 in Mouza- Taldiha, J.L.No.- 345, P.S.- Sarenga, District- Bankura over an area of 11.93 acres in the riverbed of Kangsabati.

Ref:- 1) This Office earlier memo no.797 dated 10/02/2017 and 461/MM/LR/LOI/SAND/2022 dated 24/03/2022.
2) His application dated 29/09/2022.

With reference to the above noted subject, this is to inform him that the validity of Letter of Intent as stated in earlier memo no. 461/MM/LR/LOI/SAND/2022 dated 24/03/2022 in reference to e-auction conducted on and from 04/10/2016 to 06/10/2016 for grant of mining lease for sand in sand block 0115KB001 (Name of the Sand block) located in plot No. 231 in Mouza- Taldiha, J.L.No.- 345, P.S.- Sarenga, District- Bankura over an area of 11.93 acres in the riverbed of Kangsabati is extended till 60 days after the disposal of EC application by SEIAA. All other clauses as mentioned in the said memo remain intact.

District Magistrate
Bankura

Memo No. 1206/1(2) /MM/LR/LOI/SAND/2022 Date: 02/11/2022

Copy to:

1) The Joint Secretary, Department of Industry, Commerce & Enterprises (Mines Branch) for kind information.
2) The Chief Mining Officer, Asansol for information.

District Magistrate
Bankura

ANNEXURE IV: Approved Mining Plan

REVISED MINING PLAN INCLUDING MINE CLOSURE PLAN
RIVER BED MINING FOR SAND
TALDIHA SAND MINE (SAND BLOCK - 0115KB001)
DSR Potential Zone Code : BNK_KN_RA_08.

[As per West Bengal Minor Mineral Concession Rules, 2016 & West Bengal Sand (Mining, Transportation, Storage and Sale) Rules, 2021]

Approved vide, Memo No. 125/MO/Purulia
Dated 16.04.2025

Lessee:

Amiya Ranjan Das
Village – Brahmandiha, Post – Gargaria,
Police Station – Sarenga,
District – Bankura, West Bengal, Pin – 722 150.

Office of the Mining Officer In-Charge of Purulia Zone Govt. of West Bengal

Sand Block Code: TALDIHA SAND MINE
(SAND BLOCK - 0115KB001).
Mineral: River Bed Material (Sand)

Mouza: Taldiha,
Area: 3.65 Hectare,
Plot No.: 231, J.L. No.: 345,
River: Kangsabati River, Police Station: Sarenga,
District: Bankura, West Bengal.

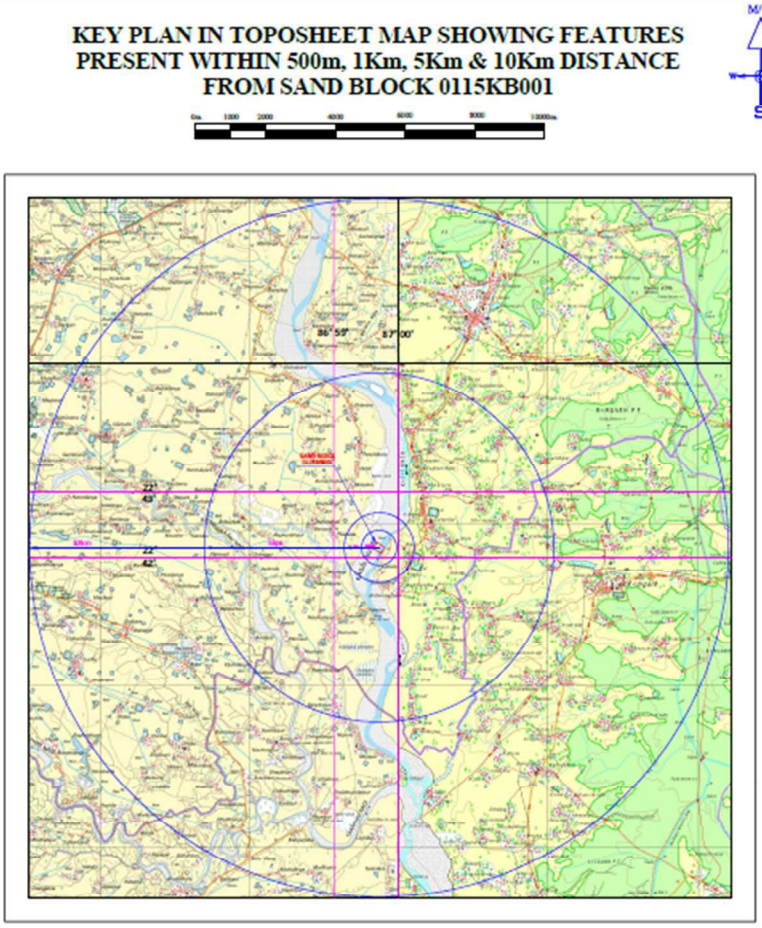
Prepared by:

Geosumukh Inframines Private Limited, Konnagar,
RQP: Sanjay Kumar Pandey.
RQP Regn No.: RQP/KOL/383/2013A.

Approved
Sanatan Mahato 16/04/25
(Sanatan Mahato)
Mining Officer
In-Charge of Purulia Zone
Govt. of West Bengal

ANNEXURE V: Project Site Located on Toposheet

KEY PLAN IN TOPOSHEET MAP SHOWING FEATURES PRESENT WITHIN 500m, 1Km, 5Km & 10Km DISTANCE FROM SAND BLOCK 0115KB001



Boundary Points	Co-ordinates	
	Latitude	Longitude
A	N 22° 42' 14.50"	E 086° 59' 37.96"
B	N 22° 42' 10.09"	E 086° 59' 45.41"
C	N 22° 42' 04.57"	E 086° 59' 42.64"
D	N 22° 42' 08.44"	E 086° 59' 35.11"

LEASE BOUNDARY

10 Km, 5Km, 1Km & 500m BUFFER FROM LEASE BOUNDARY

MOUZA:- TALDIHA, BLOCK:- SARENGA,
DISTRICT:- BANKURA (W.B.), J.L. NO. - 345
AREA:- 3.65 HECT., PLOT NO - 231
PROJECT PROPONENT:- AMIYA RANJAN DAS
RIVER :- KANGSABATI
SAND BLOCK - 0115KB001

PREPARED BY

ENVIRONMENT CONSULTANT:
INDIAN MINE PLANNERS
(QCI-NABET ACCREDITED ENVIRONMENT CONSULTANT)

ANNEXURE VI: Base Line Data (Lab Report)

Annexure VI: Soil Analysis Report

N.D. INTERNATIONAL

GOVERNMENT REGISTERED
An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Format No.: NDI/FM/81
Date: 20.03.2023

Certificate No. NL(M)/23-2410180
SAMPLE SUBMITTED BY PARTY :

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-61, Rajdanga Main road, East Kolkata Township Project E.M Bypass,Kol-107
Description of Sample	: Soil
Collection Source	: MIN_JH_01_I (Binpur-1). L1
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity: 67%
Sample Drawn on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023

A. CHEMICAL TEST FINDINGS:

Sl. No.	Test Parameters	Test Method	Unit	Result
1	Electrical Conductivity (1: 2.5 Ageous solution)	IS 14767 :2000 134	µs/cm	156
2	Nitrogen	IS 14684:1999	%	0.0198
3	Moisture	IS 2720 (Par1-2) :1973	%	20.56
4	Specific Gravity	NDI/CHEM/SOP/S-03	-	2.81
5	Bulk Density	FAO Method: 2007	gm/cm^3	1.56
6	Phosphorus as P	FAO: (METHOD)U. N 2007	Mg/g	0.019
7	Potassium as K	13.1 of FAO :2007	mg/g	0.23
8	Sodium Absorbtion Ratio (SAR)	IS 11624:2019	-	0.59
9	Permeability	NDI/CHEM/SOP/S-05	cm/h	1.65
10	Calcium as Ca	Tbt Fertilizer Control Order 1985	mg/g	0.0108
Texture of Soil				
11	Gravel	FAO Method: 2007	%	Nil
12	Sand	FAO Method: 2007	%	74.60
13	Slit	FAO Method: 2007	%	20.40
14	Clay	FAO Method:2007	%	23.60

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For N.D. International

K.P. De - CEO (Authorised Signatory)

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An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Format No.: NDI/FM/81
Date: 20.03.2023

Certificate No. NL(M)/23-2410180
SAMPLE SUBMITTED BY PARTY :

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-61, Baidanga Main road, East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Soil
Collection Source	: MIN_JH_01_I (Binpur-1). L2
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity: 67%
Sample Drawn on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023

A. CHEMICAL TEST FINDINGS:

Sl. No.	Test Parameters	Test Method	Unit	Result
1	Electrical Conductivity (I: 2.5 Aqeous solution)	IS 14767 :2000 134	µs/cm	149
2	Nitrogen	IS 14684:1999	%	0.018
3	Moisture	IS 2720 (Par1-2) :1973	%	20.82
4	Specific Gravity	NDI/CHEM/SOP/S-03	-	2.49
5	Bulk Density	FAO Method: 2007	gm/cm^3	1.38
6	Phosphorus as P	FAO: (METHOD)U. N 2007	Mg/g	0.016
7	Potassium as K	13.1 of FAO :2007	mg/g	0.19
8	Sodium Absorbtion Ratio (SAR)	IS 11624:2019	-	0.32
9	Permeability	NDI/CHEM/SOP/S-05	cm/h	1.72
10	Calcium as Ca	Tbt Fertilizer Control Order 1985	mg/g	0.0099
Texture of Soil				
11	Gravel	FAO Method: 2007	%	Nil
12	Sand	FAO Method: 2007	%	73.80
13	Silt	FAO Method: 2007	%	12.50
14	Clay	FAO Method:2007	%	15.80

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An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Format No.: NDI/FM/81
Date: 20.03.2023

Page -1 of 1

Certificate No. NL(M)/23-2410180
SAMPLE SUBMITTED BY
PARTY :

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-61, Baidanga Main road, East Kolkata Township Project E.M Bypass,Kol-107
Description of Sample	: Soil
Collection Source	: MIN_JH_01_I (Binpur-1). L3
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity: 67%
Sample Drawn on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023

A. CHEMICAL TEST FINDINGS:

Sl. No.	Test Parameters	Test Method	Unit	Result
1	Electrical Conductivity (I: 2.5 Aqeous solution)	IS 14767 :2000 134	µs/cm	148
2	Nitrogen	IS 14684:1999	%	0.0185
3	Moisture	IS 2720 (Par1-2) :1973	%	20.42
4	Specific Gravity	NDI/CHEM/SOP/S-03	-	2.77
5	Bulk Density	FAO Method: 2007	gm/cm^3	1.46
6	Phosphorus as P	FAO: (METHOD)U. N 2007	Mg/g	0.018
7	Potassium as K	13.1 of FAO :2007	mg/g	0.26
8	Sodium Absorbtion Ratio (SAR)	IS 11624:2019	-	0.28
9	Permeability	NDI/CHEM/SOP/S-05	cm/h	1.98
10	Calcium as Ca	Tbt Fertilizer Control Order 1985	mg/g	0.0089
Texture of Soil				
11	Gravel	FAO Method: 2007	%	Nil
12	Sand	FAO Method: 2007	%	77.50
13	Slit	FAO Method: 2007	%	11.70
14	Clay	FAO Method:2007	%	16.80

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N.D. INTERNATIONAL KOLKATA

For N.D. International

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Annexure VII: Ambient Air Quality Monitoring Report

N.D. INTERNATIONAL

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An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)/23-2410180 Date: May ,2023 Page -1 of 1

Name of Customer : Indian Mine Planners and Consultants

Address : GE-61, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107

: Site Address: - MIN_JH_01_I (Bimpur-1).

Description of Sample : Ambient Air

TEST FINDINGS:

Sl. No.	Date of Monitoring	Collection Source: L-1					
		PM 10 (µg/m³)	PM 2.5 (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	CO(ppm)	Si (µg/m³)
1	02-Mar-23	72	54	15	9	< 1.0	6.1
2	05-Mar-23	56	41	17	8	< 1.0	8.8
3	08-Mar-23	73	45	14	7	<1.0	4.1
4	11-Mar-23	64	47	19	8	< 1.0	6.6
5	14-Mar-23	77	51	20	8	< 1.0	6.4
6	17-Mar-23	71	55	21	9	< 1.0	6.7
7	20-Mar-23	79	46	20	10	1	6A
8	23-Mar-23	84	51	21	10	< 1.0	5.8
9	26-Mar-23	74	44	22	9	< 1.0	4.6
10	29-Mar-23	71	56	19	9	< 1.0	6.2
11	01-Apr-23	81	54	15	9	< 1.0	6.1
12	04-Apr-23	78	41	17	8	< 1.0	9.4
13	07-Apr-23	73	45	14	7	< 1.0	4.1
14	10-Apr-23	65	48	19	8	< 1.0	6.6
15	13-Apr-23	73	47	14	10	1	6.1
16	16-Apr-23	79	50	15	8	1	5.1
17	19-Apr-23	72	47	18	9	1	4.4
18	22-Apr-23	75	55	22	10	1	4.8
19	25-Apr-23	81	51	26	10	1	6.4
20	28-Apr-23	63	46	20	9	< 1.0	8
21	01-May-23	61	47	21	11	1	9.5
22	04-May-23	78	48	14	10	< 1.0	9.1
23	07-May-23	80	54	15	14	1	6.6
24	10-May-23	71	58	11	12	1	6.2
25	13-May-23	79	52	21	12	< 1.0	6.1
26	16-May-23	63	58	14	11	1	9
27	19-May-23	67	54	11	14	2	8
28	22-May-23	76	52	13	11	< 1.0	6.6
29	25-May-23	72	46	14	17	2	8.6
30	28-May-23	79	47	16	14	1	5.8
MAX		**81**	**58**	**26**	**17**	**2**	**9.5**
MIN		**56**	**41**	**11**	**7**	**1**	**4.1**
Average		**72.9**	**49.66**	**17.26**	**10.03**	**1.2**	**6.39**

...END OF TEST REPORT...

For N.D. International

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TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)/23-2410180 Date: May ,2023 Page -1 of 1

Name of Customer : Indian Mine Planners and Consultants

Address : GE-61, Rajdanga Main road,East,Kolkata Township Project,E.M.Bypass,Kol-107

: Site Address: - MIN_JH_01_I (Binpur-1).

Description of Sample : Ambient Air

TEST FINDINGS:

Sl. No.	Date of Monitoring	Collection Source: L-2					
		PM 10 (µg/m³)	PM 2.5 (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	CO(ppm)	Si (µg/m³)
1	02-Mar-23	71	55	18	10	< 1.0	6.1
2	05-Mar-23	64	43	14	8	< 1.0	8.8
3	08-Mar-23	73	51	22	6	<1.0	4.1
4	11-Mar-23	59	49	21	8	< 1.0	6.6
5	14-Mar-23	66	55	17	11	< 1.0	6.4
6	17-Mar-23	69	59	26	9	< 1.0	6.7
7	20-Mar-23	72	46	20	10	1	6.8
8	23-Mar-23	58	51	21	10	< 1.0	5.8
9	26-Mar-23	70	44	22	9	< 1.0	4.6
10	29-Mar-23	74	56	16	9	< 1.0	6.2
11	01-Apr-23	81	54	11	9	< 1.0	6.1
12	04-Apr-23	71	41	17	8	< 1.0	9.4
13	07-Apr-23	71	45	14	7	< 1.0	4.1
14	10-Apr-23	78	48	19	8	< 1.0	6.6
15	13-Apr-23	73	47	14	10	2	6.1
16	16-Apr-23	74	50	15	8	1	5.1
17	19-Apr-23	78	47	18	9	2	4.4
18	22-Apr-23	77	55	22	10	1	4.8
19	25-Apr-23	81	51	27	10	1	6.4
20	28-Apr-23	69	46	20	9	< 1.0	8
21	01-May-23	64	47	21	11	1	9.5
22	04-May-23	74	48	14	10	< 1.0	9.1
23	07-May-23	81	54	15	14	2	6.6
24	10-May-23	71	58	10	12	1	6.2
25	13-May-23	76	52	21	12	< 1.0	6.1
26	16-May-23	71	58	14	19	2	9
27	19-May-23	74	54	11	14	2	8
28	22-May-23	77	52	13	11	< 1.0	6.6
29	25-May-23	78	46	14	19	2	8.6
30	28-May-23	70	47	16	14	1	5.8
MAX		81	41	22	19	2	9.5
MIN		59	59	10	6	1	4.2
Average		72.16	50.3	17.43	10.46	1.2	6.62

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TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)/23-2410180 Date: May ,2023

Name of Customer : Indian Mine Planners and Consultants

Address : GE-61, Rajdanga Main road,East Kolkata Township Project,E.M.Bypass,Kol-107

: Site Address: - MIN_JH_01_I (Binpur-1).

Description of Sample : Ambient Air

TEST FINDINGS:

Sl. No.	Date of Monitoring	Collection Source: L-3					
		PM 10 (µg/m³)	PM 2.5 (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	CO(ppm)	Si (µg/m³)
1	02-Mar-23	81	51	18	9	< 1.0	6.1
2	05-Mar-23	73	41	11	8	< 1.0	8.8
3	08-Mar-23	74	45	18	5	<1.0	3.5
4	11-Mar-23	66	47	14	8	< 1.0	6.6
5	14-Mar-23	74	51	23	8	< 1.0	6.4
6	17-Mar-23	78	55	21	9	< 1.0	6.7
7	20-Mar-23	70	46	20	10	1	6A
8	23-Mar-23	81	51	21	10	< 1.0	5.8
9	26-Mar-23	70	44	22	9	< 1.0	4.6
10	29-Mar-23	74	56	19	7	< 1.0	6.2
11	01-Apr-23	81	54	15	9	< 1.0	6.1
12	04-Apr-23	71	41	17	8	< 1.0	9.4
13	07-Apr-23	71	45	14	7	< 1.0	4.1
14	10-Apr-23	66	48	19	8	< 1.0	6.6
15	13-Apr-23	70	47	14	10	1	6.1
16	16-Apr-23	74	50	15	8	1	5.1
17	19-Apr-23	78	47	18	9	1	4.4
18	22-Apr-23	70	55	22	10	1	4.8
19	25-Apr-23	81	51	26	10	1	6.4
20	28-Apr-23	69	46	20	9	< 1.0	8
21	01-May-23	54	47	21	11	1	9.5
22	04-May-23	58	48	14	10	< 1.0	9.1
23	07-May-23	81	54	15	14	1	6.6
24	10-May-23	71	58	11	12	1	6.2
25	13-May-23	71	52	21	12	< 1.0	6.1
26	16-May-23	66	56	14	11	1	9
27	19-May-23	69	54	11	14	2	8
28	22-May-23	74	52	13	11	< 1.0	6.6
29	25-May-23	78	46	14	17	2	8.6
30	28-May-23	70	47	16	14	1	5.8
MAX		81	51	26	17	2	9.5
MIN		54	41	11	5	1	3.5
Average		72.13	49.5	17.23	9.9	1.0	6.58

...END OF TEST REPORT...

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An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)23-2410180 Date: May ,2023 Page -1 of 1

Name of Customer : Indian Mine Planners and Consultants

Address : GE-61, Rajdanga Main road,East,Kolkata Township Project,E.M.Bypass,Kol-107

: Site Address: - MIN_JH_01_I (Bimpur-1).

Description of Sample : Ambient Air

TEST FINDINGS:

Sl. No.	Date of Monitoring	Collection Source: L-4					
		PM 10 (µg/m³)	PM 2.5 (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	CO(ppm)	Si (µg/m³)
1	02-Mar-23	81	54	15	9	< 1.0	6.1
2	05-Mar-23	71	41	17	8	< 1.0	8.8
3	08-Mar-23	71	45	14	7	<1.0	3.1
4	11-Mar-23	66	47	19	8	< 1.0	6.6
5	14-Mar-23	74	51	20	8	< 1.0	6.4
6	17-Mar-23	78	55	21	9	< 1.0	6.7
7	20-Mar-23	70	46	20	10	1	6.7
8	23-Mar-23	81	51	21	10	< 1.0	5.8
9	26-Mar-23	70	44	22	9	< 1.0	4.6
10	29-Mar-23	74	56	19	9	< 1.0	6.2
11	01-Apr-23	81	54	15	9	< 1.0	6.1
12	04-Apr-23	71	41	17	8	< 1.0	8.4
13	07-Apr-23	71	45	14	7	< 1.0	4.1
14	10-Apr-23	66	48	19	8	< 1.0	6.6
15	13-Apr-23	70	47	14	10	1	6.1
16	16-Apr-23	74	50	15	8	1	5.1
17	19-Apr-23	78	47	18	9	1	4.4
18	22-Apr-23	70	55	22	10	1	4.8
19	25-Apr-23	81	51	26	10	1	6.4
20	28-Apr-23	69	46	20	9	< 1.0	8
21	01-May-23	48	47	21	11	1	8.5
22	04-May-23	74	48	14	10	< 1.0	8.1
23	07-May-23	81	54	15	14	1	6.6
24	10-May-23	71	58	11	12	1	6.2
25	13-May-23	71	52	21	12	< 1.0	6.1
26	16-May-23	66	58	14	11	1	9
27	19-May-23	69	54	11	14	2	8
28	22-May-23	74	52	13	11	< 1.0	6.6
29	25-May-23	78	46	14	17	2	8.3
30	28-May-23	70	47	16	14	1	5.8
MAX		**81**	**58**	**26**	**17**	**2**	**8.5**
MIN		**64**	**41**	**11**	**7**	**1**	**3.1**
Average		**72.2**	**50.6**	**18.1**	**12.3**	**1.3**	**5.7**

...END OF TEST REPORT...

For N.D. International

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Annexure VIII: Weather Data Report

N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)/23-2410180 | Date: May ,2023 | Page -1 of 1

Name of Customer : Indian Mine Planners and Consultants

Address : GE-6, [redacted] Main [redacted] Kolkata Township [redacted] EM Bypass,Kol-107

: Site Address: - MIN JH 01 I (Bistpur-1).

Description of Sample : Weather Monitoring

Sampling Location : L-1

TEST FINDINGS:

Sl. No	Date	Time	Temperature (°C)	Humidity (%)	Wind Direction (Degree)	Wind Speed (m/Sec)
1	12-Mar-23	6:00 AM	22.6	78	134	4.4
2	12-Mar-23	10:00 AM	21.7	69	213	5.3
3	12-Mar-23	2.00 PM	20.7	75	192	3.1
4	12-Mar-23	6:00 AM	23.4	71	178	0.6
5	12-Mar-23	10:00 AM	30.7	80	140	4.7
6	13-Mar-23	2.00 PM	22.4	79	332	3.6
7	13-Mar-23	6:00 AM	27.8	65	231	4.8
8	13-Mar-23	10:00 AM	24.5	71	352	3.7
9	13-Mar-23	2.00 PM	23.1	66	180	5.5
10	13-Mar-23	6:00 AM	31.5	61	277	4.1
11	13-Mar-23	10:00 AM	34.3	79	183	5.9
12	14-Mar-23	2.00 PM	22.6	58	177	1.3
13	14-Mar-23	6:00 AM	30.7	63	339	0.6
14	14-Mar-23	10:00 AM	22.4	53	72	2.8
15	14-Mar-23	2.00 PM	27.8	73	99	5.7
16	14-Mar-23	6:00 AM	24.5	71	57	3.6
17	14-Mar-23	10:00 AM	23.1	71	51	4.8
18	15-Mar-23	2.00 PM	20.3	66	177	3.7
19	15-Mar-23	6:00 AM	24.6	61	236	5.5
20	15-Mar-23	10:00 AM	21.7	79	183	3.7
21	15-Mar-23	2.00 PM	30.7	58	177	5.5
22	15-Mar-23	6:00 AM	22.4	63	339	4.1
23	16-Mar-23	10:00 AM	27.8	79	27	5.9
24	16-Mar-23	2.00 PM	24.5	58	99	4.4
25	16-Mar-23	6:00 AM	23.1	63	55	5.3
26	16-Mar-23	10:00 AM	34.3	53	42	3.1
27	16-Mar-23	2.00 PM	22.6	73	332	3.7
28	17-Mar-23	6:00 AM	30.7	88	231	5.5
29	18-Mar-23	10:00 AM	22.4	71	352	4.1
30	19-Mar-23	2.00 PM	21.7	57	183	5.9
31	20-Mar-23	6:00 AM	23.4	76	177	1.3
32	21-Mar-23	10:00 AM	30.7	65	339	0.6
33	22-Mar-23	2.00 PM	22.4	71	27	5.5
34	23-Mar-23	6:00 AM	27.8	67	99	3.7
35	24-Mar-23	10:00 AM	28.4	73	57	5.5

...END OF TEST REPORT...

For N.D. International

K.P. De - CEO (Authorised Signatory)

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Annexure IX: Ambient Noise Monitoring Report

N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

SAMPLE DRAWN BY US:

Certificate No. NL(M)/23-2410180 Date: May ,2023

Name of Customer : Indian Mine Planners and Consultants

Address : GE-6, Baidanga Main road,East Kolkata Township Project,E.M.Bypass,Kol-107

: Site Address: - MIN_JH_01_I (Binpur-1).

Description of Sample : Ambient Noise Level

Sampling Location : L-1, L-2, L-3 & L-4

TEST FINDINGS:

Date	Time	Day Time Noise Level in dB (A)-Leg				
		L1	L2	Date	L3	L4
17-03-2023	6 AM - 7 AM	45.5	42.6	19-03-2023	47	38.2
	7AM - 8 AM	47	55		45.2	42
	8 AM - 9 AM	45.2	45.9		50.4	41.8
	9 AM - 10 AM	50.4	49.7		43.9	45.2
	10 AM - 11 AM	49.7	40.8		44	50.4
	11 AM - 12 PM	49	41.4		46	43.9
	12 PM - 1 PM	51.5	43.9		44.6	44
	1 PM - 2 PM	45.2	44		51	46
	2 PM - 3 PM	50.4	46		50.4	44.6
	3 PM - 4 PM	44.6	43.1		48.7	44.6
	4 PM - 5 PM	42.3	43.9		49	42.3
	5 PM - 6 PM	49.8	44		44.6	49.8
	6 PM - 7 PM	54.1	50.4		42.3	44
	7 PM - 8 PM	52.8	48.7		49.8	46
	8 PM - 9 PM	47	49		54.1	44.6
	9 PM - 10 PM	45.2	42.3		45.2	40.8
Date	**Time**	**Night Time Noise Level in dB (A)-Leg**				
		L1	**L2**	**Date**	**L3**	**L4**
17-03-2023	10 PM - 11 PM	41.7	45.2	19-03-2023	44	48.7
	11 PM - 12 AM	40.8	50.4		46	49
18-03-2023	12 AM - 1 AM	41.4	44.6	20-03-2023	44.6	44.6
	1 AM - 2 AM	43.9	42.3		44.6	42.3
	2 AM - 3 AM	44	49.8		42.3	49.8
	3 AM - 4 AM	43.1	45.2		49.8	44
	4 AM - 5 AM	43.9	50.4		44.6	46
	5 AM - 6 AM	41.7	48.7		40.8	44.6

Note: Limits as per CPCB for Residencial Area, Day Time (6:00 am to 10:00 pm): 55 dB(A), Night Time (10:00 pm to 6:00 am): 45 dB(A) Commercial area Day Time (6:00 am to 10:00 pm), Night Time (10:00 pm to 6:00 am):55 dB(A)

...END OF TEST REPORT...

For N.D. International

K.P. De - CEO (Authorised Signatory)

1 The test report shall not be reproduced, except in full, without written approval of the company.

2 Results relate only to the parameters tested.

3 The remaining sample after test will be retained for 15 days from the date of issue of certificate.

SKR

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E-mail : ndinternational@gmail.com, Website : www.ndinternational.in

Annexure X: Ground Water Quality Monitoring Report

N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 — Date: 20.03.2023

SAMPLE DRAWN BY US: — Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-6, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Ground Water
Collection Source	: MIN_JH_01_1 (Binpur-1). L_1
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity : 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab — Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS :

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/1 00 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	7.7	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 231'd Ed n2540-C	mg/L	158	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE :

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-B	mg/L	18.4	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	<0.1 (DL:0.1)	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.28	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	1.54	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn, 4500 SO_4-B	mg/L	20.65	200	400
10	Sulphide as (H2S)	APHA 23rd Edn, 4500 S^{2-}D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as $CaCO_3$)	APHA 23rd Edn. 2340 C	mg/L	78	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.002 (DL:0.002)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.01)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	11	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	3.9	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	24	250 mg/L (max)	

Note : 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS : 1622.

Remarks : Bacteriologically : Satisfactory for the above tested parameters

Chemically : Satisfactory for the above tested parameters.s

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

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MD-II

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N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 — Date: 20.03.2023

SAMPLE DRAWN BY US: — Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-6, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Ground Water
Collection Source	: MIN_JH_01_1 (Binpur-1). L_2
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature : 42 C, Humidity : 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab — Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS :

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/1 00 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	6.7	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 23I'd Ed n2540-C	mg/L	138	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE :

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-B	mg/L	20.3	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	<0.1 (DL:0.1)	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.19	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	1.37	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn. 4500 SO_4-B	mg/L	24.8	200	400
10	Sulphide as (H2S)	APHA 23rd Edn. 4500 S^{2-}D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as CaCO3)	APHA 23rd Edn. 2340 C	mg/L	82	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.002 (DL:0.002)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.01)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	18	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	3.3	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	19	250 mg/L (max)	

Note : 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS : 1622.

Remarks : Bacteriologically : Satisfactory for the above tested parameters

Chemically : Satisfactory for the above tested parameters.

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

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MG-II

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GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 — Date: 20.03.2023

SAMPLE DRAWN BY US: — Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-6, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Ground Water
Collection Source	: MIN_JH_01_1 (Binpur-1).L;
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature : 42 C, Humidity : 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab — Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS :

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/1 00 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	7.0	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 23I'd Ed n2540-C	mg/L	118	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE :

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-8	mg/L	19.2	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	<0.1 (DL:0.1)	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.28	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	0.94	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn. 4500 SO_4-B	mg/L	18.33	200	400
10	Sulphide as (H2S)	APHA 23rd Edn. 4500 S^{2-}D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as CaCO3)	APHA 23rd Edn. 2340 C	mg/L	55	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.002 (DL:0.002)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.01)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	9	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	3.6	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	17	250 mg/L (max)	

Note : 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS : 1622.

Remarks : Bacteriologically : Satisfactory for the above tested parameters

Chemically : Satisfactory for the above tested parameters.

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

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MG-II

Annexure XI: Surface Water Quality Monitoring Report

N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 Date: 20.03.2023

SAMPLE DRAWN BY US: Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-6, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Surface Water
Collection Source	: MIN_JH_01_1 (Binpur-1).L;
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature : 42 C, Humidity : 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS :

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/1 00 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	7.3	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 23'd Ed n2540-C	mg/L	89	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE :

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-B	mg/L	23.18	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	<0.1 (DL:0.1)	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.62	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	0.94	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn. 4500 SO_4-B	mg/L	22.11	200	400
10	Sulphide as (H2S)	APHA 23rd Edn. 4500 S^{2-}-D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as $CaCO_3$)	APHA 23rd Edn. 2340 C	mg/L	65	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.002 (DL:0.002)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.01)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	10	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	4.2	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	19	250 mg/L (max)	

Note : 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS : 1622.

Remarks : Bacteriologically : Satisfactory for the above tested parameters

Chemically : Satisfactory for the above tested parameters.

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

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N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 — Date: 20.03.2023

SAMPLE DRAWN BY US: — Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-6, Rajdanga Main road,East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Surface Water
Collection Source	: MIN_JH_01_1 (Binpur-1). L_2
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity: 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab — Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/100 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	7.3	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 23I'd Ed n2540-C	mg/L	366	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE:

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-B	mg/L	55	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	<0.1 (DL:0.3)	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.47	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	3.3	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn. 4500 SO_4-B	mg/L	15.60	200	400
10	Sulphide as (H2S)	APHA 23rd Edn. 4500 S^{2-}D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as $CaCO_3$)	APHA 23rd Edn. 2340 C	mg/L	89	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.002 (DL:0.03)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.05)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	8.9	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	3	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	13	250 mg/L (max)	

Note : 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS : 1622.

Remarks : Bacteriologically : Satisfactory for the above tested parameters

Chemically : Satisfactory for the above tested parameters.

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

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N.D. INTERNATIONAL

GOVERNMENT REGISTERED

An ISO 9001:2015 Company Certificate : 20DQHH82

TEST REPORT

Certificate No. NL(M)/23-2410180 Date: 20.03.2023

SAMPLE DRAWN BY US: Page -1 of 1

Name of Customer	: Indian Mine Planners and Consultants
Address	: GE-61, Rajdanga Main road, East Kolkata Township Project,E.M Bypass,Kol-107
Description of Sample	: Surface Water
Collection Source	: MIN_JH_01_1 (Binpur-1). L_1
Sampling Done by	: Mr. A. Mondal & R. Mondal
Environmental Condition	: Temperature: 42 C, Humidity: 67%
Sample Drawn on	: 12.03.2023
Sample Received on	: 12.03.2023
Analysis Started on	: 12.03.2023
Analysis Completed on	: 20.03.2023
Method of Sampling	:IS-1622:1981, IS-17614(P-25):2022(Bact), IS-17614(P-5):2021(Chem),
Mode of Sampling	: Grab Sampling Plan:NDI/FM/52A

A. MICROBIOLOGICAL TEST FINDINGS :

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500 : 2012
1	Total Coliform/ 100ml @ 37°C for 24 hours	IS 1622	CFu	<1 (DL:1)	Not Detectable
2	E. coli/100 ml @ 44.5°C for 24 hours	IS 1622	-	Absent	Not Detectable

B. ORGANOLEPTI C & PHYSICAL PARAMETERS:

Sl. No.	Test Parameters	Test Method	Unit	Results	Norms as per IS 10500: 2012	
					AL(Max.)	PL(Max.)
3	pH at 25 c	APHA 23rd Edn.4500 H^+ B	-	7.09	6.5-8.5	No relaxation
4	Total Dissolved Solid	APHA 23I'd Ed n2540-C	mg/L	378	500	2000

C. GENERAL PARAMETERS CONCERNING SUBTANCES UNDESIRABLE :

5	Chloride (as Cl)	APHA 23rd Edn.4500 Cl-B	mg/L	75	250	1000
6	Fluoride (as F)	APHA 23rd Edn. 4500-F-C	mg/L	0.3	1.0	1.5
7	Iron (as Fe)	APHA 23rd Edn. 31500- Fe B	mg/L	0.35	0.3	No relaxation
8	Nitrate (as NO_3)	APHA 23rd Edn.4500- NO_3 B	mg/L	2.9	45	No relaxation
9	Sulphate (as SO_4)	APHA 23rd Edn. 4500 SO_4-B	mg/L	10.8	200	400
10	Sulphide as (H_2S)	APHA 23rd Edn. 4500 S^{2-}-D	mg/L	<0.05 (DL:0.05)	0.05	No relaxation
11	Total Hardness (as $CaCO_3$)	APHA 23rd Edn. 2340 C	mg/L	93	200	600
12	Arsenic (as As)	APHA 23rd Edn. 3113B	mg/L	<0.01 (DL:0.002)	0.01	0.05
13	Total Chromium (as Cr)	APHA 23rd Edn. 3111 D	mg/L	<0.01 (DL:0.05)	0.05	No relaxation
14	Total Suspended Solids	APHA 23rd Edn. 2540 D	mg/L	8.04	100 mg/L (max)	
15	Biochemical Oxygen Demand at 27°C for 3 days	IS 3025 (Part - 44) 1993	mg/L	3	30 mg/L (max)	
16	Chemical Oxygen Demand	APHA 23rd Edn. 5220 B	mg/L	14	250 mg/L (max)	

Note: 1. AL- Acceptable Limit. 2. PL- Permissible Limit. 3. DL- Detection Limit

As per IS 10500:2012 Total Coliform should be Not Detectable/100ml, which is equivalent to <1 Cfu/100 ml as per IS: 1622.

Remarks: Bacteriologically: Satisfactory for the above tested parameters

Chemically: Satisfactory for the above tested parameters.

Statement of Conformity is applied considering Decision Rule as per ISO Guide 98-4

...END OF TEST REPORT...

For, N.D. International

Sweta Mukherjee
(Microbiologist)
(Authorised Signatory)

N.D. INTERNATIONAL KOLKATA

For, N.D. International

K.P. De - CEO
Authorised Signatory

1. The test report shall not be reproduced,except in full,without written approval of the company.
2. Results relate only to the parameters tested.
3. The remaining sample after test will be retained for 15 days from the date of issue of certificate.

MG-II

107B, Block-F, New Alipore, Kolkata-700 053, Phone : 4021-6600-17 (18 Lines), 4021 6600 (Direct), Mob.: 9830654565, 9830789456
E-mail : ndinternational@gmail.com, Website : www.ndinternational.in

ANNEXTURE VIII: CER Undertaking

Details of CER Activities of Taldiha Sand Mine (Sand Block-0115KB001) Quarry According to MOEF O.M. (No. F-No. 22-65/2017-IA.III) dated 30th September, 2020 and 1st May, 2018 regarding CER (Corporate Environment Responsibility):

Capital Investment (in Rupees)	Percentage of Capital Investment to be Spent	Amount Required for CER Activities (in Rupees)	Amount Proposed & Details for CER Activities (in Rupees)	
			Particulars	CER Fund Allocation (in Rupees)
Rs. 4,29,00,000/-	2 %	Rs. 8,58,000/-	Following Activities will be done at Taldiha Primary School, Village – Taldiha, Station – Sarenga, District – Bankura, West Bengal.	
			Building a Room for Students	Rs. 8,50,000/-
			Plantation work (100 Plants)	Rs. 52,000/-
			Total	Rs. 9,02,000/-

** Building a Student Room, and plantation of 100 plants at Taldiha Primary School, will be completed within 2 years from the date of mining lease agreement.

Amrita Ranjan Das

ANNEXURE IX: Transport Route Map

TRANSPORTATION MAP OF SAND LEASE AREA

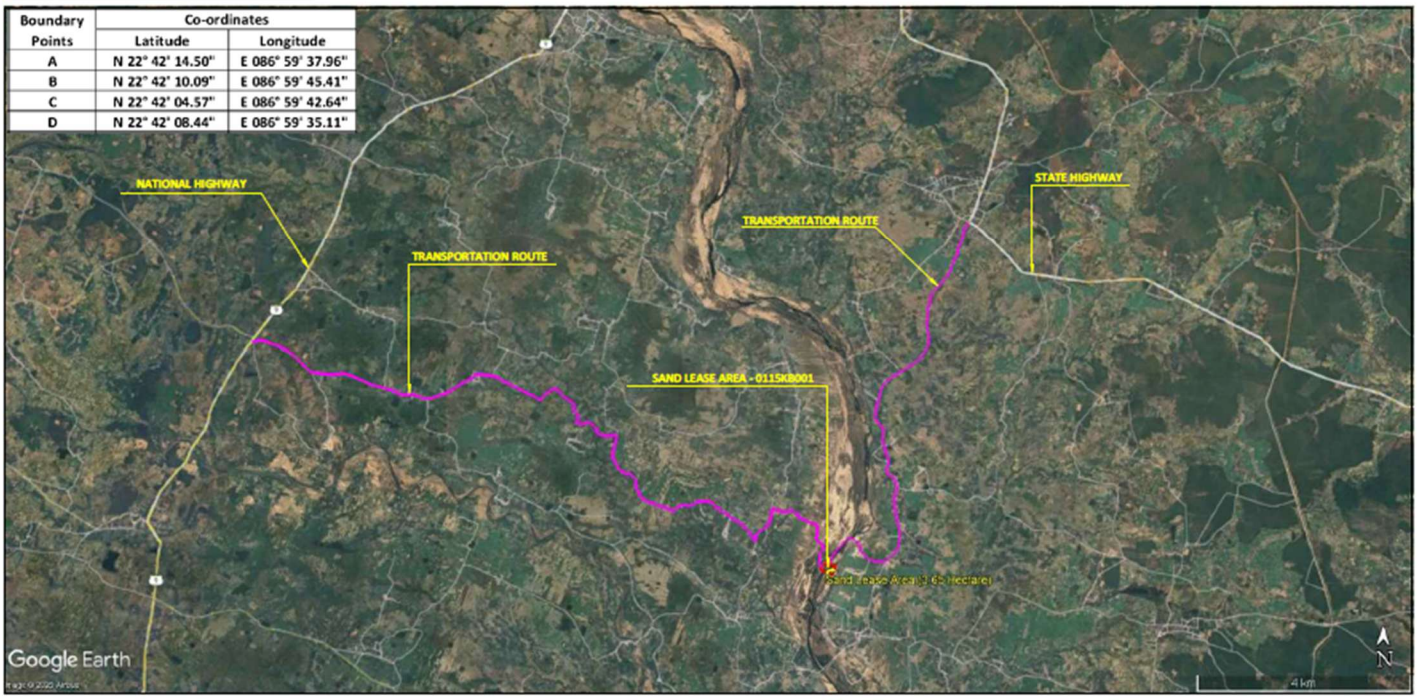
MOUZA:- TALDIHA, P.S.:- SARENGA,
DISTRICT:-BANKURA(W.B.)
PLOT NO.:- 231, J.L. NO. - 345.
AREA:- 3.65 HECTARE
PROPONENT:- AMIYA RANJAN DAS, BLOCK - SARENGA
SAND BLOCK CODE :- 0115KB001

M/N
W E
S

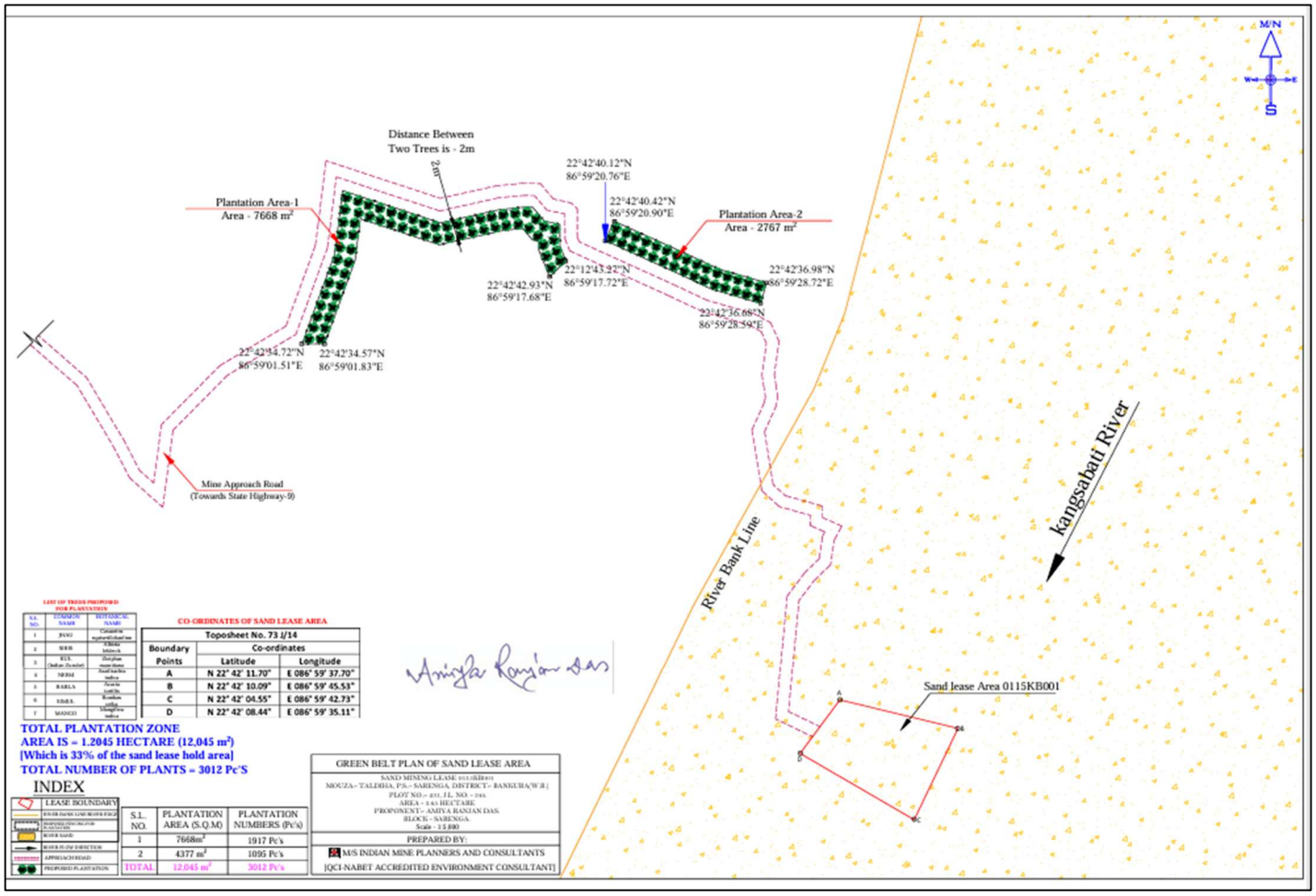
INDEX

LEASE BOUNDARY
TRANSPORTATION ROUTE

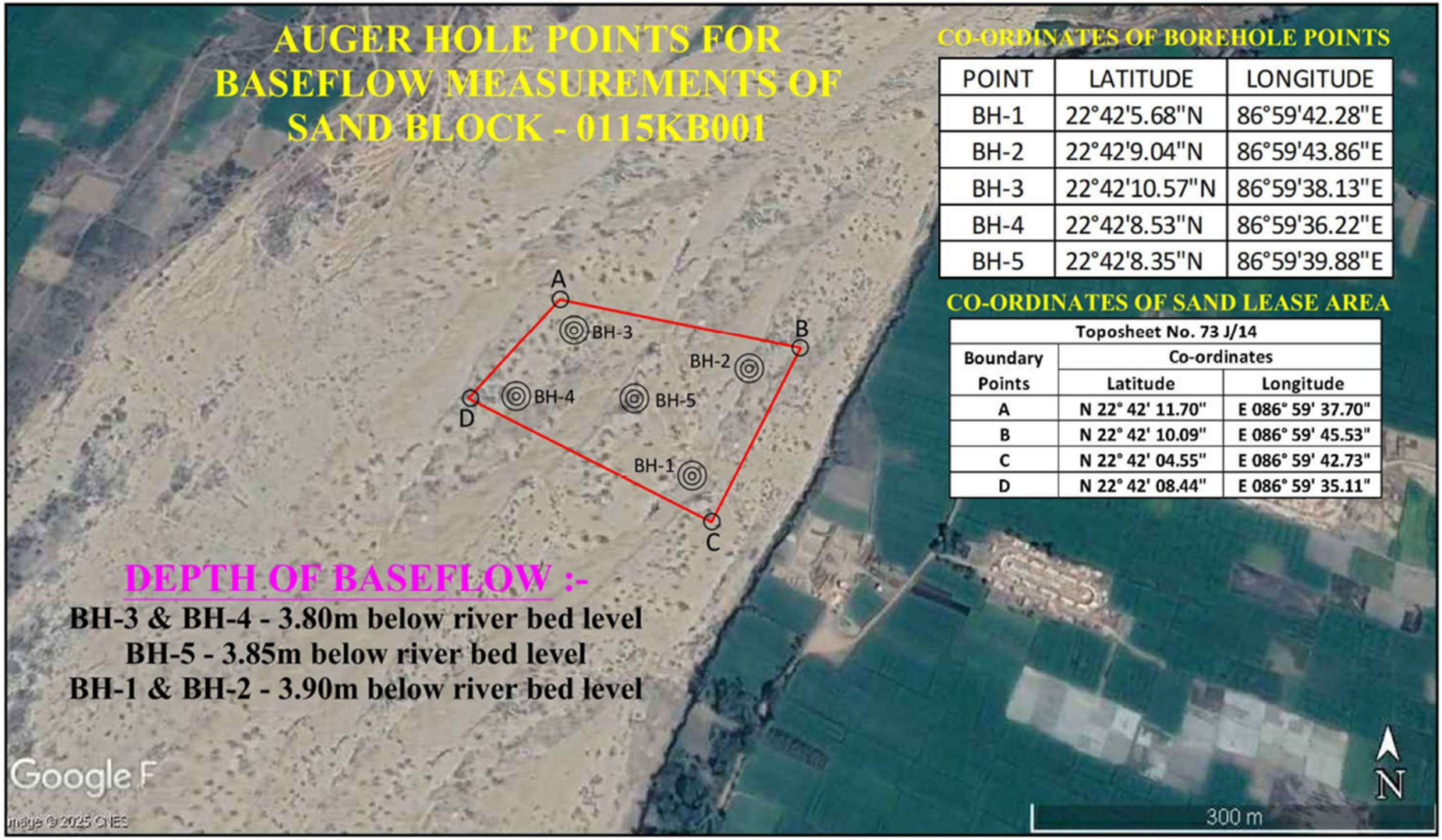
Boundary Points	Co-ordinates	
	Latitude	Longitude
A	N 22° 42' 14.50"	E 086° 59' 37.96"
B	N 22° 42' 10.09"	E 086° 59' 45.41"
C	N 22° 42' 04.57"	E 086° 59' 42.64"
D	N 22° 42' 08.44"	E 086° 59' 35.11"



ANNEXURE XI: Proposed Plantation Plan.



ANNEXURE XII: Baseline flow monitoring photographs.



ANNEXURE XIII: Project Cost Break-up.

Total Project Cost of TALDIHA SAND MINE

(SAND BLOCK - 0115KB001):

Rs. 4,29,00,000/-

(Rupees Four Crore and Twenty Nine Lakhs only).

Break Up of Project Cost of TALDIHA SAND MINE (SAND BLOCK - 0115KB001)

Sl. No.	Description	Rate	Amount (in Rupees)
1	Bid Amount	–	1,11,00,000/-
2	Royalty (including Cess, DMF, GST etc.) of **85,52,792 cft** (2,42,187.8592) Cubic Metre sand material	@ Rs. 3.60 / cft	3,07,90,051.2/-
3	Miscellaneous (Temporary Labour Room, Temporary Toilet etc.)		10,09,948.8/-
Total (Rs.)			**4,29,00,000/-**

ANNEXURE XIV: NABET Accreditation Certificate

भारतीय गुणवत्ता परिषद
QUALITY COUNCIL OF INDIA
Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Indian Mine Planners and Consultants, Kolkata

GE-61, Rajdanga Main Road, Behind Gateway Hotel Kolkata, West Bengal- 700107

*The organization is accredited as **Category-A** under the QCI-NABET **Scheme for Accreditation of EIA Consultant Organization, Version 3:** for preparing EIA/EMP reports in the following Sectors-*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast/underground mining	1	1 (a) (i)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated July 21, 2023 and supplementary assessment minutes dated December 08, 2023 & March 14, 2024 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3194 dated April 17, 2024. The accreditation needs to be renewed before the expiry date by Indian Mine Planners and Consultants, Kolkata following due process of assessment.

Issue Date
April 17, 2024

Valid up to
May 09, 2026

Mr. Ajay Kumar Jha
Sr. Director, NABET

Certificate No.
NABET/EIA/23-26/RA 0322

Prof (Dr) Varinder S Kanwar
(CEO NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.