

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT  
AND  
ENVIRONMENTAL MANAGEMENT PLAN**

FOR

**MIN\_BNK\_16\_B**

**Project area 12.51 ha.**

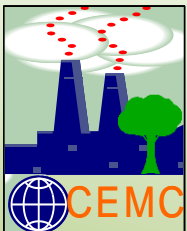
**Mouza: Tasuli, plot no. -869, J.L No. -28; P.S. Patrasayer,  
District: Bankura**

**Peak Rated Capacity 332100 Cum/Year**

**Project Applicant**

***M/s West Bengal Mineral Development & Trading  
Corporation Limited (WBMDTCL)***

**Centre for Envotech and Management Consultancy Pvt. Ltd.**



AN ISO: 9001:2015, ISO 14001:2015 & ISO 45001:2018 certified company,  
Empanelled with OCCL, Govt. of Odisha, OSPCB as Category "A" Consultant Organization,  
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## DECLARATION

Declaration by Experts contributing to the EIA report for Environment Clearance in respect of proposed MIN\_BNK\_16\_B at Mouza: Tasuli, J.L. No.-28, Plot no: 869, P.S: Patrasayer, Dist: Bankura, West Bengal by M/s West Bengal Mineral Development and Trading Corporation Limited.

This project falls under Sl. No. 1(a), [i.e., Riverbed sand mining)] of Category “B1” of the list of the projects of the schedule shall require prior Environmental Clearance from Ministry of Environment, Forest & Climate Change (MoEF&CC), Govt.of India. We, hereby, certify that we were part of the EIA team in the following capacity that developed the above EIA.

EIA Co-ordinator : Riverbed sand mining

Name : Mr. Debashish Mishra

## **Centre for Envotech and Management Consultancy Pvt. Ltd.**



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## **Chapter-1**

### **INTRODUCTION**

#### **1.1 GENERAL INFORMATION**

MIN\_BNK\_16\_B Sand Mine project, which belongs to Damodar River bed is located at Mouza-Tasuli , J.L. No.- 28, P.S. Patrasayer, District: Bankura, State: West Bengal. The LOI was granted in favor of M/s. West Bengal Mineral Development and Trading Corporation Limited (WBMDTCL) dated 30.11.2022 vide memo no. 689/ICE-12011(99)/68/2022-MINES (**Annexure I**).

**1.1.1 Mine plan and Progressive Mine Closure Plan:** Modified Mining Plan and Progressive Mine Closure Plan of the proposed mine lease area is prepared by QP Ananya Maity. This Mine Plan is approved vide letter No. No. SGP./MP/6-21/2023/33 dated 21.02.2023.

Mine plan was approved by Senior Geologist of West Bengal on 21.02.2023 (**Annexure II**).

**1.1.2 Environment Consultant:** The lessee has hired an Environment Consultant *i.e.* Centre for Envotech and Management Consultancy Private Limited, Plot No-N5/305, IRC Village, Nayapalli, Bhubaneswar – 751015 (QCI/NABET Accredited Consultant- ORG000494) for preparation of Environmental Impact Assessment Report for obtaining Environmental Clearance from SEIAA/SEAC West Bengal.

**1.1.3 ToR Letter:** It is in this context, hard copy of Form-I and Pre-Feasibility Report has been submitted to SEIAA/SEAC, West Bengal on 30.03.2023 requesting for issue of “Terms of Reference” (ToR). The technical presentation for ToR before SEAC, West Bengal was held on 12.04.2023. Subsequently, the ToR Letter has been issued on 27.04.2023 by SEIAA, (File no. EN/T-II-1/347/2023).

#### **1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT**

MIN\_BNK\_16\_B is a Sand Mine for the production of 332100 Cum /Year sand from the lease hold area of 12.51 Ha, at Mouza: Tasuli, plot no. -869, J.L No. -28; P.S. Patrasayer, District: Bankura, State: West Bengal.

Identification of Project Proponent Applicant: West Bengal Mineral Development & Trading Corporation Limited. Address: WBIDC Building, 3rd Floor, DJ-10, Sector-II, Salt Lake, Kolkata – 700091.

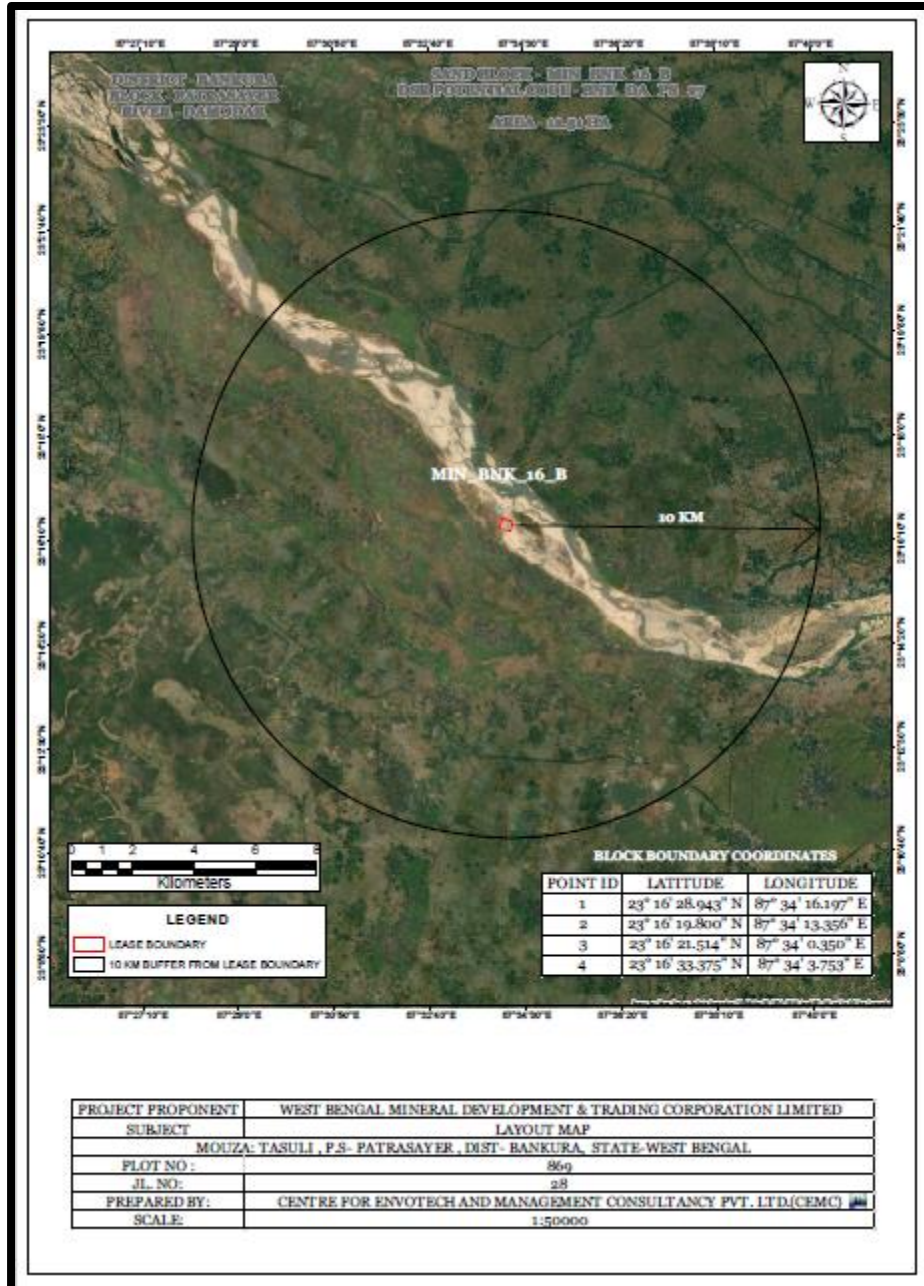
### 1.3 ENVIRONMENTAL CLEARANCE

The proposed sand mining project Mouza: Tasuli, plot no. -869, J.L No. -28; P.S. Patrasayer, District: Bankura, State: West Bengal falls in Category “B1”, 1(a), due to mining lease area is more than 5Ha as per OM dated 12th December, 2018 project will be assessed by SEIAA, West Bengal. Lessee will have to take Environmental Clearance from SEIAA, West Bengal as per EIA notification September, 2006 amended in December 2009 and April 2011 and amendment thereof to start the mining process.

### 1.4 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF THE PROJECT

S. No.	Particulars	Details			
1	Nature and Size of the Project	Mining of Sand Minor Minerals with Production Capacity of 332100 Cum/Year. (M.L. Area- 12.51Ha).			
2	<b>Location</b>				
	<b>Plot/Survey/Khasra No.</b>	<b>River Name</b>	<b>J.L. No.</b>	<b>Plot No.</b>	<b>Area (Ha.)</b>
		Damodar	28	869	12.51
	<b>Mauza</b>	Tasuli			
	<b>Block</b>	Patrasayer			
	<b>District</b>	Bankura			
	<b>State</b>	West Bengal			
<b>Geographical Coordinates</b>	<b>Latitude and Longitude</b>	Point ID	Latitude	Longitude	
		1	23°16'28.943" N	87° 34' 16.197" E	
		2	23°16'19.800" N	87° 34' 13.356" E	
		3	23°16' 21.514" N	87° 34' 0.350" E	
		4	23° 16' 33.375" N	87° 34' 3.753" E	
	<b>Toposheet No.</b>	F45D11, F45D12			
3	<b>Lease Area Details</b>				
	Lease Area	12.51			
	Type of Land	River bed			
	Topography	Undulated (Riverbed)			
4	<b>Cost Details</b>				
	Cost of the project	Rs. 15,17,25,348/-			
	Cost for EMP	Rs. 6.50 Lakhs			
	Cost for CER	2% of the total cost			

Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/Protected Forest etc.) within 10 Km radius	There is no any Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius.
Nearest Town/ Major City with population	Bankura, Approx. 51.96 km towards NW.
Nearest Railway Station	Durgapur Railway Station, 35.48 km towards W
Nearest National/State Highway	SH-9, Approx. 5.95 km towards W. NH-19, Approx. 19.20 km towards S.
Nearest Airport	Kazi Nazrul Islam Airport, approx. 50.13 Km towards NW.
Medical Facilities	Bankura Sammilani Medical College and Hospital, Approx. 55.91 Km.
Seismic Zone	Zone III
Water Body	Damodar River (Riverbed)



**Figure No.C1-1 10km Radius Layout Map**

### 1.5 SCOPE OF THE STUDY

The scope of the study includes a detailed characterization near the Mine Lease Area for various environmental parameters like Ambient Air, Water, Noise, and Land, Biological and Socio-economic aspects.

## 1.6 TERMS OF REFERENCE

The project proposal was submitted to State Level Environment Impact Assessment Authority- West Bengal for its appraisal. Based on which, presentation was held on 12.04.2023 for Terms of Reference (TOR). Based on the data provided and presentation made, ToR of proposed Sand mining project has been issued by SEIAA, West Bengal vide (File no-SIA/1(a)/638/19). The compliance of ToR is described below.

**Table No.C1.1- COMPLIANCE FOR ToR**

<b>S.No.</b>	<b>ToR</b>	<b>Compliance</b>
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.	Since this is a new project, this compliance is not applicable.
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	State Govt. has given its consent to grant mining lease vide letter number 689/ICE-12011(99)/68/2022-MINES by Mining department, West Bengal on dated 30.11.22 is enclosed as Annexure No. I.
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.	The documents including mine plan and Draft EIA being submitted are compatible with one another mentioning following information: Mining Lease Area- 12.51 Ha. Lessee: M/s. West Bengal Mineral Development and Trading Corporation Limited (WBMDTCL), Proposed Production- 332100 Cum/year. No mines waste will be generated as whole mined material is saleable.

		<p>Small amount of domestic waste such as Gutkha pouch, some eatable items will be generated, will be managed by laborers itself as per existing lease. Separate bins will be provided near mine site.</p> <p>Mining Method-Opencast semi-mechanized.</p> <p>Refer Chapter-2 for all above information's.</p>
4.	<p>All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ Toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).</p>	<p>Toposheet No. of mining lease area is provided in EIA/EMP Report.</p> <p>Refer Chapter-1</p> <p>The land-use of the study area with proper demarcated features is enclosed with the report, Land Use pattern&amp; land use map is given in chapter 3, Refer Chapter-3</p>
5.	<p>Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.</p>	<p>Land Use pattern &amp; land use map is given in chapter 3, Refer Chapter-3</p>
6.	<p>Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the state; land diversion for mining should have approval from State land use board or the concerned authority.</p>	<p>The proposed land is a dry bed of river.</p> <p>The mining process will be done land use policy of the State &amp; there is no land diversion has been proposed.</p>

7.	It should be clearly stated whether the proponent company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the EIA report., Refer, Chapter-6, Fig:- C6-1
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.	This is an open cast sand mining project. Mining will be done by opencast semi mechanized method without adoption of drilling & blasting.
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 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report.  No waste will be generated except small amount of municipal solid waste, which will be managed as per law.

		All the details in the EIA report are for the life of the mine period. Refer 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.	Land use pattern of 10 km from the periphery of the lease area is prepared and incorporated with the report. The study area lies on Damodar River. No National parks or Wildlife Sanctuary is found within 10 km study area, Refer Chapter-3,
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.	The proposed project lies on Damodar River and as such there is no over burden. No top-soil will be produced as waste material because all the excavated material will be saleable. There is no requirement of R& R Plan as it is a river bed sand mining project.
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.	There is no forest land within the lease area.

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.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated.
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.	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	No RF/PF is present within the 10 km radius of the lease area. However, the vegetation detail of the study area is incorporated with the report, Refer Chapter-3
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.	The details Impacts & there mitigation measures are given in chapter 4 of EIA/EMP Report.
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned	There is no any National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves are present within 10 km study area. Refer Chapter-1

	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 alongwith 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.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease for flora fauna, endangered & endemic species is incorporated in the EIA/EMP report. Refer Chapter-3
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	There is no critically polluted or 'Aravali Range' nearby lease area.
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	There is no CRZ near lease area.

	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).	
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.	<p>This is a River Bed Mining Project.</p> <p>There are no inhabited areas in the allotted mine area which lies on the Damodar River, therefore no R&amp;R Plan is proposed.</p>
22.	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations	<p>Base line study was carried out for one Season (winter) from December 2022 to February 2023. Details are provided in Chapter-3 of EIA report.</p> <p>The locations of the monitoring stations were decided on the basis of prevailing micro - meteorological conditions (Wind direction &amp; wind speed) of the study area.</p> <p>The wind rose pattern is given in chapter-3 of EIA/EMP Report.</p>

	<p>should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p>	<p>The location of the monitoring sites is shown in map.</p> <p>Refer Chapter-3</p>
23.	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided.</p> <p>The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p>	<p>Air modeling has been provided as Annexure III.</p> <p>The wind rose showing pre-dominant wind direction is indicated in the EIA/EMP Report.</p> <p>Refer Chapter-3, Figure No.-C3-7</p>
24.	<p>The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.</p>	<p>The water requirement for the project is 25 KLD out of which 6.5 KLD for dust suppression and 8.50 KLD for use for domestic &amp; drinking purpose and 10 KLD for plantation. Water will be sourced from the nearest pond with proper permission.</p> <p>A detailed water balance is provided in the report. Refer Chapter-2, Table-C2-4</p>

25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Water requirement will be fulfilled by private water tanker for drinking purpose and from nearest pond for dust suppression and green belt development. So, no clearance is required.
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.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project in lease area.
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 activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 3 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.
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	Mining will be up to 3 m below ground level or above the ground water table whichever comes first. This mining will not intersect the ground water table, as the ground water level in pre monsoon in 0.81-17.78 m bgl& in post monsoon it is 0.08-15.38 m bgl.  Therefore, Hydro geological Report will not require for this project.

	permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	
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 project site lies on Damodar river. No diversion is proposed.
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 Elevation of the applied area for the block is 76.4 ASML to 77.6 ASML in the stretch. Mining will be up to 3 m below ground level or above the ground water table whichever comes first.
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of plants selected for green belt development if incorporated in Chapter-9.

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 will be about 36 trucks carrying the minerals per day. The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report. Refer Chapter-4
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipment's, etc. Details are given in the EIA/EMP Report. Refer Chapter-2
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	The proposed mining is an opencast sand mining project, where sand will be naturally replenished during monsoon season, there is no feasibility of reclamation on dry river bed
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	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control is given in the report, discussed in Chapter-9.

	required facilities proposed in the mining area may be detailed.	Each labour will undergo pre-placement medical examination. Thereafter periodical health checkup will be arranged as stated in the report. Refer Chapter-9, Table-C9.1 for budgetary allocation.
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 proposed project being a small scale semi-mechanized mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in Chapter-9. However protective equipments will be provided & health camps & awareness programs will be arranged for them. Details are given in report. Refer Chapter-9.
37.	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report, Refer. Chapter-9
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	The detailed environmental management plan to mitigate the environmental impacts is mentioned in of the EIA/EMP Report.  Refer Chapter-9.

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.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions Will be provided in the final EIA/EMP Report of the Project.
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.	No litigation is pending against the project.
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.	The capital cost & the EMP cost is earmarked for EMP. Refer, Chapter-2. Table No. C2-7 & Chapter-9. Table No. C9-2
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A Disaster management is given in EIA report. Refer Chapter-7,
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.	Benefits of the project is discussed in detail under Chapter -8 2% of the capital cost of the project cost will be used as CER cost
44.	Besides the above, the below mentioned general points are also to be followed:	
a.	Executive Summary of the EIA/EMP Report (enclosed as <b>Annexure-A</b> ).	Executive summary of the EIA/EMP Report shall be submitted in both draft and final EIA report.
b.	All documents to be properly referenced with index and continuous page numbering.	All documents is 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.	The source and period of baseline data collection has been provided with respective sampling station.

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.	Details of testing reports of air, water, soil & noise have been enclosed in EIA report. Refer Chapter-3.
e.	Where the documents provided are in a language other than English, an English translation should be provided.	The documents being provided is both in Native and English language (Executive Summery).
f.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The Questionnaire shall be submitted along with Final EIA Report.
g.	While preparing the EIA report, the instruction for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4 <sup>th</sup> August, 2009, which are available on the website of this Ministry, should be followed.	All the instructions for the proponent and instructions for the consultants issued by MOEFCC vide O.M. No. J/11013/41/2006/- IA.II(I) dated 4 <sup>th</sup> August, 2009 are being 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.	There will be no major changes in basic scope and project parameters from Form-1 & PFR. If any changes after PH, shall be incorporated in final EIA report.
i.	As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of	Since this is a new project, this compliance is not required.

	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) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface plan cum geological section, geological has been incorporated in chapter 2 of EIA report.
<b>B.</b>	<b>Additional Terms of Reference</b>	
a)	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 enclosed as Annexure IV. There will be no hard toing or paving of any haulage route within the riverbed.
b)	A plan on the management and handling of sand during the period of intermediate stockpiling should be submitted.	The management and handling plan of sand is enclosed as Annexure IV.
c)	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	Provision has been made to plant minimum of about 5000 number of saplings such as Babul, Acacia, Sonajhuri, Krishnachura, Sisoo etc. or as will be specified by local forest department suitable to the available land for plantation. WBMDTCL will put their efforts to complete the plantation within first two years of mining operation. Since the project site is on the river bed, WBMDTCL

	project life and the plantation so done shall be taken care of during the rest of the project life. Species of the plant selected should be self-sustaining in that particular region.	will seek available land status from the district level in order to take up the plantation activities.
d)	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.	WBMDTCL is committed to make the expenses up to a maximum limit of 2% of the total project cost. WBMDTCL 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 environment protection. An undertaking in this regard is being furnished in Annexure-V.
e)	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.	Study report on base flow level measured at 5 no. of points with date and supporting photographs will be submitted on periodical basis and also will be part of half yearly compliance report.
f)	Management plan of haul road to the public road.	It will be managed accordingly with respect to planting of trees.
g)	Spatial year wise progressive plantation programme.	Yearwise programme for plantation has been provided in the PFR earlier.

## **Chapter-2**

### **PROJECT DESCRIPTION**

#### **2.1 TYPE OF THE PROJECT**

The proposed project is excavation of Sand from riverbed of Damodar River. It is an opencast semi- mechanized mining project to excavate Sand in its existing form.

#### **2.2 NEED OF THE PROJECT**

Building huge infrastructure such as road and housing sector requires basic construction raw materials in which sand is one of primary raw material required for the purpose. The mining activities as proposed are the backbone of all construction and infrastructure projects as the raw material for construction is made available only from such mining project. The sand to be excavated is in high demand at the local market for real estate and infrastructure industry. This project will also provide employment to local people helping them earn livelihood. In addition to this, it will further prevent widening of the above mentioned rivers bed due to the deposition of sediments which if not mined out will result in raising of the river bed causing flooding, damage to the adjoining areas, destruction of life and property.

#### **2.3 DESCRIPTION OF THE PROJECT**

The proposed sand mining project at Mouza: Tasuli, J.L. No.-28, P.S.: Patrasayer, Bankura, West Bengal for production capacity of 332100 Cum / Year over an area of 12.51 Ha (Fig. C.2-1).

**Table No.C2-1** Location Details

<b>Location</b>	MIN_BNK_16_B		
	<b>Point ID</b>	<b>Latitude</b>	<b>Longitude</b>
	<b>1</b>	23° 16' 28.943" N	87° 34' 16.197" E
	<b>2</b>	23° 16' 19.800" N	87° 34' 13.356" E
	<b>3</b>	23° 16' 21.514" N	87° 34' 0.350" E
	<b>4</b>	23° 16' 33.375" N	87° 34' 3.753" E
	MIN_BNK_16_B Sand Mine covers Damodar River bed deposit which is located at Mouza: Tasuli , J.L. No.-28, P.S. Patrasayer, District: Baankura, State: West Bengal (Fig. C.2-2).		
<b>Type</b>	Sand mining project, Category- B1		
<b>Area</b>	12.51 Ha		
<b>Production Capacity</b>	332100 Cum/Year( Peak rated)		
<b>Toposheet Number</b>	F45D11, F45D12		
<b>Nearest Settlements</b>	Tashuli		
<b>Nearest Highway</b>	NH-19, approx. 19.20km, towards W SH-9 approx. 5.95km, towards S		
<b>Nearest Railway Station</b>	Durgapur Railway Station, 35.48km towards W		
<b>Nearest Airport</b>	Kazi Nazrul Islam airport, approx. 50.13km towards NW		
<b>Nearest River</b>	Damodar river		



Figure No.C2-1 Mining Lease Plan Map

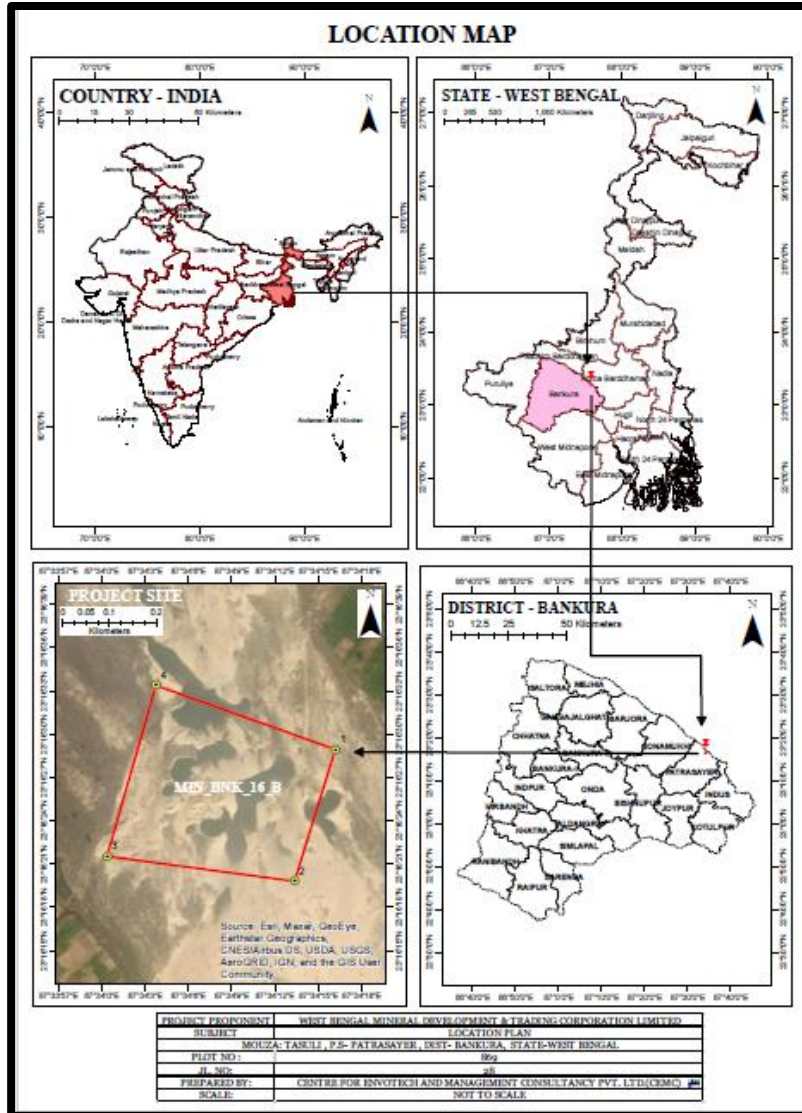


Figure No.C2-2 Location Map of the Project Site

## 2.4 GEOLOGICAL PROFILE OF THE AREA

### 2.4.1 PHYSIOGRAPHY

Bankura district has been described as the "connecting link between the plains of Bengal on the east and Chota Nagpur plateau on the west." Geomorphologically the district can be divided into three major parts viz. hilly tract in the west, flat terrain in the east and undulatory tract in the central part.

### 2.4.2 GEOLOGY

Geologically the district can be subdivided in to three distinct zones with well-defined lithology units. Moving from west to east the variations can be observed with specific contacts zones. The western most part of the district occupied by Singhbhum group of rocks gradually truncated

Chotanagpur Gneissic Complex and moving further east, Gondwana Super Group with economical coal deposits. A vast area of the east central part of the district is occupied by younger anorthosites and is represented by few dikes as well.

The central and southern part of the district is represented by extensive flood plain of river Kangsabati, Dwarakeswar, Shilabati, and Sali while the dissected lateritic uplands are representing Pleistocene sediments are occasionally preserved as a inliers within flood plans. These flood plans gradually merges grater Damodar basin towards south.

The mining lease area and its surroundings are represented by Sand, silt and clay deposits of unclassified quaternary sequence.

The stratigraphic succession is furnished in Table C2-2.

**Table No. C2-2** Stratigraphic succession

AGE	FORMATION	LITHOLOGY	
Pleistocene to recent	Kasai Formation	Sand and silt	
	Daintikri Formation	Alternate layers of sand, silt and clay	
	Sijua Formation	Clay impregnated with clay	
	Lalgarh Formation	Ferruginous sediments with rock fragments	
	Unclassified Quaternary	Sand, silt and clay	
Cenozoic	Unclassified	Laterite	
Tertiary		Clay and grit	
		Ferruginous gritty sandstone and shale	
Carboniferous to Triassic	Gondwana Supergroup	Mahadeva Formation	Red sandstone, red clay
		Panchet Formation	Sandstone, shale
		Raniganj Formation	Sandstone, shale, coal
		Barakar Formation	Sandstone, shale, coal and fireclay

AGE	FORMATION	LITHOLOGY
Proterozoic	Singbhum Group	Quartz vein
		Kuilapal granite
		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		
Archean (?) to Proterozoic	Chhotanagpur Gneissic Complex	Dolerite
		Granite gneiss
		Feldpathic schist
		Pink granite/Biotite-granite gneiss
		Hornblende-biotite-granite gneiss
		Hornblende schist
Archean	Unclassified Metamorphics	Quartzite, quartz schist
		Phyllite and mica schist
		Garnetiferous sillimanite biotite schist
		Amphibolite, hornblende schist and epidiorite

### 2.4.3 SOIL TYPES

Soil of Bankura district can be broadly grouped into three principal type viz. (1) Red Soil, (2) Alluvial Soil and (3) Laterite Soil.

The alluvial soils, which have wide distribution in the east-central parts of the district, are grouped according to soil association as Damodar-Rajmahal riverine, Damodar flatlands, Damodar 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 Damodar flatland areas are enriched by silt deposition during floods.

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.

#### 2.4.4 DRAINAGE

The major rivers of Bankura district are Damodar, Darakeswar, Kangsabati and Silabati, controlling the drainage pattern of the district. All the rivers have a south-easterly flow and the rivers are almost parallel to each other.

Damodar River originates from Chhotonagpur Plateau and flows towards southwest along the northern boundary of Bankura district. Before it enters the Bankura, it receives the water of many smaller hill streams including those of the Barakar, its principal tributary. Durgapur barrage is situated on Damodar River towards the upstream side of the mining lease area. Other important rivers of Bankura are Gandheswari, etc.

A Drainage map has been prepared and furnished below in figure no. C2-3.

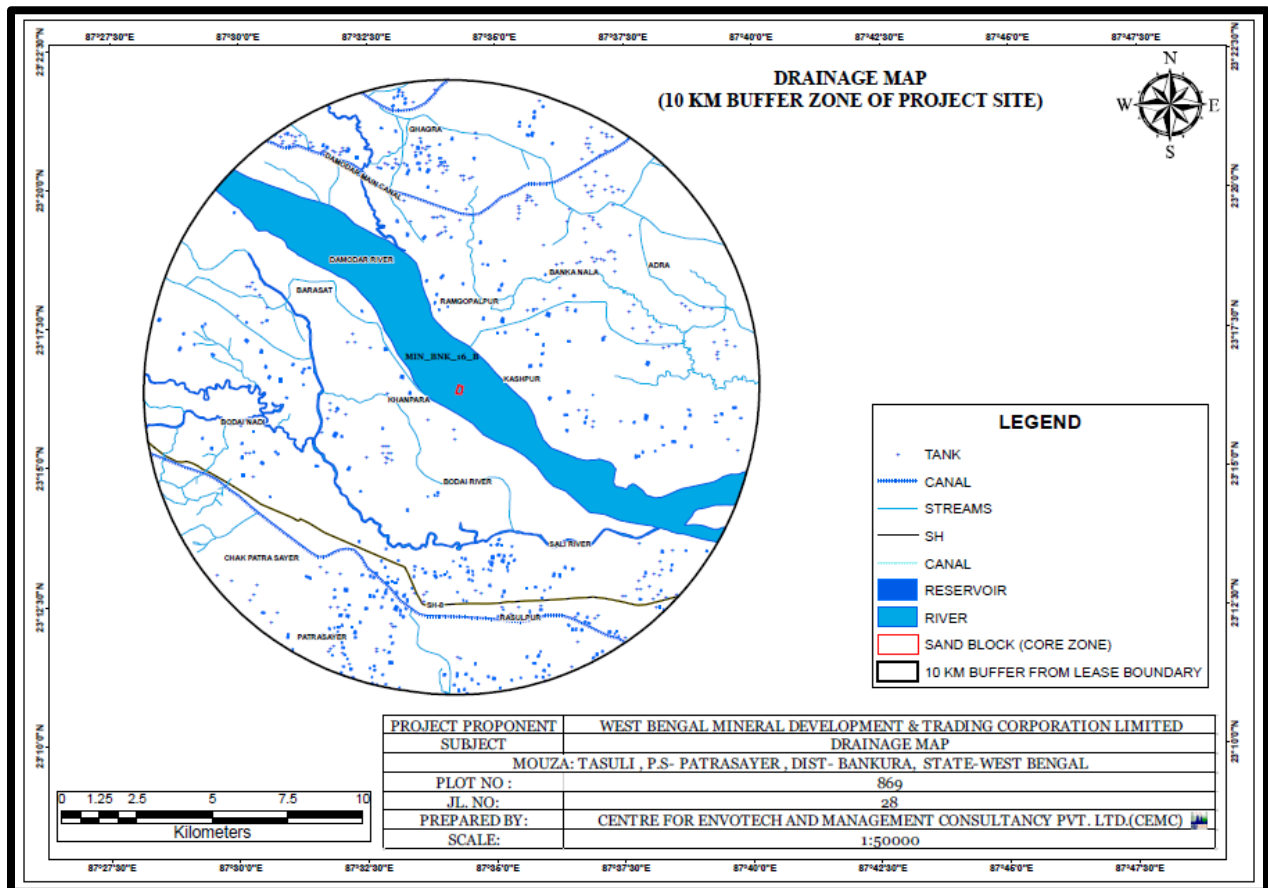


Figure No.C2-3 Drainage map of 10km buffer of project site (MIN\_BNK\_16\_B), Bankura

#### **2.4.5 CLIMATE & RAINFALL**

The district Bankura belongs to humid tropical climatic region, experiences very minor variation in temperature and rainfall.

The climate of the district is characterized by oppressive heat and high humidity in summer with average daily maximum temperature varying between 26°C and 39°C. Winter is generally dry and cold with average winter temperature around 15° C. 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. October and the first half of November may be termed as post monsoon season.

The average annual rainfall in the district is 1481.5 mm. The rainfall during the monsoon season – June to September – constitutes 74 percent of the annual rainfall; July and August are the rainiest months.

#### **2.5 SEISMICITY OF THE AREA**

The state of West Bengal lies in a region with moderate to low to high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, this state also falls in Zones III, IV and V. The mine lease area is located in seismic **Zone III**. This region classified as the **Moderate Damage Risk Zone**.

#### **2.6 AVAILABLE RESERVES AND PRODUCTION**

##### **2.6.1 Geological Reserve**

The proposed project is of river bed mining project, so entire deposit is in the river bed. The measurement of the 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 meter. All the quantity estimated under proved (111) category under UNFC, 2012. Safety zone of 7.5 meter has been calculated from the excavation zone and excluded from the reserve estimation process.

**2.6.2** The peak rated production is 332100 Cum /Year up to the lease period as geological mineral reserves is 1477180.8 Cum.

**Table No. C2-3** Calculation of Mineable area of MIN\_BNK\_16\_B sand mine

<b>Total Area (Ha)</b>	<b>Safety Zone (Ha)</b>	<b>Average Mineable Area (Ha)</b>	<b>Thickness (m)</b>
12.51	1.44	11.07	3

**Table No. C2-4** Geological Resource of MIN\_BNK\_16\_B Sand mine

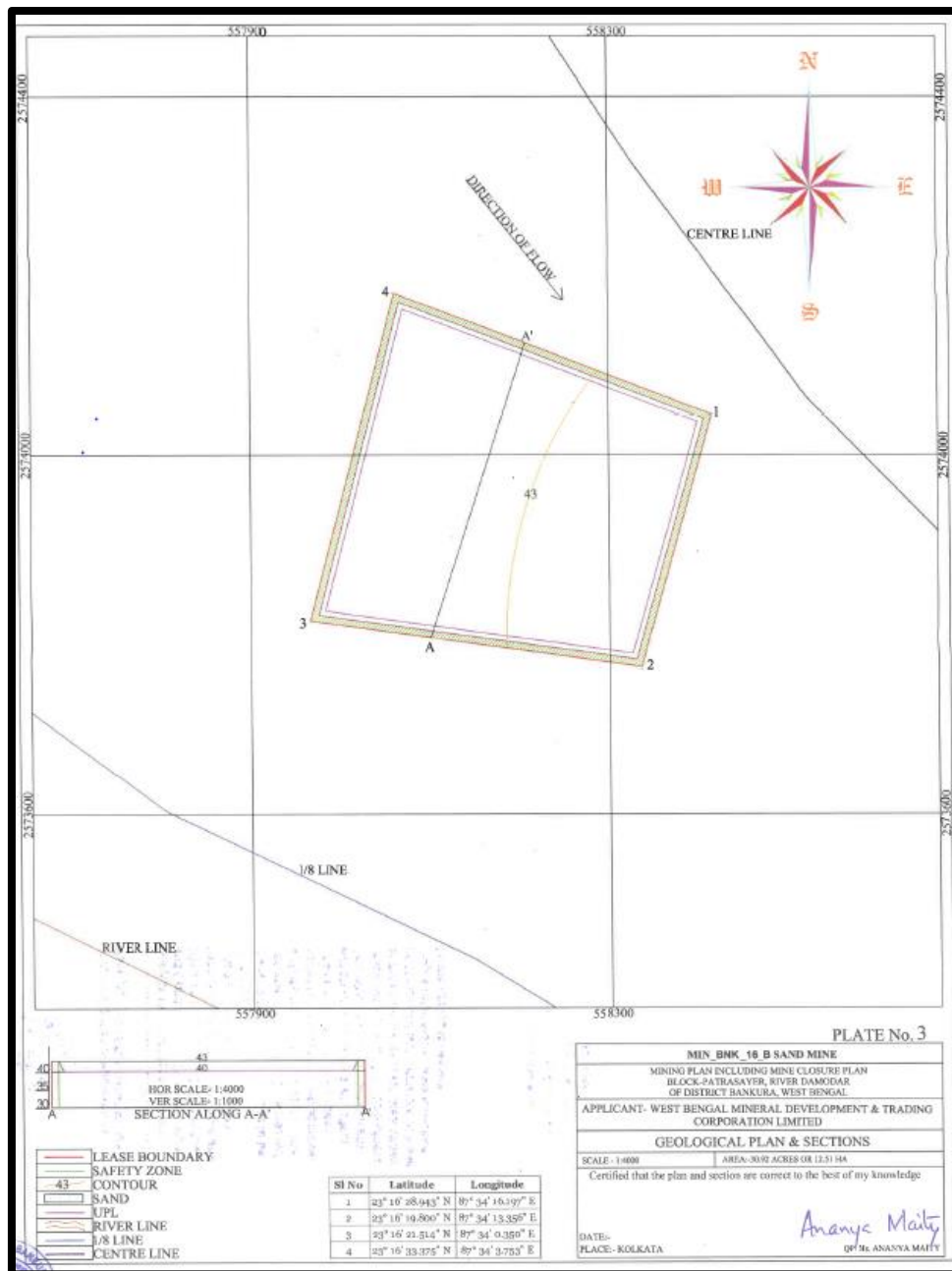
Year	Total Area (Ha)	Thickness (m)	Replenishment rate (%)	Geological Resource (Cum)
1	12.51	3	100	375300
2	12.51	3	73.40	275470.2
3	12.51	3	73.40	275470.2
4	12.51	3	73.40	275470.2
5	12.51	3	73.40	275470.2
<b>Total Geological Resource</b>				<b>1477180.8</b>

**Table No. C2-5** Mineable Reserve/Annual Production of MIN\_BNK\_16\_B Sand mine

Year	Average Mineable Area (Ha)	Thickness (m)	Replenishment rate (%)	Mineable Reserve (Cum)	Annual Production (Cum)
1	11.07	3	100	332100	332100
2	11.07	2.202	73.40	243761.40	243761.40
3	11.07	2.202	73.40	243761.40	243761.40
4	11.07	2.202	73.40	243761.40	243761.40
5	11.07	2.202	73.40	243761.40	243761.40
<b>Total Mineable Reserve</b>				<b>1307145.60</b>	<b>1307145.60</b>

### 2.6.3 Life of the mine

The mining lease grant order has been issued for 20 years, however this mining plan is prepared for 5 years and reviewed in every 5 years as per provision of WBMMCR, 2016. Since sand is replenishable resources replenishment study will be reviewed and this mine plan including mine closure plan will be modified resource statement.



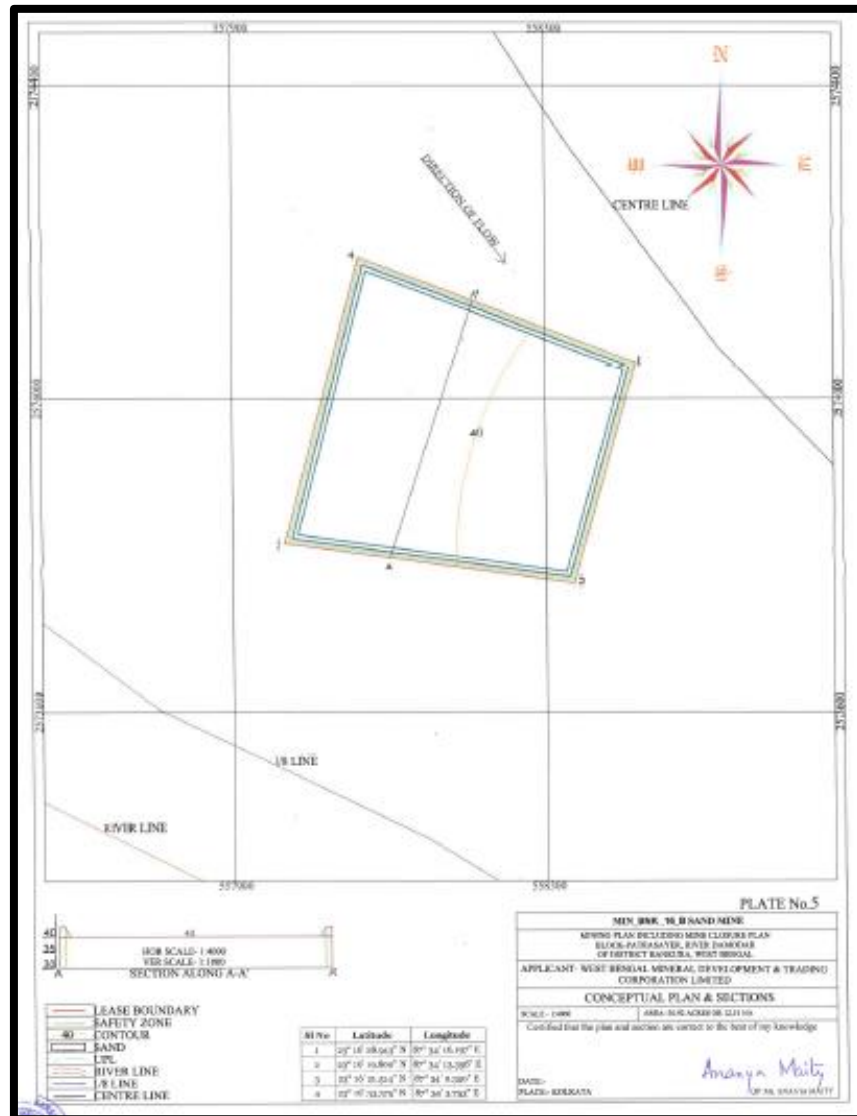
**Figure No.C2-4 Geological Plan & Section**

**2.7 METHOD OF MINING**

Mining will be carried out in opencast strip-mining method through light machineries such as Backhoe Loaders, excavators and tippers or also through manual mining methodology. No drilling & blasting will be required. Excavation of sand will be done mechanically using front end loaders, front-end loaders with backhoe etc. There will be a single bench operation with 3-meter in one meter slice. Safety barrier of 7.5 meter from the lease boundary will be considered and shall remain untouched.

### 2.7.1 Conceptual Plan of Mining

The longitudinal section of the river channel is explained in the Figure C2-5 given below. The longitudinal section exhibits the generic upstream to downstream flow of river along with the sand deposits contained with it. As seen in the illustration, the top surface of the sand deposit is undulating and gently dipping and the contours of sand deposit vary with the factors as enumerated in above paragraph.



### 2.7.2 Machineries

Mining will be carried out through semi mechanized open cast mining methodology with deployment of light mining machineries. An estimated no. of machineries are provided in table No. C2-6

**Table No. C2-6** Machineries

<b>Sl. No.</b>	<b>Machinery</b>	<b>Numbers</b>	<b>Fuel consumption per hour (Ltrs) per machine</b>
1.	Excavator(JCB/Poclain) 1.0 – 1.2 cum	2	12
2.	Tipper (10 ton)	8	7
3.	Sprinkler 4KL	1	4
<b>Total</b>		<b>11</b>	<b>23</b>

## **2.8 TRANSPORTATION OF MINERALS**

Mineral Sand will be transported by trucks. Loaded trucks will travel on Kuccha road made for plying of trucks. The temporary road will provide access to the river bed and the movement of loaded trucks. The village has its outlet meeting the tar road on the nearby villages and from where the mineral is sent to various destinations. Similarly, mineral will be transported on the other side through approach roads which finally merge with tar roads for final destinations.

## **2.9 STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE**

The present sand mining locations do not have significant top soil/clay layer to be preserved elsewhere during the mining operations.

The sand deposits inherit gravels, pebbles with them being a part and parcel of river system. There is no disposal. The proposed project is the mining of sand from dry part of riverbed, therefore no mines reject will be generated.

## **2.10 USE OF MINERAL**

Deposit is moderate to good quality Sand. It is widely used in construction, buildings, bridges and other infrastructure. It is free from clay and non- sticky in nature.

## **2.11 UTILITIES AND PROPOSED SITE FACILITIES**

### **2.11.1 Water Requirement**

Total Water requirement in MIN\_BNK\_16\_B is estimated to be 25 KLD. This water will be supplied by private tankers. Water required for sprinkling and plantation purpose shall be collected from the settling tank/water harvesting pit.

The details of Water uses are given below:

**Table C2-7: Water Requirement**

<b>Purpose</b>	<b>Water used (KLD)</b>
Drinking and domestic	8.50
Green Belt	10
Dust Suppression and others	6.5
<b>Total</b>	<b>25</b>

### 2.11.2 Power supply

All the activities will be carried out in manual and semi-mechanized manner. The material will be excavated and loaded directly into tractors /trolleys by the workers themselves. The operation may be done after sunset, so the required electricity will be applied through generator.

### 2.11.3 Manpower

The manpower requirement for the proposed project will be around 63.

The following manpower will be engaged during mining operations as furnished in Table No. C2-8.

**Table No. C2-8 Manpower requirement**

<b>Sl. No.</b>	<b>Manpower</b>	<b>Numbers</b>
1.	Operator for excavators and dumpers	26
2.	Helper	18
3.	Labour	12
4.	Supervisor	2
5.	Transport Manager	2
6.	Accounts	1
7.	security	2
<b>Total</b>		<b>63</b>

### 2.11.4 Social Infrastructure Available

#### a) Medical Facilities

Bankura Sammilani Medical College and Hospital is situated at Kenduadihi, about 55.94 km away from the lease area. Primary first aid facility will be available at the proposed mines office.

#### b) Rest Shelter

A temporary rest shelter will be available at the mine site.

### C) Mine Office

Temporary mine office is proposed at the applied lease area.

### d) Latrines and Urinals

At the mine site, temporary urinals and latrines shall be provided for the workers

## 2.12 PROJECT COST

Capital cost for the project is Rs. 15,17,25,348/-

**Table No. C2-7** Project cost

<b>Sl No.</b>	<b>Description</b>	<b>Amount</b>
1	Premium Charges	5,98,12,691.16/- (Rs 5.10/cft)
2	Financial assurance	1,87,650/-
3	HEMM	86,000,000/-
4	Monsoon Preparation	10,00,000/-
5	Administration like GPS Tracker for transportation monitoring, CCTV, Project Infrastructure	10,00,000/-
6	Environmental safe guarding	29,75,006.8/-
7	Miscellaneous	7,50,000/-
<b>Total (Rs.)</b>		<b>15,17,25,348/-</b>

## Chapter-3

### DESCRIPTION OF ENVIRONMENT

#### 3.1 STUDY AREA

The study of the proposed project was undertaken for assessing the base line status of Environmental Parameters like Land, Air, Water (both ground and surface), Soil, Noise and Biological (both flora and fauna) and socio-economic status.

Baseline data has been collected out during the winter season (December, 2022 to February, 2023) by Centre for Envotech and Management Consultancy (P) Ltd. (CEMC) (NABL Accredited Lab, Certificate No. TC-6646). Team of Experts visited the study area for Social & Biological Environment study. The following data, through field survey and other sources, was collected by CEMC Pvt. Ltd., for preparing the EIA/EMP for the proposed mining area with related facilities.

#### 3.2 LAND ENVIRONMENT

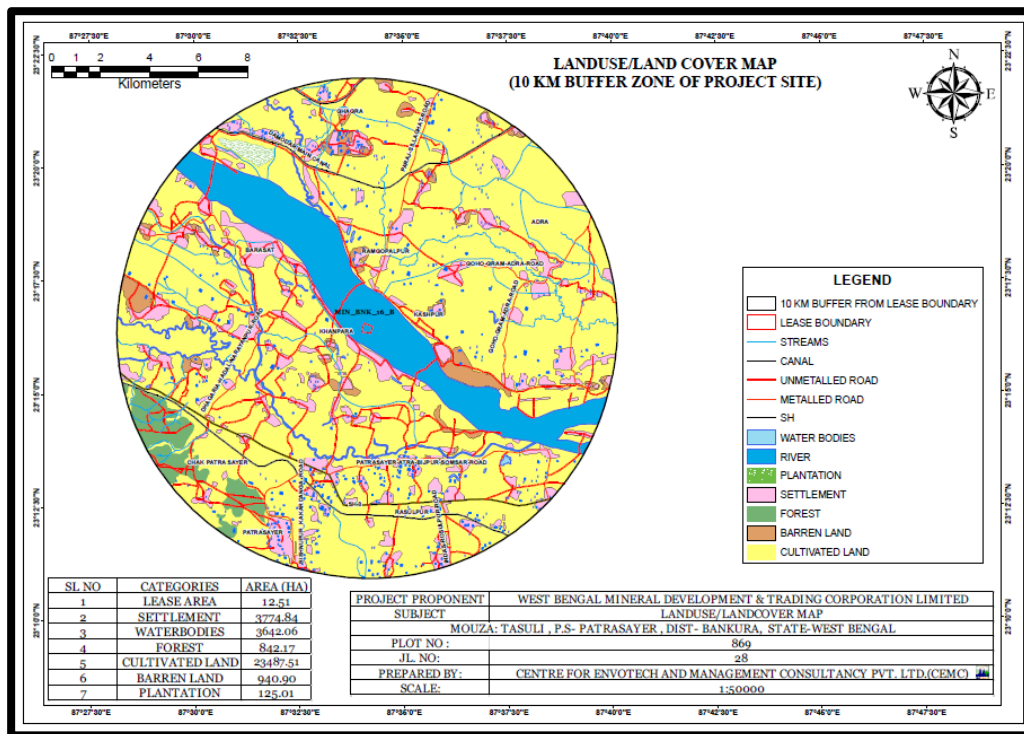
Landcover data highlights the area covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types. Water types include wetlands or open water. Landuse shows how people use the landscape for development, conservation or for other purposes. Therefore its highlights the current scenario as well as predict the impact.

**3.2.1 Landuse landcover classification & Interpretation:** The classification approach is applied on the basis of various characteristics like colour, texture, shape, association etc. The Landuse landcover map for 10 km buffer zone of the project area is shown in figure-C3-1.

The unsupervised classification approach was obtained for the Landuse and Landcover classification by using ArcGIS 10.8 version software. In this approach, the pixels of the project area are clustered in several classes on the basis of spatial & spectral variation in pixel value which are following:

1. **Settlement or Built-up land:** 11.49 percent of the total project area is covered by settlement or built-up land. The entire built-up land comes under rural areas. This area is identified by pink color in the satellite image. Built-up land can be described as an area of intensive use with much of the land covered by structures. Areas included in this category are cities, towns, villages, strip developments along with highways, transportation, power, and communications facilities, and other areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from built-up areas.

2. **Agricultural land:** 71.55 percent of the total project area is covered under agricultural land or cultivated area. Agricultural land may be defined as the land that is used primarily for the production of food and fiber. In the imageries, cropland is identified by yellow color.
3. **Water Bodies:** All natural and man-made ponds, reservoirs, river come under this class. This feature is identified by light to dark blue color and cover only 11.09 percent of the total project area.
4. **Barren land:** A barren land is a dry or bare land having very few or no plants. The barren land of the project area is consist of sand and cover only 2.86 percent of the total project area. This area is identified by brown color in the image.
5. **Forest land:** 2.56 percent of the total project area is covered under forest land. This area is identified by green color in the image.
6. **Lease area:** Lease area is the specified site for the project, which covers 0.03 percent of the total project area. This area is identified by red color boundary in the image.
7. **Plantation:** 0.38 percent of the total project area is covered under plantation.



**Figure No.C3-1** Landuse Landcover Classification

On the basis of the landuse landcover classification, the area of different land features are as follows (Table C3.1):

**Table No.C3-1** Land use distribution

<b>Class Name</b>	<b>Area (Ha)</b>	<b>Area (%)</b>
Lease area	12.51	0.03
Settlement/Built-up land	3774.84	11.49
Cultivated area/ Agricultural land	23487.51	71.55
Forest	842.17	2.56
Water Bodies	3642.06	11.09
Plantation	125.01	0.38
Barren land	1325.49	3.98

### 3.3 SOIL SAMPLING

The baseline study covers collection of soil samples and determining relevant physical and chemical properties.

#### 3.3.1 Methodology

Soil sample collection was done making a pit about 15 inches deep and heaping the loose soil dug out. The loose soil is spread up in a circle and divided into 4 quadrants. The opposite quadrants are chosen and again the process is repeated till we get the required quantum of sample for analysis purpose. Collection of samples was done from 3 locations as shown in figure no. C3-2. Samples were analyzed as per CPCB guidelines.

**Table No.C3-2** Soil Quality Monitoring Locations

<b>SITE</b>	<b>LOCATION</b>	<b>DISTANCE</b>
SQ1	Towards North from the mine site	2.89
SQ2	Towards West from the mine site	1.43
SQ3	Towards South-West from the mine site	1.69

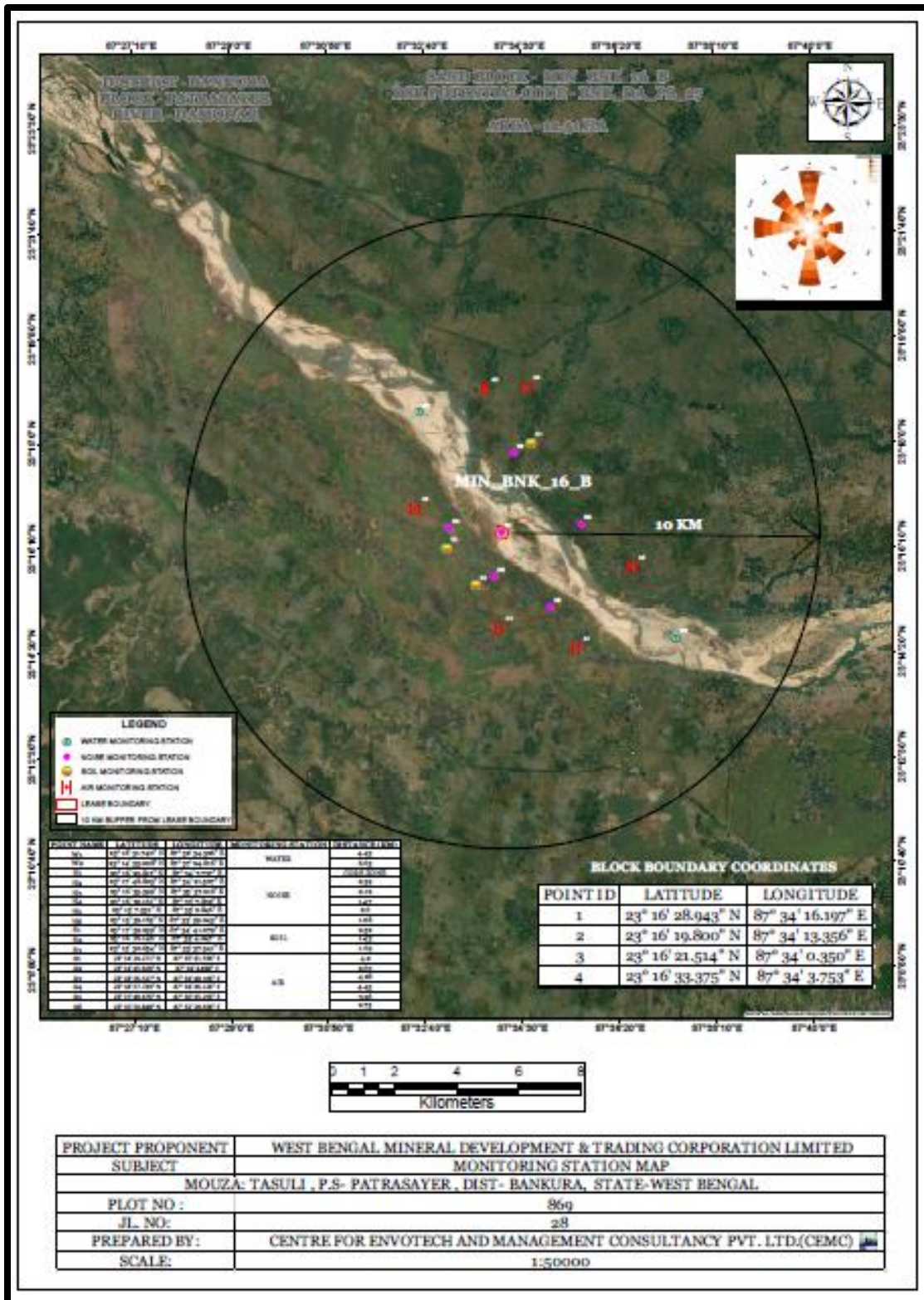


Figure No. C3-2 Map Showing the Monitoring Locations of Soil, Water, Air & Noise

**Table No.C3-3** Sampling Data

		Location	SQ1	SQ2	SQ3
S. No.	Parameter	Unit	Result	Result	Result
1	pH	-	7.54	7.64	7.49
2	Conductivity	µmhos/cm	460.0	398.0	421.0
3	Sodium (as Na)	mg/kg	75.40	58.21	71.91
4	Water holding capacity	%	28.6	34.45	35.18
5	Potassium (as K)	mg/kg	260.5	241.03	238.20
6	Sand	%	86.50	61.00	68.00
7	Clay	%	4.80	18.00	19.00
8	Silt	%	8.70	21.00	13.00
9	Calcium (as Ca)	mg/kg	441.00	298.06	276.12
10	Magnesium (as Mg)	mg/kg	173.09	67.29	63.75
11	SAR	-	1.49	0.97	0.98
12	CEC	meq/100gm	2.12	2.15	2.17
13	Phosphorus (as P)	mg/kg	12.50	10.84	11.23
14	Organic carbon	%	0.41	0.46	0.48
15	Porosity	%	36.89	40.98	38.63
16	Permeability	cm/hr	1.60	1.95	1.92
17	Bulk Density	kg/cm <sup>3</sup>	1.44	1.38	1.35
18	Total Kjeldahl Nitrogen (TKN)	%	0.034	0.041	0.025

### 3.3.2 Results

Samples collected from identified locations indicate pH value of 7.64, 7.54 & 7.49, which shows that the soil is slightly alkaline in nature. Organic carbon ranges from 0.48 %, 0.46 % & 0.41 % in the soil samples and, whereas the Potassium is found to be ranging from 260.5 mg/kg, 241.03 mg/kg & 238.20 mg/kg.

### 3.4 WATER ENVIRONMENT

This section describes the prevailing water environment in the study area in terms of water resources i.e. quantitatively and qualitatively. This has been achieved by performing qualitative

analysis of water samples collected from surface water body falling within the study area. Surface water samples are collected from locations as shown in Figure No. C3.2.

### 3.4.1 Methodology

Perennial source of Surface water in the study area is Damodar River (a tributary of Ganga River) which flow from North East to North West direction. Samples were collected from upstream and downstream areas of the project site and third sample was also collected near the project site.

Sampling locations for surface water quality have been finalized and shown in Table C3-4 Figure C3-2

### 3.4.2 Surface water

The surface water parameters have been analyzed as per APHA procedure and compared with CPCB water quality criteria mentioned in Table and the Surface water sample results are mentioned in Table No. C3-4

**Table No. C3-4** Water Quality Criteria as per Central Pollution Control Board

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250

**Table No. C3-5** Water Quality Monitoring Locations

SITE	LOCATION	DISTANCE
SW1	Towards North West from the mine site	4.43
SW2	Towards South East from the mine site	6.63

**Table No. C3-6** Sampling Data

S. No.	Parameter	Test Method	Units	SW1	SW2
1.	pH (at 25°C)	IS:3025(Part-11)	---	7.29	7.62
2.	Temperature	IS:3025(Part-9)	°C	24.0	24.0
3.	Turbidity	IS:3025(Part-10)	NTU	1.93	15.6
4.	Electric Conductivity @25°C	IS:3025(Part-14)	µS/cm	350	312
5.	Sulphate (SO <sub>4</sub> )	IS:3025(Part-24)	mg/l	14.0	12.01
6.	Nitrate (NO <sub>3</sub> )	IS:3025(Part-34)	mg/l	6.21	6.60
7.	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	mg/l	210.5	132
8.	Chloride (as Cl)	IS:3025(Part-32)	mg/l	9.87	12.4
9.	Fluoride (as F)	APHA 4500F	mg/l	0.12	0.21
10.	COD (as O <sub>2</sub> )	APHA-5220 B	mg/l	23.69	25.0
11.	Iron (as Fe)	IS:3025(Part-53)	mg/l	0.492	0.164
12.	Dissolve Oxygen	IS-3025(Part-38)	mg/l	8.7	6.2
13.	Total Dissolved Solid	IS:3025(Part-16)	mg/l	190.9	200
14.	BOD (3 days at 27°C)	IS:3025 (P-44)	mg/l	2.12	5.20
15.	Calcium (as Ca)	IS:3025(Part-40)	mg/l	45.96	46.49
16.	Magnesium (as Mg)	IS:3025(Part-46)	mg/l	9.7	17.50
17.	Arsenic (as As)	IS:3025(Part-37)	mg/l	BDL (<0.01)	BDL (<0.01)

18.	Lead (as Pb)	IS:3025(Part-47)	mg/l	BDL (<0.01)	BDL (<0.01)
19.	Copper (as Cu)	IS:3025(Part-42)	mg/l	BDL (<0.05)	BDL (<0.05)
20.	Zinc (as Zn)	IS:3025(Part-49)	mg/l	BDL (<0.01)	BDL (<0.01)
21.	Manganese (as Mn)	IS:3025(Part-59)	mg/l	BDL (<0.10)	BDL (<0.10)
22.	Total Chromium (as Cr)	IS:3025(Part-52)	mg/l	BDL (<0.05)	BDL (<0.05)
23.	Sodium (as Na)	IS:3025(Part-45)	mg/l	27.4	23.5
24.	Potassium (as K)	IS:3025(Part-45)	mg/l	1.8	1.8
25.	Total Alkalinity (as CaCO <sub>3</sub> )	IS:3025(Part-23)	mg/l	180	155
26.	Phosphate (as P)	IS:3025(Part-31)	mg/l	0.25	0.21
27.	Nitrite (as NO <sub>2</sub> )	IS:3025(Part-34)	mg/l	0.18	0.14
28.	Total Suspended Solid	IS:3025(Part-17)	mg/l	8.70	12.4
29.	Faecal Coliform	IS-1622	MPN/100 ml	1.2 × 10 <sup>3</sup>	1.0 × 10 <sup>3</sup>
30.	Total Coliform	IS-1622	MPN/100 ml	1.5 × 10 <sup>3</sup>	1.8 × 10 <sup>3</sup>

### 3.4.3 Results:

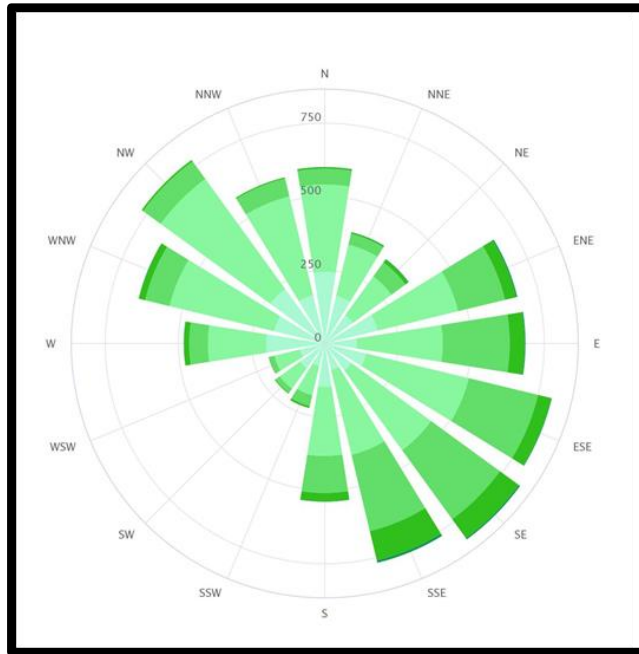
The river water quality parameters are compared with BDU Criteria of CPCB. No metal contamination has been found in surface water samples. Overall the surface water quality of river is meeting the Class D of DBU Criteria of CPCB for its suitability for wild life and fisheries.

### 3.5 AIR ENVIRONMENT

This section describes the prevailing air environment in the study area for evaluating the impacts of mining activity in surrounding areas. This has been achieved by determining the ambient air quality within the study area, represented by 10 km radius area around the project site, as shown in Figure 3.7. Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hourly monitoring was carried out for SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>& PM<sub>2.5</sub> twice a week at each station. This study was done during pre-monsoon season for a period of 3 months from December, 2022 to February 2023. The analysis reports are appended below in the Table-C3.7

**Table No. C3-7** Site-specific meteorological data

Month	Wind Speed (km/h)	Temperature (°C)			Rainfall (mm)
	Avg	Max	Min	Avg.	No. of rainy Days
December, 2022	14.2	24°C	10°C	17°C	-
January, 2023	14.9	24°C	9°C	14°C	-
February, 2023	14.5	29°C	13°C	21°C	-



**Figure No. C3-3:** Wind Rose Pattern

**3.5.1 Observation**

The prominent seasonal wind direction is NW & SE contributing to its major portion (Fig.C3-3).

**3.5.2 Methodology**

The choice of monitoring locations for ambient air quality is based on:

Meteorology of the area: From the meteorological data the frequency and duration of wind is preliminary determined, from which the wind rose diagram is first drawn. Six monitoring stations have been selected to assess the Air quality in study area.

The location of nearest human habitation is also considered for selecting the location of air quality monitoring station. The quality of air at this location is important to know the impact of the proposed mining activities .in terms of emission of particulate matter and gaseous emissions.

It is equally important to know the accessibility to the selected air quality stations. Therefore the availability of roads along with electricity also plays an important role in finalizing the ambient air quality monitoring locations.

Based on these factors, six monitoring locations were identified as shown in Table C3.8 and Figure C3-2. CPCB guidelines for the measurement of ambient air quality on 24 hourly monitoring was carried out for SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>& PM<sub>10</sub> twice a week at each station for a study period of 3 months (December 2022 to February '2023).

**Table No.C3-8** Ambient air monitoring location

<b>SITE</b>	<b>Location</b>	<b>Distance</b>
AQ1	Towards South from the project site	4.2
AQ2	Towards South from the project site	2.75
AQ3	Towards North from the project site	4.28
AQ4	Towards North from the project site	4.45
AQ5	Towards East from the project site	3.96
AQ6	Towards West from the project site	2.63

**Table No.C3-9** Sampling Data

<b>Parameter</b>	<b>PM<sub>2.5</sub>(µg/m<sup>3</sup>)</b>	<b>PM<sub>10</sub>(µg/m<sup>3</sup>)</b>	<b>SO<sub>2</sub>(µg/m<sup>3</sup>)</b>	<b>NO<sub>2</sub>(µg/m<sup>3</sup>)</b>
<b>AAQM Norms</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
<b>AQ1</b>				
<b>MIN</b>	25.23	64.26	7.1	12.45
<b>MAX</b>	40.54	77.38	8.68	15.21
<b>AVG</b>	30.94	70.77	7.96	13.72
<b>98 Percentile</b>	39.99	77.36	8.65	15.21
<b>AQ2</b>				
<b>MIN</b>	34.21	64.86	6.28	14.65
<b>MAX</b>	43.69	78.64	12.97	19.87
<b>AVG</b>	39.08	72.15	8.24	17.40
<b>98 Percentile</b>	42.85	78.29	12.00	19.84
<b>AQ3</b>				
<b>MIN</b>	27.06	54.34	7.06	10.25
<b>MAX</b>	41.21	76.28	9.78	13.53

<b>AVG</b>	34.12	66.64	8.47	12.14
<b>98 Percentile</b>	41.19	75.72	9.77	13.53
		<b>AQ4</b>		
<b>MIN</b>	25.72	51.28	6.23	8.15
<b>MAX</b>	38.63	73.41	7.87	10.49
<b>AVG</b>	30.38	63.40	7.02	9.19
<b>98 Percentile</b>	38.44	72.38	7.74	10.49
<b>AQ5</b>				
<b>MIN</b>	26.37	53.45	6.63	8.03
<b>MAX</b>	38.91	74.92	7.96	10.95
<b>AVG</b>	32.07	65.62	7.40	9.80
<b>98 Percentile</b>	38.91	74.41	7.94	10.94
<b>AQ6</b>				
<b>MIN</b>	28.42	53.92	6.27	8.63
<b>MAX</b>	40.27	75.29	9.24	14.18
<b>AVG</b>	34.40	62.29	7.90	11.89
<b>98 Percentile</b>	39.74	73.10	8.50	14.10

### 3.4.3 Results:

The ambient air quality study for the 6 AAQ monitoring stations shows that the maximum and minimum ground level concentration for PM<sub>10</sub> is respectively 78.64 µg/m<sup>3</sup> at AQ2 and 51.28 µg/m<sup>3</sup> at AQ4. Whereas the maximum and minimum ground level concentration for PM<sub>2.5</sub> ranges between 43.69 µg/m<sup>3</sup> at AQ2 and 25.23 µg/m<sup>3</sup> at AQ1 respectively. Similarly for SO<sub>2</sub>, the maximum and minimum ground level concentration varies between 12.97 µg/m<sup>3</sup> and 6.23 µg/m<sup>3</sup> for respectively AQ4 and AQ6 stations. For NO<sub>2</sub> the maximum and minimum ground level concentration varies between 19.87 µg/m<sup>3</sup> & 8.03 µg/m<sup>3</sup> for respectively AQ2 and AQ5 stations.

### 3.6 NOISE ENVIRONMENT

The ambient noise levels within the study area were recorded using Sound Level Meter. Noise level monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986 and amended thereof.

### 3.6.1 Methodology

The proposed project activity is expected to affect ambient noise quality in the surrounding areas. Therefore the choice of monitoring locations is based on human habitation factors. Table C3-10 and Figure C3-2 shows noise quality monitoring locations.

**Table No.C3-10** Noise Quality Monitoring Station

<b>SITE</b>	<b>Location</b>	<b>Distance</b>
NQ1	Mine site	--
NQ2	Towards North from project site	2.39
NQ3	Towards East from project site	2.12
NQ4	Towards West from project site	1.47
NQ5	Towards South from project site	2.6
NQ6	Towards South from project site	1.08

**Table No. C3- 11** Sampling Data

<b>S. No.</b>	<b>Location</b>	<b>Result</b>		<b>Unit</b>
		Day	Night	
1	NQ1	58.9	46.4	dB(A)
2	NQ2	50.2	43.0	dB(A)
3	NQ3	50.4	40.2	dB(A)
4	NQ4	51.1	40.1	dB(A)
5	NQ5	52.0	41.5	dB(A)
6	NQ6	51.5	38.8	dB(A)
<b>Requirement (as per CPCB Guidelines Limits in dB (A) Leq</b>				
<b>Category of Area/ Zone</b>		<b>Day time</b>	<b>Night time</b>	
Industrial Area		75	70	
Residential Area		55	45	
Commercial Area		65	55	
Silence Zone		50	40	

### 3.6.2 Results:

Noise monitoring study reveals that the minimum & maximum noise levels at day time were recorded as 50.2 dB (A) at NQ2 & 58.9 dB (A) at NQ1. The minimum & maximum noise levels at night time were found to be 38.8 dB (A) at NQ6 & 46.4 dB (A) at NQ1.

There are no other major noise producing sources in the study area except some domestic activities, which contributes to the local noise level of the area. Traffic movements in nearby villages also add to the ambient noise level of the area.

### **3.7 BIOLOGICAL ENVIRONMENT**

The biological environment is very crucial for living environment of any area. The Biological diversity includes the variation of all of life forms mainly genetic, species and population. However Flora and Fauna diversity is broadly understood type. They are further divided into terrestrial and aquatic life form. Forests are repository of the bio-diversity, gene pool resources, sequester carbon dioxide and provide lot of other environmental services. They play a very vital role in sustaining the life of people and are crucial for the food and water security. In India, the sustained flow of water in our rivers, streams and rivulets and recharge of ground water is necessary for the food security and drinking water availability. The hydrological functions of forests include interception of rainfall and regulating the stem flows, binding soil to prevent soil erosion and conserving the soil moisture.

#### **3.7.1 RESULTS AND DISCUSSION**

The primary survey of study area was conducted particularly with reference to habitat types, listing of species and assessment of the existing baseline ecological (terrestrial and aquatic ecosystem) conditions.

##### **3.7.1.1 National Park, Wildlife Sanctuary, Notified Forest, Ecologically Sensitive area and critically polluted areas in study area:**

There is no national park, wildlife sanctuary and critically polluted area in 10km radius from the project site. There are no forests within 15 Km from the boundary of the project site.

##### **3.7.1.2 Floral Biodiversity**

**Core Zone:** The core zone was devoid of any plant or tree naturally growing over there. The agrobiodiversity of the study area is unique and there is no reserve or protected forest. The core zone is a long stretch of river sand and no flora was found in the core zone.

**Buffer Zone:** Some of the most dominant species in non forest area are babool (*Vachellia nilotica*), vilayati babool (*Prosopis juliflora*), neem (*Azadirachta indica*), gulmohar (*Delonix regia.*), amaltas (*Cassia fistula*), dhatura (*Datura stramonium*), arandi (*Ricinus communis*), ber (*Ziziphusjujube*), bougainvillia (*Bougainvillea spectabilis*), peepal (*Ficus religiosa*), shisham (*Dalbergiasissoo*), sagwan (*Tectona grandis L.f.*) etc. were observed within 10km radius of the study area. Predominant plant vegetation is Dalbergia shisoo, Acacia catechu, Borassus flaberiformis and Bombax ceiba respectively. The other plant is Acacia nilotica, Acacia sp,

Azadirachta indica, Eucalyptus, Dhatura sp, Zizyphus sp, Cassia tora, Dalbergia sisoo, Parthenium sp, Cassia sp.

### 3.7.1.3 Faunal Biodiversity

The fauna visiting core zone includes monkeys (Prebytis entellus), snakes (Trimeresurus gramineas, Dryophis nasutus), rabbits (Lepus nigricollis), fish (Catla catla, Labeo rohita etc), crows (Corvus splendens) etc. As per the information collected by the field team, the common animals of the study area are toad (Duttaphrynus melanostictus) and frog (Hoplobatrachus tigerinus), Indian garden lizards (Calotes versicolor), House lizards (Hemidactylus frenatus). In addition, the commonly found domestic animals such as cow, dog, cat etc. and lower life forms, such as, ants, spider, butterfly, bee, wasp, and termite are also found in the study area. The common birds inhabiting in the study area are Bulbul (Pycnonotus jocosus), Pigeon (Columba livia), and Koel (Eudynamys scolopaceus).

**3.7.1.4 Aquatic life:** Along its course river Damodar support rich aquatic habitat. Numerous species Fishes, planktons & zooplaktons are found in the study area.

### 3.8 SOCIO-ECONOMIC ENVIRONMENT

The study area of Proposed Sand Mining Project of Area 12.51 Ha comes under Mauza- Tasuli, P.S.- Patrasayer Dist:- Bankura, State- West Bengal. The study area involves 157 rural villages. There are no urban areas in the study area.

#### 3.8.1 Methodology

The details of the activities and population structure have been obtained from Census 2011 and analyzed.

#### 3.8.2 Results

**Table No. C3-12** Demographic Profile of the Villages in the study area

S. No.	Demographic Feature	Population
1	Total Population	184,070
2	Male	93,612 (50.85%)
3	Female	90,456 (49.14%)
4	Schedule caste	85,501 (46.45%)
5	Schedule Tribe	5,533 (3%)

\*Source: Census of India 2011, figures in parenthesis represents percent value

#### a) Demographic Composition

According to Census 2011, Core zone doesn't have any human habitation and 10km buffer have the total population of 184,070 Individuals only. There are 46.45 percent of total populations are schedule caste, schedule tribe are 3 percent.

**Table No.C3-13** Demography of Study Area, District Bankura, West Bengal, India

S. No.	Item	Number of Individuals	%	Number of Individuals	%	Number of Individuals	%	Number of Individuals	%
1	Name of area	<b>Study area</b>		<b>Bankura District</b>		<b>West Bengal</b>		<b>India</b>	
4	Total Population	184,070		3,596,292		91,276,115		1.2 x 10 <sup>9</sup>	
5	Total Male Population	93,612	50.85	1,840,504	51.17	46,809,027	51.28	6.2 x 10 <sup>8</sup>	52
6	Total Female Population	90,456	49.14	1,755,788	48.82	44,467,088	48.71	5.9 x 10 <sup>8</sup>	48

\*Source: Census of India 2011

**b) Comparison:** The total population clears that study area is having total population very less than district population due to less population density (average 10 per ha).

**c) Social Infrastructure Available:**

The Proposed Sand Mining Project of Area 12.51 Ha on Damodar River of District- Bankura of State-West Bengal, Country: India offers a much required infrastructural input for fulfilling the requirement of quality sand in West Bengal.

**d) Education facilities**

Tashuli Primary School is situated at a distance of 0.66km. Serorai A.M High School is situated at a distance of 6.64 km.

**e) Health Facilities**

Health Wellness Center is situated at a distance of 3.96 km from the mine lease area.

**f) Religious Places**

Shri Ram Mandir is situated at a distance of 0.54km from the project site.

**g) Drinking water**

Drinking water facility will be provided by the Private tankers at mining site by project proponent.

**h) Electricity**

All the habitations in the study area are provided with electricity and the same is available for domestic.

## Chapter 4

### ANTICIPATED IMPACTS AND THEIR MITIGATION MEASURES

All Mining projects, whether existing or new, have positive or negative impacts on the surrounding environment. Depending on the nature of activities and baseline environment status, the impacts are assessed for their importance. The results of these assessments are used to formulate mitigation measures and future methodology for Environmental Monitoring and Environmental Management plan.

The environmental parameters likely to be affected by mining are related to many factors, i.e. physical, social, economic, agriculture and aesthetic. The excavated sand will be transported via trucks to outsiders. The operations may disturb environment of the area in various ways, such as removal of mass, change of landscape, flora and fauna of the area, surface drainage, and change in air, water and soil quality. While for the purpose of development and economic up-liftmen of people, there is need for establishment of mining industries, but these should be environment friendly. Therefore, it is essential to assess the impacts of mining on different environmental parameters, before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. The likely impacts on different environmental parameters due to this mining project are discussed here.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause and effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning/consultation/extrapolation.

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail:

- Land environment
- Water environment
- Air environment
- Noise environment
- Biological environment
- Socio economic development
- Soil environment

Based on the environmental baseline scenario as detailed in Chapter 3 and the proposed mining activity in Chapter 2, this chapter assesses the likely impact and their extent on various environmental parameters along with the mitigation measures.

#### **4.1 LAND ENVIRONMENT**

The proposed extraction of stream bed materials, mining below the existing streambed, and alteration of channel-bed form and shape may lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology if, the operations are not carried out scientific & systematically.

The mining and allied activities involved due to mining result in creation of temporary haul roads and formation of mined pits, etc. affecting the land use pattern. In this project, silt and clay are also produced as a constituent along with minerals, which are considered to be waste.

##### **4.1.1 Anticipated impacts:**

- Mining activity will impact river bed topography by formation of excavation voids.
- Undercutting and collapse of river banks.
- River bed mining may bring in some change in topography at the nearby area of the mine lease.
- Stacks of solid waste generated from mining activity may hinder the flow of water in monsoon season.

##### **4.1.2 Mitigation measures:**

Adopting suitable, site-specific mitigation measures can reduce the degree of impact of mining on land. Some of the land-related mitigation measures are as follows:

- Excavated pits will get replenished annually in monsoon itself & will be restored to original.
- Mineral will be mined out after leaving safety distances from both side from the bank as “No mining zone” for bank stability.
- The mine working will remain confined to allotted river bed only, so it will not disturb any surface area outside the mine lease area which may affect topography or drainage.
- Solid waste will not be stacked on the bank side as it will hinder the flow of water in monsoon season.

## **4.2 WATER ENVIRONMENT**

### **4.2.1 Anticipated impacts:**

Mining of sand from within or near *river* has an indirect impact on the physico-chemical habitat characteristics during monsoon season. These characteristics include in stream roughness elements, depth, velocity, turbidity, sediment transport and stream discharge.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

- Alteration of flow patterns resulting from modification of the river.
- An excess of suspended sediment during monsoon season.

### **4.2.2 Mitigation measures**

Project activity will be carried out only in the dry part of the Damodar River. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream in monsoon season only. No proposal is envisaged for pumping of water either from the River (in monsoon) or tapping the ground water.

In the lean months, the proposed mining will not expose the base flow of the *River* and hence, there will not be any adverse impact on surface hydrology.

The deposit will be worked from the top surface up to a maximum depth of 3 m below ground level or above the ground water table whichever comes first. Hence mining will not affect the ground water regime as well.

Further mining will be completely stopped during the monsoon seasons to allow the excavated area to regain its natural profile.

## **4.3 AIR ENVIRONMENT**

### **4.3.1 Anticipated impacts:**

Emission of fugitive dust is envisaged due to:

- Mining Activities includes excavation and lifting of minerals. The whole process will be done by semi-mechanized process without drilling and blasting. Therefore, the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

- Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads.

#### **4.3.2 Air Modeling:**

The proposed project includes various activities like approach roads, haul roads, excavation and transportation of sand. These operations generally result in 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.

The mining is proposed to be carried out by opencast Semi- mechanized method. The air borne particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>) generated by transportation of sand is the main respirable air pollutant. The emissions of Sulphur dioxide (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>2</sub>) contributed by vehicles plying on haul roads will be marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

#### **4.3.3 Emissions Details:**

Loading - unloading and transportation of sand, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the proposed mining activities releasing Particulate Matter (PM<sub>10</sub>) affecting Ambient Air of the area. Emission Loading and unloading was calculated by the area sources. Transportation of the sand by trucks operated per hour on the haul road was calculated by the area source which was combination of line sources with each truck loaded with sand transported over the haul road of the mining area. It was assumed that truck will carry out at state permissible limit capacity of sand.

#### **4.3.4 Model details and result:**

As required the meteorological data recorded during the month of December, 2022 to February, 2023 on wind speed, wind direction, temperature, and rainfall was processed to extract hourly mean meteorological data as per the guidelines of CPCB/MoEF for prediction of impacts from the area source and is given in Table C.3-7. By using the above-mentioned inputs, ground level concentrations due to the sand mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory

standards and to apply mitigation measures to reduce impact caused by mining activities. PM10 was the major pollutant occurred during mining activities. Impact of area source emission was considered and prediction of impact was made on various monitoring locations in the study area due to loading and unloading and ii) transportation of vehicles on the haul road of the mining area. Impact was predicted in the worst case scenario due to combined impact of loading and unloading and emission due to transportation of vehicles on sand mine on haul road of mining area and other mining activities will occur simultaneously.

The model result is provided as **Annexure III**.

#### **4.3.5 Mitigation measures:**

The collection and lifting of minerals will be done by loaders. Therefore, the dust generated is likely to be insignificant as there will be no drilling & blasting. The only air pollution sources are the road transport network of the trucks. The mitigation measures like the following will be resorted:

- Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further by 74%.
- Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
- Deploying PUC certified vehicles to reduce their emissions.
- Proper tuning of vehicles to keep the gas emissions under check.
- Monitoring to ensure compliance with emission limits would be carried out during operation.

#### **4.4 NOISE ENVIRONMENT**

The proposed mining activity is semi-mechanized in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals.

##### **4.4.1 Anticipated impacts:**

- Mental disturbance, stress & impaired hearing.
- Decrease in speech reception & communication.
- Distraction and diminished concentration affecting job performance efficiency.

The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms. The summary of the permissible exposures in cases of continuous noise as per above rules is given below:

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

#### **4.4.2 Mitigation measures:**

The following measures have been envisaged to reduce the impact from the transportation of minerals:

- The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.
- No such machinery is used for mining which will create noise to have ill effects.
- Awareness will be imparted to the workers about the permissible noise levels & maximum exposure to those levels.

#### **4.5 BIOLOGICAL ENVIRONMENT**

Mining which leads to the removal of channel substrate, re-suspension of streambed sediment and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities. Sand mining generates additional traffic, which negatively impairs the environment.

##### **4.5.1 Anticipated impacts:**

###### **a) Flora**

The proposed project of river bed sand mining shall be carried out on the riverbed of Damodar River. There are no trees in the project area. The project shall also not lead to any change in land use and will be replenished every year after successive rains. The proposed mining activity, which

although is an economically gainful activity, also constitutes river training work. It allows for necessary dredging activity which may otherwise lead to flooding of the valley.

There shall be negligible air emissions or effluents from the project site during loading of the truck. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

#### **b) Fauna**

Animals are sensitive to noise and avoid human territory. The project stretch of the river is not an identified drinking water point for the animals. However, any animal desirous of accessing the river can continue to do so upstream or downstream of the stretch during the mining activities, as there will not be any damming or diverting of water. Hence, no significant impact is anticipated from the proposed project.

#### **4.5.2 Mitigation measures:**

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated, however, the following mitigation measures will be taken to further minimize it:

##### **a) Flora**

Although, the project will not lead to any tree cutting, plantation activities shall be undertaken to improve the vegetation cover of the area. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation. The list of plants proposed for green belt is as follows.

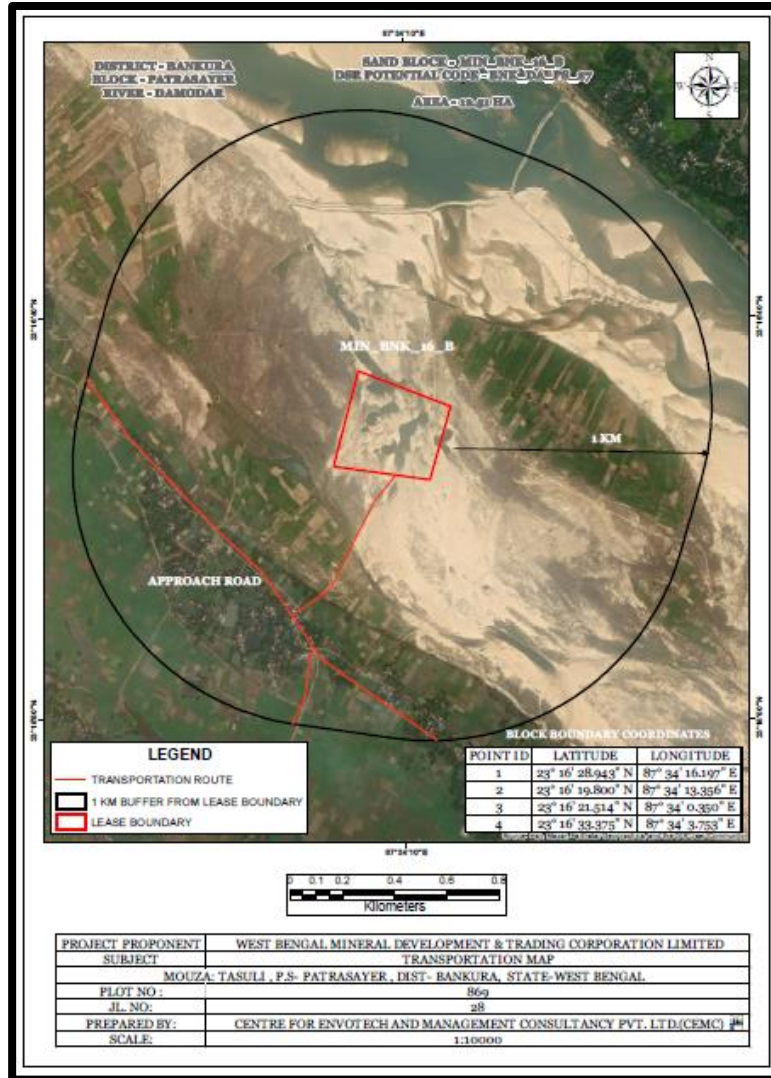
##### **b) Fauna**

The workers shall be directed to not venture out of the leased area for collecting fuel wood, or hunting. They shall also be trained not to harm any wildlife. No work shall be carried out after sunset.

#### **4.6 TRAFFIC ANALYSIS**

##### **4.6.1 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 No. C4-1** Map Showing Transportation Route

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. 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 kuchha road. For that, two skilled person 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 No. C4-1-: Existing Traffic Scenario & LOS**

S. No.	Vehicles distribution	NUMBER OF VEHICLES DISTRIBUTION/HOUR	PASSENGER CART UNIT (PCU)	TOTAL NUMBER OF VEHICLE (PCU)/DAY
		SH-9		SH-9
1	Heavy Commercial Vehicles	2230	1.0	2230
2	Light Commercial Vehicles	960	3.0	2880
3	Cars	2950	0.5	1475
4	Two Wheeler	1450	1.0	1450
5	Three Wheeler	1120	3.0	3360
	Total			11395/24 =475 PCU/hour

**Table No. C4-2 Existing Traffic Scenario & LOS**

S. No.	ROAD	V (VOLUME IN PCU/HR)	C (CAPACITY IN PCU/HR)	EXISTING V/C RATIO	LOS
1	SH-9	475	1500	0.31	B

The existing Level of Service (LOS) is “B” i.e. very good.

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

**Table No. C4-3 Capacity 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 No. C4-4** Modified Traffic Scenario & LOS

S. No.	Road	Increased Pcus / State Highway	V (Volume Pcu/Hr)	C (Capacity In Pcu/Hr)	Modified V/C Ratio	LOS
1	State Highway-9	120	475 +120= 595	1500	0.39	B

#### 4.6.2 Results

From the above analysis it can be seen that the Transportation load on SH-9 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.

#### 4.6.3 Traffic Management

- 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.

**Chapter-5**  
**ANALYSIS OF ALTERNATIVES**  
**(Technology and Site)**

**5.1 INTRODUCTION**

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives help to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options.

**5.2 ALTERNATIVES FOR MINE LEASE**

Sand (minor mineral) deposits are site specific. It is present in inside river bed (12.51 Ha.).The mining of the material will be done by opencast semi-mechanized method inside riverbed. The mining will be done as per laid down procedures West Bengal Minor Mineral Concession, Stocking, Transportation of Mineral sand Prevention of Illegal Mining Rules, 1972. No overburden from inside riverbed block will be produced. Therefore, no alternative site is suggested as the mineral is site specific

**5.3 ALTERNATIVE FOR TECHNOLOGY AND OTHER PARAMETERS**

Some alternatives considered during EIA study are discussed below:

**Table No. C5-1** Alternative for Technology and other Parameters

S. No	Particular	Alternative Option 1	Alternative Option 2	Remarks
1.	Technology	Opencast Semi mechanized and mechanized mining	Opencast Mechanized mining	Opencast semi-mechanized Riverbed is preferred <b>Benefits:</b> <ul style="list-style-type: none"> <li>•No electric power requirement</li> <li>•Minimal noise will be generated</li> <li>•Minimal air pollution will be generated.</li> </ul>
2.	Employment	Local employment	Outsource employment	Local employment is preferred. <b>Benefits:</b> <ul style="list-style-type: none"> <li>•Provides employment to local people along with financial benefits</li> </ul> No residential building/housing is required.

3.	Labourer transportation	Public transport	Private transport	Local labours will be deployed so they will either reach mine site by Bicycle or by foot. <b>Benefits:</b> Cost of transportation of men will be negligible.
4.	Material transportation	Public transport	Private transport	Material will be transported through trucks/trolleys on the contract basis. <b>Benefits:</b> It will give indirect employment
5.	Water requirement	Tanker supplier	Ground water/ surface water supply	Tanker supply will be preferred. <b>Benefits:</b> No change in the surface water or ground water quality.
6.	Road	Haul road	Metallic road	Haul road will be considered for Linking mine site from. Minimum distance will be measured along with less number of trees for considering optimum haul road roots. <b>Benefits:</b> Less distance, less fuel used, minimum or negligible no. of trees will be cut in best opted haul road root.

#### 5.4 SUMMARY

We have analyzed all the option for alternative so the proposed mine site. This project is sand specific project and existing land use of mine lease classified as River Body which will continue to be so even after the current mining project is over, hence no alternate site is suggested for this project.

## **Chapter-6**

### **ENVIRONMENTAL MONITORING 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. Environmental Monitoring Program will be implemented once the project activity commences. Environmental Monitoring Program includes:

(i) Environmental surveillance (ii) Analysis and interpretation of data (iii) Preparation of reports to support environmental management system and (iv) Organizational set up responsible for the implementation of the programme. Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC and Consent to Operate issued by the State Pollution Control Board. Compliance of same will be submitted to respective authorities on regular basis.

#### **6.2 ENVIRONMENTAL MANAGEMENT CELL**

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will comply as per conditions. For this the lessee WBMDTCL has taken decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the proposed mine with the objectives mentioned in approved Environment Policy. The system of reporting of Non-conformances /violation of any Environmental Law/Policy will be as per quality management system. The internal audit will be conducted on periodic basis and any Non-conformances/violation to Environmental Law/Policy will be closed and discussed during Management Review Meetings of board of directors/partners.

##### **6.2.1 Hierarchy**

An advisory group will be appointed to look after all environmental issues and ensure compliance with Environmental Clearance conditions/SPCB norms. A Senior Consultant and Working group will be appointed under the advisory group. Advisory group will report to the Lessee directly and

discuss the non-compliance if so any. An immediate solution will be arrived to ensure compliance with norms.



**Figure No.C6-1** Hierarchy of Environment System for Dealing Environmental Issues

### **6.2.2 Responsibilities for Environmental Management Cell (EMC)**

The responsibilities of the EMC include the following:

- Environmental Monitoring of the surrounding area.
- Development of green belt/plantation.
- Ensuring minimal use of water.
- Proper implementation of pollution control measures.
- Access the risk area.
- Implementation of QMS.
- Conducting internal audit.
- Closing of NCs and conduction of Management Review Meetings.

### **6.3 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE**

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a sit using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The key aims of environmental monitoring are:

- To ensure that results/ conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.

- To verify the evaluations made during the planning process, in particular with risk and impact assessments and standards and target setting and to measure operational and process efficiency.
- Monitoring will also be required to meet compliance with statutory and corporate requirements. Finally, monitoring results provide the basis for auditing, *i.e.* to identify unexpected changes.

#### 6.4 LOCATIONS OF MONITORING STATIONS

The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature. Locations for the post project monitoring shall be as under.

**Table No. C6-1** Locations for monitoring stations

S. No.	Description	Location
1	Ambient Air Quality	Villages from the Lease Boundary
2	Noise Level Monitoring	Lease Boundary, villages from the Lease Boundary
3	Water Level and Quality	Nearby Surface water sources
4	Soil Quality	Villages near the study area.

#### 6.5 BUDGET ALLOCATION FOR MONITORING

Budget for monitoring of Air, water, Noise and Soil will be Rs. 2.0 Lakhs to be incurred by the project proponent for undertaking pollution prevention measures during the mining activity.

**Table No. C6-2** Budget for monitoring

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Water Quality	0.5
2	Air Quality	0.5
3	Noise Level	0.5
4	Soil quality	0.5
<b>TOTAL</b>		<b>2.0</b>

## **6.6 SUMMARY**

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will comply as per conditions. For this lessee WBMDTCL has taken decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the proposed mine with the objectives mentioned in approved Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters *viz.*, air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year. The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature. A budget for monitoring of Air, water, Noise and Soil will be incurred by the project proponent for undertaking pollution prevention measures during the mining activity.

## **Chapter-7**

### **ADDITIONAL STUDIES**

#### **7.1 INTRODUCTION**

This chapter will highlight the additional studies that had been performed based on feedback from internal quality assessment, regulatory authority and stakeholder. Mining operations are associated with several potential hazards that affect adversely the human health and environment. It would normally require the assistance of emergency services to handle it effectively. The mining operation will be taken up under the supervision and control of qualified staff including Mine Manager (Grade I). Similarly Sand mines also have impending dangers and risk which need to be addressed for which a disaster management plan has been prepared with an aim of taking precautionary steps to avert disasters and also to take such action after the disaster which limits the damage to the minimum.

#### **7.2 ITEMS IDENTIFIED BY PROPONENT**

No requirements of additional studies have been identified due to the unique location and proposed method of mining to be adopted.

#### **7.3 ITEMS IDENTIFIED BY REGULATORY AUTHORITY**

All studies identified by regulatory authority have been discussed in detail in Chapter 4.

#### **7.4 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN**

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

Risk assessments will help mine operators to identify high, medium and low risk levels. This is a requirement of the Occupational Health and Safety Act 2000. Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements. The following natural/industrial problem may be encountered during the mining operation.

- Inundation: Filling of the mine pit due to excessive rains
- Slope failures at the mine faces or stacks
- Accident due to fire (in forested areas)

As per proposal made under the mining plan the area will be developed by means opencast mining method. Extraction of minerals is to be carried out by open cast semi-mechanized method. Water table will not be touched during the mining process. No high risk accidents like landslides, subsidence flood etc. have been apprehended.

#### **7.4.1 Risks due to inundation**

Mining will be done during the non-monsoon periods (October-June); therefore problem of inundation is not likely to happen.

#### **7.4.2 Risks Due to Failure of Pit Slope**

In order to allay dangers due to open cast slope failure, final pit, slope stability estimations will be made for the existing mines. Determining the factor of safety, the slopes should be

#### **7.4.3 Risks due to Failure of Waste Dumps**

All the Material excavated during mining will be saleable, therefore no waste dumps are proposed.

#### **7.4.4 Risks of Accidents due to Trucks and Dumpers**

Identifying the hazards that come along with the presence of vehicles at the workplace (e.g. reversing operations, loading) can cause harm if not properly handled. Among some of the factors that may make vehicle accidents more likely are:

- Rough access roads
- Time pressure
- Inadequate brakes (Possibly from lack of maintenance)
- Carelessly parked vehicles(*e.g.* being parked on a slope without being adequately secured)
- Unsafe coupling and uncoupling of trailers, and
- Untrained drivers
- Overturning vehicles

To avoid such instances we will talk to the workers and their representatives and will involve them in the risk assessment process and tell them what to do, to reduce risk. All transportation within the mine lease area should be carried out directly under the supervision and control of management.

The vehicles will be maintained in good working condition and checked thoroughly at least once a month by the competent person authorized for the purpose by the management.

## **7.5 DISASTERS AND ITS MANAGEMENT**

Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in a mine will be able to work under conditions, which are adequately safe and healthy. At the same time the environmental conditions also will not impair his working efficiency. This is possible only when there is adequate safety in mines. Hence mine safety is one of the most essential aspects of any working mine. The safety of the mine and the employees is taken care of by the Mines Act 1952, which is well defined with laid down procedure to ensure safety and constantly monitored and supervised by Directorate General of Mines Safety and Department of Mines, State Government.

### **7.5.1 Identification of Hazards**

There are various factors, which can create disaster in sand mine. These hazards are as follows:

- Inundation / Flooding.
- Quick Sand Condition.
- Drowning
- Accident due to vehicular movement.
- Accident during sand loading, transporting and dumping

#### **7.5.1.1 Sand Loading**

The sand is loaded in the trucks using hand shovels and back-hoe. There are possibilities of injury in the hands during loading with shovels and staying under bucket movement.

- There are possibilities that the workers standing on the other side of loading may get injury due to over thrown sands with pebbles.
- There are possibilities of workers getting injured during opening of side covers of the trucks to facilitate sand loading.
- There are possibilities of riverbank collapse due to close proximity of sand extraction.
- There are chances of falling of cattle/children into sand pit in river bed-- instances of death due to fall in such pits were reported from other areas to the Department of Mines.
- Chance of workers getting injured due to improper balancing of truck while loading

#### **7.5.1.2 Heavy Machinery**

Most of the accidents occur during transportation by dumpers, trucks and other heavy vehicles and are often attributable to mechanical failures, in which the factor of human errors cannot be ruled out.

### 7.5.1.3 Inundation / Flooding

- The possibility of inundation/flooding of the sand mines are very high during monsoon or during heavy rains in lean season as the mine area lies over the sand dunes of a riverbed.
- There are dangers to the trucks and other machineries due to flooding.
- There are dangers to the workers working in the sand dunes. Inundation or flooding is expected and beneficial for these sand mines as during this time only the sand reserve gets replenished.

### 7.5.2 Safety Features Required in Tippers/Trucks

- **Rear Vision System:** For assisting operator to have back view during reversing.
- **Auto dipping System:** To reduce glaring of eyes of operator during night.
- **Load Indicator and Recorder:** Enables management to detect and prevent over loading.
- **Global Positioning system:** To prevent illegal transport and selling of sand, restricting short-cut routes other than stipulated routes and computerized monitoring.
- **Seat belt reminder:** To alert operator for using the seat belt.

### 7.5.3 Mitigation of Hazards

#### 7.5.3.1 Measures to Prevent Accidents during Sand Loading

- The trucks will be brought to a level so that the sand loading operation suits to the ergonomic Condition of the workers and the back-hoe.
- The loading will be done from one side of the truck only.
- The workers will be provided with gloves and safety shoes during loading.
- Opening of the side covers (pattas) will be done carefully and with warning to prevent injury to the loaders.
- No sand will be collected within 7.5m from bank, especially from outer bank of the meandering river. Safe clearance will be mainly determined by the height of the river bank and thickness of sand to be extracted from the close vicinity of that bank.
- Ponding in the river bed shall not be allowed
- Operations during daylight only.
- No foreign material (garbage's) will be allowed to remain/spill in river bed and catchment area, or no pits/pockets are allowed to be filled with such material.
- Stockpiling of harvested sand on the river bank will be avoided.
- For particular operations, approaching river bed from both the banks will be avoided.

## 7.6 REPLENISHMENT OF SAND DEPOSITS

The rivers are dynamic in nature. The rivers carry Sediment transport is a direct function of water movement. During transport in a water body, sediment particles become separated into three categories: suspended material which includes silt + clay + sand; the coarser, relatively inactive bed load and the saltation load. Suspended load comprises sand + silt + clay-sized particles that are held in suspension because of the turbulence of the water.

The size grades defined in the circular of the Central Water Commission (CWC), Government of India, are coarse (> 0.2 mm), medium (0.2- 0.075 mm) and fine (< 0.075 mm) fractions. They correspond to fine sand; very fine sand and silt-clay on the Udden Went worth scale. The coarse and medium fractions are interpreted as ‘temporarily suspended bed load’ whereas the fine fraction is the ‘wash load’ or ‘long term suspended load’.

The suspended load is further divided into the wash load which is generally considered to be the silt + clay-sized material (< 62 µm in particle diameter) and is often referred to as “fine-grained sediment”. The wash load is mainly controlled by the supply of this material (usually by means of erosion) to the river. The amount of sand (>62 µm in particle size) in the suspended load is directly proportional to the turbulence and mainly originates from erosion of the bed and banks of the river. In many rivers, suspended sediment (i.e. the mineral fraction) forms most of the transported load. Bed load is stony material, such as gravel and cobbles that moves by rolling along the bed of a river because it is too heavy to be lifted into suspension by the current of the river. Bed load is especially important during periods of extremely high discharge and in landscapes of large topographical relief, where the river gradient is steep (such as in mountains). It is rarely important in low-lying areas.

**The catchment and other details of Damodar River are given in Table no. C7-1 below.**

**Table No. C7-1: Catchment areas of Ganga & Damodar River**

<b>River</b>	<b>Total length(km)</b>	<b>Total catchment area</b>	<b>Average annual rainfall(mm)</b>
Damodar	592 km	41965 km <sup>2</sup>	1400mm

## 7.7 SOCIAL IMPACT ASSESSMENT, REHABILITATION & RESETTLEMENT (R&R) ACTION PLAN

Socio Economic Impact Assessment refers to systematic analysis of various social and economic characteristics of human being living in a given geographical area during a given period is carried out separately but concurrently with Environment Impact Assessment. It focuses the effect of the project on social and economic well-being of the community.

### **7.7.1 Impact on Demographic Composition**

The proposed project will hardly make any difference in the demographic composition of the study area as the additional employment it envisages to create will be met locally to the maximum extent. Hence, the chances of immigration of people from outside the study area are remote. Accordingly, there will be no variation in the total population of the study area including that of sex ratio, when the mine starts operating.

### **7.7.2 Employment Opportunities**

The proposed project will provide employment to the local people. It has been estimated that **63** people will get direct employment in this mining project. It is a positive impact of the project since it is providing employment opportunities to the local people.

### **7.7.3 Increased Supply of Sand in the Market**

With the commencement of the proposed mining project the supply of sand will increase and the gap between demand and supply will decrease to some extent, if not fully.

### **7.7.4 Impact on Agriculture**

The entire mining area is part of river bed and the entire land is Government Revenue Land. It is a non- forest land and the proposed activity is to take place in the bed of river Damodar & agriculture field. There will be no negative impact on agriculture because compensation will be made to the land owners and agriculture land is reclaimed & give back to the land owners after the completion of mining contract so that they will again use the field for cultivation. Scientific mining will be adopted in the proposed mining project the area will be free from annual floods, which destroy standing crops, land and property. This is a positive impact of the proposed mining project.

### **7.7.5 Impact on Road Development**

Movement of tractor-trolleys and other vehicles to and fro the mining site is expected to increase substantially, when mining will start. The existing roads connecting the quarry with the National and State Highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved. Hence, there is good scope for road development in the mining area. Further, there are risks of accidents during loading of extracted minerals into tractor-trolleys and transportation to markets for sell. However, accidents can be avoided by taking due care & precautions.

### **7.7.6 Income to Government**

The proposed mining activity will benefit the State in the form of royalty, dead rent, fees & earning from taxes.

### **7.7.7 Impact on Law and Order**

As most of the workers to be employed in the proposed mining project are local residents no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area. However, to meet any untoward incident one police post may be set up closed to the mining area.

### **7.7.8 Impact on Health**

There are no chances of occurring diseases, due to manual mining of sand. Sand is non-toxic. However, sand mining activities such as excavation and loading unloading of sand require precautions since it create respiratory problems among mine workers. Excessive inhalation of sand is a serious health concern. To avoid respiratory problem from sand necessary protection should be taken.

### **7.7.9 Rehabilitation and Resettlement (R&R) Plan**

The MIN\_BNK\_16\_B Sand Mine area does not have any habitation. Hence, the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc. exist within the lease area. The mining operation will not disturb/ relocate any village or need resettlement.

## **7.8 SUMMARY**

Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements. Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in amine will be able to work under conditions, which are adequately safe and healthy. At the same time the environmental conditions also will not impair his working efficiency. This is possible only when there is adequate safety in mines. Hence mine safety is one of the most essential aspects of any working mine. It is very important to conserve the scheduled fauna in the area by the local authority as well as by the forest officials. People are not aware about the wildlife and protection of wild animals. There is an urgent need of education and awareness to local people about the wild life and their importance. A green belt will be developed around the core zone. Green belt plantation will be started with the beginning of the mining and will be completed at the end of mine lease. This mining project has positive impact on social and economic well-being of the community because this project provides employment opportunities to local people and many social welfare works done by project proponent. There is no displacement of the population within the project area and adjacent nearby area.

## **Chapter: 8**

### **PROJECT BENEFITS**

#### **8.1 INTRODUCTION**

The proposed sand mining project will improve the overall economic and aesthetic scenario of the locality. This will be in form of roads, water supply, employment, living standard and economic growth.

#### **8.2 PHYSICAL BENEFITS**

- Generate useful economic resource for construction.
- Improve Socio-economic conditions of surrounding areas.
- Protecting river banks.
- Reduce the probability of submergence of adjoining agricultural lands.
- Protection of crops being cultivated along the river bank.
- **Improvements in the physical infrastructure:-**The proposed Sand mine will have numerous induced impacts on society such as growth in schools, hospitals, hotels & resorts, transport etc. It will also attract other entrepreneur to establish their venture in the region.
- **Improvements in the social infrastructure: -**The social infrastructure like religious places (temple, mosque, church,); marriage homes, Bus stations, railway stations, play grounds, stadium will be improved due to the induced impact of the proposed drug manufacturing.
- **Employment potential –skilled; semi-skilled and unskilled: -** The manpower requirement for the proposed project will be around 63 when semi-mechanized mining methodology is considered. In case of manual mining, the manpower will be increased to 332 considering one manpower can be excavate 5 Cum sand per day.
- **Other tangible benefits:-**The other tangible benefits includes metrics and improvements demonstrating process and system cost savings, compliant inspections and customer audits, faster product approvals and manufacturing throughput, less rejected material, reduced nonconformance issues, and more efficient continuous improvement and project implementation. Intangible benefits include improved staff morale, faster, more accurate transparent decision making, less employee turnover, increased staff accountability, and an enhanced culture of quality throughout the organization.

#### **8.3 SOCIAL BENEFITS**

The mining in the area will create rural employment. It has been observed that conditions of the villages around mining areas are better than that of distant villages. The mining activity in the

region will have positive impact on the social economic condition of the area by way of providing employment to the local in-habitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture.

- A detailed programme for socio economic development of the area has been framed. The salient features of the programme are as follows:
- Social welfare programme like provision of medical facilities educational facilities, water supply for the employees as well as for nearby villagers will be taken.
- A well laid plan for employment of the local people has been prepared by giving priority to local people.
- Supplementing Govt. efforts in health monitoring camps, social welfare and various awareness programs among the rural population.
- Assisting social forestry programme.
- Adoption of villages for general development.
- Supply of water to village nearby villages.
- Development of facilities within villages like roads, etc

#### **8.4 Corporate Environmental Responsibilities**

2.0 % of the Project cost is incurred as Corporate Environmental Responsibility (CER) and the utilization of this amount will be in social welfare.

#### **8.5 ECOLOGICAL BENEFITS**

A green belt will be developed along the boundary of the mining lease area. The area for green belt plantation consists of undisturbed soil; hence plantation could be made as in any garden or road side plantation. Green belt is erected not from biodiversity conservation point of view but is basically developed as a screen to check the spread of dust pollution. It is proposed to plant **5000** Nos. of **native species** along with some fruit bearing and medicinal trees during the plan period

#### **8.6 CONCLUSION**

The management will recruit the semi-skilled and unskilled workers from the nearby villages. The project activity and the management will definitely support the local Panchayat and provide other form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant **5000 Nos.** native species per during the mining plan period.

## **Chapter- 9**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **9.1 INTRODUCTION**

The Environment Management Plan (EMP) will outline the measures that will be undertaken to ensure compliance with environmental legislation and recommendations from the EAC / SEAC to minimize adverse impacts on the environment. The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during the implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels. The present environmental management plan addresses the components of environment, which are likely to be affected by the different operations in a mine area. The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. An Environmental Management Plan (EMP) is a site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner

#### **9.2 LAND USE PATTERN**

River bed mining can lead to river bank erosion and sedimentation arising from changes in hydrology due to alteration in water depths and river bed morphology. Sand and gravel in lowland river land forms are biologically important and an economic asset. Keeping this in mind, the following management plans are suggested:

- Mineral will be mined out after leaving sufficient safety zone from the bank as per sustainable sand mining guidelines-2016 for bank stability.
- The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
- Pits will get replenished naturally every year after monsoon.
- Grass/plants will be planted on the bank of the river for their stability.

#### **9.3 AIR ENVIRONMENT MANAGEMENT**

Mitigative measures suggested for air emission control will be based on the baseline ambient air Quality monitoring data. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that the air quality needs to be monitored on a regular basis to check it vis-à-vis the NAAQS prescribed by MoEF&CC and in cases of non-compliance, appropriate mitigative measures will be adopted. In order to minimize impacts of mining on air and to maintain it within the prescribed limits of CPCB/ SPCB, an Environmental Management

Plan (EMP) has been prepared. This will help in resolving all environmental and ecological issues likely to cause due to mining in the area.

During the course of mining no toxic substances are released into the atmosphere as such there seems to be no potential threat to health of human beings. In the mining activities, the only source of dust emission from loading & gaseous emissions is from the engines of vehicles. The reasons may be quality of fuel, improper operation of the engine, etc, proper maintenance of engines will improve combustion process and brings reduction in pollution.

### **9.3.1 Control of Gaseous Pollution**

In mining activities, the only source of gaseous emissions is from the engines of transport vehicles. The emissions from the diesel engines of the machinery can be controlled by proper maintenance and monitoring of machines.

### **9.3.2 Control of dust pollution**

The main pollutant in air is PM<sub>10</sub>, which is generated due to various mining activities. However to reduce the impact of dust pollution the following steps have been taken during various mining Activities.

#### **i. During loading operation**

- Latest loading equipment like hydraulic excavators will be used with dumpers. This reduces the number of buckets to fill from height and thus have comparatively less dust generation. The propagation of this dust is confined to loading point only and does not affect any person both the operators of excavator and dumpers who will sit in closed chamber and will be equipped with dust mask.
- Skilled operators will operate excavators.
- Avoid overloading of dumpers and consequent spillage on the roads.
- The operators' cabin in the drills, dumpers will be provided with dust free enclosure and persons working at high dust prone areas will be provided with dust mask.

#### **ii. During transport operation**

- All the haulage roads including the main ramp be kept wide, leveled, compacted and properly maintained and watered regularly during the shift operation to prevent generation of dust due to movement of dumpers, and other vehicles.
- Mineral carrying trucks will be effectively covered by Tarpaulin to avoid escape of fines to atmosphere.
- Regular Compaction and grading of haul roads to clear accumulation of loose material.
- Air quality will be regularly monitored both in the core zone and the buffer zone.

**iii. Plantation work carried out**

In order to reduce air pollution in the surroundings, green belt will be developed along mine approach road. The plantation will be done along the bank of a river.

**iv. Monitoring of air pollution**

Periodic air quality survey will be carried out to monitor the changes consequent upon mining activities as per the norms of CPCB.

**9.4 NOISE AND VIBRATION ENVIRONMENT**

The ambient noise level monitoring carried out in and around the proposed mine lease area shows that ambient noise levels are well within the stipulated limits of MoEF&CC. There is no drilling and blasting for mineral extraction. Noise pollution will only be due to loading and transporting equipment.

**9.4.1 Noise Abatement and Control**

- Proper maintenance of all machines is being carried out, which help in reducing generation of noise during operations.
- No other equipment's except the Transportation vehicles and Excavator and Loaders (as and when required) for loading is allowed.
- Noise generated by this equipment is intermittent and does not cause much adverse impact.
- Periodical monitoring of noise will be done to adopt corrective actions wherever needed.
- Plantation will be taken up along the approach roads. The plantation minimizes propagation of noise and also arrests dust.
- Mining will be done on day time only.

**9.5 WATER ENVIRONMENT MANAGEMENT**

Mining will not intersect the ground water table of the area. The mining does not have any impact on topography and natural drainage of surrounding area. Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into soak pits. Therefore, not at all disturbing water environment.

**9.5.1 Waste water management**

No waste water is generated from the mining activity of minor minerals as the project only involves lifting/excavation of Sand and transportation directly to the consumers.

### **9.5.2 Water conservation**

The project do not consume any process water except for drinking, dust suppression and plantation. Plantation is proposed, which will increase the water holding capacity and help in recharging of ground water.

### **9.6 SOLID WASTE MANAGEMENT**

Waste management is an important facet of environment management. Thus, solid waste management is important from both aesthetics and environment viewpoints.

- Generated food waste or any other domestic waste will be collected in dustbins and will be properly disposed off.
- There are no toxic elements present in the mineral which may contaminate the soil or river water.

### **9.7 GREEN BELT DEVELOPMENT**

The proposed green belt in the lease area is to be developed taking into consideration the availability of area as the efficiency of green belt in pollution control mainly depends on tree species, its width, distance from pollution sources, side of the habitat from working place and tree height. The proposed green belt has been designed to control PM10, gaseous pollutants, noise, surface run off and soil erosion etc. While considering the above aspects due care will be taken for selecting the suitable characteristics plant species such as fast growing, locally suitable plant species, resistant to specific pollutant and those which would maintain the regional ecological balance, soil and hydrological conditions.

#### **9.7.1 Plantation program**

Under the afforestation plan, plantation in nearby villages and connecting roads will be undertaken. The implementation for development of greenbelt will be of paramount importance as it will not only add up as an aesthetic feature but will also act as a pollution sink. The species to be grown in the areas will be dust tolerant and fast growing species so that a permanent greenbelt is created. Plantation in the barrier zone and roads is necessary as these areas will contain fine particulates resulting from mining operation and vehicle movement. Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks in the river. It is proposed to have plantation on both sides of the roads as greenbelt to provide cover against dust dissemination. River banks will be strengthened by way of plantation on the banks. A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt. It is proposed to plant **5000 Numbers** of native species will be planted during the plan period.

## **9.8 SOCIO-ECONOMIC ENVIRONMENT**

In general, socio-economic environment will have positive impact due to the mining project in the area. The deployed laborers will be from nearby villages only as these people are mainly dependent upon such mining activities. In order to further improve the socio-economic conditions of the area, the management will contribute for development works in consultation with local bodies.

## **9.9 OCCUPATIONAL HEALTH AND SAFETY**

Occupational Health and Safety professionals develop and coordinate safety and health systems and strategies within organizations. They identify workplace hazards, assess risks to employee health and safety, and recommend solutions. Increasingly, Health and Safety Professionals are also responsible for many of the environmental aspects of their workplace. As this profession matures there is an increased emphasis on risk management strategy and on the development of workplace culture.

Occupational Health and Safety professionals in the minerals industry may perform the Following tasks-

- I. The collection of minor minerals from the Sand mine does not cause any occupational ill effects.
- II. Except fugitive dust generation there is no source which can show a probability for health related diseases and proper dust suppression will control dust generation and dispersion.
- III. Dust masks will be provided to the workers working in the dust prone areas as additional personal protective equipment.
- IV. The occupational health hazards have so far not been reported.
- V. Awareness program will be conducted about likely occupational health hazards so as to have preventive action in place.
- VI. Any workers health related problem will be properly addressed.
- VII. Periodical medical checkup will be conducted.
- VIII. Promote occupational health and safety within their organization and develop safer and healthier ways of working;
- IX. Help supervise the investigation of accidents and unsafe working conditions, study possible causes and recommend remedial action;

- X. Develop and implement training sessions for management, supervisors and workers on health and safety practices and legislation;
- XI. Coordinate emergency procedures, mine rescues, firefighting and first aid crews;
- XII. Communicate frequently with management to report on the status of the health and safety strategy and risk management strategy, and Develop occupational health and safety strategies and systems, including policies, procedures and manuals.

**Table No. C9-1** Budget for occupational health

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs)
1	Provide free health checkups & medicines to the nearby villagers of the project site.	0.25
2	Assistance to set up a temporary health center during the lease tenure.	0.25

#### 9.10 COST OF EMP MEASURES

Following provisions are proposed to be taken for improving, control and monitoring of environment protection measures.

**Table No. C9.2:** EMP Cost (Lakhs)

S. No.	Description	Capital Cost (lakh)
1	Pollution Control & Dust Suppression	1.5
2	Pollution Monitoring & Occupational Health 1. Air pollution 2. Water pollution 3. Noise pollution 4. Soil pollution	2
3	Occupational Health	0.5
4	Plantation	2
5	Haul road Maintenance Cost	0.5
Total		6.5

## **Chapter-10**

### **SUMMARY & CONCLUSION**

#### **10.1 INTRODUCTION**

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as category B-1 due to project area is more than 5.0 Ha. The LOI was granted in favor of West Bengal Mineral Development and Trading Corporation Limited (WBMDTCL) dated 30.11.2022 vide memo no. 689/ICE-12011(99)/68/2022-MINES for the period of 5 years (A copy of LOI is attached as Annexure-I).

The Proposed Sand Mining Project at Mouza: Tasuli, plot no. -869, J.L No. -28; P.S. Patrasayer, District: Bankura, State: West Bengal, Area: 12.51 Ha for production 332100 Cum/Year.

#### **10.2 PROJECT DESCRIPTION**

The proposed project is for mining of Sand (Minor Mineral) by open cast semi-mechanized method in over an area of 12.51 Ha. By M/s. West Bengal Mineral Development and Trading Corporation Limited (WBMDTCL). The project site falls under seismic zone III. The total geological reserve is 1477180.8 Cum and total mineable reserve is 1307145.60 Cum. Mine lease area will be worked in benches and the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Mineral Sand will be transported by trucks. The deposit is moderate to good quality sand. It is widely used in construction, buildings, bridges and other infrastructure. It is free from clay and non-sticky in nature. Total water requirement for the project is 25 KLD. Total man power requirement for the project is 63. The site facilities like temporary, rest-shelter, first aid facility, drinking water facility etc. will be provided as per requirement. There is no litigation pending against this project.

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

The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried out during winter season (December, 2022 to February, 2023). This collected data was further used to identify potential impacts of the mining activity on the surrounding environment and formulate mitigation measures.

**Table No. C10.1:** Baseline Environmental Status

<b>Attribute</b>	<b>Baseline status</b>
<b>Ambient Air Quality</b>	The ambient air quality study for the 6 AAQ monitoring stations shows that the maximum and minimum ground level concentration for PM <sub>10</sub> is respectively 78.64 µg/m <sup>3</sup> at AQ2 and 51.28 µg/m <sup>3</sup> at AQ4. Whereas the maximum and minimum ground level concentration for PM <sub>2.5</sub> ranges between 43.69 µg/m <sup>3</sup> at AQ2 and 25.23 µg/m <sup>3</sup> at AQ1 respectively. Similarly for SO <sub>2</sub> , the maximum and minimum ground level concentration varies between 12.97 µg/m <sup>3</sup> and 6.23 µg/m <sup>3</sup> for respectively AQ4 and AQ6 stations. For NO <sub>2</sub> the maximum and minimum ground level concentration varies between 19.87 µg/m <sup>3</sup> & 8.03 µg/m <sup>3</sup> for respectively AQ2 and AQ5 stations.
<b>Noise Levels</b>	Noise monitoring study reveals that the minimum & maximum noise levels at day time were recorded as 50.2 dB (A) at NQ2 & 58.9 dB (A) at NQ1. The minimum & maximum noise levels at night time were found to be 38.8 dB (A) at NQ6 & 46.4 dB (A) at NQ1.
<b>Water Quality</b>	The river water quality parameters are compared with BDU Criteria of CPCB. No metal contamination has been found in surface water samples. Overall the surface water quality of river is according to Criteria of CPCB for its suitability for wild life and fisheries.
<b>Soil Quality</b>	Samples collected from identified locations indicate pH value of 7.64, 7.54 & 7.49, which shows that the soil is slightly alkaline in nature. Organic carbon ranges from 0.48 %, 0.46 % & 0.41 % in the soil samples and, whereas the Potassium is found to be ranging from 260.5 mg/kg, 241.03 mg/kg & 238.20 mg/kg.
<b>Ecology and Bio-diversity</b>	There are no Ecologically Sensitive Areas present in the study area.

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

Based on the Baseline Environment, as determined in Chapter 3, environmental impacts of the mining activity on the surrounding environment are described in following sub-sections.

**10.4.1 Impact on Land Use Pattern:** Presently there is no activity on the land. The project site is located on bank of river. There is no human settlement in the near vicinity of the project. Restoration of mine lease area is a natural process. There would not be cutting & felling of trees.

#### **10.4.2 Impact on Air Quality**

Information on air quality was studied and predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, and transportation operations may cause deterioration in air quality. In the present case, only wet materials will be handled. The collection and lifting of minerals will be done Semi mechanized mining method shall be adopted for the mining of sand. Therefore the dust generated is insignificant. Water sprinkling will be done in regular manner for dust suppression.

#### **10.4.3 Impact of Noise Levels**

Noise level will increase due to transportation. The project site away from the villages no major impact of the noise level will be there. Vehicle with low noise level will be preferred for the project.

#### **10.4.4 Impact on Water Quality**

More over due to small scale of mining operation using minimum machineries, dust suppression is by water spraying through water sprinkler limited to haulage road. Rainwater flowing through the exposed mine cuts would carry some sediment of soil and rock. These are found to be nontoxic in nature. Surface runoff water from mines has only high turbidity during monsoon. As discussed, the mining activity will require very less quantity of water in comparison to the recharging. Hence, it will not affect the water regime of the area.

#### **10.4.5 Impact on Soil Quality**

The soil textures a yellowish, light-coloured variety of red soil. The basin land of the rivers is mostly sandy soil, and the land adjacent to the rivers is sandy loam. It is due to settling of air borne dust or due to wash off of solid particulates by surface or ground water. This may lead to change in porosity, permeability & other such physical characteristics of soil of the area.

#### **10.4.6 Flora & Fauna**

##### **a) Flora**

Floral environment is affected by mining activities due to:

- Air Pollution i.e. both dust & gaseous pollution
- Water pollution
- Land Pollution

Pollutant like dust, gaseous emanations, solid & liquid effluents will be minimized at the generation point itself and adequate measures will be taken to prevent their impact on environment.

There is no forest in the core zone of mining lease area. So, there will be no deforestation due to mining.

The mining lease area is devoid of vegetation. So, the greenery to be developed under green belt development programme will improve the floral environment of the area.

#### **b) Fauna**

There is no likelihood of any adverse impact on the faunal environment too due to mining activities.

#### **10.4.7 Socio-Economic Profile**

The social demographic profile of the area is not likely to be much affected, as there is not much displacement of people due to the project. The mining in the area has created rural employment. The mining activity in the region has positive impact on the social economic condition of the area by providing employment to the local inhabitants; wages paid increase the per capita income.

#### **10.5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**

We have analyzed all the options for alternatives of the proposed mine site. This project is sand specific project and existing land use of mine lease classified as River Body which will continue to be so even after the current mining project is over, hence no alternate site is suggested for this project.

#### **10.6 ENVIRONMENTAL MONITORING PROGRAM**

This chapter includes the technical aspects of monitoring the effectiveness of mitigation measures (including measurement methodologies, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules). In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will be complied as per conditions. For this lessee WBMDTCL has taken decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the proposed mine with the objectives mentioned in approved Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters viz., air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year. The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity,

temperature. A budget for monitoring of Air, water, Noise will be Rs.2.0 Lakhs to be incurred by the project proponent for undertaking pollution prevention measures during the mining activity.

#### **10.7 ADDITIONAL STUDIES**

Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements. Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in a mine will be able to work under conditions, which are adequately safe and healthy. At the same time the environmental conditions also will not impair his working efficiency. This is possible only when there is adequate safety in mines. Hence mine safety is one of the most essential aspects of any working mine. It is very important to conserve the scheduled fauna in the area by the local authority as well as by the forest officials. People are not aware about the wildlife and protection of wild animals. There is an urgent need of education and awareness to local people about the wild life and their importance. A green belt will be developed around the core zone. Green belt plantation will be done upto completion of plan period. This mining project has positive impact on social and economic well-being of the community because this project provides employment opportunities to local people and many social welfare works done by project proponent. There is no displacement of the population within the project area and adjacent nearby area.

#### **10.8 PROJECT BENEFITS**

The management will recruit the semi-skilled and unskilled workers from the nearby villages. The project activity and the management will definitely support the local Panchayat and provide other form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant 5000 Nos. of native species will be planted during the mining plan period. The project proponent has allocated 2 % of total project cost annum for CER Activities. Other than this social development of village will be considered as per social activities. Socio-economic environment will have positive impact due to the mining project in the area. The mining activity will create employment opportunities to local communities. The project will not only improve the living standard of local people but also create an aesthetic value to the river banks where green belt will be developed.

## **10.9 ENVIRONMENT MANAGEMENT PLAN**

As per Above discussion there is no measure impact on the environment due to mining except fugitive emission in the form of dust generated during handling of mineral. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation development will be carried out in the mine premises, along the approach roads, around Govt. buildings, schools approx. 5000 trees during plan period. A budget of Rs. 6.50 Lakh per year for EMP is incurred by Project Proponent.

### **10.9.1 Air Quality Management**

The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. Utmost care will be taken to prevent spillage from the trucks. Overloading will be prevented. Plantation activities along the roads will also reduce the impact of dust in the nearby villages.

### **10.9.2 Management for Noise Pollution**

As the only impact is due to transportation of sand to the construction through village roads, emphasis will be given on the following points.

- Minimum use of Horns at the village area.
- Timely maintenance of vehicles and their silencers to minimize vibration and sound.
- Phasing out of old and worn out trucks.
- Provision of green belts along the road networks.
- Care will be taken to produce minimum sound during loading.

It was found that the sand mining activity will not have any significant impact on the biological environment of the region. Since mining activity is carried out only during the day time, the movement of animals during the night will not be hindered.

### **10.9.3 Water Management**

The deposits occur in the middle/bottom of the river. During the entire lease period, the deposit will be worked from the top surface to 3 m below ground level. The ultimate depth of the open cast pits will be 3 m below ground level.

### **10.9.4 Soil Management**

Topsoil is stored separately and used for plantation work in the mined out area. Green belt development around the area minimizes the impact of mining on soil characteristics & even Soil Erosion in the area.

### **10.9.5 Green Belt Development**

The green belts will be designed to control PM 10, gaseous pollutants, noise, surface run off and soil erosion etc.

### **10.10 CONCLUSION**

This Project will provide several benefits to the nearby Villages by a proper planning and management. This project will employ most of the worker from nearby villages. Only supervisor Staff will be hired from outside. There will not be any increase in population due to the project. However, few people from other area may migrate in this area for business opportunities. During the operation of this project no adverse impact on the surrounding environment. So project is beneficiary for the surrounding village. From the baseline study and various discussion on probable impacts of all the operational activity, it has been concluded that this project will more positive impact and will generate the revenue and employment in the area. On the above facts and baseline study, the proposed activity is recommended for the commencement with proper mitigation measure as suggested.

## Chapter-11

### DISCLOSURE OF CONSULTANTS ENGAGED

Centre for Envotech and Management Consultancy (P) Ltd. (CEMC) is an ISO 9001:2015, OHSAS 18001:2007 & ISO 14001-2015 certified leading Forest and Environmental consultancy empaneled by State Pollution Control Board (SPCB), Odisha. It was established in 2005 & its registered office is at Plot no-522/3458, Pahal, Bhubaneswar-752101. The consultancy/firm has well-furnished laboratory equipped with modern scientific instruments for analysis of various physico-chemical parameters of soil, water and air. The technical team of CEMC (P) Ltd. has wide experience in Mineral Exploration & Mining, Environmental Impact Assessment/ Environmental Management Planning and Environmental Monitoring, Forest Diversion Proposal, Development of Various Projects like Industry & Building Projects, in Commissioning of Various Pollution Control Devices, Air Quality modeling and Hydrogeological survey, and other technical assignment for various industries. CEMC Pvt. Ltd. is Accredited by National Accreditation Board for Education and Training (NABET), Quality Council of India (QCI) as 'A' Category Consultant Organization for carrying out EIA Studies in Mining, Irrigation, Thermal Power, Coal Washery, Mineral Beneficiation including pelletisation, Metallurgical industries (ferrous and Non-ferrous), Cement Plants, Port, Harbour jetties etc, Highways, railways, transport terminals, common Municipal Solid Waste Management Facility, building and large construction projects.

CEMC (P) Ltd. Environment Laboratory got recognition by MoEF & CC, Govt. of India, under Environment (Protection) Act, 1986 and accredited by National Accreditation Board for Testing and Calibration of Laboratories (NABL- an Autonomous body under Department of Science and Technology) in accordance with the standard ISO/IEC 17025:2005.

Our aim is to provide sustainable development for the growth of Industries, a one stop service provider for all types of Industries / Mines related projects, particularly relating to environmental issue.

#### **CORE TEAM:**

The level of expertise available with us and the infrastructure we have made is imperative for us to think about of the consultancy in fulfilling its mandate of providing highest quality of works to their clients on monitoring of air, water and soil in mining and urban areas, GIS and geographical analysis, biodiversity and resource mapping of forest covers and their modeling, preparation of EIA, EMP of various projects. To make these activities successful the expert members in respective fields with their expertization are mentioned in this chapter.

**DECLARATION BY EXPERTS CONTRIBUTING TO THE EIA:**

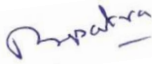
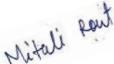
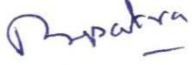

Declaration by Experts contributing to the Draft EIA Report for Environment Clearance of the proposed “Sand Mining Project” on Damodar River of Mouja-Tasuli, Block- Patrasayer, Dist:- Bankura, State-West Bengal.


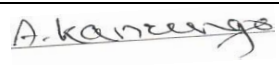
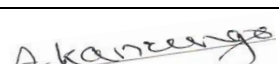




I, hereby, certify that, I was a part of the Draft EIA/EMP team in the following capacity that developed the above Draft EIA Report.

**Table No. C11-1 EIA Coordinator**

<b>EIA Coordinator</b>	
Name	Mr. Debashish Mishra
Signature & Date	
Period of involvement	May 2022- June 2024

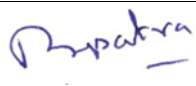
**Table No. C11-2 Functional Area Experts**

<b>S. No.</b>	<b>Functional Areas</b>	<b>Name of the Experts</b>	<b>Involvement (period &amp; task)</b>	<b>Signature and date</b>
1	AP	Dr. B.K. Patra – FAE (B)	2020- till date	
2	WP	Ms. Mitali Rout FAE (B)	2020- till date	
3	SHW	Dr. B.K. Patra – FAE (A)	2020- till date	
4	SE	Mr. S. K. Das – FAE (A)	2020- till date	

5	EB	Mr. D. Mishra – FAE (A)	2020- till date	
6	HG	Mr. A. Kanungo – FAE (A)	2020- till date	
7	Geo	Mr. A. Kanungo – FAE (A)	2020- till date	
8	SC	Mr. D. Mishra – FAE (B)	2020- till date	
9	N&V	Dr. D. K. Pandey – FAE (A)	2020- till date	
10	LU	Dr. N. R. Das– FAE (A)	2020- till date	
11	RH	Er. A. P. Barik – FAE (A)	2020- till date	

**Declaration by the Head of the Accredited Consultant Organization**

I, Dr. Bidyut Kumar Patra, hereby, confirm that the above mentioned experts prepared the Draft EIA Report for Environment Clearance of the proposed “Sand Mining Project” on Damodar River of Mouja- Tasuli, Block- Patrasayer, Dist:- Bankura, State-West Bengal. I also confirm that I shall be fully accountable for any misleading information mentioned in this statement.

<b>Signature</b>	
<b>Name</b>	Dr. Bidyut Kumar Patra
<b>Designation</b>	Director
<b>Name of the EIA Consultant Organization</b>	Centre for Envotech and Management Consultancy (P) Ltd

# **Annexure-I**

## **Annexure-II**

## **Annexure-III**

## **Annexure-IV**

## **Annexure-V**



Government of West Bengal  
DEPARTMENT OF INDUSTRY, COMMERCE & ENTERPRISES  
Mines Branch  
4, Abanindranath Tagore Sarani (Camac Street), Kolkata – 16

Memo No.-689/ICE-12011(99)/68/2022-MINES

Date: 30/11/2022

To: Chairman & Managing Director  
West Bengal Mineral Development & Trading Corporation Ltd.

Sub: Provisional Grant Order for Sand Blocks  
Ref: Your Office Memo No. MDTC/SAND/003/987 dated 27.04.2022

Sir,

With reference to the subject mentioned above, I am directed to inform you that Provisional Grant Order is hereby accorded by this department to the West Bengal Mineral Development & Trading Corporation Ltd. for the sand blocks already auctioned from your end (Annexure attached).

You are requested kindly to arrange to prepare the mining plan for the sand blocks, get them approved by competent authority and also to obtain Environmental Clearance and all other statutory clearances as per norms.

On completion of the above-mentioned process, mining lease shall be executed between this department and the corporation in due course.

This has the approval of the competent authority of this department.

Yours faithfully,

Deputy Secretary

No. 689/1(11)-ICE-12011(99)/68/2022-MINES

Date: 30/11/2022

Copy forwarded for kind information and necessary action to :

1. The Director of Mines and Minerals, West Bengal.
- 2-7. ADM & DL&LRO (Alipurduar, Bankura, Birbhum, Darjeeling, Paschim Bardhaman & Paschim Medinipur).
8. The Chief Mining Officer, West Bengal.
9. PA to Principal Secretary, Dept of Environment with request to place it for the appraisal of the authority.
10. PA to Secretary, Dept of I, C & E with request to place it for the appraisal of the authority
11. PA to Secretary, Dept. Of L&LR and R&RR with request to place it for the appraisal of the authority

Deputy Secretary

87°34'0"E

87°34'10"E

87°34'20"E

87°34'30"E

DISTRICT-BANKURA  
BLOCK-PATRASAYER  
RIVER-DAMODAR

SAND BLOCK- MIN\_BNK\_16\_B  
DSR POTENTIAL CODE-BNK\_DA\_PS\_27



**MINING LEASE PLAN**

AREA-12.51HA

23°16'30"N

23°16'30"N

23°16'20"N

23°16'20"N

MIN\_BNK\_16\_B

Damodar River

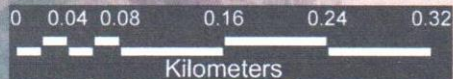
Damodar River

Damodar River

**LEGEND**

- COORDINATE
- SAND BLOCK

*30/11/22*



NAME	AREA(HA)	DISTRICT	SL NO	LATITUDE	LONGITUDE
MIN_BNK_16_B	12.51	Bankura	1	23° 16' 28.943" N	87° 34' 16.197" E
			2	23° 16' 19.800" N	87° 34' 13.356" E
			3	23° 16' 21.514" N	87° 34' 0.350" E
			4	23° 16' 33.375" N	87° 34' 3.753" E

87°34'0"E

87°34'10"E

87°34'20"E

87°34'30"E



**Government of West Bengal**  
**Office of the Senior Geologist**  
**Directorate of Mines and Minerals**  
**Geological Prospecting Branch, South Bengal Unit**  
**Pranabananda Sarani, Bankura – 722 102**

No .SGP./MP/6-21/2023/ 33

Dated, Bankura, 21<sup>st</sup> February, 2023

To,  
The Chairman and Managing Director,  
West Bengal Mineral Development & Trading Corporation Limited,  
WBIIDC Building, 3<sup>rd</sup> Floor, DJ-Block, DJ-10,  
Sector-II, Bidhannagar (Saltlake City),  
Kolkata – 700091

**Subject-** Approval of 08(Eight) Nos of “Mining Plan” for mining of ‘River-bed Sand’ in respect of Sand Blocks, bearing I.D.MIN-BNK-16\_B, MIN\_BNK\_44\_B, MIN\_BNK\_23, MIN\_BNK\_49\_I, MIN\_BNK\_49\_II, MIN\_BNK\_50\_I, MIN-BNK-18\_B, MIN-BNK-18\_A,

- Ref.-** i) IC&E Department’s Order No. 689/ICE-12011(99)/68/2022-MINES dated 30.11.2022 and submission of Hard Copies of above referred Mining Plans by Q.P. Ms. Ananya Maity dt. 09.02.2023.  
ii) IC&E Department’s Order No. 689/ICE-12011(99)/68/2022-MINES dated 30.11.2022 and submission of Hard Copies of above referred Mining Plans by Q.P. Ms. Ananya Maity dt. 01.02.2023.

Sir,

In exercise of power conferred under Sub rule 2(b) under Rule 4 of the West Bengal Minor Minerals Concession Rules, 2016 read with Gazette Notification No. 48-ICE/O/MIN/GEN-MIS/17/2021 dt. 25/01/2022 along with Order No. 456/2C-672/2022, dt. 22/12/2022, I, the undersigned, am hereby approving the above mentioned Mining Plans for ‘River- bed Sand’. The Mining Plans concerned are applicable to mining of Sand as mentioned in the Mineral Block Code in the following table :

Sl. No.	Block ID	Mouja	Plot No.	JL No.	Area(Ha)	River	
1.	MIN_BNK_16_B	Tasuli	869	28	12.51	Damodar	
2.	MIN_BNK_44_B	Pakhanna Gopalpur	897 133	58 59	23.61		
3.	MIN_BNK_23	Sabanpur Gamidya	93 709	141 192	8.25	Darakeswar	
4.	MIN_BNK_49_I	Chandipur Narangi Chakkabir Dakshin Gobindapur Bangalchak	1,5,18 2003,2750 837,841,842 349 888	89 124 133 134 37	14.29		
5.	MIN_BNK_49_II	Chandipur Narangi Chakkabir Dakshin Gobindapur Bangalchak	1,5,18 2003,2750 837,841,842 349 888	89 124 133 134 37	12.75		
6.	MIN_BNK_50_I	Chandipur Paschim Srirampur	- - -	89 38	27.59		
7.	MIN_BNK_18_B	Salkhara	2084	67	18.29		Damodar
8.	MIN_BNK_18_A	Salkhara	2084	64	4.64		

after its due examination and this approval is subject to the strict compliances of the following conditions as cited below:-

01. i) The Mining Plans are 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 Mining Plans are 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 Mining Plans 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.
03. It is also clarified that this approval of Mining Plans under the West Bengal Minor Mineral Concession Rules, 2016 and West Bengal Sand (Mining, Transportation, Storage and Sale) Rules, 2021 is subject to the provision of Forest (Conservation) Act, 1980, Forest (Conservation) Rules, 1981 and other relevant statutes, orders and guidelines including those issued by Hon'ble Courts of Law (including National Green Tribunal) as may be applicable to the proposed lease area from time to time.
04. It is further clarified that approval of the aforesaid Mining Plans is subject to the provisions of the Environment Impact Assessment Notification, 2006 as amended.
05. The execution of Mining Plans shall be subjected to vacations of prohibitory orders/ notices, if any.
06. The approved Mining Plans are valid for the entire duration of the mining lease, which will be granted by the State Government.
07. The Provisions of the Mines Act, 1952 and Rules and Regulations made there-under including submission of notice of opening, appointment of Manager and other statutory officials as required by the Mines Act, 1952 shall be complied with if applicable.
08. The annual production quantity shall be reviewed from time to time considering replenishment rate of the river, which will be assessed periodically on the basis of replenishment study. The Mining Plans shall be reviewed/modified accordingly, if necessary.
09. Mining operation shall preferably be manual and under specific circumstances/situation semi-mechanized. The provisions of Sustainable Sand Mining Management Guidelines, 2016 and Enforcement & Monitoring guidelines for Sand Mining, 2020 shall be complied with.
10. A copy of Environmental Clearance shall be submitted to this office when the same will be issued by the State Level Environment Impact Assessment Authority (SEIAA), West Bengal.
11. Plot area and its GPS coordinates of the lease boundary as showing on the statutory plan have been certified by the competent authority. The competent authority is requested to strictly adhere to the framework as well as scope of approval of Mining Plan of the said lease area granted and certified. This office has undertaken this declaration without verification of the mining lease.

12. It shall be ensured that no mining activity shall be carried out during the monsoon season and the workers should be advised and protected accordingly.
13. The boundary pillar shall maintain in good order throughout the lease period of mining.
14. The Mining Plan for sand is a new concept. The proposed quantity of extraction is based upon the available knowledge resource, local parameters, safety and District Survey Report of the concerned district. In this regard, it is also to be mentioned that an Annual Replenishment Study Report shall be prepared and duly certified by an authorized agency and a copy of the same shall be submitted to the Office of the Chief Mining Officer, Asansol during the lease period validity so as to ensure that the quantity of the mineral to be removed does not exceed the natural sedimentation in order to avoid over-exploitation of the mineral which may have an adverse effect upon the River Dynamics.
15. At any stage, if it is observed that the information furnished in the document are incorrect or misleading, the approval of the document shall be revoked with immediate effect.

This is for your information, record and taking necessary action.

Enclosure: Approved Mining Plan.

Yours faithfully,

*Rahaman*  
21/02/23  
Bajlur Rahaman  
Senior Geologist

No .SGP./MP/6-21/2023/

Dated, Bankura, 21<sup>st</sup> February, 2023

Senior Geologist  
Dte. of Mines & Minerals  
G. P. Br., S. B. Unit  
Bankura

Copy forwarded for information & necessary action to:-

1. The Director, Directorate of Mines & Minerals, Government of West Bengal, *Shilpa Sadan*, 4, Abanindranath Tagore Sarani (2nd Floor), Kolkata – 700 016;
2. The Deputy Secretary to the Govt. of West Bengal, Department of Industry, Commerce & Enterprises, Mines Branch, *Shilpa Sadan*, 4, Abanindra Nath Tagore Sarani (Camac Street), Kolkata – 700 016;
3. The Chief Mining Officer, Court Road, Asansol-713304
4. The Mining Officer In-Charge of Purulia Zone, G.P Branch Campus, Deshbandhu Road, Purulia-723101

Bajlur Rahaman  
Senior Geologist

<b>Location and distance from project site (km)</b>	<b>Background value PM10 (98 percentile) in <math>\mu\text{g}/\text{m}^3</math> (A)</b>	<b>Incremental GLC PM10 in <math>\mu\text{g}/\text{m}^3</math> (B)</b>	<b>Total Predicted GLC PM10 in <math>\mu\text{g}/\text{m}^3</math> (A+B)</b>
AQ1, 4.2	77.36	1.5	78.86
AQ2, 2.75	78.29	<0.001	78.29
AQ3, 4.28	75.72	0.1	75.82
AQ4, 4.45	72.38	<0.001	72.38
AQ5, 3.96	74.41	<0.001	74.41
AQ6, 2.63	73.10	<0.001	73.10

This is a 24-h average total predicted maximum GLC at project site is (base-line + incremental) based on the monitored data of various sampling locations of PM10 occurred at project site.

## **Comprehensive Sand Transportation Plan**

MIN\_BNK\_16\_B Sand Mine of West Bengal Mineral Development and Trading Corporation Limited is located at Mouza- Tasuli , J.L. No.- 28, P.S. Patrasayer, District: Bankura, State: West Bengal. Sand from MIN\_BNK\_16\_B sand block will be transported through the fair weather approach road which is not black topped. The approach road will be strengthened before transportation of sand beyond the riverbed. The total length of the approach road (aerial distance) is around 1km upto Bishnupur- Burdwan roads. In no circumstances the approach road within the riverbed will be hard topped. The approach roads are distributed in parallel to the riverbanks. The daily production need requires around 37 trucks (considering one 200 cft capacity truck covering 8 trips) to ply which is not adding much traffic to the existing conditions. Water sprinkling shall be done beforehand of sand transportation per day.



**WEST BENGAL MINERAL DEVELOPMENT &  
TRADING CORPORATION LTD.  
(A Govt. of West Bengal Undertaking)**

CIN : U14219WB1973SGC028707  
Regd. Office : WBIDC Building, 3rd Floor  
DJ-10, Sector-II, Salt Lake, Kolkata-700091  
Phone : 033-2359-0073  
Email : wbmtdcltd@gmail.com  
Website : mdcl.wb.gov.in

Memo No: MDTC/SAND/002(iv)/1752

Date : 06.07.2023

**Undertaking**

Undertaking is hereby provided to incur the expenses towards Corporate Environmental responsibility (CER) as per MOEF& CC's notifications Nos. F-No. 22-65/2017-IA.III dt. 30<sup>th</sup> September, 2020 and 1<sup>st</sup> May, 2018 with respect to our Sand Project MIN\_BNK\_16\_B comprising an area of 12.51 Ha, and administratively falls under Mouza: Tasuli, plot no. -869, J.L.No. -28; P.S. Patrasayer, District: Bankura The said Sand Block is bounded by the following Geo-coordinates.

Point ID	Latitude	Longitude
1	23° 16' 28.943" N	87° 34' 16.197" E
2	23° 16' 19.800" N	87° 34' 13.356" E
3	23° 16' 21.514" N	87° 34' 0.350" E
4	23° 16' 33.375" N	87° 34' 3.753" E

WBMDTCL is committed to make the expenses upto a maximum limit of 2% of the total project cost. It is to be noted that, all the expenditure will be made in due consultation with the district authorities and also as per the recommendation of the district authorities. The main objective of this expense shall be peripheral development and environment protection. The scope of work shall be followed but not limited to the activities listed below:

1. Infrastructure development.
2. Drinking water facility.
3. Electricity development including solar projects.
4. Roads and drains.
5. Creation of water body for community use.
6. Solid Waste Management System and Scientific Studies.
7. Skill Development Programs.
8. Embankment Protection

This is also to be stated that, all communication in this regard shall be made to the Chairman SEIAA, West Bengal and activities shall be monitored under the project. The statement of expenses shall be captured in the six monthly compliance reports to be submitted to SEIAA.

Authorised Signatory

West Bengal Mineral Development and Trading Corporation Limited

**Samik Panigrahi, WBCS (Exe.)**  
General manager (Sand & Admin)  
W.B. Mineral Dev. & Trading Corp. Ltd.

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY  
Pranisampad Bhawan, 5<sup>th</sup> floor, LB 2, Sector-III, Salt Lake, Kolkata – 700 106  
e-mail: [environmentwb@gmail.com](mailto:environmentwb@gmail.com)  
Web Portal: [www.environmentwb.gov.in](http://www.environmentwb.gov.in)

No. 823 / EN / T – II – 1/ 347/ 2023

Date: 27<sup>th</sup> April, 2023

To

M/s. West Bengal Mineral Development and Trading Corporation Limited.  
13, Nellie Sengupta, sarani ,  
2nd floor, Kol- 700087,

Sub: ToR for doing EIA for the proposed (MIN\_BNK\_16\_B) Sand Mine over an area of 12.51 ha (30.89 Acres) on Damodar River at J.L.-28 Plot No.- 869, Mouza:-Tasuli, Block- Patrusayer Dist.- Bankura West Bengal, (proposal no SIA/WB/MIN/417897/2023)

Sir,

This is to inform you that SEIAA in its meeting on 27.04.2023 considered your online application (vide Proposal No. SIA/WB/MIN/417897/2023) as well as the recommendations of SEAC for issuance of ToR and agreed with the recommendation.

The ToR for conducting EIA study is attached herewith (annexure 1).

The ToR is valid for a period of 3(three) years from the date of issue. EIA/EMP is to be submitted before the expiry of the ToR for consideration of EC application.

Encl: Annexure 1



(K Balamurugan )  
Member Secretary, SEIAA

No. 823/1/EN/T-II-1/347/2023

Date: 27<sup>th</sup> April, 2023

Copy forwarded for the information to:

The Secretary, State Level Expert Appraisal Committee, 'Paribesh Bhavan', LA, Salt Lake Sector III,  
Kolkata- 700106



Member Secretary, SEIAA

**A STANDARD TERMS OF REFERENCE**

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.
2. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
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.
4. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
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.
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.
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.
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.
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.
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.
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.
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.
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.

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.
15. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
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.
17. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
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.
19. Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
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).
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 sectorial programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
22. One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
23. Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

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.
25. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
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.
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.
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.
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.
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.
31. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
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.
33. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
34. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
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.
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.
37. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
38. Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

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.
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.
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.
42. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
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.
44. Besides the above, the below mentioned general points are also to be followed:-
  - a. Executive Summary of the EIA/EMP Report (enclosed as **Annexure – A**).
  - 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.
  - 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-11013/41/2006-IA.II(I) dated 4<sup>th</sup> 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-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
  - j. The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

#### **B Additional Terms of Reference**

- a) Means of access and egress between the embankment and the sand quarry may be clearly earmarked. The Project Proponent must commit that no hard toping or paving of any haulage route within the riverbed will be attempted.
- b) A plan on the management and handling of sand during the period of intermediate stockpiling should be submitted.
- c) 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 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.

- d) 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.
- e) 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.
- f) Management plan of haul road to the public road.
- g) Spatial year wise progressive plantation programme.

The project proponent is requested to submit the final EIA/EMP prepared as per the above-mentioned ToRs and incorporating all the issues raised during Public Hearing / Public Consultation to the SEAC for further consideration of the proposal for environmental clearance.

The PP shall, – while applying for environmental clearance, upload in the PARIVESH portal, the EIA/EMP report along with the documents/ submissions/ clarifications sought hereinabove

**Executive Summary**

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

- 1) Project name and location (Village, District, State, Industrial Estate (if applicable)).
- 2) Products and capacities. If expansion proposal, then existing products with capacities and reference to earlier EC.
- 3) Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative).
- 4) Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
- 5) Measures for mitigating the impact on the environment and mode of discharge or disposal.
- 6) Capital cost of the project, estimated time of completion.
- 7) Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./private land, status of its acquisition, nearby (in 2-3 km.) water body, population, with in 10km. other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary).
- 8) Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population.
- 9) Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
- 10) Likely impact of the project on air, water, land, flora-fauna and nearby population.
- 11) Emergency preparedness plan in case of natural or in plant emergencies.
- 12) Issues raised during public hearing (if applicable) and response given.
- 13) Environment Management Plan (EMP) as per Office Memorandum issued by the MoEF & CC vide F. No. 22-65/2017-IA.III dated 30.09.2020 with proposed expenditure.
- 14) Occupational Health Measures.
- 15) Post project monitoring plan.