

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN
OF
SAND MINING PROJECT ON KIUL RIVER AT (JAMUI
KIUL BLOCK - 08) SAND GHAT**

SAND BLOCK	BLOCK 08
PROPOSAL NO	SIA/BR/MIN/422378/2023
TOR NO	SIA/1(a)/2419/2023
AREA	30.70 HA
PRODUCTION	184200 cum/year or 379452 TPA
LOCATION	Mauza – Sagdaha, Kendih, Bandra, Block - Khaira, District- Jamui, Bihar.

Applicant

M/S Shakti Inframines Developers Pvt. Ltd.

Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto

Vill.- Khandpar, P.O.+ P.S.- Sheikhpura,

Dist.- Sheikhpura- 811105 (Bihar).



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Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

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1.0 PURPOSE OF THE REPORT

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage of project planning & design, find ways & means to reduce adverse impacts. By using EIA, we can decide the suitable mitigation measures for implementation to maintain healthy working environment and contain pollution within permissible limits.

River plays an important role in the lives of the people. The river systems provide irrigation, potable water, transportation, electricity, and the livelihoods for a large number of people all over the country and to rural areas. Apart from this, river is also a good source of construction grade material as sand & gravel.

As transportation and construction infrastructure expanded since last few decades, the demand for construction grade sand also increased exponentially. The market demand of river sand is high throughout the nation. Sand is extracted directly from the river channel and it doesn't require processing other than size grading. But it is now well understood that continued and indiscriminate sand mining can cause serious environmental impacts, particularly if the river being mined is eroded.

Environmental Impact Assessment is one of the proven management tools for integrating environmental concerns in development process and for improved decision making as there is a need to harmonize the developmental activities with the environmental concerns into the larger interest of the society. The growing awareness, over the years, on environmental protection and sustainable development, has given further emphasis to the implementation of sound environmental management practices for mitigating adverse impacts from developmental activities. EIA study plays a vital role in sustainable development of a country. Recognizing its importance, the Ministry of Environment and Forest, Government of India had formulated policies and procedures governing the industrial and other developmental activities to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concern in project development.

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF & CC dated 14th September, 2006

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and its subsequent amendment there-off and also the EIA Guidance Manual for Mining of Minerals of MoEF & CC, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area.

1.1 IDENTIFICATION OF PROJECT, PROJECT PROPONENT & CLUSTER APPROCH

The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar).

The proposed mining is a cluster of 04 mining lease area of Jamui Kiul Block 05, Jamui Kiul Block 06, Jamui Kiul Block 07 & Jamui Kiul Block 08 over an combined area of 77.40 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 05, Block 06, Block 07 & Block 08 are coming in cluster situation whose combined cluster area is 77.40 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

As per the Director of Geology, Bihar, the modification of mining plan has been approved .As per EIA notification 2016 and subsequent amendments, the project is coming under category ‘**B**’ (**B1**) and the lease area is more than 5.0 Ha, approved Mining Plan, Pre-feasibility Report and EMP are required for Environment Clearance in respect of the said quarry lease. Copy of letter is enclosed as **Annexure No. II.**

The Details of Cluster of lease area given below(As per DSR):

Sand Block Name	Area (Ha)	Production
Jamui Kiul Block 05	23.4	309000 TPA
Jamui Kiul Block 06	10.2	164388 TPA
Jamui Kiul Block 07	13.1	431364 TPA
Jamui Kiul Block 08	30.7	177984 TPA
Total	77.40	10,82,736 TPA

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The proposed project is of River bed sand mining and falls under Category- “B1” as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Jamui Kiul Block 08 Sand Ghat fall in Mauza – Sagdaha, Kendih, Bandra, Block - Khaira Dist - Jamui (Bihar). The details of the project are given below:

Name & Address of the Mine	Jamui Kiul Block 08	Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)
River	Kiul	
Mineral	Sand	
Area (Ha.)	Jamui Kiul Block 08	30.70 Ha.
Production	Jamui Kiul Block 08	379452 TPA
Postal Address	Jamui Kiul Block 08	M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto Vill.- Khandpar, P.O.+ P.S.- Sheikhpura, Dist.- Sheikhpura- 811105 (Bihar).
Status of Mine	Fresh application for Environmental Clearance.	
Project Cost	RS- 3,50,98,000/-	
CER Cost	CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 3,50,98,000/- x 2% = Rs. 7,01,960/-	

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 379452 Tonnes per annum. Detail has been given below:

The proposed project is over an area 30.7 ha for Jamui Kiul Block 08. Details are summarized in Table no 1.1

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As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B-1’**. The estimated project cost for the proposed project is **given below:** (including auction cost)

Table: 1.1 Project Cost & Production

Block	Area	Khata No	Khasra No	Production	Auction Cost
Jamui Kiul Block 08	30.7	159, 172, 150	1, 857, 920	379452 TPA	3,03,93,000
Total				379452 TPA	3,03,93,000

The proposed mining lease area falls in Survey of India Toposheet 72H/13, 72 L/1.

The mine lease co-ordinates and connectivity details are listed below:

Table: 1.2 Mine lease Pillar Co-ordinates (Jamui Kiul Block 08)

Pillar No	Latitude (N)	Longitude (E)
A	24°51'17.58"N	86°13'15.35"E
B	24°51'25.95"N	86°13'11.94"E
C	24°51'48.19"N	86°13'25.58"E
D	24°51'55.62"N	86°13'36.63"E
E	24°51'48.64"N	86°13'39.97"E
F	24°51'38.44"N	86°13'33.34"E
G	24°51'26.64"N	86°13'19.84"E

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10 KM BUFFER MAP OF THE STUDY AREA

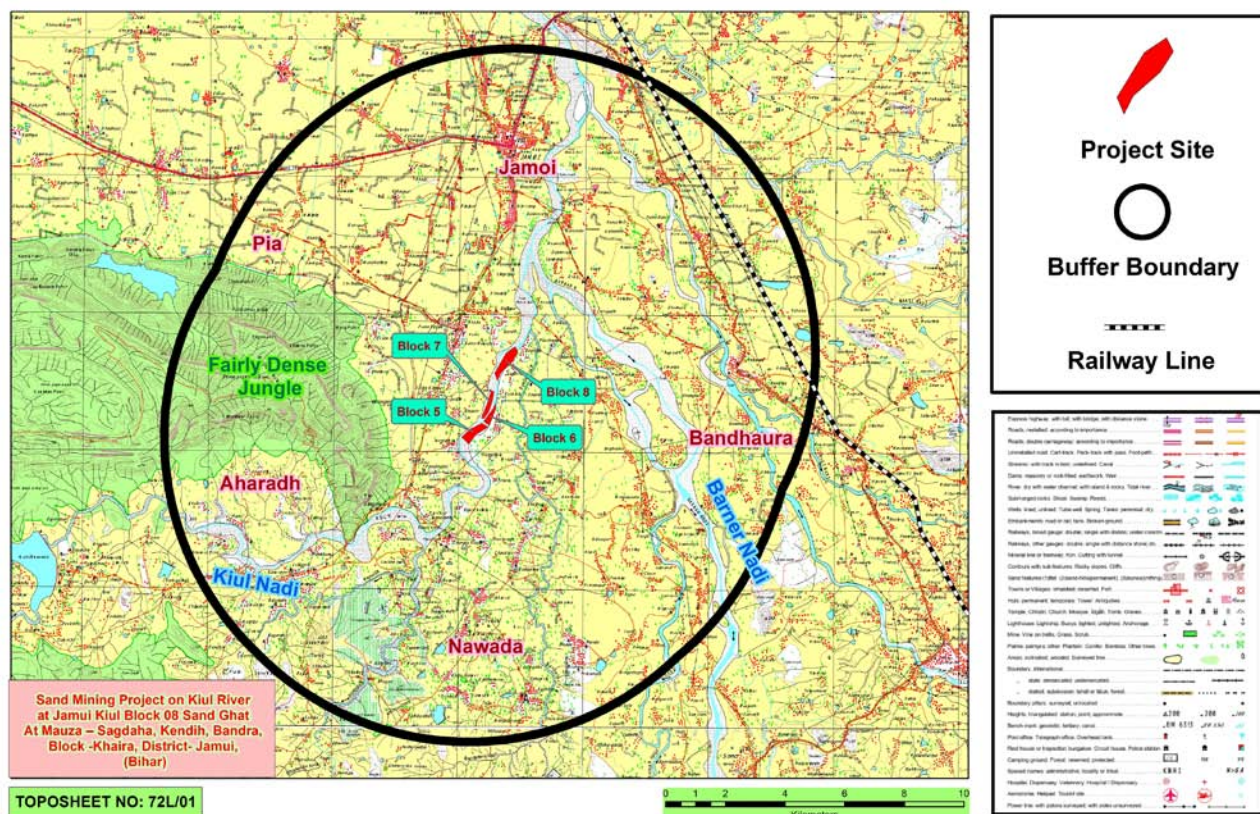


Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

Nearest Habitation/ town	Blocks	Village	Distance (Km) Direction
	Jamui Kiul Block 08	Bhandra	Bhandra, approx. 0.17 Km in E direction.
		Sagdaha	Sagdaha approx. 0.25Km in E direction.
		Kendih	Kendih approx. 0.60 Km in NW direction.
		Khaira	Jamui approx. 2.0 Km in

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			NW direction.
Nearest Railway Station	Blocks	Railway Station	Distance (Km) Direction
	Jamui Kiul Block 08	Jamui Railway Station	Jamui Railway Station at distance of approx. 13 km in NE direction.
Nearest Airport	Blocks	Airport	Distance (Km) Direction
	Jamui Kiul Block 08	Jayprakash Narayan Airport, Patna,	Jayprakash Narayan Airport, Patna, approx. 140 km towards NW direction.
Nearest Highway	SH-82 at distance of approx. 2.40 Km in North-East direction		

1.3, Details of environmental settings

Sl. No.	Particulars	Details
2	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	No Ecological Sensitive areas found within 10 km study area.
3	Nearest water body	The mine site lies on the dry bed of Kiul river.
4	Seismic Zone	Zone- IV <i>Source</i> <i>BMTC</i> <i>2nd</i> <i>edition</i> https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20II.htm

The EIA-EMP report is prepared as per the TOR granted under the EIA Notification. In order to assess the impact on environment due to proposed mine, it is necessary to ascertain present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operation.

Project's importance to the country and the region

Sands are ubiquitous material; available everywhere and is being used from the time immemorial for wide applications in our daily life; infrastructures, building construction, highways, roads, townships, multiplexes, foundations of buildings and industrial units etc. and is an integral part of development. Life without sand is unthinkable. Over the millennia, the weathering effect, the flow of water at high velocities in rivers and the pressure of water from the high mountainous reservoirs converted and pushed the hard ground underneath into sands, etc. which travelled as sediments with the flow. This sand got deposited along the river course wherever conditions were favorable. In the deep past this settled sand was not extracted in a quantity in which it deposited; since due to less population the requirements was not enough. As a result of continuous deposit of sand, the rivers went on changing their course, widening by itself, eroding the fields and expanding, resulting in flooding, inundation and breaking their banks, causing devastation of property and loss of life. There has been a severe impact on every aspect of the environment. The rivers thus, needed channelization and therefore, extraction of these minor minerals through mining was expedient. The haphazard mining of sands being practiced now for long, through unregulated, uncontrolled and illegal way added almost an irreversible damage to the environment, which became a cause of serious concern to everyone. Though sands are very important mineral source for development, its mining through scientific methods has also become equally imperative.

It is for this purpose that 'mining plan' is being drawn so that all its aspects are taken care of justifiably, according to law, protecting the environment, removing all adverse impacts and creating a direct and indirect employment opportunities, improving socio-economic conditions of the local inhabitants and all-around status of life, achieving thereby a sustainable development.

Besides the above, the process of mining of minor minerals (Sand) is a constant source of revenue generation to the State Government through Royalty.

1.4 SCOPE OF THE STUDY

The project proposal was submitted to State Level Environment Impact Assessment Authority-Bihar for its appraisal. Based on which, presentation was held for Terms of Reference (TOR). Based on the

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data provided and presentation made, the SEIAA-Bihar has issued the Terms of Reference is attached at **Annexure-1**.

Followings are the point wise compliance of the ToR provided by the SEIAA Bihar.

Table: 1.5 Point wise Compliance for TOR of of Jamui Kiul Block 08
(ToR File No- SIA/1(a)/ 2419//2023)

S. No	TOR	Compliance	Reference in the Report
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is fresh LOI, Mine is yet to be opened. It will open only after getting environmental clearance.	--
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 consent for mining vide letter no. 2249 dated 22-12-2022 in favor of M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar	Annexure II, LOI
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 and mining technology	The documents including mine plan and EIA report submitted are compatible with one another w.r.t. to following information: Mining Lease Area- 30.7	Annexure- III Mine plan All details has been complied in

	and should be in the name of the lessee.	<p>Hectare.</p> <p>Lessee: M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar.</p> <p>Proposed Production- 184200 cum/year or 379452 TPA.</p> <p>Waste generation-</p> <p>No waste will be generated.</p> <p>Mining Method-Opencast semi-mechanized method</p>	chapter-2
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).	All Corner Coordinates of mining lease area superimposed on Toposheet Map has been incorporated in EIA/EMP Report	Refer Chapter 2 Fig: 2.1, Corner Coordinates map
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	<p>The land use map showing salient features of the area is given in the report.</p> <p>The geological map of the mine lease area is also given in the report showing geomorphology</p>	Land-use of the study area Figure 3.1.
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	<p>The Lease area is dry part of River bed. This is a barren land.</p> <p>The mining process will be</p>	Chapter II & III

	State; land diversion for mining should have approval from State land use board or the concerned authority.	done by land use policy of the State & no land diversion has been proposed.	
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 processes /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 insuring compliances 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.	Chapter VIII Section 8.1 Corporate Environment Policy
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	Issue related to mine safety has been given in of chapter 7.	

	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.	<p>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.</p> <p>All the details in the EIA report are for the life of the mine period.</p> <p>The details of mining & production have been given in the report.</p>	<p>Chapter I</p> <p>Figure 1.1</p>
10	<p>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.</p> <p>Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p>	<p>Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report.</p> <p>The study area lies in Kiul River.</p> <p>No Ecological Sensitive areas found within 10 km study area.</p>	<p>Land-use of the study area Figure 3.1 , Table 3.1</p> <p>10 km buffer map enclosed in Chapter I of EIA Report.</p>
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use ,R&R	There is no overburden outside the mine lease area.	

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	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.	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 schedule 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	However, the vegetation details of the study area are incorporated with the report.	Chapter III Section 3.1.6 Biological Environment
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 IV of EIA/EMP Report.	Chapter IV
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	No National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed) are found within 10 km of the study area. MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III Section 3.1.6 Biological Environment

	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.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in the report.	Chapter III Section 3.1.6 Biological Environment
19	Proximity to Areas declared as ‘Critically Polluted’ or the Project areas attracting court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the	Proposed project does not come under critically polluted area.	

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	prescribed Authorities, such as the SPCB or State Mining Dept. 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)	There is no R & R involved in this project.	
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	There is no R & R involved in this project.	

	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	Base line study was carried out for March 2023 to May 2023 Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction & wind speed) of the study area. The wind rose has been given in chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary. The location of the monitoring sites has been shown in map.	Chapter III

	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.	A detailed study on Air quality modeling will be incorporated at the time of FEIA.	
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for the project is 2.10 KLD for drinking, dust suppression and green belt development. A detailed water balance is being provided in the report.	Chapter –II Section 2.7 Water Requirement
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the	Water requirement will be fulfilled by private water tanker. So, no clearance is required.	Chapter II

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

	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 required should be provided.	<p>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.</p> <p>No artificial rainwater harvesting is proposed for the present project in lease area, however if any such project proposed by State Government PP will help out for the above.</p>	
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided".	<p>Mining activity will be done on Dry Bed of River so there is no impact on surface water.</p> <p>Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.</p>	Chapter II
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	The detailed impact and control measure w.r.t the quality of water in the surrounding area is discussed under Chapter 4.	

	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.	The project site lies on Kiul 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 mining will be done as per the approved mining plan and 1 meter bgl whichever comes first.	
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and Quantities 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	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 Plant species selected for green belt is detailed in the EIA	Chapter VIII Section 8.2

	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.	report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving 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.	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV
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,	Chapter II

		protective equipments, etc. Details are given in the EIA/EMP 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.	Conceptual plans and Sections are given in Chapter 2.	
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.	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 have been given in the report, discussed in Chapter-4. Each labour will undergo pre-placement medical examination. Thereafter periodical health check up will be arranged as stated in the report. About 4.0 lakh has been earmarked for occupational health.	Chapter VII

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-VIII.	Chapter VII
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 to time for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report.	Chapter VI
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 has been mentioned in of the EIA/EMP Report.	Chapter VIII
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	This is a draft EIA report. Public hearing is yet to be conducted.	--

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

	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.	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 of 3.22 lakh & 5.5 lakh (for Block 08) as recurring cost has been earmarked for EMP. Chapter IX table no. 9.2	Chapter IX
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VII
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.	2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of village.	
44	Besides the above, the below mentioned general points are also to be followed:-		
a	All documents to be properly referenced with index and continuous page numberings.	All the documents are properly referenced with index and continuous page numbering.	

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

b	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	Compiled With EIA report.	
c	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.	Compiled With EIA report.	
d	Where the documents provided are in a language other than English, an English translation should be provided.	Compiled With EIA report.	
e	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled With EIA report.	
f	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Compiled With EIA report.	

g	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.	Agreed	
h	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.	This is new case for Mining. No certified compliance is required.	
i	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	Compiled With EIA report.	

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

	dumps, if any, clearly showing the land features of the adjoining area.		
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Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

2.0 TYPE OF PROJECT

The project is proposed is for sand block Jamui Kiul Block 08 for the excavation of sand from the bed of river Kiul. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

The project site lies on Kiul River. The river get recharged by the rain water and carries sediment consisting of sand etc during monsoon season, generally.

Sand is used widely in the construction industry. It is usually mixed with cement and other ingredients to create mortar for building. It is also used in agriculture, as sandy soils are ideal for crops such as watermelons, peaches and peanuts. Sand is also used in Aquaria as it makes a low cost aquarium base material. This project will also provide employment to local people helping them earn livelihood.

2.2 LOCATION DETAILS

The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 08, Sand Ghat at Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar).

The proposed mining is a cluster of 04 mining lease area of Jamui Kiul Block 05, Jamui Kiul Block 06, Jamui Kiul Block 07 & Jamui Kiul Block 08 over a combined area of 77.40 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 05, Block 06, Block 07 & Block 08 are comes in cluster situation whose combined cluster area is 77.40 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The address of the proponents is given below:

Sand Block name	Area (Ha)	Production
Jamui Kiul Block 05	23.4	309000 TPA
Jamui Kiul Block 06	10.2	164388 TPA

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Jamui Kiul Block 07	13.1	431364 TPA
Jamui Kiul Block 08	30.7	177984 TPA
Total	77.40	10,82,736 TPA

Table: 2.1 Mine lease Pillar Co-ordinates (Jamui Kiul Block 08)

Pillar No	Latitude (N)	Longitude (E)
A	24°51'17.58"N	86°13'15.35"E
B	24°51'25.95"N	86°13'11.94"E
C	24°51'48.19"N	86°13'25.58"E
D	24°51'55.62"N	86°13'36.63"E
E	24°51'48.64"N	86°13'39.97"E
F	24°51'38.44"N	86°13'33.34"E
G	24°51'26.64"N	86°13'19.84"E

Sand Ghat is well connected to the nearest metalled road 0.06 km distance from the lease. SH-82 at distance of approx. 2.40 Km in North-East direction. Jamui Railway Station at distance of approx. 13 km in NE direction.

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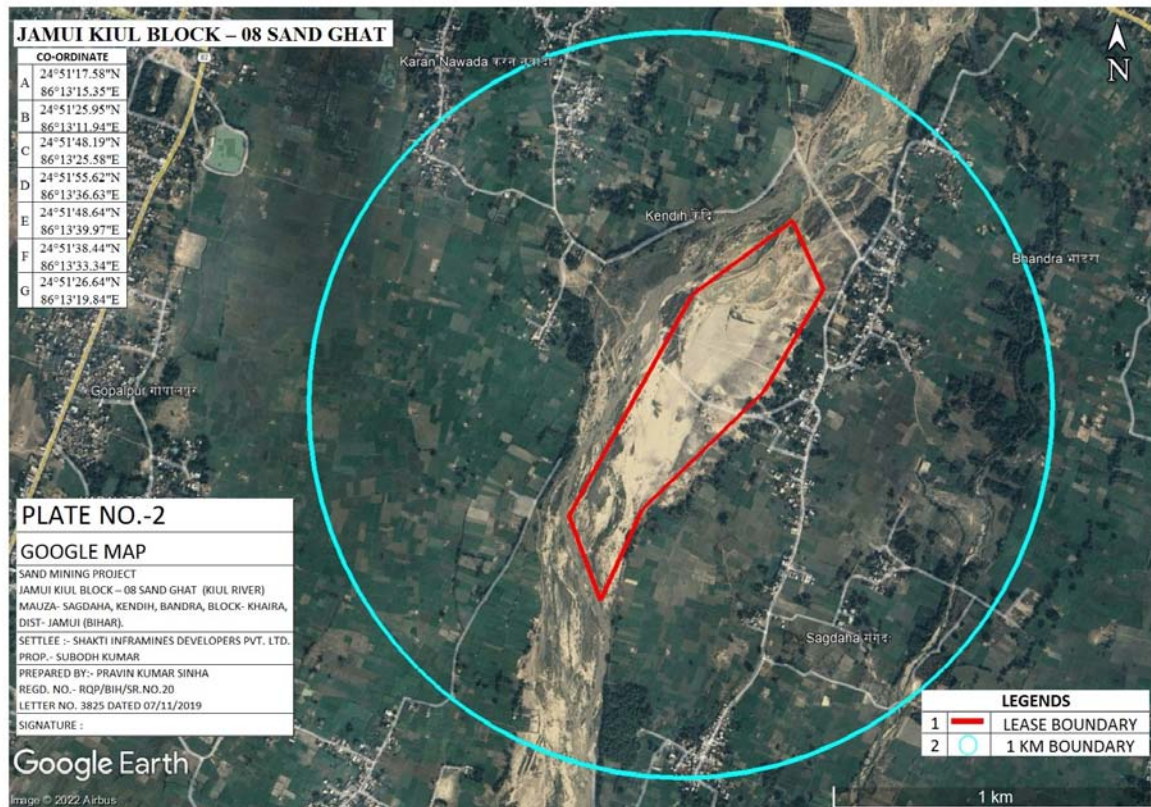


Figure 2.1:- Pillar Coordinate map of Jamui Kiul Block 08

2.2.1 Lease / Block Area

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production is given below in tabular form.

Block	Area	Khata No	Khasra No	Production	Auction Cost
Jamui Kiul Block 08	30.7	159, 172, 150	1, 857, 920	379452 TPA	3,03,93,000
Total				379452 TPA	3,03,93,000

As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as Category 'B-1'. The estimated project cost for the proposed project is given in above table.

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

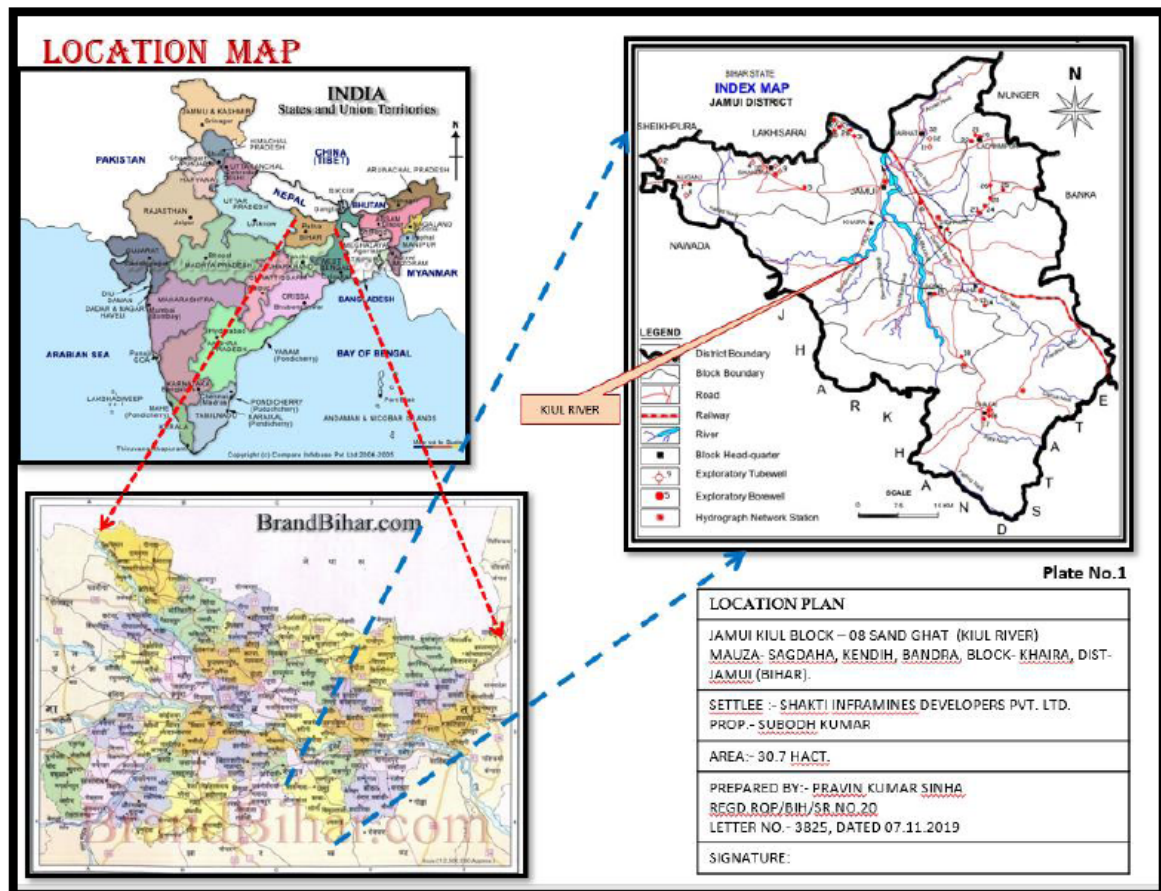


Figure 2.2:- LOCATION MAP OF THE PROJECT SITE

2.3 TOPOGRAPHY & GEOLOGY

2.3.1 Topography

Most of the part of the district has hilly topography. Western portion of Jamui like Sikandra Jamui a little part of Khaira has plain area. Sikandra block is situated in alluvial zone. A sizeable part of the district comprise plains which are paddy-growing lands. Southern part of the district is covered with hills and forest characteristically reminiscent of the Chhotanagpur plateau in physical features. Hills of the district are considered to be the out – laying extension of Vindhya Range. Southwest part of the district has another block of hills known as Gidheswar Pahar.

Source: Mining plan

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2.3.2 GEOMORPHOLOGY

The district has a diverse geomorphology ranging from hills to flood plains. The major geomorphic units are rocky upland, plateau / pediplain and alluvial plain.

There are three major hilly tracts, namely, a) the hills of Batia-Jhajha area having strike in east-west direction lying in the northern fringe of Chakai plateau, b) the Gidheshwar hills in the western part of the district and c) the Kharagpur hills lying in north-eastern part of the district. Attaining a height of 475 m amsl in Barhat block.

Plateau representing oldest table land in the area is Chakai plateau. The pediplains having rolling topography has relief up to 300 m amsl. It extends from Batia to the south of Kharagpur hills and comprises residual soil overlain by mixture of sheet wash deposits.

Alluvial plain is represented by Jamui terrace. It is made up of sediments derived from the denudation of Chakai plateau and Kharagpur hill. The thickness of alluvium in the northern part is about 80 m, while in southern part it reduces to 10 m. Other landforms such as escarpment, inselberg, valley fills are also present.

Source: https://cgwb.gov.in/District_Profile/Bihar/Jamui.pdf

2.3.3 REGIONAL GEOLOGY

Geologically, it represents nearly two third of Bihar is under cover of Ganga basin composed of alluvium and masks the nature of basement rocks.

Showing the Geological Succession and their geographic distribution

Table 2.2 Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhya	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist

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Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda, Sheikhpura and Munger District
Proterozoic	Mica Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

Source: Mining Plan

2.3.4 LOCAL GEOLOGY OF THE AREA

Kiul River is a tributary of Ganges. Kiul River originates in Giridih of Jharkhand and flows through Lakhisarai, Sheikhpura and Jamui districts of the Indian state of Bihar and joins Harohar river in the Diara region. Kiul originates from the Tisri Hill Range in Kharagdiha police station area of Giridih district. After forming the boundary of the district for a short distance it enters Jamui district through a narrow gorge near the Satpahari hill. It first flows in an easterly direction close to the southern base of the Girdheswari Hills. It turns northward at their eastern extremity and passes near the town of Jamui. Two miles south of Jamui it is joined by Barnar, below this point it receives the Alai, a mountain stream and near Jamui railway station it is joined by the Anjan. It then flows north-east up to Lakhisarai, It passes below the railway bridge between Kiul junction and Lakhisari station and is joined a few miles north of that place, near Rahuaghat, by the Harohar (Halahar or Harhobar), a continuation of the Sakri River. After this it turns due east and falls into the Ganges near Surajgarha. Until it meets the Harohar the Kiul has broad sandy bed and in some places is as much as half a mile wide, though it contains very little water in summer.

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is coarse and at the tale end of the river the grain size is reduced to smaller sizes resulted in the formation of

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clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition.

Source: Mining Plan

2.3.5 CLIMATE

The average annual rainfall of district is 1107.3 mm. About 80% of the rainfall is received during June to September by south-west monsoon. The climate of Jamui district represents a transition between dry and extreme climates of the northern India and warm and humid of West Bengal. In the summer season the diurnal temperature rises up to 42⁰C, while in winter season it drops to as low as 2⁰C.

Source: https://cgwb.gov.in/District_Profile/Bihar/Jamui.pdf

2.4 GEOLOGICAL RESERVE

The geological reserves have been each stretches & for individual blocks. Geological reserves have been completed through cross sectional area method. The area of each section line is multiplied by strike influence to get the volume.

Proved Mineral Reserves (111): All quantities of sand occurring up to depth of 1m from surface has been considered as proved reserves.

Table-2.2:- Proved Mineral Reserves

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserves	111	307000
Total		307000

Total Geological Reserve = **307000cum. or 632420 tonnes.**

Source Mining Plan

2.4.1 Mineable Reserves:

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.06 kg/m³) to get the tonnage.

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The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to paleochannels of the river will be leveled & restored back.

Table-2.4:- Summary of minable reserves of Jamui Kiul Block 08 Sand Ghat as below (the bulk density multiply by 2.06)

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
91-90	1138	251	1	285638	588414
Total				285638	588414

Total Mineable Reserve = 285638 CUM or 588414 Tonnes

Table No-.2.5 Classification Mineral Reserves:

Sand Ghat	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Mineable Permitted Reserve As per LoI (m3)
Jamui Kiul Block 08	30.7	307000	285638	184200

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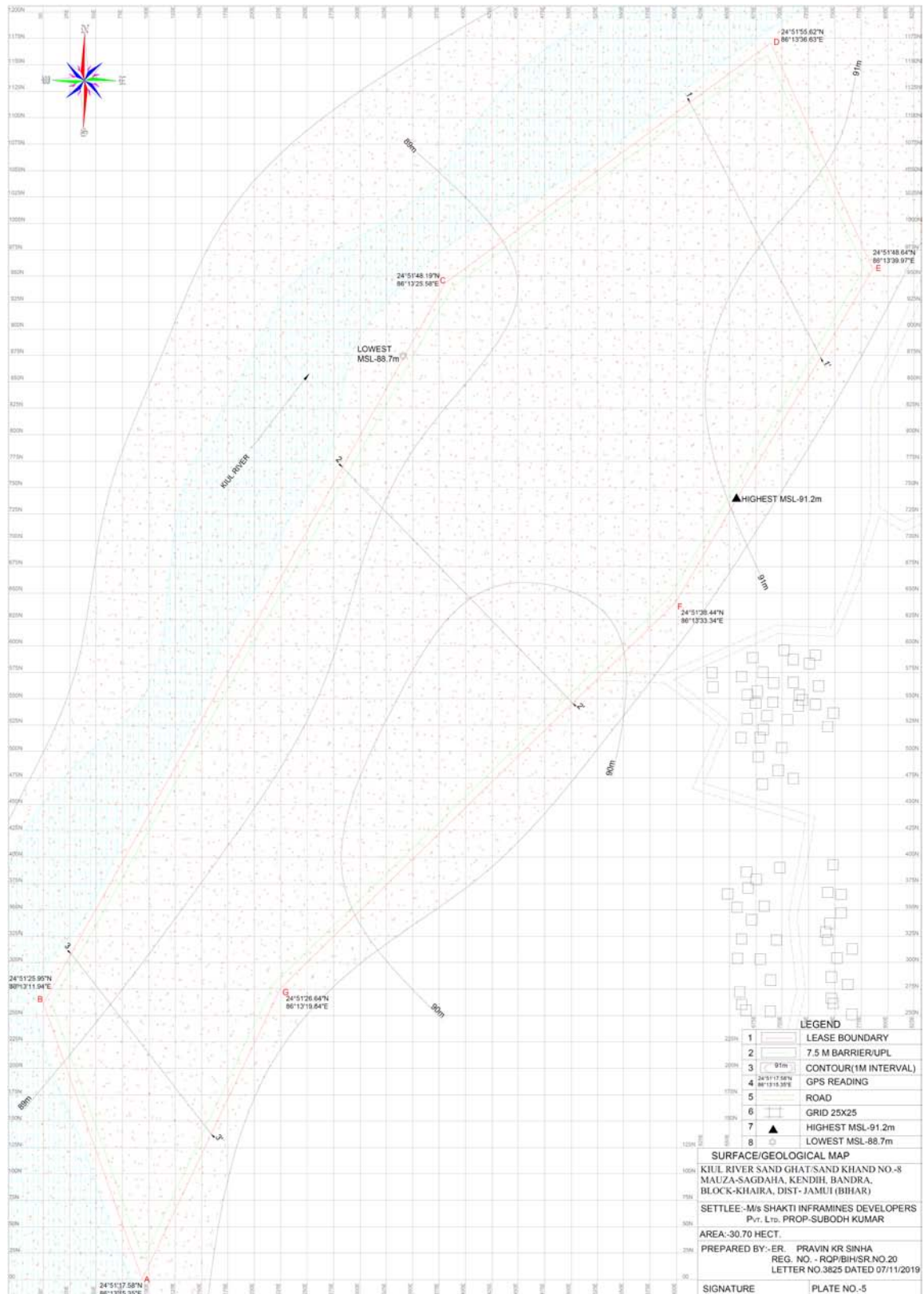


Figure 2.3:- Surface cum Geological Section of Jamui Kiul Block 08

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

2.4.2 Type of Mining

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019, SSMG -2016, and EMGSM – 2020.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 1 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6 m width will be maintained for mining blocks as per guideline M.M.R-12019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from Jamui Kiul Block 08 is given below:-

Table 2.3 Year wise Production Details of Jamui Kiul Block 08

YEAR	ROM sand (cum)	ROM sand (Tones)
1 st Year	184200	184200
2 nd Year	184200	184200
3 rd Year	184200	184200
4 th Year	184200	184200
5 th Year	184200	184200

Source: Mining Plan

2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Jamui Kiul Block 08 Sand Ghat. However, as the digging depth will be restricted to 1.0 m only. This will be further replenished during rainy

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season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

(i) Final Slope Angle to Be Adopted: River bank side will be protected by working in dry part of the river and by leaving safety distance of the width of the river of 5 meter. Bank side natural slope will not be disturbed. This will prevent collapse of bank and erosion. However, the height of the bank with respect to river bed is varying from 3-4 meters.

(ii) During plan period workings will be carried out in the Sand Ghat at a time of the Applied Area simultaneously. Scattered workings will ensure safety, remove congestion of vehicles and will have better control and management.

(iii) Ultimate Capacity of Dumps: There will be no OB removal / during the plan period. Therefore no proposal has been envisaged for its separate dumping. No outside material will be filled up in the extracted zone

2.6.0 Anticipated life of mine

There is as such no specific life of the mine as the area under reference is inactive part of river bed of the river and its pale channels and whatever quantity of minor minerals are extracted from the Applied Area during five year; almost equal to extracted quantity of the same are replenished every year and the river bed area will be leveled & restored back.. However, as lease has been granted for 5 years, mining will be done for the allotted time.

2.6.1 Waste –disposal arrangement

No top soil is present in the mining area as it is riverbed. Small amount of domestic waste will be generated by the workers at the site, which will be disposed off through proper municipal way. No other waste generation is expected. No waste will be thrown into the streams or left on the banks. Separate bins will be kept within the lease area for domestic wastes.

2.7 GENERAL FEATURES

2.7.1 Land-use pattern

The mine lease area is flat river bed and river banks. There is no forest land or agriculture land in the mine lease area. The entire mining lease lies within River.

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2.7.2 Surface drainage pattern

The mine site lie on the dry bed of Kiul River so there will be no impact on surface water.

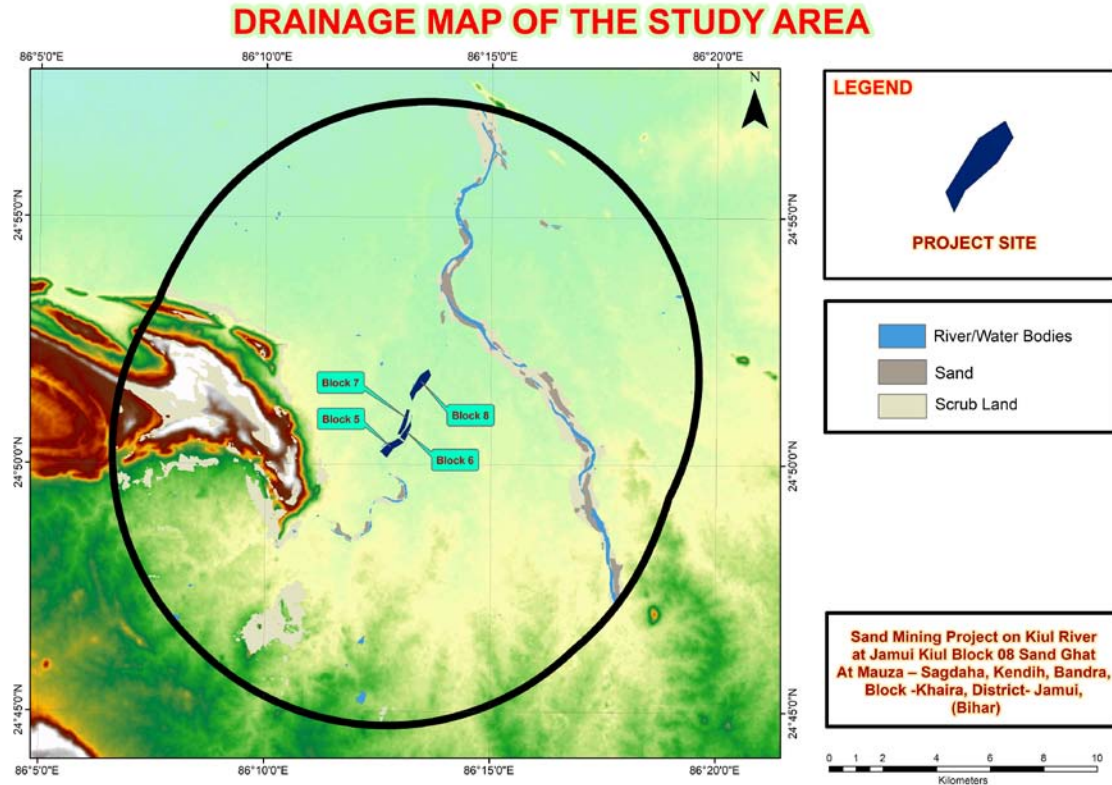


Fig-2.4, Drainage map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 20 who will be utilized for excavation & loading of minerals into trucks or tractor-trolleys. Break-up of Man-power requirement is given in below **Table 2.8**.

Table 2.4 Manpower Requirement

S. No.	Category	Numbers
1.	Administration	01
2.	Supervisor	02
3.	Skilled	05
4.	Un-skilled	12
TOTAL		20

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2.7.4 Water supply

Water requirement for the proposed project will be provided for the workers for drinking & domestic purpose. Water will also be provided for dust suppression. Fresh water will be only used for drinking purpose. The break up for water requirement is given below:

Table 2.5 Water requirement

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor $10 \times 20 / 1000 = 0.20$ KLD	0.20
Dust Suppression	Total approach road to be water sprinkled = 60 m $60 \text{ m} \times 6 \text{ m} \times 0.5 \times 2 \text{ times} / 1000 = 2.52$ KLD	0.36
Plantation	307 plant (during plan period) @ 5 L/per plant = $307 \times 5 \text{ lts} = 1535 / 1000 = 1.53$ KLD	1.53
Total		2.09 – 2.10 KLD

The water will be supplied from available sources from nearby village.

2.7.5 Site services

The following facilities/amenities will be extended by the mine management under site services:

- A temporary rest shelter will be provided for the workers near to the site for rest.
- Provisions will also be made for following in the rest shelter:
 - ❖ First aid box will be made available at the site. In emergency worker.
 - ❖ Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.
 - ❖ Mask and gloves distribution to the workers.

2.7.6 Extent of Mechanization

The operation will be open cast semi- mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.

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2.7.7 Statutory requirements

It is accepted that effective resource management cannot be done in isolation. The proponent therefore vigorously pursues approaches towards coordination and integration where possible, so as to lead to coordinated regulatory systems.

Various acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of include inter alia, the following:

- Bihar Minor Mineral Concession Rule, 2014 amended till date.
- The Mines Act, 1952.
- The Mines and Mineral (Development and Regulation) Act, 1957.
- Mines Rules, 1955.
- Mineral Concession Rules, 1960.
- Mineral Conservation and Development Rules, 1988.
- The Water (Prevention and Control of Pollution) Act, 1974.
- The Air (Prevention and Control of Pollution) Act, 1981.
- The Environment (Protection) Act, 1986.
- The Forest (Conservation) Act, 1980.
- The Wildlife (Protection) Act, 1972.

3.0 General

The main objective of describing the environment which may be potentially affected, are i) to assess present environmental quality and the environmental impacts and ii) to identify environmentally significant factors that could preclude mine development. Mining activities affect the existing status of environment at site. In order to maintain the existing environmental status at mining site it is essential study existing environmental status and assess the impact of upcoming project on various environmental components. This chapter gives idea of description of environment status of the study area and this will be helpful for assessment of impact on the environment due to proposed mining activities. Baseline environmental status in and around proposed mining lease area describe the existing conditions of air, noise, water, soil, biological and socio-economic environment. The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The data was collected for various environmental attributes so as to compute the impacts that are likely to arise due to proposed development activity.

3.0.1 Study area & study period

The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The baseline environment quality was carried out over a radial distance of 10 km around the mining lease area during the months of March 2023 to May 2023.

3.0.2 Methodology

Base line attributes like ambient air, water, meteorology, noise, Soil, Ecology and Biodiversity & Socio Economy condition were collected as per approved term of reference. Secondary data was also collected from various government department as well as local people. Methodology adopted in this study is as follows.

- ✓ By setting up meteorological station near project site
- ✓ Collection of site specific meteorological data at the mine site.
- ✓ Installation of respiratory dust samplers (for PM₁₀, PM_{2.5}) at different location in the study area for the collection of primary air pollutant and analyze the existing air conditions.
- ✓ Carrying out a detailed biological study for the Core and Buffer Zone

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- ✓ Soil sample were collected from various location in the study area to analyze physical and chemical characteristics for assessment of impact on soil.
- ✓ Surface and Ground water samples were also collected from the various locations in the study area for analysing the existing water quality in the study area.
- ✓ Noise measurement has been done in core zone as well as buffer zone to analyze the existing situation in the study area.
- ✓ Literature review that includes identification of relevant data and articles from various publications, various government agencies and other sources for socio-economy, demography has been done with primary data collection in 10 km of the study area.
- ✓ Existing pollution load has been also identified in the buffer zone due to similar activities.
- ✓ Accordingly, field studies were carried out during the study period (March 2023 to May 2023) to establish the existing baseline conditions.

3.1 Land Environment of the Study area

Land use

Land use involves the management and modification of natural environment or wilderness in to built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the total of arrangements, activities and inputs that people undertake in a certain land cover type.

Land cover

Land cover is the physical material at the surface of the earth. Land covers include grass, asphalt, trees, bare ground, water, etc. Earth cover is the expression used by ecologist Frederick Edward Clements that has its closest modern equivalent being vegetation. The expression continues to be used by the Bureau of Land Management.

To assess the land use pattern surrounding the 10 km radius of the site, a detailed study was carried out. The land use pattern study reveals that the 10 km environs is predominantly agricultural land. The land use details are given in **Table- 3.1** and shown in **Figure-3.1**.

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Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha)
Scrub Land	2166.55
Forest	3574.09
River/Water Bodies	288.31
Settlement	4858.86
Vegetation	327.65
Agriculture	28065.34
AREA	39280.80

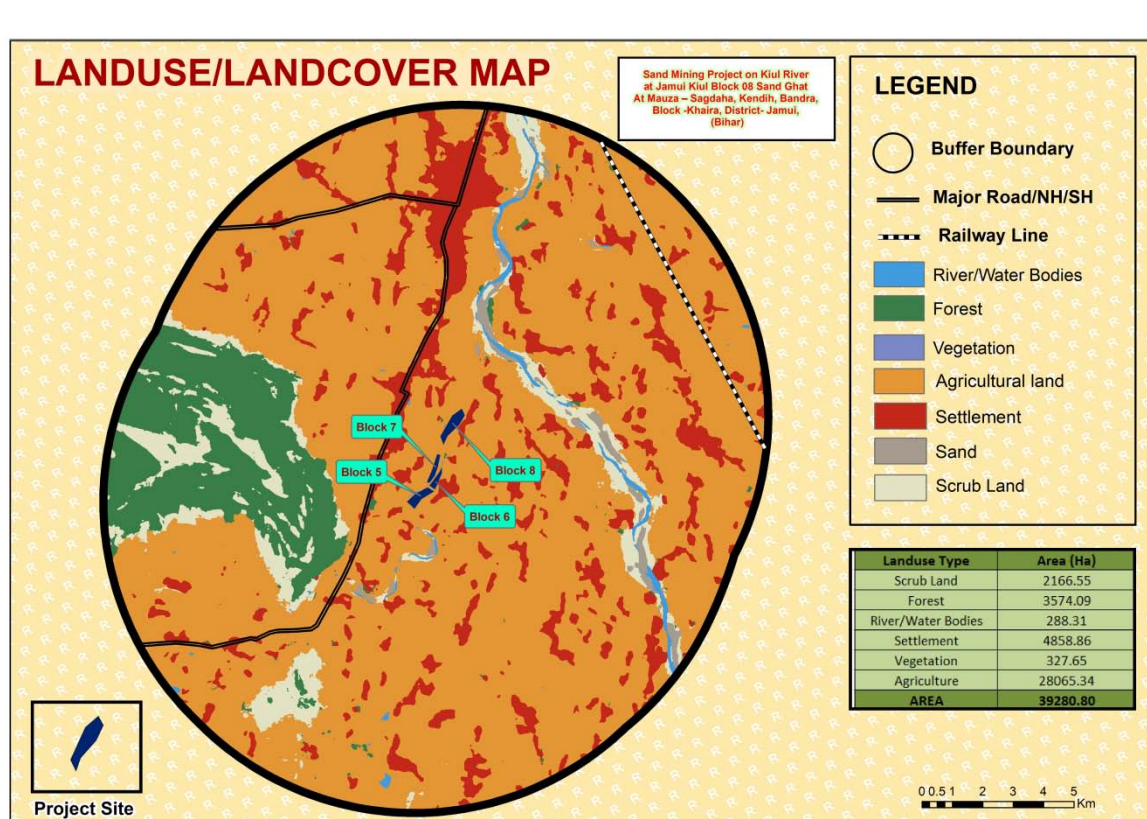


FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

3.2 Water Environment

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of

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ground water has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture purpose.

The water quality at the site and other locations within the 10 km impact zone was monitored during March 2023 to May 2023. The water sampling locations marked within the study are presented in **Table 3.2** and **Figure 3.2** and the result of the monitoring and analysis are presented in the **Table 3.3** showing Water Quality Monitoring Locations marked within the Study Area.

Table 3.2: Water Sampling Locations

Water (Ground) Monitoring Locations		
GW 1	Mangobandar Bazar	5.90 km ESE
GW 2	Nariyana village	4.25 Km NE
GW 3	Tola Bheriatar	3.50 Km S

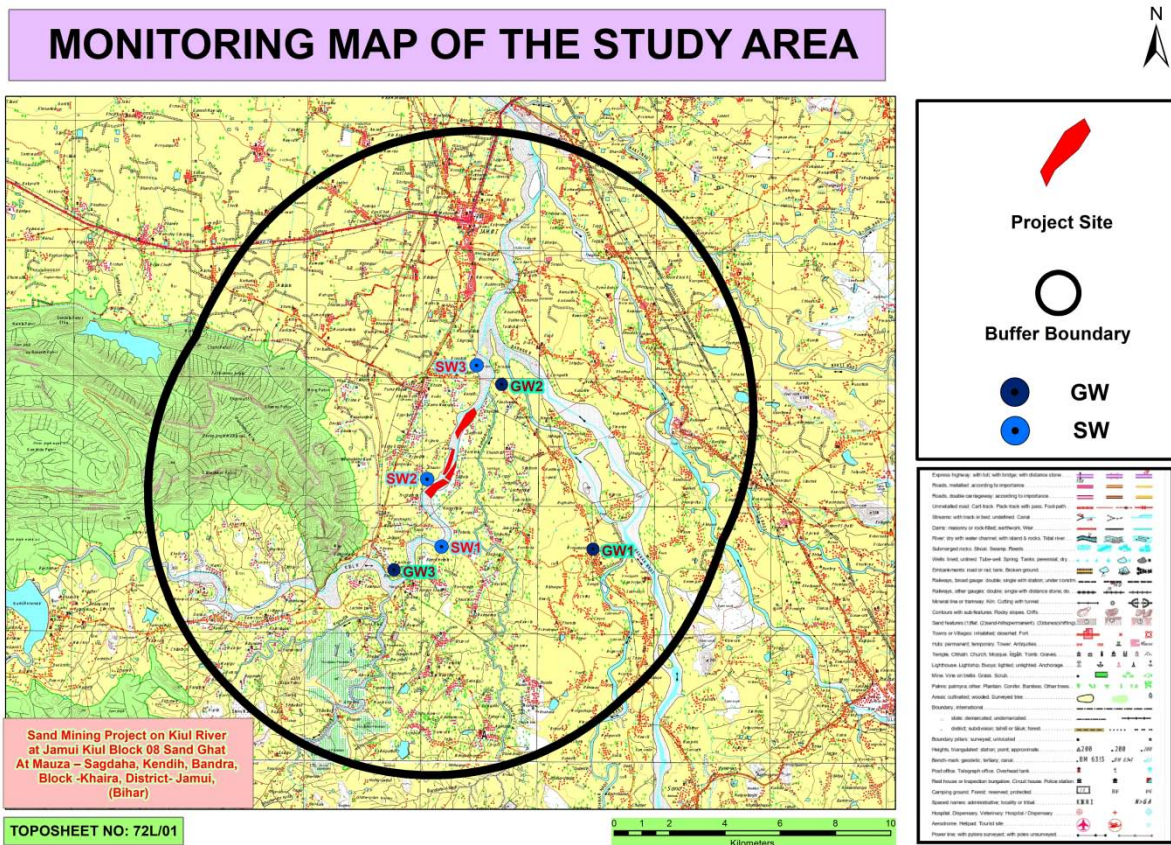


Figure 3.2 Water Sampling Location Map

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Table 3.3 Ground Water Quality Monitoring Result

S.N.	Parameters	GW1	GW2	GW3	Acceptable/Permissible Limit (IS 10500:2012)
1	pH Value	7.2	7.7	7.5	6.5-8.5/No relax
2	EC, $\mu\text{S}/\text{cm}$	537	618	543	--
3	Turbidity NTU	<1	<1	<1	1/5
4	TDS mg/l	360	414	364	500/2000
5	TSS mg/l	<1	<1	<1	--
6	Total Hardness as CaCO_3 mg/l	227	266	210	200/600
7	Chloride as Cl mg/l	66.4	83.9	66.2	250/1000
8	Total Alkalinity mg/l	120	126	121	200/600
9	Sulphates as SO_4 mg/l	19.7	29.1	19.1	200/400
10	Nitrates as NO_3 mg/l	32.9	36.4	30.6	45/No relax.
11	Fluoride as F mg/l	1.02	0.81	0.85	1/1.5
12	Iron as Fe mg/l	0.18	0.06	0.10	1.0/No relax.
13	Zinc as Zn mg/l	0.90	0.75	0.86	5/15
14	Calcium as Ca mg/l	55.6	65.7	60.2	75/200
15	Magnesium as Mg,	21.5	24.8	14.6	30/100
16	Sodium as Na mg/l	16.0	17.5	21.3	--
17	Potassium as K mg/l	0.6	1.7	3.0	--
18	Cadmium as Cd mg/l	BDL	BDL	BDL	0.003/No relax
19	Copper as Cu mg/l	BDL	BDL	BDL	0.05/1.5
20	Nickel as Ni mg/l	BDL	BDL	BDL	0.02/No relax.
21	Lead as Pb mg/l	BDL	BDL	BDL	0.01/No relax.
22	Mercury as Hg mg/l	BDL	BDL	BDL	0.001/No relax.
23	Chromium as Cr	BDL	BDL	BDL	0.5/No relax.
24	Arsenic as As mg/l	BDL	BDL	BDL	0.01/0.05
25	Cyanide as mg/l	BDL	BDL	BDL	0.05/No relax.
26	Phenolic compound mg/l	BDL	BDL	BDL	0.001/0.002
27	Oil & grease	<1	<1	<1	--
28	Total Coliform MPN/100ml	Absent	Absent	Absent	Shall not be detectable in any 100 ml sample
29	SAR	1.51	1.63	1.45	-

Observation:

Analysis of results of ground water reveals the following: -

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- pH varies from 7.2 to 7.77.
- Total hardness varies from 210 mg/l to 266 mg/l .
- Total dissolved solids vary from 360 mg/l to 414 mg/l.

The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.

3.2 (b) SURFACE WATER

Three surface water samples were collected from the study area. The location of surface water samples is given in Table 3.3 (iii). The physio-chemical analysis of the these samples are given in the Table 3.3 (iv)

Table 3.4: Surface water sampling locations

Surface Water Monitoring Locations		
SW1	Upstream Near village Pakri	1.30 Km SSE
SW 2	Project site	----
SW 3	Downstream near village Parsa	0.85 N

Table 3.5: Physio-chemical properties of surface water

S.No.	Parameters	SW1 Project	SW2 Upstrea	SW3 Downstrea	Acceptable/Permissibl e Limit (IS 10500:2012)
1	pH Value	7.2	7.1	7.2	6.5-8.5/No relax
2	Temperature ⁰ C	24.3	25.3	24.1	--
3	Turbidity	2.1	3.9	3.2	
4	EC, μ S/cm	240	282	305	
5	Sulphates as SO ₄ mg/l	22.5	27.1	22.9	200/400
6	Nitrates as NO ₃ mg/l	3.6	2.8	3.3	45/No relax.
7	TH as CaCO ₃ mg/l	99	117	114	200/600
8	Chloride as Cl mg/l	50.1	53.4	57.3	250/1000
9	Fluoride as F mg/l	0.24	0.31	0.37	1/1.5
10	C.O.D mg/l	21.5	22.3	22.8	--
11	Iron as Fe mg/l	0.23	0.21	0.31	1.0 /No relax.
12	D. O. mg/l	7.6	6.8	6.7	--
13	TDS mg/l	161	189	204	500/2000
14	B.O.D. 5 days mg/l	5.6	10.3	7.2	--
15	Calcium as Ca mg/l	20.3	23.5	25.1	75/200
16	Magnesium as Mg,	11.6	14.1	12.4	30/100
17	Arsenic as As mg/l	BDL	BDL	BDL	0.01/0.05
18	Lead as Pb mg/l	BDL	BDL	BDL	0.01/No relax.

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19	Copper as Cu mg/l	BDL	BDL	BDL	0.05/1.5
20	Zinc as Zn mg/l	BDL	BDL	BDL	5/15
21	Manganese mg/l	BDL	BDL	BDL	-
22	T Chromium as Cr	BDL	BDL	BDL	0.5/No relax.
23	Sodium as Na mg/l	13.5	13.6	19.2	--
24	Potassium as K mg/l	1.20	1.8	2.2	--
25	Total Alkalinity mg/l	31	43	50	200/600
26	Phosphate as PO ₄ mg/l	0.04	0.21	0.29	-
27	Nitrite (as NO ₂), mg/l	0.17	0.20	0.20	-
28	TSS, mg/l	6.2	21.4	10.0	-
29	Fecal Coliform MPN/100ml	230	780	460	Shall not be detectable
30	Total Coliform MPN/100ml	300	950	710	Shall not be detectable
31	Cadmium as Cd mg/l	BDL	BDL	BDL	0.003/No relax
32	Mercury as Hg mg/l	BDL	BDL	BDL	0.001/ No relax.
33	Nickel as Ni mg/l	BDL	BDL	BDL	0.02/No relax.
34	Cyanide as mg/l	BDL	BDL	BDL	0.05/No relax.

3.2.1 Sampling frequency

Parameters for analysis of water quality were selected based on the utility of the particular source of water as per CPCB guidance. Surface water quality was monitored for parameters as per Methods of Monitoring & Analysis published by CPCB and it was rated according to the CPCB Water Quality Criteria against A, B, C, D & E class of water. Water samples were collected as Grab water sample from sampling location for complete physico-chemical and bacteriological tests respectively. The samples were analyzed as per standard procedure / method given in IS: 10500.

The surface water quality is compared with CPCB water quality criteria mentioned in **Table 3.4** below:

Table 3.6, Water quality criteria as per Central Pollution Control Board

Designated-Best- Use	Class of water	Criteria
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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 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

As per the standard practice, one sample from each station was taken in January. Sampling was done by standard sampling technique as per the Standard Methods. Necessary precautions were taken for preservation of samples.

3.2.2 Result & Conclusion:

Surface water Observation:

- The analysis results indicate that the pH ranges between 7.1 and to 8.2.
- Dissolved Oxygen (DO) was observed in the range of 6.7 to 7.6 mg/l against the minimum requirement of 4 mg/l.

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- BOD values were observed to be in the range of 5.2 to 10.3 mg/l.
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 4000 MPN/100 ml to 1500 MPN/100 ml .

Based on the results it is evident that most of the parameters of the samples comply with ‘Category ‘C’ standards of CPCB (Table 3.5) are indicating their suitability for only Drinking water source after conventional treatment and disinfections.

3.3 Air Environment

Meteorology is the key to understand the air quality. The essential relationship between meteorology and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A meteorological station was set up at the proposed mine premises. Meteorological data was generated during the Pre monsoon season and shown in **Table-3.5**

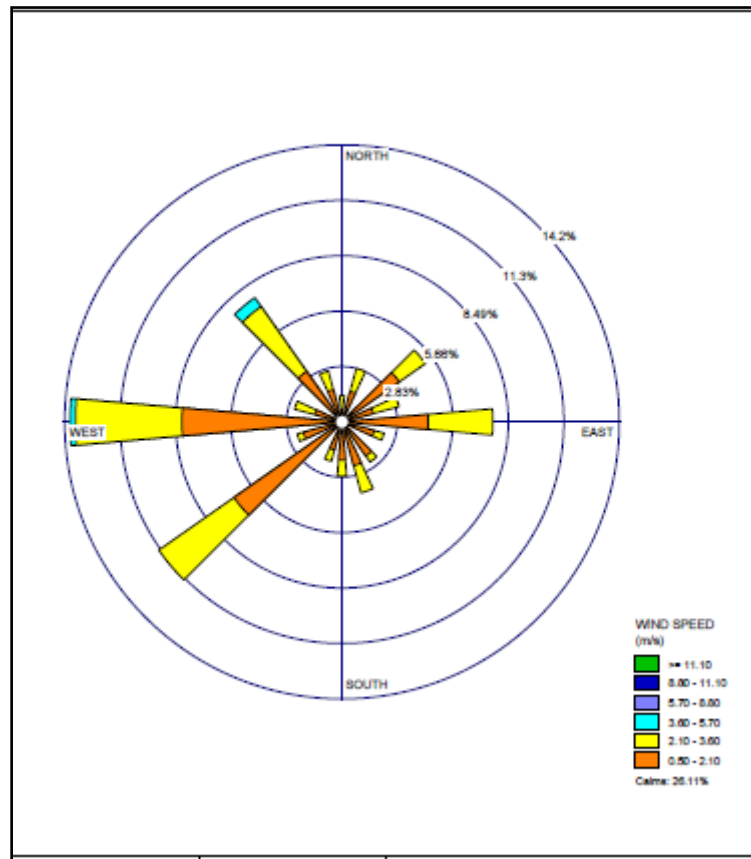
The following parameters were recorded at hourly intervals continuously during monitoring period, except rainfall which was recorded on daily basis.

- Wind speed
- Wind Direction
- Air Temperature

Table-3.7, Summarized project site meteorological data for Pre monsoon season

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Avarage	Max
MARCH 2023	21	38	9.8	21.8
APRIL 2023	26	44	12.8	25.4
MAY 2023	27	44	12.9	25.7

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3.3.2 Comparison of primary and secondary data

The India Meteorological Department (IMD) records the data twice a day viz. 0830 hr and 1730 hr while the site-specific data has been recorded at an hourly interval. On comparison of site specific data generated for study period vis-à-vis the IMD data, slight variations were observed. The following observations are brought out:

When the data generated at project site is compared with the data recorded at IMD, it is observed that the data generated at the site is broadly in comparison with regional meteorology, except for minor variations as described above such as predominant wind direction is NW at IMD while at project site predominant wind direction is West.

3.3.3 Ambient Air Quality

The ambient air quality was monitored in the impact area as per MoEF& CC guidelines. The study area represents entirely rural environment. The prime objective of the baseline air quality study was to assess the ambient air quality of the mining lease area.

3.3.4 Selection criteria for monitoring location

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

- Meteorological parameters including wind direction
- Topography of the study area
- Representative of regional background air quality for obtaining baseline status
- Representative of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at 08 locations with due consideration to the above mentioned points. AAQM locations were selected in downwind, upwind as well as crosswind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.4** and shown in **Table-3.7**

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for three months during the study period. The common air pollutant namely Particulate Matter-10 (PM₁₀) & PM_{2.5}, Sulphur-dioxide (SO₂) and Oxides of Nitrogen (NO₂) has been measured through a planned field monitoring.

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The baseline values of the air pollutants of concern are presented in Tables below statistical parameters like minimum, maximum, average and 98th percentiles have been computed from the observed field data for all sampling stations and are given **Table-3.8, Table-3.9, Table-3.10& Table 3.11**. These are compared with the standards prescribed by Central PollutionControl Board (CPCB) for industrial, residential and rural zone.

Table 3.8: Ambient Air Quality Monitoring Stations

Air Monitoring Locations		
Location ID	Location name	Distance (Km) and Direction
AAQ 1	Project Site(Near Bela village)	-
AAQ 2	Mangobandar Bazar	5.90 km ESE
AAQ 3	Nariyana village	4.25 Km NE
AAQ 4	Tola Bheriatar	3.50 Km S
AAQ 5	Bisanpur	7.45 Km SW
AAQ 6	Bandhaura	9.0 Km E
AAQ 7	Khutauna	6.45 Km NNW
AAQ 8	Aashna village	8.0Km SSE

MONITORING MAP OF THE STUDY AREA

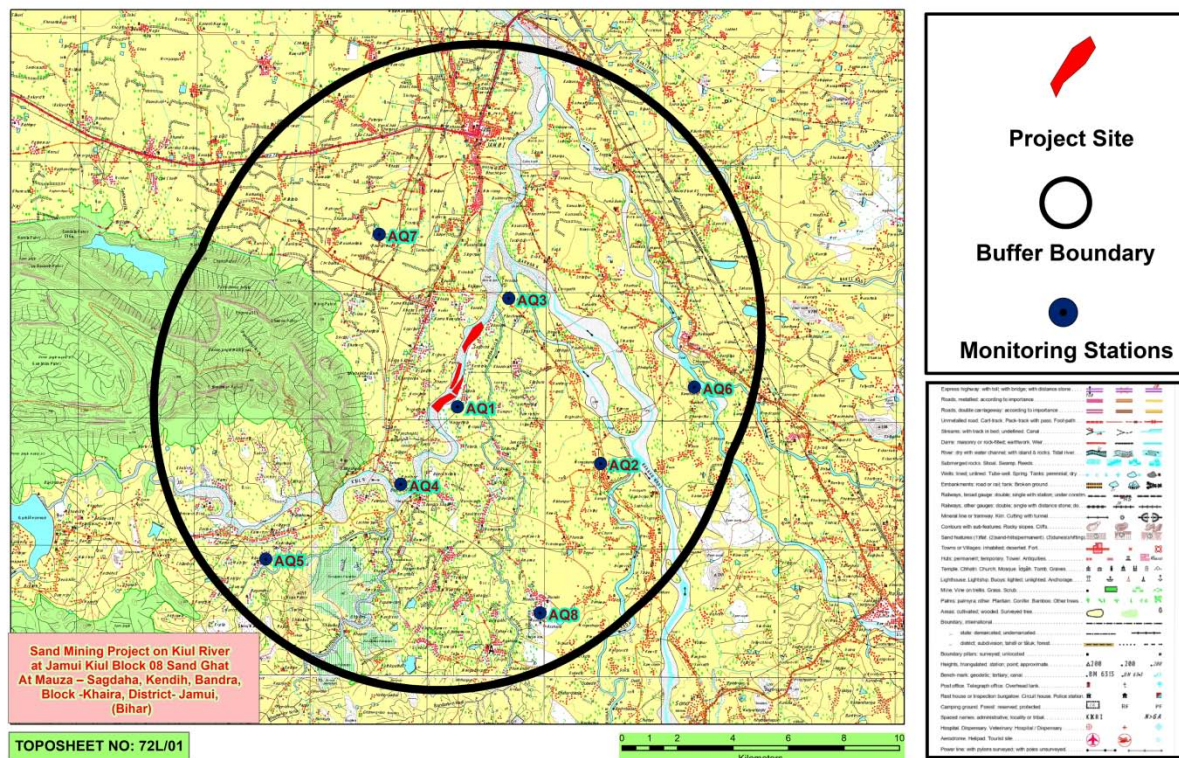


Figure 3.4 Ambient Air Quality Monitoring Stations

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Table-3.9: Ambient Air Quality in the Study Area PM_{2.5}

Location Code	PM _{2.5} (µg/m ³)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site(Near Bela village)	30.69	39.27	34.2	39.1
AAQ2	Mangobandar Bazar	24.46	32.81	28.87	32.69
AAQ3	Nariyana village	29.73	38.14	31.74	37.11
AAQ4	Tola Bheriatari	22.65	27.58	24	27.24
AAQ5	Bisanpur	31.56	45.12	38.65	44.52
AAQ6	Bandhaura	19.21	24.77	21.14	24.61
AAQ7	Khutauna	25.02	32.04	28.31	31.69
AAQ8	Aashna village	26.47	39.85	32.73	39.8

Table-3.10: Ambient Air Quality in the Study Area PM₁₀

Location Code	PM ₁₀ (µg/m ³)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site(Near Bela village)	61.38	78.34	73.93	78.32
AAQ2	Mangobandar Bazar	63.12	73.32	68.92	73.12
AAQ3	Nariyana village	59.25	78.45	62.95	77.21
AAQ4	Tola Bheriatari	55.41	70.61	62.14	70.09
AAQ5	Bisanpur	59.28	74.65	66.36	73.18
AAQ6	Bandhaura	53.4	65.8	57.17	65.38
AAQ7	Khutauna	66.21	75.28	69.94	74.87
AAQ8	Aashna village	59.3	79.95	70.44	79.8

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Table-3.11: Ambient Air Quality in the Study Area SO₂

Location Code	SO ₂ (µg/m ³)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site(Near Bela village)	11.76	14.75	12.85	14.53
AAQ2	Mangobandar Bazar	5.84	9.78	7.7	9.63
AAQ3	Nariyana village	11.55	13.88	12.55	13.83
AAQ4	Tola Bheriatari	9.58	11.3	10.26	11.27
AAQ5	Bisanpur	9.23	18.56	13.87	17.74
AAQ6	Bandhaura	9.74	10.65	10.14	10.65
AAQ7	Khutauna	6.28	9.31	8.06	9.28
AAQ8	Aashna village	8.25	12.77	10.39	12.73

Table-3.12: Ambient Air Quality in the Study Area NO₂

Location Code	NO ₂ (µg/m ³)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site(Near Bela village)	16.85	19.5	17.5	19.21
AAQ2	Mangobandar Bazar	9.45	13.61	11.39	13.32
AAQ3	Nariyana village	15.67	18.36	16.78	18.31
AAQ4	Tola Bheriatari	12.45	16.39	14.01	16.15
AAQ5	Bisanpur	15.62	20.31	18.74	20.17
AAQ6	Bandhaura	10.96	15.4	11.82	14.81
AAQ7	Khutauna	9.62	14.75	11.99	14.67
AAQ8	Aashna village	10.48	16.78	14.36	16.77

3.3.4.1 Baseline Scenario

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Particulate Matter (PM_{2.5})

Fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. In general some of the important sources of particulate matter are mines. The following sources of particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from ground or other mining operations

PM_{2.5} recorded within the study area was in the range of 19.21 $\mu\text{g}/\text{m}^3$ to 45.12 $\mu\text{g}/\text{m}^3$. Table 3.3 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60 $\mu\text{g}/\text{m}^3$ for PM_{2.5} for industrial, residential, rural and other areas.

Suspended Particulate Matter (PM₁₀)

Suspended particulate matter in general terms is the particulate matter in suspension in ambient air. It includes dust, smoke etc. In general some of the important sources of suspended particulate matter are mines. The following sources of suspended particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from ground or other mining operations

The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 53.4 $\mu\text{g}/\text{m}^3$ to 79.95 $\mu\text{g}/\text{m}^3$. The 24 hourly average values of PM₁₀ were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100 $\mu\text{g}/\text{m}^3$ for PM₁₀ in industrial, residential, rural and other areas.

Sulphur Dioxide (SO₂)

Sulphur dioxide gas is an inorganic gaseous pollutant. Sulphur dioxide emissions are expected to be emitted wherever combustion of any fuel containing Sulphur takes place. The Sulphur in the fuel will combine with oxygen to form Sulphur dioxide. The following sources of Sulphur dioxide in the study area are identified:

- Emissions from domestic/consumption of fuel (coal, diesel, etc)

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of causing illness and lung injury. Further it can combine with water in the air to form toxic acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants.

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Sulphur dioxide is an irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes breathing related diseases as it affects the lungs.

The minimum and maximum concentration of SO₂ recorded within the study area was 5.84 µg/m³ to 18.56 µg/m³.

The 24 hourly average values of SO₂ were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m³ for Residential, Rural and other areas.

Oxides of Nitrogen (NO₂)

The important sources of oxides of Nitrogen are from utilities and auto exhaust due to vehicular movement in mine lease area. The following sources of oxides of nitrogen in the study area are identified.

- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. NO₂ has inherent ability to produce deleterious effects by themselves like toxicity. It causes asphyxiation when its concentration is great enough to reduce the normal oxygen supply from the air. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 9.45 µg/m³ to 20.31 µg/m³.

The 24 hourly average values of NO₂ were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m³ for Residential, Rural and other areas.

Ambient Air Quality in the Study Area, Free Silica

Location Code	Free silica (µg/m ³)		
	Name of the station	Min	Max
AAQ1	Project Site(Near Bela village)	0.76	1.48
AAQ2	Mangobandar Bazar	0.58	1.32
AAQ3	Nariyana village	0.45	1.29
AAQ4	Tola Bheriatari	0.35	1.75
AAQ5	Bisanpur	0.39	0.58

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AAQ6	Bandhaura	0.35	0.54
AAQ7	Khutauna	0.41	0.41
AAQ8	Aashna village	0.26	0.74

3.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth's crust, a medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 05 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Figure 3.5** and shown in **Table 3.12**. The physico-chemical characteristic of these soil samples is given in **Table 3.13**.

Table 3.13: Description of soil sampling locations

Soil monitoring locations		
SQ 1	Project Site(Near Bela village)	-
SQ 2	Mangobandar Bazar	5.90 km ESE
SQ 3	Nariyana village	4.25 Km NE
SQ 4	Tola Bheriatari	3.50 Km S
SQ 5	Bisanpur	7.45 Km SW

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17	Iron	mg/kg	9.9	10.6	8.9	6.8	9.9
18	SAR	-	2.78	2.88	1.87	2.42	2.82
19	CEC	meq/100g	6.50	7.44	8.47	11.41	8.17

Table 3.14 (a) :Physico-chemical properties of soil

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.47 to 8.10, which shows that the soil is alkaline in nature. Potassium is found to be from 80.3 mg/kg to 295.9 mg/kg.

3.5 NOISE ENVIRONNENT

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986. The levels recorded are as stated in **Table 3.15**. The noise level monitoring locations are marked in **Figure 3.6** and shown in **Table 3.14**.

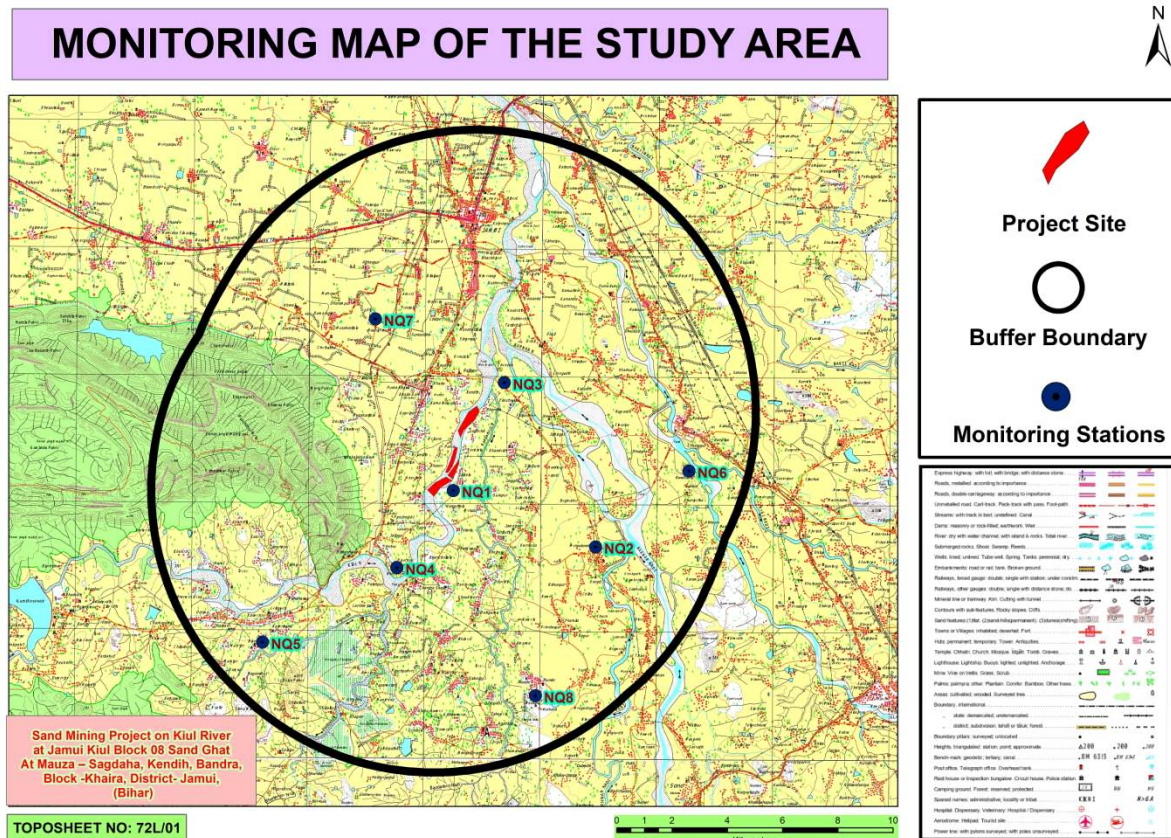


Figure 3.6 Noise Monitoring Stations

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Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Project Site(Near Bela village)	-
NQ 2	Mangobandar Bazar	5.90 km ESE
NQ 3	Nariyana village	4.25 Km NE
NQ 4	Tola Bheriatari	3.50 Km S
NQ 5	Bisanpur	7.45 Km SW
NQ 6	Bandhaura	9.0 Km E
NQ 7	Khutauna	6.45 Km NNW
NQ 8	Aashna village	8.0Km SSE

Table 3.16: Noise Monitoring Results

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines),Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Project Site(Near Bela village)	Residential Zone	55	45	58.2	44.1
2	Mangobandar Bazar	Residential Zone	55	45	51.6	43.6
3	Nariyana village	Residential Zone	55	45	52.8	42.2
4	Tola Bheriatari	Silence zone	50	40	53.5	40.3
5	Bisanpur	Residential Zone	55	45	52.4	42.4
6	Bandhaura	Residential Zone	55	45	51.0	43.8
7	Khutauna	Residential Zone	55	45	53.5	41.5
8	Aashna village	Residential Zone	55	45	51.6	42.2

Results

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 51.0 dB(A) to 58.2 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 40.3 dB (A) & 44.1dB(A) respectively.

There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.

3.6 BIOLOGICAL ENVIRONMENT

3.6.1.1 Introduction

The ecological study reflects the potential of a regional ecosystem and its biological components. In India, the biological diversity of plants and animals varies from region to region on account of their diversity and density. Producers (plants), consumers (animals), and decomposers (microbes) govern the whole cycle of ecology. Plant and animals both are interdependent on each other.

The biological study is essential to understand the impact of any developmental project on the existing flora and fauna present in the study area. Hence, studies on various aspects of the ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact if required.

The Environment baseline data generation report in respect of flora-fauna has been prepared to assess the current ecology & biodiversity scenario of the area; and to carry out Environmental Management Plan based on the proposed project activities. The plan will identify and address the environmental and ecological conservation implications of the area. Conservation of biodiversity is essential for sustainable development.

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project was located on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar),

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The proposed mining was a cluster of 04 mining lease area of Jamui Kiul Block 05, Jamui Kiul Block 06, Jamui Kiul Block 07 & Jamui Kiul Block 08 over an combined area of 77.40 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

3.6.2.1 Description of Eco-sensitive zones in the Study Area (Wildlife Sanctuary/ National Parks/Animal or Elephant Corridors/ Protected Wetlands etc.)

There are no National parks, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 5 km from the present project.

Also, areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value are doesn't exist in the core and buffer zone of the present project. On the other hand, the proposed alignment will cross over some riverine channel in the core zone. Adequate structure for cross drainage shall be constructed in order to maintain the natural hydrology and protection of all forms of biota found there in all the water bodies of the area. Apart from the above, the proposed project the area will promote tourism activities due to the existing Beraila Wildlife Sanctuaries (Bird Sanctuary).

3.6.3 Drainage /Water Bodies of the Study Area

Apart from these, some seasonal (monsoon-fed) riverine streams and Nallas are also present in the study area. Few ponds are also recorded nearby the different villages mainly used for fish farming, Cattle feeding, Irrigation purpose by the villagers, etc.

Scope and Objectives of the Study

The above study aims in identifying potential impacts on flora and fauna and to suggest relevant compensatory and mitigatory measures to protect/conservate biodiversity in the likely impacted area due to the project activity. Following points to be covered under the scope of work:

- Survey of terrestrial & aquatic flora & fauna for core & buffer zone separately.
- Details of endemic species found in the study area and their IUCN status, Schedule status (as per WPA, 1972).
- Survey of the study area in terms of features like breeding & spawning grounds, habitats, flight paths, and the migratory path of the animals.

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- Survey of flora covering types e.g. agriculture crop, commercial crop, plantation, natural vegetation/forest type, grass land. The endangered & endemic species of flora & fauna beside any other flora, if present are also to be identified.
- The survey has been covering a total listing of the faunal population. The survey has also covered endangered, endemic, migratory & detail of aquatic fauna.
- The assessment of potential damage to terrestrial & aquatic flora and fauna. The impact should be categorized as primary & secondary, temporary and long term, unavoidable & risk transboundary impacts, possible irreversible change.

3.6.4 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project in Pre monsoon season period (March 2023 to May 2023). Both terrestrial and aquatic ecosystems have been studied to understand the biological environment. Secondary data were collected from authentic sources like the Forests Department, Fisheries Department, Agriculture Department of Jamui, and available published literature.

3.6.5 Flora (Aquatic and Terrestrial)

For the collection of data for aquatic flora, the methodology prescribed in the standard book of Adoni (1985), NEERI (1998), and APHA (2015) has been adopted. A total of 05 sampling sites were selected for the collection of samples to analyze the aquatic flora.

On the other hand, for the terrestrial data, community analysis was carried out during the summer season. For the collection of terrestrial data, a total of 05 sampling points were selected. At every sampling site, quadrates of 10m X 10m (100 sq.m.) size were randomly laid to study tree species. The circumference of all the adult individuals 30 [cm circumference at breast height (CBH)] was measured with Freeman's tape. The study of communities was carried out by using qualitative characteristics, and quantitative characteristics. Qualitative characteristic mainly involved presence/absence of the species, genera, and family. This showed the community structures, composition and other characteristic can be readily described by visual observation without actual measurements. The quantitative analysis involved the structure and composition of vegetation across vegetation types and compared in terms of frequency, density, abundance, and basal area of tree species.

3.6.6 Fauna (Aquatic and Terrestrial)

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For the collection of data for aquatic fauna, the methodology prescribed in the standard book of Adoni (1985), NEERI (1998), and APHA (2015) has been adopted. A total of 05 sampling points were selected for the collection of samples to identify the aquatic fauna.

On the other hand, for the terrestrial data, the assessment of fauna was done by an extensive field survey in the area at 05 locations. During the survey, the Line Transect method was used for the study of mammals and Transact & Patch sampling were used for Amphibians, visual encountered methods was used for reptiles and butterflies. The presence of wildlife was also confirmed from the animal calls, footmarks, excreta, and from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area which was later confirmed from the different government offices like the forest department or wildlife department, etc.

Observations of birds were made during a walk-through in the chosen transect for sighting birds. The number of birds observed in each sampling location was listed. Birds were noted and identified with the help of binocular and standard field identification guides.

3.6.7 Sampling Sites

A total of 05 sampling sites (TS-1 to TS-5) were selected for the terrestrial vegetation, avian fauna, and other terrestrial animals like reptiles, mammals, etc. For the collection of samples and data of aquatic flora and fauna, 05 separate sampling sites (AS-1 to AS-5) were also selected at different locations in the study area.

3.6.8 Flora of the Study Area

The core zone of the proposed project area doesn't have any major natural forest land.

A major part of the core and buffer zone of the project is agricultural land having some major vegetation in the form of agro forestry. Vegetation patterns in villages and surrounding areas are slightly different from the rest of the areas in the Jamui district.

The common species grown near the villages are mostly edible, fruits bearing or useful plants. Purposely planted tree patches (mostly fruit-bearing) are available nearby several villages in the study area. The most dominant tree species in the study area are, *Ficus bengalensis* (Bargad) *Azadirachta indica* (Neem), *Aegle marmelos* (Bel), *Emblica officinalis* (Amla), *Syzygiumcumini* (Jamun), *Dalbergia sissoo* (Sisam), , *Musa paradisiacal* (Kela), *Cassia siamea* (Kasod/Siris), *Litchi chinensis* (Litchi), *Mangifera indica* (Aam) and in case of

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shrubs *Antigonum leptopus*, *Ricinus communis*, *Lantana camara*, *Jatropha gossipifolia* and *Cassia auriculata* etc. The most dominant species in the study area of both the district was *Mangifera indica* (Aam) and its different varieties.

3.6.9 Flora of Core zone

3.6.9.1 Terrestrial Flora of Core zone (Natural vegetation etc.).

There is no flora found in the core zone

3.6.9.2 Agricultural Crops/ Commercial Crops of the Core zone and Buffer Zone

Details of the agricultural vegetation and commercial crops were collected from the 05 selected sites of the core (Jamui district). These crops are similar to the crops of buffer zone also. So, the same information is applicable for the core and buffer zone.

Table 3.18: List of Crops seasonally planted by respective farmers in the Core and Buffer Zone

S.No.	Botanical Name	Local/Trade Name	Family Name
1	<i>Zey mays</i>	Makkha/Maize	Poaceae
2	<i>Triticum aestivum</i>	Wheat	
3	<i>Oryza sativa</i>	Paddy	
4	<i>Cicer arietinum</i>	Channa	Fabaceae
5	<i>Coriander sativum</i>	Dhaniya	Apiaceae
6	<i>Abelmoschus esculentus</i>	Bhendi	Amaranthaceae
7	<i>Mamordica charanta</i>	Karela	Cucurbitaceae
8	<i>Capsicum annum</i>	Mirchi	Solanaceae
9	<i>Lycopersicon lycopersicum</i>	Tomato	
10	<i>Solanum melongena</i>	Brinjal	
11	<i>Capsicum annuum</i>	Mirchi	
12	<i>Solanum tuberosum</i>	Potato	
13	<i>Allium cepa</i>	Onian	Amaryllidaceae
14	<i>Cajanus cajan</i>	Pigeon pea	Fabaceae
15	<i>Carica papaya</i>	Papaya	Caricaceae
16	<i>Okra</i>	Ladyfinger/ Bhindi	Malvaceae
17	<i>Lagenaria siceraria</i>	Bottle gourd/ Lauki	Cucurbitaceae
Source: Present Survey Data Supported by District Agriculture Department, Jamui			

3.6.9.3 Aquatic Flora of Core zone (Phytoplankton/ Macrophytes).

Aquatic floral details of the core zone were collected from 05 selected sites of the study area. Some sites were located buffer zone adjacent to the present alignment, however some were located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone are given in tables 3.19, 3.20 & 3.21

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Phytoplankton: Most of the phytoplankton species recorded from the core zone was similar to the buffer zone also. So, the same information is applicable for the core and buffer zone. Phytoplankton species were collected and identified from 05 selected sampling sites of the study area. Details of Phytoplankton species are given in table 3.19

Table 3.19: List of Phytoplankton species present in different water bodies in study area (Core and Buffer Zone).

S.N.	Taxonomic Details	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	Chlorophyceae									NA	NA
1	<i>Ankistrodesmus</i> sp.			+	+	+	+			NA	NA
2	<i>Ankistrodesmus falcatus</i>		+	+			+	+	+	NA	NA
3	<i>Arthrodesmus</i> sp.	+		+	+		+		+	NA	NA
4	<i>Chlorella</i> sp.		+	+	+	+	+	+	+	NA	NA
5	<i>Chlorella vulgaris</i>	+		+	+	+			+	NA	NA
6	<i>Chlorococcum</i> sp.	+	+	+			+		+	NA	NA
7	<i>Closteriopsis</i> sp.	+	+		+	+		+		NA	NA
8	<i>Closterium quadratum</i>						+	+	+	NA	NA
9	<i>Coelastrum</i> sp.	+	+	+	+		+		+	NA	NA
10	<i>Cosmarium aequale</i>			+	+		+	+		NA	NA
11	<i>Cosmarium formii</i>	+	+	+	+	+	+		+	NA	NA
12	<i>Cosmarium margaritatum</i>	+		+	+		+	+		NA	NA
13	<i>Crucigenia</i> sp.	+	+	+	+		+			NA	NA
14	<i>Gonium</i> sp.	+		+		+	+		+	NA	NA
15	<i>Oocystis crassa</i>	+	+			+	+	+	+	NA	NA
16	<i>Pediastrum duplex</i>	+	+	+	+		+		+	NA	NA
17	<i>Treubaria triappendiculata</i>			+		+	+	+	+	NA	NA
18	<i>Ulothrix</i> sp.	+	+	+	+	+	+	+		NA	NA
19	<i>Ulothrix zonata</i>	+		+		+	+		+	NA	NA
20	<i>Volvox</i> sp.	+	+	+		+	+			NA	NA
21	<i>Zygnema</i> sp.	+	+	+	+	+	+	+		NA	NA
	Total	19	15	23	16	17	24	12	17		
	Cyanophyceae									NA	NA
1	<i>Anabaena</i> sp.		+	+	+	+	+		+	NA	NA
2	<i>Anabaena circinalis</i>	+	+	+	+	+	+	+		NA	NA
3	<i>Anabaena flosaque</i>	+	+		+	+	+	+	+	NA	NA
4	<i>Anacystis</i> sp.	+		+		+	+		+	NA	NA
5	<i>Aphanocapsa</i> sp.	+		+	+	+	+	+	+	NA	NA
6	<i>Aphanothece</i> sp.	+	+		+	+			+	NA	NA

Chapter-III	BASELINE DATA DESCRIPTION
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7	<i>Chroococcus</i> sp.	+		+	+	+	+	+		NA	NA
8	<i>Gloeocapsa</i> sp.	+	+	+			+		+	NA	NA
9	<i>Lyngbya</i> sp.	+	+		+	+	+	+	+	NA	NA
10	<i>Merismopedia</i> sp.	+	+	+		+	+	+	+	NA	NA
11	<i>Merismopedia tenuissima</i>	+		+	+	+	+			NA	NA
12	<i>Microcystis</i> sp.		+		+			+	+	NA	NA
13	<i>Microcystis aeruginosa</i>	+		+			+			NA	NA
14	<i>Nostoc</i> sp.		+		+	+	+	+	+	NA	NA
15	<i>Oscillatoria subbrevis</i>	+			+		+		+	NA	NA
16	<i>Spirulina</i> sp.		+	+	+	+	+	+		NA	NA
17	<i>Spirulina laxissima</i>		+	+		+	+		+	NA	NA
	Total	12	11	11	12	13	15	9	12		
	Bacillariophyceae									NA	NA
1	<i>Achnanthes</i> sp.	+	+	+	+		+	+	+	NA	NA
2	<i>Amphora ovalis</i>	+				+	+		+	NA	NA
3	<i>Amphora</i> sp.	+	+	+	+	+		+		NA	NA
4	<i>Coccooneis</i> sp.	+	+		+		+	+	+	NA	NA
5	<i>Cyclotella</i> sp.			+		+	+	+	+	NA	NA
6	<i>Cymbella affinis</i>	+		+	+		+		+	NA	NA
7	<i>Melosira granulata</i>	+				+	+	+		NA	NA
8	<i>Navicula similis</i>	+	+	+	+		+	+	+	NA	NA
9	<i>Navicula subrhyncocephala</i>	+	+		+		+		+	NA	NA
10	<i>Nitzschia palea</i>	+	+		+	+	+			NA	NA
11	<i>Pinnularia</i> sp.	+	+	+				+	+	NA	NA
12	<i>Synedra acus</i>	+				+	+		+	NA	NA
13	<i>Synedra ulna</i>		+		+	+	+	+	+	NA	NA
14	<i>Tabellaria</i> sp.	+			+		+			NA	NA
	Total	16	12	9	13	11	15	10	13		
	Euglenophyceae									NA	NA
1	<i>Euglena acus</i>	+	+	+	+	+	+	+	+	NA	NA
2	<i>Euglena</i> sp.	+			+	+	+		+	NA	NA
3	<i>Euglepha</i> sp.	+	+	+	+	+	+	+	+	NA	NA
4	<i>Phacus</i> sp.		+				+			NA	NA
5	<i>Phacus caudatus</i>	+			+	+	+	+	+	NA	NA
6	<i>Trachelomonas</i> sp.	+	+	+	+	+	+	+		NA	NA
	Total	5	4	3	5	5	6	4	4		
Source: Primary Survey Data of P&M Solution Pvt. Ltd., Noida											

Table 3.20: Site wise Qualitative list of Phytoplankton species recorded from the Core and Buffer Zone

Class	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
Chlorophyceae	19	15	23	16	17	24	12	17
Cyanophyceae	12	11	11	12	13	15	9	12

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Bacillariophyceae	16	12	9	13	11	15	10	13
Euglenophyceae	5	4	3	5	5	6	4	4
Total No. of Species	52	42	46	46	46	60	35	46

Macrophytes: The aquatic vegetation recorded from the core zone was similar to the aquatic vegetation of the buffer zone also. So, the same information is applicable for the core and buffer zone. The maximum number of aquatic vegetation was recorded at sites 06 and 08 due to the perennial nature of the water bodies. On the other hand, other water bodies support less vegetation due to a lack of water (monsoon-fed streams), and moisture. The details of Macrophytes species are given in table 3.21

Table 3.21: List of Aquatic Macrophytic vegetation of Core and Buffer Zone

S.No.	Name of the Taxa	Family Name	IUCN Status	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	<i>Azolla pinnata</i>	Salviniaceae	LC	+	+	+	+	+	+	+	+
2	<i>Cyperus alopecuroides</i>	Cyperaceae	LC	+	+			+	+	+	+
3	<i>Cyperus difformis</i>	Cyperaceae	LC	+		+	+		+	+	+
4	<i>Eichhornia crassipes</i>	Pontederiaceae	LC	+	+	+		+	+		+
5	<i>Hydrilla verticillata</i>	Hydrocharitaceae	LC				+			+	+
6	<i>Ipomea aquatica</i>	Convolvulaceae	LC		+	+	+	+	+		+
7	<i>Ipomea carnea</i>	Convolvulaceae	LC	+	+	+	+		+	+	+
8	<i>Lemna minor</i>	Araceae	LC	+	+			+	+	+	+
9	<i>Ludwigia parviflora</i>	Onagraceae	LC	+	+	+	+		+	+	+
10	<i>Nelumbo sp.</i>	Nelumbonaceae	LC		+			+			
11	<i>Nymphoides aquatica</i>	Menyanthaceae	LC	+		+		+	+	+	+
12	<i>Phragmites karka</i>	Poaceae	LC						+		
13	<i>Pistia stratiotes</i>	Araceae	LC		+		+			+	+
14	<i>Polygonum glabrum</i>	Polygonaceae	LC	+	+	+		+	+	+	+
15	<i>Typha latifolia</i>	Typhaceae	LC						+		+
16	<i>Typha orientalis</i>	Typhaceae	LC		+		+	+	+	+	

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Total No. of Species	9	8	8	8	9	13	11	13
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3.6.10 Flora of Buffer zone

3.6.10.1 Terrestrial Flora of Buffer zone (Natural vegetation/Commercial vegetation).

During the present survey Tree herbs and shrubs species were recorded from the buffer zone of the present study area. The below-mentioned vegetation details have been collected from the Core as well as Buffer zone of the present study area. All the details have been furnished based on the field survey at 09 different locations and data supported by the Department of Forest, Jamui district of Bihar. The details of vegetation of the buffer zone is given in Table 3.22.

Table 3.22: List of Trees, Shrubs, Herbs and Grasses observed in Buffer Zone

S.No.	Botanical Name	Common/ Hindi Name	Name of family
	Trees		
1	<i>Acacia nilotica</i>	Babool	Mimosaceae
2	<i>Acacia nilotica</i>	Desi babool	Fabaceae
3	<i>Aegle marmelos</i>	Bel	Rutaceae
4	<i>Ailanthus excels</i>	Adusa	Simaroubaceae
5	<i>Albizia amara</i>	Siris	Mimosoideae
6	<i>Albizia lebbek</i>	Sirish	Mimosaceae
7	<i>Alstonia scholaris</i>	Saptaparni	Apocynaceae
8	<i>Anthocephalus cadamba</i>	Kadamb	Rubiaceae
9	<i>Artocarpus heterophyllus</i>	Jack fruit	Moraceae
10	<i>Azadirachta indica</i>	Neem	Meliaceae
11	<i>Bauhinia variegata L.</i>	Kachnar	Leguminosae
12	<i>Bombax ceiba</i>	Semal	Malvaceae
13	<i>Bombax malabaricum</i>	Semal tree	Malvaceae
14	<i>Butea monosperma</i>	Palas	Leguminosae
15	<i>Cassia fistula</i>	Bahawa	Caesalpinaceae
16	<i>Cassia siamea</i>	Chirkundi	Mimosaceae
17	<i>Dalbergia latifolia</i>	Shisam	Leguminosae
18	<i>Dalbergia sissoo</i>	Shisam	Leguminosae
19	<i>Delonix regia</i>	Gulmohar	Fabaceae
20	<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
21	<i>Eucalyptus globules</i>	Nilgiri	Myrtaceae
22	<i>Ficus benghalensis</i>	Bargad	Moraceae
23	<i>Ficus religiosa</i>	Pipal	Moraceae
24	<i>Madhuca longifolia</i>	Mohua tree	Sapotaceae
25	<i>Magnifera indica</i>	Aam	Anacardiaceae
26	<i>Melia azedarach</i>	Bukkam Neem	Meliaceae

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27	<i>Moringa olerifera</i>	Munga	Moringanaceae
28	<i>Musa paradisiacal</i>	Banana	Musaceae
29	<i>Nerium oleamder</i>	Kaner	Apocynaceae
30	<i>Phyllanthus emblica</i>	Awla	Euphorbiaceae
31	<i>Pisidium guava</i>	Guava	Myrtaceae
32	<i>Pongamia pinnata</i>	Karanj	Leguminosae
33	<i>Prosopis juliflora</i>	Vilayati babool	Fabaceae
34	<i>Punica malus</i>	Anar	Lythraceae
35	<i>Shorea robusta</i>	Sal	Depterocarpaceae
36	<i>Syzygium cumini</i>	Jamun	Myrtaceae
37	<i>Tectona grandis</i>	Sagwan	Verbenaceae
38	<i>Terminalia arjuna</i>	Arjun	Combretaceae
39	<i>Zizyphus jujube</i>	Ber	Rhamnaceae
40	<i>Zyziphus mauritiana</i>	Ber	Rhamnaceae
Shrub & Herbs			
41	<i>Acanthospermum hispidum</i>	Kanti	Asteraceae
42	<i>Acheranthus aspera</i>	Aghada	Amaranthaceae
43	<i>Antigonum leptopus</i>	coral vine	eaecanogyloP
44	<i>Argemone mexicana</i>	Pila dhtura	Papaveraceae
45	<i>Chenopodium album</i>	manure weed	Amaranthaceae
46	<i>cleome viscosa</i>	Pivali tilval	Cleomaceae
47	<i>Dalura metel</i>	Dhotra	Solanaceae
48	<i>Echinops echinatus</i>	Unthkantali	Asteraceae
49	<i>Ervatamia divaricata</i>	Chandani	Apocynaceae
50	<i>Euphorbia hirta</i>	Mothi dudhi	Evphorbiaceae
51	<i>Ipomoea carnea</i>	Besharam	Convolvulaceae
52	<i>Jatropha gossipifolia</i>	cotton-leaf	Euphorbiaceae
53	<i>Lantana camara</i>	Ghaneri	Verbenaceae
54	<i>Mimosa pudica</i>	Chui Mui	Mimosaceae
55	<i>Ocimum sanctum</i>	Tulsi	Labiatae
56	<i>Parthenium hysterophorus</i>	Gajar grass	Asteraceae
57	<i>Ricinus communis</i>	Arand	Euphorbiaceae
58	<i>Tridax procumbens</i>	Kambarmodi	Asteraceae
59	<i>Xanthium strumarium</i>	Chota Dhatura	Asteraceae
Grasses			
60	<i>Apluda mutica</i>	Mauntian grass	Poaceae
61	<i>Apluda mutica</i>	Banjura grass	Poaceae
62	<i>Commelina benghalensis</i>	Bokna	Commelinaceae
63	<i>Cynodon dactylon</i>	Doob	Poaceae
64	<i>DactylSeptemberenum aegyptium</i>	Crow foot grass	Poaceae
65	<i>Pennisetum purpureum</i>	Elephant grass	Poaceae
66	<i>Saccharum spontaneum</i>	kans	Poaceae
Climbers			
67	<i>Abrus precatorius</i>	Gunja	Fabaceae

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68	<i>Antigonon leptopus</i>	Anantalata	Polygonaceae
69	<i>Bougainvillea glabra</i>	Booganbel	Nyctaginaceae
70	<i>Celastrus paniculata</i>	Kujari	Celastraceae
71	<i>Cissampelos pareira</i>	Khariya lata	Menispermaceae
72	<i>Clitoria ternatea</i>	Blue pea	Fabaceae
73	<i>Cuscuta reflexa</i>	Amarbel	Convolvulaceae
74	<i>Cuscuta reflexa</i>	Amar bel	Convolvulaceae
75	<i>Hemidesmus indicus</i>	Anantamul	Apocynaceae
76	<i>Ipomoea cairica</i>	Neeli Bel	Convolvulaceae
77	<i>Tilospora cordifolia</i>	Giloy	Menispermaceae

Source: Primary data of P&M Solution, Noida and data supported by the Department of Forest, Jamui district of Bihar.

3.6.10.2 Agricultural vegetation/ Commercial vegetation of the Buffer zone.

The variety of Crops and cropping patterns in the core and the buffer zone was the same in the study area. Vegetation details of the buffer zone were collected from 05 selected sites (TS-1 to TS-05)

3.6.10.3 Aquatic Flora of Buffer zone (Phytoplankton/ Macrophytes/ Aquatic Weeds)

Phytoplankton: The diversity of Phytoplankton species was similar in the core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.19 & 3.20

Macrophytes: The diversity of aquatic macrophytes was similar in both core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.21

3.6.11 Fauna of the Study Area

Proposed alignment passing through the rural and purely in the agricultural field. At some places, it will cross from adjacent to some villages in the study area. The study area is devoid of any natural forest, so, major wildlife animals are rarely found in the area. Only some moving animals were observed. Domesticated animals mainly constitute the faunal population within the project area.

The assessment of fauna was done on the bases of secondary data collected from different government offices like the forest department, wildlife department, etc. The presence of wildlife was also confirmed by the local inhabitants depending on the animal sightings and the frequency of their visits in the project area.

During the present study period, a large number of local birds are noticed in the buffer zone of the study area. But, there are no bird habitats like nesting, breeding, and foraging patterns are noticed in the core zone.

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3.6.12 Fauna of the Core Zone

3.6.12.1 Terrestrial fauna of core zone (Mammals/Reptiles/amphibians/birds/insects etc.).

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area (including core and buffer zone), especially nearby town and villages. Other mammals and reptiles found in the study area are listed in Table 3.23.

Table 3.23: List of Mammals/Reptiles/Amphibians/Birds recorded from the Core Zone

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
Mammals					
1	Five striped palm squirrel	<i>Funambulus pennanti</i>	Sciuridae	IV	LC
2	Indian Field Mouse	<i>Mus booduga</i>	Muridae	V	LC
3	Common House Rat	<i>Rattus rattus</i>	Muridae	V	LC
4	Bandicoot Rat	<i>Bandicotabengalensis</i>	Muridae	V	LC
Reptiles & Amphibians					
5	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE
6	Common skink	<i>Eutropis carinata</i>	Scincidae	IV	LC
7	King cobra	<i>Ophiophagus hannah</i>	Elapidae	II	LC
8	Cobra	<i>Naja naja</i>	Elapidae	II	LC
9	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE
Bird Species					
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
4	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
5	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
6	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
7	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC

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8	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
9	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	IV	LC
10	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
11	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
12	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
13	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC
14	<i>Vanellus indicus</i>	Red-wattled lapwing	Charadriidae	IV	LC

IUCN Status =LC: Least Concern, **NE:** Not Evaluated.

Source: Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Jamui district of Bihar

Table 3.24: Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	LC
2.	Common emigrant	<i>Catopsilia pomona</i>	Pieridae	LC
3.	Common crow	<i>Euploea core</i>	Nymphalidae	LC
4.	Small grass yellow	<i>Eurema brigitta</i>	Pieridae	LC

Source: Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Jamui district of Bihar

3.6.12.3 Aquatic Fauna of Core zone (Zooplankton/ Macro-invertebrates/ Fishes/ Amphibians/ Turtles etc.)

All the aquatic fauna recorded from the core zone were also recorded from the buffer zone and most of the sampling sites are the same for the core and buffer zone as given in table 3.17. So, the list of aquatic fauna of the core zone is merged with the details of the buffer zone and is given in Table 3.25 to 3.27.

3.6.12.4 Fauna of Buffer zone

To prepare a detailed report on the status of faunal biodiversity of the present study area (1 km buffer) of Jamui district of Bihar and to assess the impacts due to digging/ leveling of alignment route/ construction of bridge/ operational activity which evolves suitable mitigation measures to protect & conserve biodiversity following components were studied:

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terrestrial biodiversity, wildlife survey (diversity), habitat study (feeding, breeding, roosting areas), distribution of birds, rare & endangered species of the study area.

The fauna of the study area (Core and Buffer zone) vary upon the local topography and different types of habitats. The fauna of the study area has been categorized into two categories based on their habitat, i.e.

- (i) Aquatic fauna and
- (ii) Terrestrial fauna.

During the present survey, there are some seasonal, perennial and private water body was observed along with the proposed alignment, which will be affected due to the present project activities. The alignment of the project will cross a few seasonal and perennial streams.

3.6.12.6 Terrestrial Fauna of Buffer zone (Mammals/Reptiles/Amphibians/Birds/ Insects etc.)

The major part of the study area lies under agricultural fields and barren land which restricts the wildlife habitat significantly. There is neither any wildlife sensitive area nor any corridor for the movement of wildlife in the study area. A list of the animals of the study area has been prepared on the basis of the survey and also inquire from the local people. The animals, thus recorded were cross-checked with Wildlife (Protection) Act, 1972 for their schedule status. Faunal details of the study area are given in Tables 3.25 to 3.27.

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area, especially nearby town and villages. Other mammals and reptiles found in the study area are listed in Table 3.25.

Table 3.25: List Mammals, Reptiles and Amphibians recorded from the Buffer Zone

S. No.	Common Name	Scientific Name	Family	Status as per WPA- 1972	IUCN status
Mammals					
1	<i>Bandicota bengalensis</i>	Bandicoot Rat	Sciuridae	IV	LC
2	<i>Canis aurius</i>	Jackal	Pteropodidae	V	LC
3	<i>Fellis chaus</i>	Jungle cat	Soricidae	IV	LC

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4	<i>Funambulus palmarum</i>	Three-striped Squirrel	Suidae	III	LC
5	<i>Funambulus pennanti</i>	Five striped palm squirrel	Hyaenidae	III	LC
6	<i>Herpestes edwardsi</i>	Indian Grey Mongoose	Canidae	II	LC
7	<i>Hyaena hyaena</i>	Stripped hyena	Leporidae	V	LC
8	<i>Lepus nigricollis</i>	Indian Hare	Canidae	II	LC
9	<i>Mus booduga</i>	Indian Field Mouse	Sciuridae	IV	LC
10	<i>Presbytis entellus</i>	Common langur	Cercopithecidae	II	LC
11	<i>Pteropus giganteus</i>	Indian Flying Fox	Pteropodidae	V	LC
12	<i>Suncus murinus</i>	Grey musk Shrew	Muridae	V	LC
13	<i>Sus scrofa</i>	Wild Boar	Canidae	III	LC
14	<i>Vulpes bengalensis</i>	Indian fox	Felidae	II	LC

Reptiles and Amphibians

1	<i>Bufo melanostictus</i>	Common toad	Bufonidae	IV	LC
2	<i>Bungarus caeruleus</i>	Krait	Elapidae	IV	NE
3	<i>Calotes versicolor</i>	Garden lizard	Agamidae	IV	NE
4	<i>Crotalus</i> sp.	Pit viper	Viperidae	II	LC
5	<i>Euphlyctis hexadactyla</i>	Common frog	Dicroglossidae	IV	LC
6	<i>Eutropis carinata</i>	Common skink	Scincidae	IV	LC
7	<i>Naja naja</i>	Cobra	Elapidae	II	LC
8	<i>Ophiophagus hannah</i>	King cobra	Elapidae	II	LC
9	<i>Ptyas mucosa</i>	Rat Snake	Colubridae	II	NE
10	<i>Rana temporaria</i>	Common frog	Ranidae	IV	LC
11	<i>Testudo graeca</i>	Common Tortoise	Testudinidae	IV	VU
12	<i>Varanus</i> sp.	Monitor lizard	Varanidae	II	LC

IUCN Status =LC: Least Concern, VU: Vulnerable. NT: Near Threatened, NE: Not Evaluated,

Source: Primary Survey data of P&M solution, Noida and the data supported by Department of Forest, Jamui District.

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ii. Avian Fauna

Table 3.26: Avian Fauna observed from the study area (01 KM Buffer area)

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972)	IUCN Status
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Alcedo atthis</i>	Small blue kingfisher	Alcedinidae	IV	LC
4	<i>Amandava amandava</i>	Red munia	Estrildidae	IV	LC
5	<i>Amaurornis phoenicurus</i>	White-breasted waterhen	Rallidae	IV	LC
6	<i>Ardea cinerea</i>	Grey heron	Ardeidae	IV	LC
7	<i>Ardea purpurea</i>	Purple heron	Ardeidae	IV	LC
8	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
9	<i>Athene brama</i>	Spotted Owlet	Strigidae	IV	LC
10	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
11	<i>Butorides striatus</i>	Striated heron	Ardeidae	IV	LC
12	<i>Casmerodius albus</i>	Great egret	Ardeidae	IV	LC
13	<i>Centropus sinensis</i>	Crow pheasant	Cuculidae	IV	LC
14	<i>Ceryle rudis</i>	Pied kingfisher	Alcedinidae	IV	LC
15	<i>Cinnyris asiaticus</i>	Purple Sunbird	Psittaculidae	IV	LC
16	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
17	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC
18	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
19	<i>Dicrurus adsimilis</i>	Black drongo	Dicruridae	IV	LC
20	<i>Egretta garzetta</i>	Little egret	Ardeidae	IV	LC
21	<i>Francolinus pondicerianus</i>	Titar	Phasianidae	IV	LC
22	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
23	<i>Gallus gallus</i>	Jungle hen	Phasianidae	IV	LC

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24	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
25	<i>Pluvialis fulva</i>	Pacific golden plover	Charadriidae	IV	LC
26	<i>Pseudibis papillosa</i>	Red-naped ibis	Threskiornithidae	IV	LC
27	<i>Psittacula krameri</i>	Rose ringed Parakeet	Psittacidae	IV	LC
28	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
29	<i>Sarkidiornis melanotos</i>	Knob-billed duck	Anatidae	IV	LC
30	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
31	<i>Spilopelia senegalensis</i>	Little brown dove	Columbidae	IV	LC
32	<i>Sturnia pagodarum</i>	Brahminy Starling	Sturnidae	IV	LC
33	<i>Tringa tetanus</i>	Common redshank	Charadriidae	IV	LC
34	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
35	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC

IUCN Status =LC: Least Concern, **VU:** Vulnerable.

Source: Primary Survey data of P&M Solution and the data supported by Department of Forest, Jamui, Bihar.

iii. Butter Flies

Table 3.27: Butterflies observed from the Buffer zone of the study area

S.No.	Scientific Name	Common Name	Family	IUCN Status
1	<i>Catopsilia pomona</i>	Common emigrant	Pieridae	LC
2	<i>Chlosyne lacinia</i>	Sunflower/Bordered Patch	Nymphalidae	LC
3	<i>Crocothemis erythraea</i>	Scarlet dragonfly	Libellulidae	LC
4	<i>Danaus chrysippus</i>	Plain Tiger	Nymphalidae	LC
5	<i>Danaus genutia</i>	Stripped Tiger	Nymphalidae	LC
6	<i>Euploea core</i>	Common crow	Nymphalidae	LC
7	<i>Eurema brigitta</i>	Small grass yellow	Pieridae	LC

Source: Primary Survey data of P&M Solution and the data supported by Department of Forest, Jamui, Bihar.

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3.6.12.7 Aquatic Fauna of Buffer zone (Zooplankton/Macro-invertebrates/Fishes/Amphibians /Turtles etc.)

Aquatic fauna is referred to as any form of an animal that has adapted to living in the aquatic environments such as rivers, lakes, ponds, dams, streams, etc.). River and its adjoining streams are formed the drainage in the study area. Few other seasonal water bodies like village ponds, streams, and nallas are also present in the study area. In general, faunal account of any water bodies can be divided into following categories, *i.e.*, (i) zooplankton, (ii) Macro-invertebrates/Insects/Benthos (iii) Fishes (iv) Amphibians/ Reptiles/ etc. Details of Zooplankton; Macro-invertebrates/insects/benthos; Amphibians/Reptiles and Fishes recorded from the different water bodies of the study area (Jamui District) are given in Tables 3.28 to 3.31.

i. Zooplankton

Zooplankton is commonly found in all types of aquatic habitats. These are recognized as secondary producers and considered as one of the best tools for the environmental monitoring program. During the present study period, a total of 60 zooplankton species was recorded and identified comprising of class Protozoa, Rotifera, Cladocera, Copepoda, and Ostracoda. The details of the zooplankton diversity of different habitats are given in Table 3.28

Table 3.28: Zooplankton species found in the different water bodies situated in the buffer zone

S.No.	Name of the Taxa	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	Protozoa										
1	<i>Arcella</i> sp.	+	+	+		+	+		+	NA	NA
2	<i>Arcella discoides</i>	+	+	+	+	+	+	+	+	NA	NA
3	<i>Arcella vulgaris</i>	+	+	+	+	+	+	+	+	NA	NA
4	<i>Centropyxis</i> sp.	+	+	+	+	+	+	+		NA	NA
5	<i>Centropyxis ecornis</i>		+			+	+		+	NA	NA
6	<i>Diffugia cuminata</i>	+	+		+	+	+		+	NA	NA
7	<i>Euglypha</i> sp.	+		+	+	+	+	+	+	NA	NA
8	<i>Metopus</i> sp.		+	+	+		+			NA	NA

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		Total	8	9	8	7	8	9	5	8		
	Rotifera											
1	<i>Anuraeopsis</i> sp.	+		+	+	+	+	+	+	+	NA	NA
2	<i>Anuraeopsis fissa</i>				+	+	+	+	+	+	NA	NA
3	<i>Asplanchna</i> sp.	+	+	+		+	+	+	+	+	NA	NA
4	<i>Asplanchna brightwelli</i>		+		+	+	+	+	+	+	NA	NA
5	<i>Brachionus</i> sp.	+		+	+	+	+	+	+		NA	NA
6	<i>Brachionus angularis</i>		+							+	NA	NA
7	<i>Brachionus calyciflorus</i>	+	+	+	+		+	+	+	+	NA	NA
8	<i>Brachionus quadridentata</i>		+	+	+		+	+	+		NA	NA
9	<i>Brachionus falcatus</i>	+			+	+	+	+	+		NA	NA
10	<i>Brachionus forficula</i>	+		+		+	+			+	NA	NA
11	<i>Cephalodella gibba</i>	+	+		+	+	+	+	+		NA	NA
12	<i>Filinia</i> sp.	+					+	+	+	+	NA	NA
13	<i>Filinia longiseta</i>		+	+		+		+	+	+	NA	NA
14	<i>Keratella</i> sp.	+		+		+				+	NA	NA
15	<i>Keratella Cochlearis</i>	+	+	+	+	+	+	+	+	+	NA	NA
16	<i>Keratella Tropica</i>	+	+		+		+	+	+		NA	NA
17	<i>Lecane</i> sp.				+		+	+	+	+	NA	NA
18	<i>Lecane luna</i>	+		+		+	+			+	NA	NA
19	<i>Monostyla quadridentatus</i>		+	+							NA	NA
20	<i>Mytilina</i> sp.	+			+	+	+	+	+	+	NA	NA
21	<i>Polyarthra vulgaris</i>	+		+		+				+	NA	NA
22	<i>Testudinella patina</i>		+		+		+	+	+		NA	NA
23	<i>Trichocerca</i> sp.	+		+		+	+			+	NA	NA
	Total	15	11	13	13	15	18	16	16			
	Cladocera											
1	<i>Alona</i> sp.	+	+	+	+	+	+	+	+	+	NA	NA
2	<i>Alona intermediate</i>		+		+		+	+	+		NA	NA
3	<i>Bosmina</i> sp.	+		+	+	+	+	+	+	+	NA	NA
4	<i>Bosmina longirostris</i>	+		+			+	+			NA	NA
5	<i>Ceriodaphnia</i> sp.		+	+		+	+			+	NA	NA
6	<i>Chydorus sphaericus</i>	+	+		+		+	+			NA	NA

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7	<i>Daphnia</i> sp.	+		+	+		+	+		NA	NA
8	<i>Daphnia pulex</i>	+			+	+	+		+	NA	NA
9	<i>Diaphnosoma excisum</i>	+	+	+			+	+		NA	NA
10	<i>Leydgia</i> sp.		+	+		+	+		+	NA	NA
11	<i>Moina daphnia</i>	+			+		+	+	+	NA	NA
12	<i>Simocephalus</i> sp.	+	+	+		+			+	NA	NA
	Total	9	7	8	7	6	11	8	7		
	Copepoda										
1	<i>Cyclops</i> sp.	+	+	+	+	+	+	+	+	NA	NA
2	<i>Diaptomus</i> sp.	+	+	+	+	+	+		+	NA	NA
3	<i>Eucyclops</i> sp.	+	+	+			+	+	+	NA	NA
4	<i>Heleodiptomus viduus</i>	+	+			+	+			NA	NA
5	<i>Mesocyclops</i> sp.	+	+		+		+	+	+	NA	NA
6	<i>Nauplius larvae</i>	+	+	+	+	+	+	+	+	NA	NA
7	<i>Neodiptomus</i> sp.		+		+		+		+	NA	NA
8	<i>Nitzii amphibia</i>	+	+	+	+	+	+	+		NA	NA
9	<i>Paradiaptomus</i> sp.	+		+	+		+		+	NA	NA
10	<i>Thermocyclops</i> sp.	+	+	+	+	+	+	+	+	NA	NA
11	<i>Thermocyclops crassus</i>	+	+	+	+	+	+	+	+	NA	NA
	Total	10	10	8	9	7	11	7	9		
	Ostracoda										
1	<i>Cyprinotus</i> sp.	+		+	+	+	+	+	+	NA	NA
2	<i>Cypris</i> sp.	+	+	+	+		+	+	+	NA	NA
3	<i>Stenocypris</i> sp.	+	+	+	+	+	+	+	+	NA	NA
4	<i>Stenocypris malcolmsoni</i>	+	+	+	+	+	+		+	NA	NA
	Total	4	3	4	4	3	4	3	4		

Source: Primary Survey data of P&M Solution, Noida.

ii. Macro-invertebrates (Insects/Benthos)

Macro-invertebrates are commonly found in all types of aquatic habitats such as streams, rivers, wetlands, lakes, and ponds. The term macro-invertebrate is used for those animals that have no backbone and can be seen with the naked eye. These animals generally include insects, crustaceans, mollusks, and annelids. They are significant within the food chain as

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larger animals such as fish and birds rely on them as a food source. None of the macro-invertebrate species have been observed under the of Rare, Endangered, and threatened category. Various macro-invertebrate species were collected and identified from the present study area and listed in Table 3.29.

Table 3.29: Macro-invertebrates recorded from the Core and Buffer zone

	Insecta										
1	<i>Baetis nymph</i>		+	+	+	+	+	+	+	NA	NE
2	<i>Caenid mayfly</i>	+			+		+			NA	NE
3	<i>Chironomus plumosus</i>	+	+	+	+	+	+	+	+	NA	NE
4	<i>Chironomus sp.</i>	+	+	+	+	+	+	+	+	NA	NE
5	<i>Damsel flies nymphs</i>	+			+		+			NA	NE
6	<i>Dragon flies nymphs</i>	+		+	+		+	+	+	NA	NE
7	<i>Ephydra larvae</i>	+	+	+	+	+	+			NA	NE
8	<i>Hirudineria glossophonia</i>		+			+	+	+	+	NA	NE
9	<i>Hirudineria sp.</i>	+	+	+			+	+	+	NA	NE
10	<i>Limnodrillus hoffmeisteri</i>	+					+			NA	NE
11	<i>Mayflies nymphs</i>		+		+		+	+	+	NA	NE
12	<i>Mosquitos larvae</i>	+	+	+	+	+	+	+	+	NA	NE
13	<i>Ranatra elongata</i>	+	+			+	+	+	+	NA	NE
14	<i>Ranatra filliformis</i>	+		+	+	+	+	+	+	NA	NE
15	<i>Stone flies nymphs</i>			+	+		+			NA	NE
16	<i>Tubifex tubifex</i>	+	+	+		+	+	+	+	NA	NE
	Total	12	10	10	11	9	16	11	11		
	Mollusca										
1	<i>Bellamyia bengalensis</i>	+		+	+	+	+	+	+	NA	NE
2	<i>Corbicula fluminalis</i>		+	+	+	+	+	+	+	NA	NE
3	<i>Corbicula sp.</i>	+	+	+	+	+	+			NA	NE
4	<i>Gyraulus convexus</i>	+		+			+	+	+	NA	NE
5	<i>Gyraulus sp.</i>	+	+		+	+	+		+	NA	NE
6	<i>Lymnaea acuminata</i>	+		+		+		+	+	NA	NE
7	<i>Lymnaea sp.</i>	+	+	+	+	+	+	+		NA	NE
8	<i>Melanoides lineatus</i>		+	+			+		+	NA	NE
9	<i>Pila globosa (apple snail)</i>		+		+		+		+	NA	NE

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10	<i>Pila sp.</i>	+		+	+	+	+	+	+	NA	NE
11	<i>Thira sp.</i>	+	+	+			+	+	+	NA	NE
12	<i>Thira tuberculata</i>	+	+	+	+		+		+	NA	NE
13	<i>Unio tigris</i>			+	+		+	+	+	NA	NE
14	<i>Vivipara bengalensis</i>			+	+	+	+	+		NA	NE
	Total	9	8	12	10	8	13	9	11		
	Source: Primary Survey data of P&M Solution, Noida.										

iii. Amphibians

Amphibians and reptiles are commonly found at places along the margin of aquatic and terrestrial systems. The presence of water bodies like rivers, streams, etc. in the study area are providing shelter to many amphibian species. Some of the commonly reported amphibian species in the present study areas are given in Table 3.30. None of the Amphibians and Reptiles have been observed under the Rare, Endangered, and threatened category. Also, none of them are under the Schedule-I category as per Wildlife Protection Act, 1972.

Table 3.30: Amphibians and Reptiles recorded from the Core and Buffer zone

S. No	English Name	Scientific Name	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status (WPA,1972)	IUCN Status
1	<i>Agama buberculatus</i>	Rock Lizard	+	+	+	+	+	+	+	+	IV	LC
2	<i>Bufo melanostictus</i>	Common toad	+	+	+	+	+	+	+	+	IV	LC
3	<i>Bungarus caeruleus</i>	Common Krait	+	+	+	+	+	+	+	+	IV	LC
4	<i>Bungarus fasciatus</i>	Banded Krait	+	+	+	+	+	+	+	+	IV	LC
5	<i>Euphlyctis cyanophlyctis</i>	Indian skipper frog	+	+	+	+	+	+	+	+	IV	LC
6	<i>Hoplobatrachus tigerinus</i>	(Indian bullfrog).	+	+	+	+	+	+	+	+	IV	LC
7	<i>Chamelion calcarata</i>	Chameleon	+	+	+	+	+	+	+	+	II	LC
8	<i>Naja naja</i>	Indian Cobra	+	+	+	+	+	+	+	+	II	LC

Note: DD=Data Deficient, LC=Least Concern, NE=Not Evaluated.

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Source: Primary Survey data of P&M Solution, Noida and Data supported by data of Department of Forest, Jamuidistrict, Bihar.

(iii) Fishes

The study area of the present Project development project has several lentic and lotic water bodies in which few are perennial and most of the water bodies are seasonal or monsoon fed. Jammuaririver is a major lotic system in the study area. Some private ponds are also present in the study area which are mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table 3.31

Table 3.31: Fish Fauna found in different seasonal and perennial water bodies in the study area

S.No.	Name of the Taxa	Family Name	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	IUCN Status	Schedule Status in WPA (1972)
1	<i>Catla catla</i>	Cyprinidae	+	+	+	+		+		+	VU	NA
2	<i>Channa stiatius</i>	Chandadae					+	+	+		LC	NA
3	<i>Channa punctatus</i>	Chandadae			+	+	+		+	+	LC	NA
4	<i>Labeo bata</i>	Cyprinidae		+		+				+	LC	NA
5	<i>Labeo rohita</i>	Cyprinidae	+		+	+		+			LC	NA
6	<i>Macrobrachium malcomsoni</i>	Palaemonidae	+		+	+	+	+	+	+	LC	NA
7	<i>Mystus bleekeri</i>	Bagridae		+			+	+			LC	NA
8	<i>Mystus tengara</i>	Bagridae	+	+	+	+	+	+	+	+	LC	NA
9	<i>Puntius sarana</i>	Cyprinidae			+			+	+	+	LC	NA
10	<i>Puntius sophore</i>	Cyprinidae	+	+	+		+			+	LC	NA
11	<i>Puntius stigma</i>	Cyprinidae			+	+		+			LC	NA
12	<i>Puntius ticto</i>	Cyprinidae		+	+	+			+	+	LC	NA
13	<i>Xenentodon cancila</i>	Belonidae	+					+			LC	NA
14	<i>Pangasius buchani</i>	Pangasiidae	+	+	+	+	+	+		+	LC	NA
	Total		7	7	10	9	7	10	6	9		

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Note: VU= Vulnerable, LC= Least Concern and NA= Not Application.

Source: Primary Survey data of P&M Solution, Noida and data supported by Department of Fisheries, Jamui District, Bihar.

3.6.13 Observations of Present Study (Flora & Fauna)

3.6.13.1 Flora

Most of the parts of the present study area (Jamui district) are agricultural fields, village land. The forest of the district comprises tropical deciduous vegetation due to high temperature and humidity. No any rare, endangered and threatened floral species have been observed from the core and buffer zone of the present study.

3.6.13.2 Fauna

There are no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 1 km buffer area as well as 5 km of the project area. No any endangered and threatened faunal species were observed from the core and buffer zone of the present study area. On the other hand, there is no any Schedule-I fauna was recorded as per the Wildlife (Protection) Act, 1972. However, care will be taken during the developmental activities if found any.

3.7 Socio-Economic Environment

Demography & Socio-Economic Features

Demography

Demography is one of the important indicators of environmental health of an area. It includes population, sex ratio, number of households, literacy, population density, etc. In order to assess the Demographic & Socio-economic features of the area, Census data 2011, for one major district named Jamui of Bihar state was compiled and placed in the form of tabulation and graphical representation.

Demography of the Jamui District

As per the census records 2011, Jamui district has a population of 17,60,405 persons followed by 9,16,064 males and 8,44,341 females respectively. Out of the total population of the district, about 8.3% population lived in urban areas while 91.7% live in rural areas. The decadal Variation of the district has been seen at 25.9% during the decade 2001-11. The

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Urban area of the district has attained a higher decadal Variation of 40.8% as compared to that of rural area at 24.7%. The district has a population density of 567 inhabitants per square kilometre (1,470/sq. mi)

As per 2011 census sex ratio of the district is 922 females per 1,000 males. The same for rural and urban areas of the district stands at 923 and 905 respectively. As per the census records 2011, the sex ratio of population in the age group 0-6, which works out to 956, is much higher than the sex ratio of the total population as 922 for the district of Jamui. While the sex ratio of (0-6) population in the rural areas of the district is 957, the sex ratio of (0-6) population for the urban areas is only 936 females per 1000 males.

As per the census records 2011, it is observed that the proportion of scheduled castes and scheduled tribe's population to the total population of the district is found to be only 17.2 and 4.5% respectively. For rural areas, the respective proportion of scheduled castes and scheduled tribes to the total population of the district comes out to be 17.5 and 4.8% respectively. Similarly, in urban areas, the percentage of scheduled castes and scheduled tribe's population to the total population of the district comes out to 13.2 and 0.4% respectively.

It is also observed from the census records 2011, that the district has registered a literacy rate of 59.8%. As regards to rural and urban areas of the district the literacy rates have been registered 58.4% & 75.0% respectively. The gap in the male-female literacy rates has been 24.0% point as it is 71.2% male and 47.2% female respectively. For the district as a whole, the literacy rate of males is much higher than that of females.

Census data 2011 shows that the work participation rate (WPR) in the district is 25.3% for main workers and 16.03% for marginal workers. Proportion of non workers in the district is 58.67%.

Mother Tongue

At the time of the 2011 Census of India, 73.37% of the population in the district spoke Hindi, 6.81% Urdu, 5.94% Khortha, 3.66% Santali and 3.06% Magahi as their first language. 7.02% of the population spoke languages recorded as 'Others' under Hindi under Hindi on the census.

Religion

The population of the Jamui district during 2011 was 1,760,405. Hindus constitute 86.67 percent (1,525,746 persons) of the population in the district followed by Muslims 12.36

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percent (217,621 persons). All other four major religious communities have almost negligible percentages

Methodology

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study period and Census records 2011, for Jamui district of Bihar state respectively was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly rural and no town was found in the study area.

Purpose of the Study

Socio-economic study was conducted to establish the baseline demographic features and impacts due to this '*Sand Ghat Mining Project*', as operation phase of any project invariably leads to Socio-economic changes. The construction phase of any kind of project could lead to unplanned and haphazard development of slums of various size and description with little or rudimentary.

Description of Social Environment

As per the Census Records 2011, the study area has a total of 125 villages and one major Town named Jamui (NP/30 Wards) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under Four (04) tehsils namely Jamui (30 villages & 01 Town), Gidhaur (12 villages), Khaira (75 villages) and Sono (08 villages) of Jamui district in Bihar state. There are eleven (11) villages of Jamui district in Bihar state found as uninhabited villages in the study area. There is one town named Jamui (NP/30 Wards) found in the 10 km radial study zone. There are two towns named Jamui and Jhajha of Jamui district available in the distance range of 5 to 32km from the villages of study zone.

Population Distribution within 10 km radial Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 3,79,754 persons of 125 villages and one town named Town (NP) of Jamui district in Bihar state. Male-female wise total population was recorded as 1,99,008 males (52.4%) and 1,80,746 (47.6%) females respectively.

Total number of 'Households' was observed as 65,705 in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 61,962 persons consisting of 32,018 males (51.7%) and 29,944 females (48.3%) in the 10 km study zone. Scheduled Tribes

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(‘ST’) population was also observed as 1,456 persons (0.4%) consisting of 736 males (50.6%) and 720 females (49.4%) in the 10 km study zone. The child population (0-6 Age) of the study area is recorded as 67,569 (17.8%) and comprising of 34,790 (51.5%) males & 32,779 (48.5%) females respectively

Village wise details of population distribution are given as follows in **Table 3.32 & 3.33**

Table 3.32 : Village-wise Population Distribution (10km)

Name of Village/Town	No of Households	Total Population			Child Population (0-6 Years)		
		Persons	Male	Female	Persons	Male	Female
Garowada	299	1553	794	759	239	122	117
Lathane	334	1976	1039	937	369	202	167
Sugi	277	1506	792	714	304	154	150
Thegua	99	534	291	243	126	71	55
Sonpai	632	3442	1791	1651	611	297	314
Garsanda	836	4467	2306	2161	888	476	412
Barar	125	755	388	367	148	79	69
Khairi	27	143	75	68	29	14	15
Rampur	164	871	442	429	168	79	89
Khargpur	156	819	437	382	128	73	55
UgniChak	51	242	138	104	18	13	5
SihoChak	83	446	235	211	88	50	38
Puteria	132	770	417	353	145	82	63
Lukhri	172	924	489	435	166	87	79
Sahur	57	280	154	126	42	21	21
SitlaChak	Uninhabited Village						
AgabaraBarwata	1399	7063	3650	3413	1251	626	625
Piri	61	289	143	146	68	35	33
Abhaipur	258	1564	818	746	289	143	146
Markata	110	596	277	319	125	61	64
Manjura	6	39	21	18	3	3	0
Indpe	512	2962	1548	1414	526	263	263
Dhenkdih	73	352	158	194	56	27	29
Bukar	586	3042	1573	1469	546	271	275
Lotan	183	932	493	439	212	118	94
Narainpur	544	2784	1397	1387	426	199	227
Damdama	35	152	80	72	28	17	11
Dundu	279	1851	939	912	333	179	154
Narbada	143	946	521	425	180	109	71
Pira	166	912	447	465	158	68	90
Jamui (NP)/30 Wards	14509	87357	46014	41343	14173	7423	6750
Maura	1456	7163	3753	3410	1370	689	681
Gangra	1394	7680	4051	3629	1541	760	781
Chhatarpur	55	324	173	151	55	33	22
Bandhaura	304	1832	998	834	353	192	161
Patsanda	1756	9353	4897	4456	1617	804	813
Dhobghat	526	2756	1510	1246	442	237	205
Simaria	131	617	329	288	91	46	45
Kolhua	466	2930	1543	1387	560	303	257
Kumardih	259	1471	755	716	258	128	130
Kharhua	163	911	470	441	177	94	83

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Mahuli	569	2961	1547	1414	534	266	268
Ratanpur	2015	10968	5687	5281	1902	952	950
Chandabank	Uninhabited Village						
Singarpur	407	2331	1243	1088	420	237	183
Ballopur	222	1490	761	729	296	151	145
Naudiha	403	2281	1205	1076	426	241	185
Suraundha	72	341	172	169	93	41	52
Nauniatanr	67	376	192	184	88	44	44
Amari	598	3370	1767	1603	670	338	332
Khutauna	278	1342	721	621	235	117	118
Dharampur	319	1792	935	857	365	183	182
Mahapur Khurd	64	331	162	169	77	37	40
Kharui	233	1441	740	701	264	134	130
Dumarkola	583	3775	2024	1751	710	382	328
Kashmir	528	2997	1560	1437	580	307	273
Kasbagidhaur	49	212	104	108	47	21	26
Ghanberia	621	3625	1964	1661	559	308	251
Khaira	1544	9581	5068	4513	1611	849	762
Gopalpur	612	3651	1908	1743	757	389	368
Raipura	592	3105	1630	1475	436	229	207
Karan Nawada	146	659	331	328	121	55	66
Kendih	568	3268	1744	1524	522	273	249
Parsa	170	981	569	412	149	97	52
Bhaunr	754	3738	1975	1763	686	370	316
Pakri	137	785	401	384	158	79	79
BaribagJaljoga	356	2240	1146	1094	399	211	188
Fatehpur	594	3605	1882	1723	738	375	363
Baheratar	Uninhabited Village						
JorbahaDharampur	338	2074	1088	986	413	214	199
ChaukitanrDeyaldih	264	1461	725	736	286	149	137
Bhojpur	119	867	444	423	114	46	68
Daingarwaphulandih	339	2212	1142	1070	475	217	258
TolaDainagarwaMeghuraiddih	Uninhabited Village						
TolaNaukadih	20	119	61	58	27	14	13
TolaBhimain	346	2087	1089	998	388	188	200
TolaBarabandh	313	1655	837	818	327	166	161
TolaChandarSeli	282	1545	824	721	270	145	125
TolaBheriatari	38	180	99	81	43	27	16
TolaPachrukhi	44	240	132	108	40	20	20
TolaKurhwabarhiaKhandari	Uninhabited Village						
TolaAndarkurwa	195	1214	663	551	223	135	88
TolaDomantari	86	552	285	267	98	49	49
TolaPesra	111	681	359	322	110	63	47
TolaBhalni	105	558	277	281	125	64	61
TolaPurniChhit	Uninhabited Village						
TolaTetaria	98	670	358	312	128	71	57
TolaAmatari	71	330	169	161	67	29	38
TolaCharkapathal	Uninhabited Village						
Nim Nawada	1272	8199	4253	3946	1741	898	843
TolaJhundo	1812	10506	5568	4938	1998	1053	945
TolaKewalpharaita	523	3622	1873	1749	733	371	362
Dinari	218	1082	576	506	176	93	83
Kagesar	552	2893	1530	1363	539	255	284

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tihia	391	2439	1273	1166	382	206	176
Chuan	755	4657	2434	2223	930	455	475
Gangti	418	2455	1263	1192	457	219	238
Kerakado	454	2521	1335	1186	492	254	238
Chihutia	204	1388	751	637	230	124	106
Bela	657	4123	2194	1929	791	410	381
Khandaich	1544	10061	5231	4830	1788	915	873
Sagdaha	291	1631	868	763	242	124	118
Bhandra	241	1317	661	656	212	102	110
Chanco	137	781	422	359	121	65	56
Dabil	822	5095	2668	2427	792	399	393
Durgodih	Uninhabited Village						
Changodih	362	2603	1365	1238	413	217	196
Nariana	332	1927	1017	910	394	210	184
Jogajhingol	433	2704	1393	1311	503	242	261
Jitjingo	1157	6557	3402	3155	1093	564	529
Baghakhanr	125	571	276	295	85	38	47
Mangobandar	1793	9942	5171	4771	1852	940	912
Nijuara	254	1322	715	607	212	108	104
Banpur	879	5836	3068	2768	1062	565	497
Bariarpur	553	2501	1338	1163	415	222	193
Sakdari	239	1361	693	668	230	117	113
Harni	435	2734	1387	1347	595	267	328
Gadi Bishunpur	1587	8874	4579	4295	1771	874	897
Tola Nawada	Uninhabited Village						
Tola Sono	1833	9932	5321	4611	1607	845	762
Tola Sabaijor	424	2276	1206	1070	440	232	208
Tola Dehurkhi	98	631	324	307	112	46	66
Tola Kolhawara	Uninhabited Village						
Tola Chhuchhundaria	431	2658	1372	1286	442	230	212
Tola Tilakpur	145	896	466	430	170	84	86
Tola Kaleyampur	246	1362	679	683	265	115	150
TOTAL (10km)	65705	379754	199008	180746	67569	34790	32779
Source-Census of India, 2011							

Table 3.33: Village-wise SC & ST Population Distribution (10km)

Name of Village	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
Garo Nawada	1553	264	121	143	3	2	1
Lathane	1976	310	153	157	0	0	0
Sugi	1506	222	120	102	0	0	0
Thegua	534	210	117	93	4	2	2
Sonpai	3442	866	442	424	2	0	2
Garsanda	4467	1054	550	504	0	0	0
Barar	755	148	77	71	4	3	1
Khairi	143	47	23	24	0	0	0
Rampur	871	368	188	180	3	1	2
Khargpur	819	294	163	131	1	1	0
UgniChak	242	0	0	0	0	0	0
SihoChak	446	231	126	105	0	0	0
Puteria	770	238	124	114	1	1	0

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Lukhri	924	61	33	28	0	0	0
Sahur	280	0	0	0	0	0	0
SitlaChak	Uninhabited Village						
AgabaraBarwata	7063	1744	881	863	3	2	1
Piri	289	269	134	135	0	0	0
Abhaipur	1564	223	108	115	0	0	0
Markata	596	0	0	0	0	0	0
Manjura	39	0	0	0	0	0	0
Indpe	2962	610	312	298	0	0	0
Dhenkdih	352	0	0	0	0	0	0
Bukar	3042	721	362	359	0	0	0
Lotan	932	624	329	295	0	0	0
Narainpur	2784	339	166	173	0	0	0
Damdama	152	146	76	70	0	0	0
Dundu	1851	0	0	0	0	0	0
Narbada	946	220	121	99	0	0	0
Pira	912	342	159	183	1	0	1
Jamui (NP)/30 Wards	87357	8895	4693	4202	110	42	68
Maura	7163	1073	546	527	0	0	0
Gangra	7680	1476	775	701	2	1	1
Chhatarpur	324	18	8	10	0	0	0
Bandhaura	1832	257	145	112	0	0	0
Patsanda	9353	1774	874	900	4	1	3
Dhobghat	2756	709	354	355	0	0	0
Simaria	617	403	217	186	0	0	0
Kolhua	2930	294	162	132	2	2	0
Kumardih	1471	351	180	171	1	0	1
Kharhua	911	196	96	100	0	0	0
Mahuli	2961	512	281	231	1	1	0
Ratanpur	10968	1614	828	786	16	9	7
Chandabank	Uninhabited Village						
Singarpur	2331	533	289	244	1	1	0
Ballopur	1490	206	104	102	0	0	0
Naudiha	2281	236	115	121	0	0	0
Suraundha	341	276	143	133	0	0	0
Nauniatanr	376	247	129	118	0	0	0
Amari	3370	726	367	359	0	0	0
Khutauna	1342	257	138	119	0	0	0
Dharampur	1792	346	161	185	0	0	0
Mahapur Khurd	331	331	162	169	0	0	0
Kharui	1441	315	161	154	244	127	117
Dumarkola	3775	727	389	338	3	2	1
Kashmir	2997	1012	532	480	0	0	0
Kasbagidhaur	212	211	103	108	0	0	0
Ghanberia	3625	479	261	218	0	0	0
Khaira	9581	1331	692	639	12	7	5
Gopalpur	3651	1138	607	531	2	2	0
Raipura	3105	204	116	88	0	0	0
Karan Nawada	659	0	0	0	0	0	0
Kendih	3268	390	208	182	0	0	0
Parsa	981	0	0	0	0	0	0
Bhaunr	3738	965	472	493	4	2	2
Pakri	785	75	36	39	0	0	0

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Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

BaribagJaljoga	2240	309	152	157	0	0	0
Fatehpur	3605	1167	591	576	4	3	1
Baheratari	Uninhabited Village						
JorbahaDharampur	2074	286	148	138	0	0	0
ChaukitanrDeyaldih	1461	351	172	179	0	0	0
Bhojpur	867	28	13	15	0	0	0
Daingarwaphulandih	2212	0	0	0	0	0	0
TolaDainagarwaMeghuraiddih	Uninhabited Village						
TolaNaukadih	119	13	7	6	0	0	0
TolaBhimain	2087	140	71	69	0	0	0
TolaBarabandh	1655	857	424	433	0	0	0
TolaChandarSeli	1545	571	311	260	0	0	0
TolaBheriatari	180	0	0	0	0	0	0
TolaPachrukhi	240	0	0	0	0	0	0
TolaKurhwabarhiaKhandari	Uninhabited Village						
TolaAndarkurwa	1214	43	17	26	0	0	0
TolaDomantari	552	0	0	0	0	0	0
TolaPesra	681	0	0	0	0	0	0
TolaBhalni	558	0	0	0	0	0	0
TolaPurniChhit	Uninhabited Village						
TolaTetaria	670	0	0	0	0	0	0
TolaAmatari	330	104	52	52	0	0	0
TolaCharkapathal	Uninhabited Village						
Nim Nawada	8199	427	232	195	6	4	2
TolaJhundo	10506	1658	872	786	1	0	1
TolaKewalpharaita	3622	490	242	248	0	0	0
Dinari	1082	118	58	60	0	0	0
Kagesar	2893	893	456	437	1	1	0
tihia	2439	0	0	0	0	0	0
Chuan	4657	800	408	392	7	5	2
Gangti	2455	656	336	320	1	1	0
Kerakado	2521	674	350	324	1	0	1
Chihutia	1388	182	105	77	2	1	1
Bela	4123	519	265	254	8	5	3
Khandaich	10061	2184	1133	1051	1	1	0
Sagdaha	1631	201	111	90	0	0	0
Bhandra	1317	143	77	66	0	0	0
Chancho	781	212	115	97	0	0	0
Dabil	5095	699	368	331	3	2	1
Durgodih	Uninhabited Village						
Changodih	2603	328	176	152	1	0	1
Nariana	1927	476	243	233	1	1	0
Jogajhingoal	2704	363	180	183	0	0	0
Jitjhingoi	6557	1399	718	681	6	3	3
Baghakhanr	571	0	0	0	0	0	0
Mangobandar	9942	2174	1133	1041	0	0	0
Nijuara	1322	364	193	171	1	1	0
Banpur	5836	175	79	96	0	0	0
Bariarpur	2501	814	417	397	3	1	2
Sakdari	1361	0	0	0	973	491	482
Harni	2734	673	349	324	0	0	0
Gadi Bishunpur	8874	1872	938	934	3	3	0
Tola Nawada	Uninhabited Village						

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TolaSono	9932	1202	633	569	9	4	5
TolaSabaijor	2276	371	194	177	0	0	0
TolaDehurkhi	631	0	0	0	0	0	0
TolaKolhawara	Uninhabited Village						
TolaChhuchhundaria	2658	22	13	9	0	0	0
TolaTilakpur	896	385	196	189	0	0	0
TolaKaleyanpur	1362	491	241	250	0	0	0
TOTAL (10km)	379754	61962	32018	29944	1456	736	720

Source-Census of India, 2011

Sex Ratio

The 'Sex Ratio' of the study area is a numeric relationship between females and males of an area and bears paramount importance in the present day scenario where the un-ethnic pre-determination of sex and killing of female foetus during pregnancy is practiced by unscrupulous medical practitioners against the rule of the law of the country. It is evident that by contrast the practice of female foeticide is not prevalent in the study area.

The 'Sex Ratio' was observed as 922 females per 1000 males in the District. The same was recorded as 908 females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 942 female children per 1000 male children.

The village wise male-female population distribution for the study area is depicted and shown by graphical representation in **Table 3.34 & Figure 3.7**

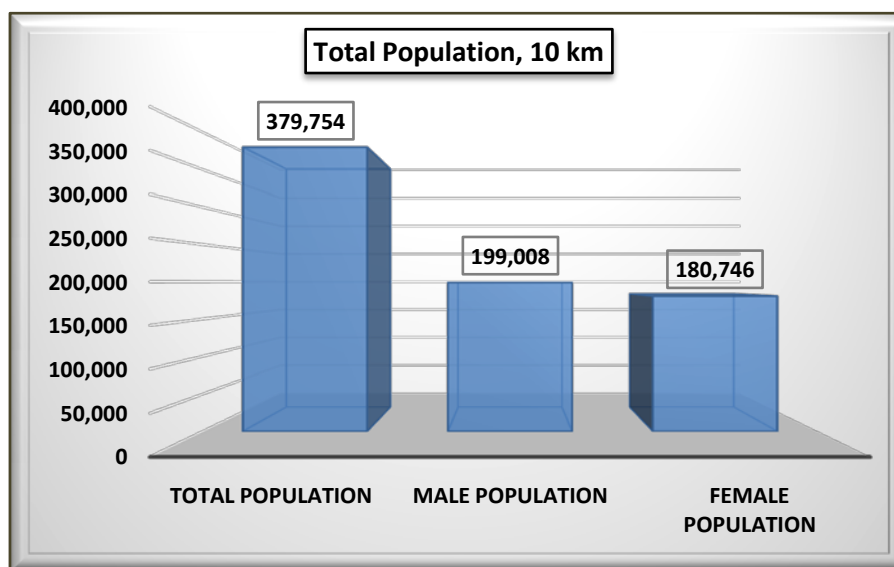


Figure3.7 : Male-Female Wise Population Distribution

Scheduled Caste & Scheduled Tribe Population

On the basis of the village wise SC & ST population distribution of the study area during 2011, the 'Scheduled Castes' population was observed as 61,962 persons consisting of 32,018

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males and 29,944 females respectively in the study area which accounts as 16.3% to the total population (3,79,754 persons) of the study area. Scheduled Tribes ('ST') population was observed as 1,456 persons, accounts as 0.4% to the total population of the study zone consisting of 736 males and 720 females in the 10km radius study zone. It implies that the rest 83.3% of the total population belongs to the general category.

Male-female wise distribution of 'SC' & 'ST' population in the study area is graphically shown in Figure 3.8 & 3.9 as follows.

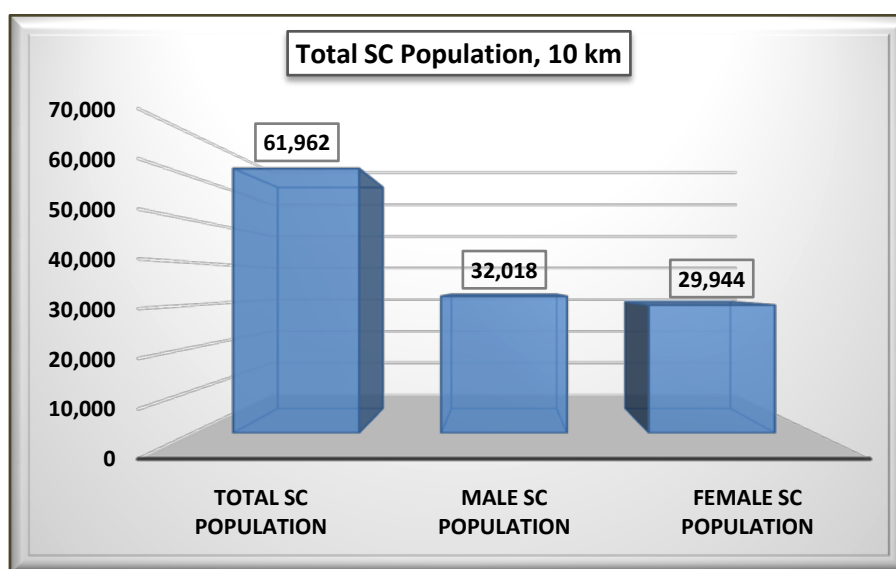


Figure 3.8 :Scheduled Caste Population in the Study Area

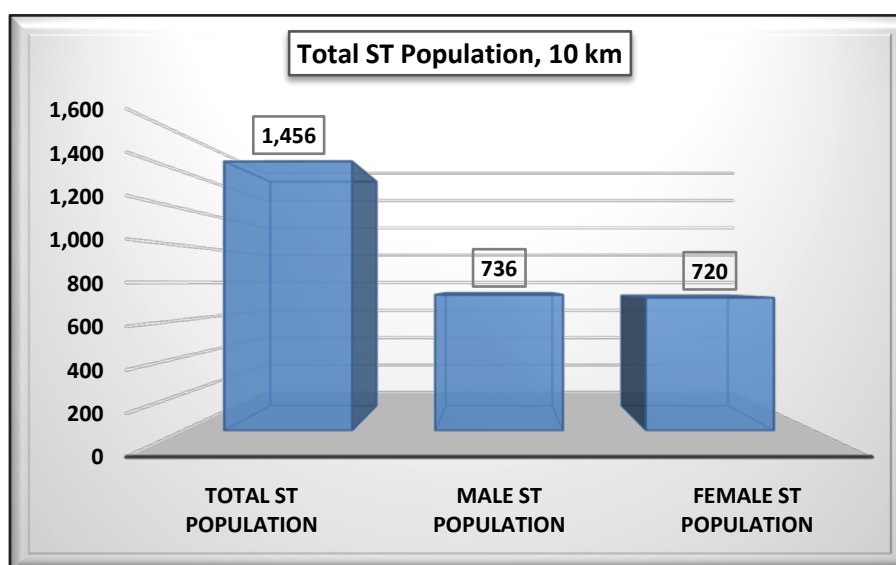


Figure 3.9 :Scheduled Tribes Population in the Study Area

Literacy Rate

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Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterate's population is represented in **Table 3.34** Total literate's population was recorded as 2,08,462 persons (55.0%) in the study area. **Table 3.34** reveals that Male-Female wise literates are observed as 1,26,309 & 82,153 persons respectively, implies that the 'Literacy Rate' is recorded as 55.0% with male-female wise percentages being 33.3% & 21.6% respectively.

The Male-Female wise graphical representation of literates & illiterate's population in study area villages/town is shown in **Figure 3.10**

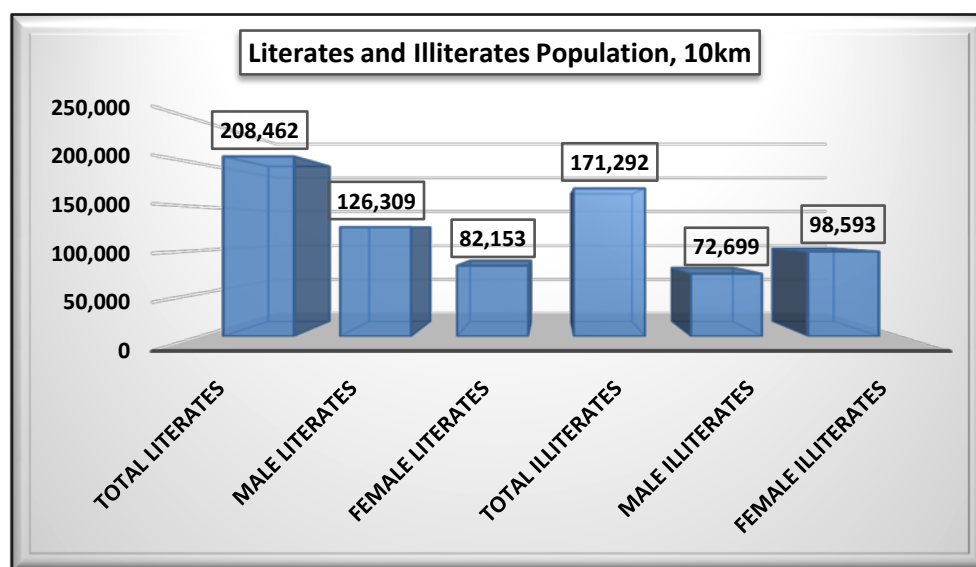


Figure 3.10 : Male-Female Wise Distribution of Literates & Illiterates

Table 3.34 : Male-Female Wise Literates and Illiterates (10 Km)

Name of Village	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
Garowada	1553	1117	610	507	436	184	252
Lathane	1976	1008	665	343	968	374	594
Sugi	1506	778	523	255	728	269	459
Thegua	534	151	117	34	383	174	209
Sonpai	3442	1851	1139	712	1591	652	939
Garsanda	4467	2300	1448	852	2167	858	1309
Barar	755	454	251	203	301	137	164
Khairi	143	76	44	32	67	31	36
Rampur	871	518	272	246	353	170	183
Khargpur	819	434	267	167	385	170	215
UgniChak	242	221	124	97	21	14	7
SihoChak	446	267	149	118	179	86	93
Puteria	770	411	250	161	359	167	192
Lukhri	924	544	349	195	380	140	240
Sahur	280	161	118	43	119	36	83
SitlaChak	Uninhabited Village						
AgabaraBarwata	7063	3754	2284	1470	3309	1366	1943

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Piri	289	129	82	47	160	61	99
Abhaipur	1564	932	579	353	632	239	393
Markata	596	298	182	116	298	95	203
Manjura	39	26	14	12	13	7	6
Indpe	2962	1668	1019	649	1294	529	765
Dhenkdih	352	213	115	98	139	43	96
Bukar	3042	1555	948	607	1487	625	862
Lotan	932	346	208	138	586	285	301
Narainpur	2784	1667	1006	661	1117	391	726
Damdama	152	71	50	21	81	30	51
Dundu	1851	1101	635	466	750	304	446
Narbada	946	373	255	118	573	266	307
Pira	912	366	224	142	546	223	323
Jamui (NP)/30 Wards	87357	56201	32257	23944	31156	13757	17399
Maura	7163	3225	2139	1086	3938	1614	2324
Gangra	7680	3332	2106	1226	4348	1945	2403
Chhatarpur	324	128	85	43	196	88	108
Bandhaura	1832	926	634	292	906	364	542
Patsanda	9353	5239	3255	1984	4114	1642	2472
Dhobghat	2756	1589	980	609	1167	530	637
Simaria	617	302	178	124	315	151	164
Kolhua	2930	1633	1033	600	1297	510	787
Kumardih	1471	907	523	384	564	232	332
Kharhua	911	454	282	172	457	188	269
Mahuli	2961	1547	972	575	1414	575	839
Ratanpur	10968	6215	3782	2433	4753	1905	2848
Chandabank	Uninhabited Village						
Singarpur	2331	1143	693	450	1188	550	638
Ballopur	1490	630	407	223	860	354	506
Naudiha	2281	1457	816	641	824	389	435
Suraundha	341	121	61	60	220	111	109
Nauniatanr	376	143	78	65	233	114	119
Amari	3370	1703	1114	589	1667	653	1014
Khutauna	1342	871	545	326	471	176	295
Dharampur	1792	957	571	386	835	364	471
Mahapur Khurd	331	154	69	85	177	93	84
Kharui	1441	723	433	290	718	307	411
Dumarkola	3775	1931	1168	763	1844	856	988
Kashmir	2997	1124	754	370	1873	806	1067
Kasbagidhaur	212	27	18	9	185	86	99
Ghanberia	3625	2473	1423	1050	1152	541	611
Khaira	9581	5566	3383	2183	4015	1685	2330
Gopalpur	3651	2092	1209	883	1559	699	860
Raipura	3105	2027	1149	878	1078	481	597
Karan Nawada	659	524	272	252	135	59	76
Kendih	3268	1873	1161	712	1395	583	812
Parsa	981	791	465	326	190	104	86
Bhaunr	3738	1966	1174	792	1772	801	971
Pakri	785	409	245	164	376	156	220
BaribagJaljoga	2240	1009	627	382	1231	519	712
Fatehpur	3605	1729	1041	688	1876	841	1035
Baheratari	Uninhabited Village						
JorbahaDharampur	2074	725	491	234	1349	597	752

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ChaukitanrDeyaldih	1461	662	439	223	799	286	513
Bhojpur	867	388	250	138	479	194	285
Daingarwaphulandih	2212	938	630	308	1274	512	762
TolaDainagarwaMeghuraiddih	Uninhabited Village						
TolaNaukadih	119	59	36	23	60	25	35
TolaBhimain	2087	980	683	297	1107	406	701
TolaBarabandh	1655	734	427	307	921	410	511
TolaChandarSeli	1545	937	568	369	608	256	352
TolaBheriatari	180	60	43	17	120	56	64
TolaPachrukhi	240	85	59	26	155	73	82
TolaKurhwabarhiaKhandari	Uninhabited Village						
TolaAndarkurwa	1214	606	392	214	608	271	337
TolaDomantari	552	291	154	137	261	131	130
TolaPesra	681	291	203	88	390	156	234
TolaBhalni	558	278	164	114	280	113	167
TolaPurniChhit	Uninhabited Village						
TolaTetaria	670	273	228	45	397	130	267
TolaAmatari	330	140	97	43	190	72	118
TolaCharkapathal	Uninhabited Village						
Nim Nawada	8199	3090	2098	992	5109	2155	2954
TolaJhundo	10506	5443	3343	2100	5063	2225	2838
TolaKewalpharaita	3622	1659	1080	579	1963	793	1170
Dinari	1082	768	464	304	314	112	202
Kagesar	2893	1661	1052	609	1232	478	754
tihia	2439	1661	930	731	778	343	435
Chuan	4657	2529	1568	961	2128	866	1262
Gangti	2455	1175	721	454	1280	542	738
Kerakado	2521	1139	744	395	1382	591	791
Chihutia	1388	798	513	285	590	238	352
Bela	4123	2224	1365	859	1899	829	1070
Khandaich	10061	5088	3172	1916	4973	2059	2914
Sagdaha	1631	1082	653	429	549	215	334
Bhandra	1317	767	467	300	550	194	356
Chancho	781	488	304	184	293	118	175
Dabil	5095	2582	1698	884	2513	970	1543
Durgodih	Uninhabited Village						
Changodih	2603	1692	977	715	911	388	523
Nariana	1927	1004	616	388	923	401	522
Jogajhingoal	2704	1329	818	511	1375	575	800
Jitjhingoi	6557	3402	2172	1230	3155	1230	1925
Baghakhanr	571	326	179	147	245	97	148
Mangobandar	9942	5164	3136	2028	4778	2035	2743
Nijuara	1322	830	518	312	492	197	295
Banpur	5836	2997	1824	1173	2839	1244	1595
Bariarpur	2501	1209	746	463	1292	592	700
Sakdari	1361	506	302	204	855	391	464
Harni	2734	1132	741	391	1602	646	956
Gadi Bishunpur	8874	4075	2499	1576	4799	2080	2719
Tola Nawada	Uninhabited Village						
TolaSono	9932	6311	3790	2521	3621	1531	2090
TolaSabaijor	2276	1147	727	420	1129	479	650
TolaDehurkhi	631	251	169	82	380	155	225
TolaKolhawara	Uninhabited Village						

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TolaChhuchhundaria	2658	534	384	150	2124	988	1136
TolaTilakpur	896	326	203	123	570	263	307
TolaKaleyanpur	1362	695	443	252	667	236	431
TOTAL (10km)	379754	208462	126309	82153	171292	72699	98593
<i>Source-Census of India, 2011</i>							

Economic Profile of Jamui District:

Jamui is a district among 38 districts of Bihar state, India. The district was formed on 21 February 1991, when it was separated from Munger district.

The economy of the district is mainly based on agriculture. Almost all people of the district is engaged in agriculture since it has no big industries and factories. Every year a huge chunk of revenue comes from the agricultural products grown in the district. Some of its chief agricultural products are paddy, wheat, lentils etc. The district is not very developed educationally due to lack of educational institutions in the district compels its students to go to other places in order to take education.

In 2006 the Ministry of Panchayati Raj named Jamui one of the country's 250 most backward districts (out of a total of 640). It is one of the 36 districts in Bihar currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

Workers Scenario:

Occupational studied to assess the skills of people in the study area. Occupational pattern helps in identifying major economic activities of the area. In the study area the Main and Marginal Workers population was observed as 91,745(24.0%) and 47,531(13.0%) to the total population (3,79,754), while the remaining 2,40,478(63.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in aplenty.

The village-wise main and marginal worker's population with further classification as casual, agricultural, households and other workers is shown as follows in **Table 3.35**

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Table 3.35 :Village-wise Occupational Pattern (10km)

Name of the Village/Town	MAIN WORK_P	MAIN_CL_P	MAIN_AL_P	MAIN_HH_P	MAIN_OT_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG_HH_P	MARG_OT_P
Garo Nawada	321	124	102	2	93	212	3	203	2	4
Lathane	141	14	17	9	101	611	44	420	45	102
Sugi	208	9	133	22	44	40	0	33	4	3
Thegua	20	2	15	0	3	253	4	239	0	10
Sonpai	752	316	228	40	168	155	38	14	3	100
Garsanda	1018	242	324	77	375	980	78	669	112	121
Barar	122	2	0	6	114	173	16	5	32	120
Khairi	49	8	39	0	2	1	0	1	0	0
Rampur	156	35	47	0	74	180	1	7	1	171
Khargpur	161	27	128	0	6	77	0	72	0	5
UgniChak	68	53	0	1	14	0	0	0	0	0
SihoChak	33	10	14	0	9	76	5	69	0	2
Puteria	130	50	22	4	54	130	12	106	0	12
Lukhri	298	50	178	31	39	142	14	108	4	16
Sahur	10	1	0	0	9	90	10	67	0	13
SitlaChak	Uninhabited Village									
AgabaraBarwata	1157	338	474	18	327	1270	150	992	17	111
Piri	87	0	83	4	0	52	0	52	0	0
Abhaipur	283	187	41	0	55	246	141	86	4	15
Markata	141	27	3	13	98	91	15	36	24	16
Manjura	7	2	2	0	3	7	0	0	7	0
Indpe	683	204	381	21	77	273	64	151	9	49
Dhenkdih	154	95	8	2	49	31	7	13	2	9
Bukar	661	174	98	68	321	813	13	669	49	82
Lotan	250	73	172	0	5	20	2	18	0	0
Narainpur	503	0	461	3	39	422	38	315	1	68
Damdama	42	1	41	0	0	33	0	33	0	0
Dundu	245	183	31	3	28	213	135	53	0	25
Narbada	80	62	14	1	3	326	58	255	0	13
Pira	11	3	4	0	4	439	2	404	12	21
Jamui (NP)/30 Wards	18728	1404	3533	965	12826	6555	479	2612	648	2816
Maura	2882	388	1477	893	124	232	5	175	25	27

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Gangra	2666	179	1039	1131	317	351	40	92	201	18
Chhatarpur	87	1	86	0	0	1	0	1	0	0
Bandhaura	513	33	146	171	163	318	2	258	11	47
Patsanda	2785	286	1047	554	898	707	139	183	245	140
Dhobghat	555	40	460	4	51	630	92	436	60	42
Simaria	194	75	111	3	5	104	4	100	0	0
Kolhua	564	212	287	25	40	350	4	293	46	7
Kumardih	405	147	174	16	68	207	43	128	4	32
Kharhua	291	109	42	75	65	78	5	27	13	33
Mahuli	1142	133	640	34	335	310	4	265	18	23
Ratanpur	2943	1044	1322	111	466	992	244	299	202	247
Chandabank	Uninhabited Village									
Singarpur	711	146	515	2	48	30	5	19	0	6
Ballopur	364	104	248	0	12	32	0	29	2	1
Naudiha	419	101	226	18	74	349	117	204	4	24
Suraundha	160	0	157	0	3	30	0	30	0	0
Nauniatanr	133	0	132	0	1	70	0	70	0	0
Amari	797	123	577	33	64	544	22	487	20	15
Khutauna	319	108	183	2	26	341	29	290	7	15
Dharampur	381	118	174	8	81	295	57	224	1	13
Mahapur Khurd	4	0	0	0	4	160	0	92	68	0
Kharui	304	73	168	35	28	6	1	0	4	1
Dumarkola	1354	583	523	194	54	167	19	111	28	9
Kashmir	716	104	564	15	33	141	4	92	41	4
Kasbagidhaur	55	0	55	0	0	0	0	0	0	0
Ghanberia	1135	457	427	48	203	269	59	157	11	42
Khaira	2996	432	948	893	723	534	189	144	68	133
Gopalpur	1182	328	646	38	170	289	116	144	7	22
Raipura	1468	521	625	35	287	128	14	42	20	52
Karan Nawada	77	22	54	0	1	194	0	194	0	0
Kendih	703	279	131	16	277	516	6	355	45	110
Parsa	291	84	188	1	18	18	6	3	0	9
Bhaunr	819	183	431	92	113	655	103	369	137	46
Pakri	208	12	177	0	19	60	1	47	0	12
BaribagJaljoga	484	15	429	12	28	254	40	188	3	23

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Fatehpur	410	196	129	30	55	1335	70	615	288	362
Baheratari	Uninhabited Village									
JorbahaDharampur	306	49	163	33	61	339	15	243	59	22
ChaukitanrDeyaldih	76	12	14	0	50	396	97	109	87	103
Bhojpur	498	264	32	201	1	67	15	10	42	0
Daingarwaphulandih	395	6	203	153	33	425	6	56	168	195
TolaDainagarwaMeghuraiddih	Uninhabited Village									
TolaNaukadih	0	0	0	0	0	51	0	38	10	3
TolaBhimain	146	33	9	81	23	667	15	547	98	7
TolaBarabandh	711	145	370	100	96	86	20	36	17	13
TolaChandarSeli	437	18	330	39	50	336	33	285	8	10
TolaBheriatari	33	31	0	1	1	39	4	0	31	4
TolaPachrukhi	40	36	1	3	0	42	3	0	38	1
TolaKurhwabarhiaKhandari	Uninhabited Village									
TolaAndarkurwa	14	2	6	1	5	610	165	182	179	84
TolaDomantari	7	3	2	1	1	264	58	145	55	6
TolaPesra	387	98	91	51	147	1	0	0	1	0
TolaBhalni	138	105	17	9	7	180	5	8	126	41
TolaPurniChhit	Uninhabited Village									
TolaTetaria	156	39	111	0	6	239	45	193	1	0
TolaAmatari	85	39	27	3	16	108	5	5	12	86
TolaCharkapathal	Uninhabited Village									
Nim Nawada	1880	372	865	364	279	1500	107	1183	158	52
TolaJhundo	2201	830	568	517	286	2398	795	919	326	358
TolaKewalpharaita	1144	305	597	154	88	499	9	250	227	13
Dinari	298	98	109	2	89	16	0	10	0	6
Kagesar	518	13	287	128	90	697	43	311	194	149
tihia	666	40	348	133	145	151	28	61	37	25
Chuan	835	102	283	275	175	1055	138	629	208	80
Gangti	691	201	366	57	67	592	97	200	250	45
Kerakado	814	83	459	37	235	303	11	92	29	171
Chihutia	243	46	131	5	61	273	13	215	24	21
Bela	1846	200	1610	21	15	46	4	35	4	3
Khandaich	2344	797	1235	182	130	936	22	575	282	57
Sagdaha	439	217	111	5	106	59	8	25	1	25
Bhandra	179	34	130	0	15	193	4	188	0	1

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Chancha	85	9	30	32	14	267	5	112	76	74
Dabil	1122	96	700	54	272	722	29	393	89	211
Durgodih	Uninhabited Village									
Changodih	411	152	211	0	48	432	15	403	2	12
Nariana	461	49	301	11	100	186	1	175	4	6
Jogajhingoal	470	114	153	73	130	360	105	118	85	52
Jitjhingoi	1875	437	1061	108	269	1331	217	759	253	102
Baghakhanr	145	0	141	0	4	31	4	15	0	12
Mangobandar	1289	315	343	283	348	2592	105	1207	912	368
Nijuaara	218	19	10	5	184	474	20	340	1	113
Banpur	1663	303	847	33	480	610	36	454	52	68
Bariarpur	971	247	188	159	377	241	42	157	5	37
Sakdari	291	2	278	0	11	382	0	381	0	1
Harni	257	21	158	43	35	1008	524	395	64	25
Gadi Bishunpur	2319	1452	651	86	130	1054	95	634	219	106
Tola Nawada	Uninhabited Village									
TolaSono	3042	351	623	898	1170	68	14	9	30	15
TolaSabaijor	538	278	55	53	152	259	9	112	126	12
TolaDehurkhi	326	10	153	159	4	3	0	2	1	0
TolaKolhawara	Uninhabited Village									
TolaChhuchhundaria	989	127	516	327	19	192	82	62	33	15
TolaTilakpur	397	32	179	178	8	71	0	12	53	6
TolaKaleyanpur	313	143	68	2	100	72	5	60	1	6
TOTAL (10km)	91745	18707	36272	10839	25927	47531	5842	26215	7233	8241

Source-Census of India, 2011

ABBREVIATIONS:

MAIN WORKERS POPULATION: **MAIN WORK_P:** Main worker's total population, **MAIN_CL_P:** Main cultivated labour population, **MAIN_AL_P:** Main agricultural labour population, **MAIN_HH_P:** Main workers population involved in household industries, **MAIN_OT_P:** Main other worker's population

MARGINAL WORKERS POPULATION:

MARG WORK_P: Marginal worker's total population, **MARG_CL_P:** Marginal cultivated labors total population, **MARG_AL_P:** Marginal agricultural labors population, **MARG_HH_P:** Marginal workers involved in household industries, **MARG_OT_P :** Marginal other workers Population

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Distribution of work participation rate of the study area population is shown in **Table 3.36** as follows;

Table 3.36 :Distribution of Work Participation Rate(10km)

Occupation Class	Year, 2011
Main Workers	91,745 (24.0%)
Male	68,914(75.0%)
Female	22,831(25.0%)
Marginal Workers	47,531(13.0%)
Male	26,132(55.0%)
Female	21,399(45.0%)
Non-Workers	2,40,478(63.0%)
Male	1,03,962 (43.2%)
Female	1,36,516(56.8%)
Total Population (10km)	3,79,754
<i>Source: Census of India Records, 2011</i>	

Graphical representation of Workers Scenario is given below as **Figure 3.11**

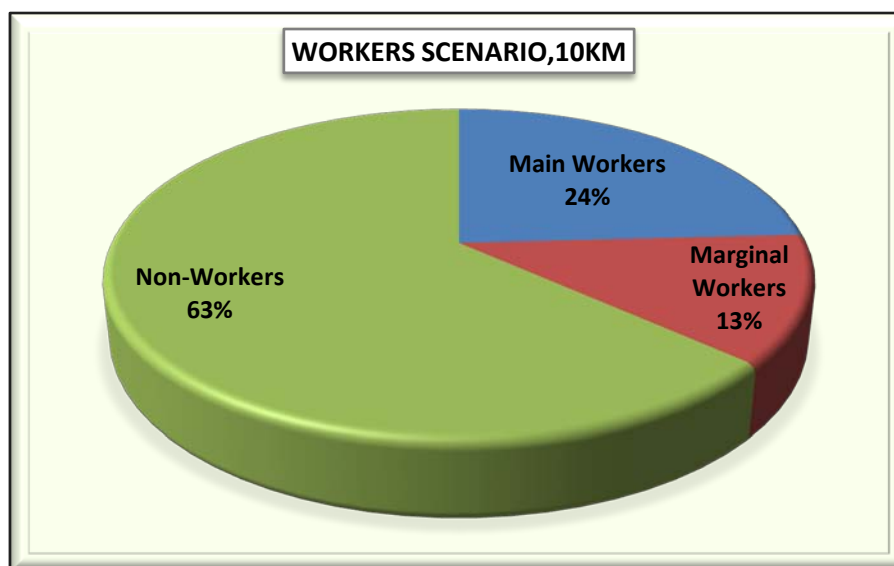


Figure 3.11: Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 91,745 persons (24.0%) to the total population (3,79,754) of the study area and its composition is made-up of Casual laborers as 18,707

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(20.0%), Agricultural laborers as 36,272 (40.0%), Household workers 10,839 (12.0%) and other workers as 25,927 (28.0%) respectively.

Composition of Main workers is shown below as **Figure 3.12**

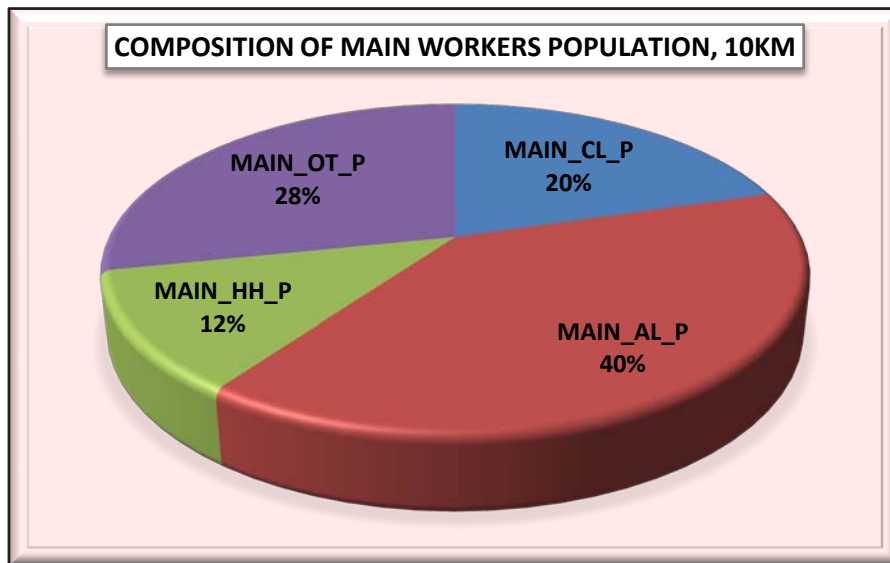


Figure 3.12 : Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 47,531 which constitute 13.0% to the total population (3, 79,754) comprising of Marginal Casual Laborers as 5,842 (12.0%), Marginal Agricultural Laborers as 26,215(55.0%), Marginal Household laborers as 7,233 (15.0%) and marginal other workers were also observed as 8,241 (18.0%) of the total marginal workers respectively.

Details about marginal workers in the study area are tabulated in **Table 3.37** .Composition of Marginal workers is shown in **Figure 3.13** as follows.

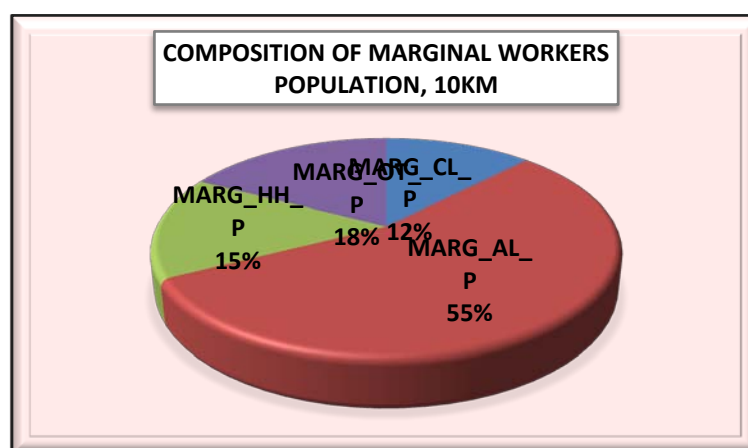


Figure 3.13 :Composition of Marginal Workers

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Composition of Non-Workers:

The total Non-worker's population was observed as 2,40,478 which accounts 63.0% to the total population (3,79,754) of the study area. Male-female wise Non-worker's population was recorded as 1,03,962 Males (43.2%) and 1,36,516 Females (56.8%) respectively.

Details about Total Non-workers in the study area are compiled in **Table 3.37** Graphical representation of Non-worker's population is shown as follows in **Figure 3.14**

Table 3.37 :Composition of Non-Workers

Non-Workers Population		
Persons	Males	Females
2,40,478	1,03,962 (43.2%)	1,36,516(56.8%)

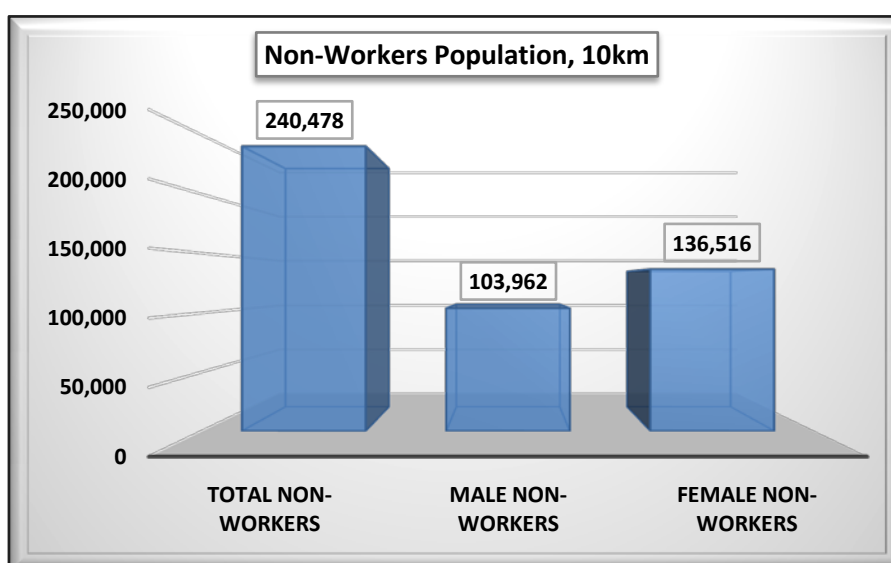


Figure 3.14 : Composition of Non-Workers

Basic Infrastructure Facilities Availability(as per the census records of 2011)

A review of basic infrastructure facilities (Amenities) available in the study area has been done on the basis of the field survey and Census records, 2011 for the study area inhabited villages of Jamui District in Bihar state. The study area has average level of basic infrastructure facilities like educational, medical, potable water and power supply and transport & communication network.

As per the Census Records 2011, the study area has a total of 125 villages and one major Town named Jamui (NP/30 Wards) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under Four (04) tehsils namely Jamui (30 villages & 01 Town), Gidhaur (12 villages), Khaira (75 villages) and Sono (08 villages) of Jamui district in

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Bihar state. There are eleven (11) villages of Jamui district in Bihar state found as uninhabited villages in the study area.

There is one town named Jamui (NP/30 Wards) found in the 10km radial study zone. There are two towns named Jamui and Jhajha of Jamui district available in the distance range of 5 to 32km from the villages of study zone.

Educational Facilities

There is a total no. of 128 Primary schools existing in the 10km radius study area. About 70 no of Middle schools are found in the study area. About 13 Higher Secondary School (SS) and 5 Senior Secondary School (SSS) facility is available in the study area. The educational facilities have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5 to 10km range.

Availability of University Education in Jamui District

There are several affiliated and constituted colleges of the Tilka Manjhi University, Bhagalpur which imparts under graduate and post graduate education in the district. IGNOU (Indira Gandhi National Open University) has opened study center K.K.M College in Jamui where one can study many distance courses of under graduate, post graduate and vocational etc.

Medical Facilities

The medical facilities are provided by different agencies like Govt. & Private individuals and voluntary organizations in the study area. As per the census 2011, only 5 no of primary health center exist in the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No community health centre exists in the study area. Only 18 no of Primary Health Sub-Centers exist in the villages of the study area. Only 5 no of Mother & Child Welfare Centers are found in the study area. No allopathic hospital exists in the study area. Only 5 medical dispensaries are found in the study area. Only 5 Family Welfare Centers are found in the study area. Overall study area villages are served by average medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

Potable Water Facilities

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Potable water facility is available in most of the villages of the study area. The entire study area has average level of potable water facilities. Hand Pump(HP) water facility is commonly observed in the study area as potable water facility. Out of the total 126 villages/towns, only 47 villages (37.3%) are served with River/Canal water in the study area. As per the census records 2011, only one village named Chhatarpur of Gidhaur tehsil of Jamui district was found being served with Tank/Pond/Lake as potable water facility in the study area.

Communication, Road & Transport Facilities

Apart from Post & Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. About 35 villages (27.8%) were found serving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area.

Only one village named Naudiha under Khaira tehsil of Jamui district was found with railway station facility in the study area. Site is well connected by SH-82 Rd which is passing in North-West direction. Nearest railway station is Gidhour Railway Station in NE. Nearest airport is JPN International Airport Patna in NW.

Communication

Roads - The district of Jamui is well served by a network of roads. Road communication is the main mode of transportation in this district. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. They are maintained by the Public Works Department, the Rural Engineering Organisation, the Zila Parishad and Municipalities. It is also connected with the interior of the district by metalled road. Two State Highway (SH) cross the district. SH-6 and SH-18 also pass through the district.

Railways - The district of Jamui has a railway communication system. It is served by East Central Railway. Jamui railway station is in Howarah-Patna-Mugalsarai main line.

Airways - Airways facilities are not available in the district.

Boats – Waterways facilities are not available in the district.

Banking Facility

The study area has almost all the schedule commercial banks with ATM facility at urban areas and the district HQ.

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Trade and Commerce

The development of the means of communication has had a great impact on the trade and commerce of the district. The district may now be said to be fairly well- connected by Road and Rail. Jamui is predominantly an agricultural district. Its export-trade comprises mostly of Rice, Wheat and other cereals. But the main agricultural trade comprises of dairy and horticultural products like milk and vegetables. The important items imported in the district are coal, iron and steel products, salt, sugar, cement, cotton and woollen textile, kerosene oil, spices and tobacco.ade and Commerce

Mines and Minerals

In Jhajha, Khaira, Sono and Chakai the chief formation is Gneiss Basement complex. China Clay is found near Panari 24 kms. south-west of Jhajha, the mines being known as BhukhliKaoten. Mines are worked by the Jhajha China Clay works.

Power Supply

It is revealed from the compiled information on amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial& for allpurposes. About 78villages (62.0%) of the study area are electrified for domestic purpose,59villages (46.8%) for agricultural purpose,and for commercial & for all purposes in the study area.Out of 126 villages/towns in the study area, 47villages (37.3%) including 10uninhabited villages (8.0%)are not electrified for any purpose in the study area.

The district receives its entire power supply from Bihar State Electricity Board. All the towns of Jamui district have electricity. In the rural areas, the Government is trying to extended electric line to the maximum number of villages by implementing various schemes for rural electrification. 485 Villages of the district are electrified.

Village/town wise Basic Infrastructure and Amenities availabilities data for the entire study area is compiled and presented in**Table 3.38** as follows;

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Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Table 3.38 Village wise Basic Amenities Availability

Name of the Village/Town	Education al				Medical							Drinking Water						C T	Communicati on & Transport				Approach to the Village				Power Supply				Nearest Town & Distance, km
	P	M	S	S	C	P	P	M	H	D	F	T	W	H	T	R	T		P	P	B	R	P	K	N	F	E	E	E	E	
			S	S	H	H	H	C			W			P	W		k		O	T	S	S	R	R	W	P	D	A	C	A	
Garo Nawada	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,5km
Lathane	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,5km
Sugi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	2	1	1	1	1	1	Jamuui,10km
Thegua	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,10km
Sonpai	3	1	0	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,6km
Garsanda	3	1	0	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,5km
Barar	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamuui,3km
Khairi	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,6km
Rampur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,6km
Khargpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Jamuui,6km
UgniChak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,8km
SihoChak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	2	1	2	1	2	2	2	2	Jamuui,9km
Puteria	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,9km
Lukhri	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,6km
Sahur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,6km
SitlaChak	Uninhabited Village																														Jamuui,6km
AgabaraBarwata	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,6km
Piri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,6km
Abhaipur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,9km
Markata	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,6km
Manjura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamuui,6km
Indpe	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,6km
Dhenkdih	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,12km
Bukar	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,8km
Lotan	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,9km
Narainpur	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,9km

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BASELINE DATA DESCRIPTION

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Damdama	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,6km
Dundu	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	1	2	2	2	2	1	1	2	1	1	1	1	Jamuui,12km
Narbada	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,13km	
Pira	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,12km	
Jamui (NP)/30 Wards	Urban Part																												Jamui (NP),0km		
Maura	2	2	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	Jamuui,24km	
Gangra	3	2	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	1	2	1	1	2	1	1	1	1	Jamuui,25km	
Chhatarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	2	2	2	1	2	1	1	1	1	1	1	1	Jamuui,22km	
Bandhaura	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,24km	
Patsanda	3	2	1	1	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	1	1	2	1	1	2	1	1	1	1	Jamuui,20km	
Dhobghat	1	1	1	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	1	1	Jamuui,30km	
Simaria	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,24km	
Kolhua	1	0	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	Jamuui,26km	
Kumardih	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,27km	
Kharhua	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	1	1	Jamuui,29km	
Mahuli	1	3	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,18km	
Ratanpur	2	5	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	1	1	2	1	1	2	1	1	1	1	Jamuui,15km	
Chandabank	Uninhabited Village																												Jamuui,15km		
Singarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamuui,5km	
Ballopur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	Jamuui,5km	
Naudiha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	1	1	1	1	2	2	1	1	1	1	Jamuui,6km	
Suraundha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	Jamuui,6km	
Nauniatanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	Jamuui,6km	
Amari	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	Jamuui,18km	
Khutauna	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	Jamuui,16km	
Dharampur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	Jamuui,15km	
Mahapur Khurd	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	Jamuui,16km	
Kharui	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	Jamuui,18km	
Dumarkola	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	Jamuui,20km	
Kashmir	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	Jamuui,18km	
Kasbagidhaur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	Jamuui,9km	
Ghanberia	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	Jamuui,9km	
Khaira	3	2	2	2	0	1	1	1	0	1	1	2	2	1	1	2	2	2	1	1	1	2	1	2	2	1	1	1	1	Jamuui,6km	
Gopalpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	1	1	Jamuui,7km	

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BASELINE DATA DESCRIPTION

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Raipura	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	Jamuui,8km			
Karan Nawada	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	Jamuui,5km			
Kendih	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	1	1	1	Jamuui,5km		
Parsa	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	Jamuui,7km		
Bhaunr	1	2	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	Jamuui,7km		
Pakri	1	2	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	Jamuui,8km	
BaribagJaljoga	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,8km	
Fatehpur	2	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,12km	
Baheratari	Uninhabited Village																												Jamuui,12km			
JorbahaDharampur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,13km	
ChaukitanrDeyaldih	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,15km	
Bhojpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Jamuui,18km
Daingarwaphulandih	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	2	Jamuui,16km
TolaDainagarwaMeghuraidih	Uninhabited Village																												Jamuui,16km			
TolaNaukadih	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	1	2	2	1	2	1	2	2	2	2	Jamuui,13km	
TolaBhimain	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,18km	
TolaBarabandh	1	1	1	0	0	0	1	0	0	0	0	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,12km	
TolaChandarSeli	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Jamuui,12km	
TolaBheriatar	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,12km	
TolaPachrukhi	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Jamuui,20km
TolaKurbwabarhiaKhandari	Uninhabited Village																												Jamuui,20km			
TolaAndarkurwa	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamuui,16km	
TolaDomantari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Jamuui,16km
TolaPesra	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,16km
TolaBhalni	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,15km
TolaPurniChhit	Uninhabited Village																												Jamuui,15km			
TolaTetaria	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,16km
TolaAmatar	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamuui,14km
TolaCharkapathal	Uninhabited Village																												Jamuui,12km			
Nim Nawada	5	1	0	0	0	0	1	0	0	0	0	2	1	1	2	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	2	Jamuui,18km
TolaJhundo	7	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jamuui,26km
TolaKewalpharaita	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	2	2	2	2	Jamuui,20km
Dinari	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,23
Kagesar	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,22km
Tihia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,10km
Chuan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	1	1	1	1	1	Jamuui,10km
Gangti	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,17km

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BASELINE DATA DESCRIPTION

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Kerakado	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamuui,15km					
Chihutia	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamuui,16km					
Bela	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,16km					
Khandaich	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,15km					
Sagdaha	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamuui,10km					
Bhandra	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamuui,12km					
Chancho	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	Jamuui,8km					
Dabil	2	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Jamuui,15km					
Durgodih	Uninhabited Village																												Jamuui,10km								
Changodih	1	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	1	1	1	2	2	2	Jamuui,7km					
Nariana	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jamuui,8km					
Jogajhingoal	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,10km					
Jitjhingoi	2	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jamuui,12km					
Baghakhanr	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamuui,12km					
Mangobandar	3	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamuui,12km					
Nijuara	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamuui,11km					
Banpur	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	1	1	1	1	1	1	Jamuui,8km					
Bariarpur	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	1	1	2	2	2	Jamuui,18km					
Sakdari	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jamuui,15km					
Harni	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Jamuui,17km					
Gadi Bishunpur	3	1	1	0	0	0	1	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	2	1	2	2	1	1	1	1	1	Jamuui,13km					
Tola Nawada	Uninhabited Village																												Jamuui,13km								
TolaSono	1	3	2	2	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	Jhajha,12km					
TolaSabaijor	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhajha,27km					
TolaDehurkhi	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jhajha,29km					
TolaKolhawara	Uninhabited Village																												Jhajha,29km								
TolaChhuchhundaria	2	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jhajha,32km					
TolaTilakpur	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jhajha,29km					
TolaKaleyanpur	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jhajha,km					
TOTAL (10km)	1												Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively																								
	2	7	1				1																														
	8	0	3	5	0	5	8	5	0	5	5																										

Source-<http://www.censusindia.gov.in/2011census/dchb/DCHB.html>

Abbreviations:

Educational Facilities: P-Primary School, M-Middle School, SS-Higher Secondary Schools, SSS-Senior Secondary School

Medical Facilities: CHC-Community Health Centre, PHC-Primary Health Centre, PHSC-Primary Health Sub-Centre, MCWC-Maternity and Child Welfare Centre, H-

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Hospital, D-Dispensary, FWC-Family Welfare Centre

Drinking Water Facilities: T-Tap Water, W-Well Water, HP-Hand Pump, TW-Tube Well Water, R-River Water, Tk-Tank Water, O-Other Drinking Water Facility, CT-Community Toilet

Communication & Transport Facilities: PO-Post Office, SPO-Sub-Post Office, PTO-Post & Telegraph Office, Tel. -Telephone Connection, Mob. -Mobile Phone Coverage, BS-Bus Services, RS-Railways Services

Approach to Village: PR-Paved Roads, KR-Kuchha Road, FP-Foot Path

Power Supply: ED-Power Supply for Domestic use, E Ag. -Power Supply for Agricultural use, EC- Power supply for Commercial use, EA-Electricity for All Purposes

Nearest Town & Distance, km : a for < 5 Km, b for 5-10 Km and c for 10+ km of nearest place where facility is available is given.

Brief Description of Places of Religious, Historical or Archaeological Importance and Tourist interest in Villages and Towns of the District:*(District level information only)*

Brief description of place of religious, historical or archaeological and tourist interest are as follows;

Chhatriyakund, Lachhwar - Well known Jain temple exists here. The place is about 26 km away from Jamui town and Known as birth place of Lord Mahavir.

Gidheshwar - It is an important historical place having a Mahadeo temple. It is 12 km away from Jamui town.

Simultalla- It is a railhead on the main line of Hawrah-Delhi. It is an important tourist place in the district. This place is also famous for its SimultallaAwasiyaVidyalaya which has been developed in pattern of Netarhat residential school (now in Jharkhand).

Famous Temples:

Jain Mandir Lachhwar - This is a large and old rest house (dhamsala) of 65 rooms constructed for the Jain pilgrims. There is a Mandir of Lord Mahavira inside the dhamsala. The idol in this temple is more than 2,600 years old.

Jhumrajsthan, Batiya - There is a temple of Baba jhumraj located in Batiya (under Sono police station) which is about almost 50 km from Jamui and 55 km from Deoghar.

Maa Netula Temple - This is a temple of Maa Netula Situated at village kumar, block sikandra. It is about 26 km west form the district headquarter jamui Bihar. Million of devotees come here and pray.

Bhim Bandh - It is located between Lakshmipur and Haveli Kharagpur Jungle. Here the visitors find many source of hot water. This is a picnic spot in winter season from October to February.

Shiv Mandir - It is situated in Harla jury of Lakshmipur block. It is a temple of lord Shiva in Lakshmipur block. It is about 500m southward from Lakshmipur market.

Kali Mandir Lakshmipur -Temple of goddess Kali is situated in Harla jury of Lakshmipur block. A temple of goddess Kali in this block. It is about 600m southward from Lakshmipur main market.

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Khaira Fort -This fort was built by Khaira-Jamui Chandel rulers. Another fort of Chandel rulers of Gidhor-Jamui was built at Gidhaur.BothChandel dynasty was related to each other and split during period of Emperor Jahagir, Mughal Rulers of Delhi.

Social and Cultural Events

In the district of Jamui, no major social or cultural event has taken place during the decade.However, the district has been famous for fairs and melas held at different places throughout the year.Fairs and festivals are held regularly in the district. There is a brief lull during the two months ofrainy season. There are some shopkeepers who keep on moving from fair to fair throughout the year.Some of the fairs held in the district are quite old..

Rehabilitation & Resettlement (R & R)

Policy to be adopted (Central/State) in respect of the project affected persons including home or land oustees and landless labour.Hence, any planning with respect to Rehabilitation & Resettlement is not applicable.

4.0 GENERAL

Identification of all potential environmental impacts due to project is an essential step of Environmental Impact Assessment. In case of mining projects, impacts on biodiversity, air pollution, water pollution, waste management and social issues are significant. Both direct and indirect environmental impacts will be created on various environmental attributes due to proposed mining activity in the surrounding environment, during the operational phase.

The occurrence of sand (minor mineral) deposits, being site specific, their exploitation often does not allow for any choice except adoption of eco-friendly operation. Positive impacts on socio-economic environment are expected due to creation of employment opportunities. Mining activities are normally carried out over a long period which also encourages development in the area such as roads, schools, hospitals etc.

Keeping in mind, the environmental baseline scenario as detailed in Chapter III and the proposed mining activity described in Chapter II, it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted.

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

1. Land Environment
2. Water Environment
3. Air Environment
4. Noise Environment
5. Biological Environment
6. Socio-Economic Environment
7. Solid Waste
8. Traffic Environment

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 landuse pattern. In this project, silt and clay are also produced as a constituent along with minerals, which are considered to be waste.

Anticipated Impacts:

- Mining activity will impact river bed topography by formation of excavation voids.
- 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.

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.
- 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

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.

Mitigation measures

Project activity will be carried out only in the dry part of the Kiul 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 3m 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.

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4.3 AIR ENVIRONMENT

Impact On Air Quality

The proposed project includes various activities like development of benches, approach roads, haul roads, excavation and transportation of mineral and waste materials. 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 manual method. The air borne particulate matter (PM₁₀) generated by ore and waste handling operations, transportation and screening of ore is the main respirable air pollutant. The emissions of Sulphur dioxide (SO₂), Nitrogen Oxides (NO₂) 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.

4.3.1 Emissions Details

Loading - unloading and transportation of sand material, 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 (PM₁₀) affecting Ambient Air of the area. Emission during, Loading and unloading was calculated by the area sources. Details of emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

Loading and Unloading - US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately. Emission during loading was found more than during unloading. Emission of PM₁₀ during loading was calculated and found to be $1.92 \times 10^{-3} \text{ g/s/m}^2$ based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM₁₀ during unloading and average wind

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speed was 0.92 m/s as observed with site data as shown in wind rose and discussion of local meteorology of the area.

Haul Road - US EPA, 2006, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during transportation of ore and overburden by trucks operated per hour on haul road. Emission of PM₁₀ due to transportation of sand on haul road was 1.65×10^{-4} g/s/m² based on assumption that silt content spread on road surface was 5%, and efficiency of PM₁₀ emission control 90%. Truck will be fully covered with tarpaulin material and emission of PM₁₀ during on the haul road will be insignificant.

Based on the above consideration that there was low emission of PM₁₀ during transportation of ore and overburden, however during loading & unloading, transportation of ore over the haul road, emission of PM₁₀ of the exposed area due to wind erosion and movement of light vehicles on the road were not considered and combined with mining activities. US EPA based Dispersion ISCST-3 model was used for prediction of impact with 24-h meteorological data of the study period for the assessment of GLC.

4.3.2 Meteorological Data

The meteorological data recorded at hourly interval during the month of March to May 2023 on wind speed 0.92 m/s, wind direction, dry & wet bulb temperature, humidity, cloud cover 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. Stability was computed by Turner's method and mixing height was obtained from publication of IMD "Atlas of Hourly Mixing Height in India, 2008.

Data recorded from authorized source/Govt. agency were used as meteorological input for Dispersion Model which was stored in the computer for further analysis and interpretation to study the local meteorology of the study area. It was observed that westerly & north westerly was pre-dominant wind during summer as shown in wind rose (Figure 4.1) with low wind speed and 13.6 % calm condition was observed during study period at the site which was very much close and cumbersome with long term meteorological data of IMD. Average wind speed was

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0.92m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM₁₀ was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.

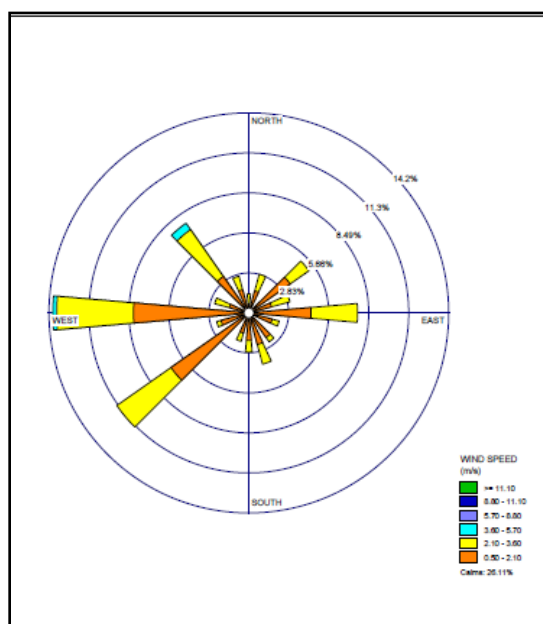


Figure 4.1: Wind Rose Diagram

Stable atmospheric condition E & F dominates in early morning and night hours and B, C & D in day hours were observed. Pollutants were dispersed from the proposed source under influence of local meteorology and dispersed on the ground in downwind direction close (~100 m) to the source under influence of moderate to low wind speed. High temperature and low humidity were observed at site with high temperature in day hours and low during night. There was no significant rain fall received and sky was clear of clouds in most of the days.

4.3.3 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study

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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 i) loading and unloading and iii) transportation of vehicles on the haul road in 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 mine on haul road of mining area and other mining activities will occur simultaneously.

Impact was predicted over the distance of 10,000 m and 2,000 m around the source in grids of 200m & 20 m respectively in Cartesian coordinates(X,Y) to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM10 was observed close to the source due to low to moderate wind speeds. Incremental value of PM10 was superimposed on the base line data monitored at the proposed site to predict total GLC of PM10 due to combined impacts.

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.
- ✓ 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

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- ✓ There is no major source of emissions except emission from combustion of fuels from the Transportation Vehicles and Material Handling.
- ✓ Besides this, to control the emissions further regular preventive maintenance of Equipment / Transportation Vehicles will be carried out on contractual basis.
- ✓ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ✓ Plantation will be carried out along the approach road, river banks & at all strategic places in the vicinity area.
- ✓ Periodic air quality monitoring will be done to assess the quality and for timely corrective actions.
- ✓ Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further.
- ✓ 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.

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.

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:

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Table 4.1, Damage risk criteria for hearing loss OSHA regulations

Maximum allowable duration per day in hour	Sound pressure dB(A)	Remarks
(1)	(2)	(3)
8.0	90	1. For any period of exposure falling in between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale. 2. No exposure in excess of 115 dB (A) is permissible.
6.0	92	
4.0	95	
3.0	97	
2.0	100	
1 ½	102	
1	105	
¾	107	
½	110	
¼	115	

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.

a. 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

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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.

Anticipated Impacts:

Flora

The proposed project of river bed sand mining shall be carried out on the riverbed of Kiul 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.

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.

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:

Flora

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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.

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

Transportation Route:

The sand extracted will store the nearby storage point. From there sand will be transported to the market. Sand will be stored in to storage point and from there it will be transported in the night time when traffic load is low on nearest SH or NH.

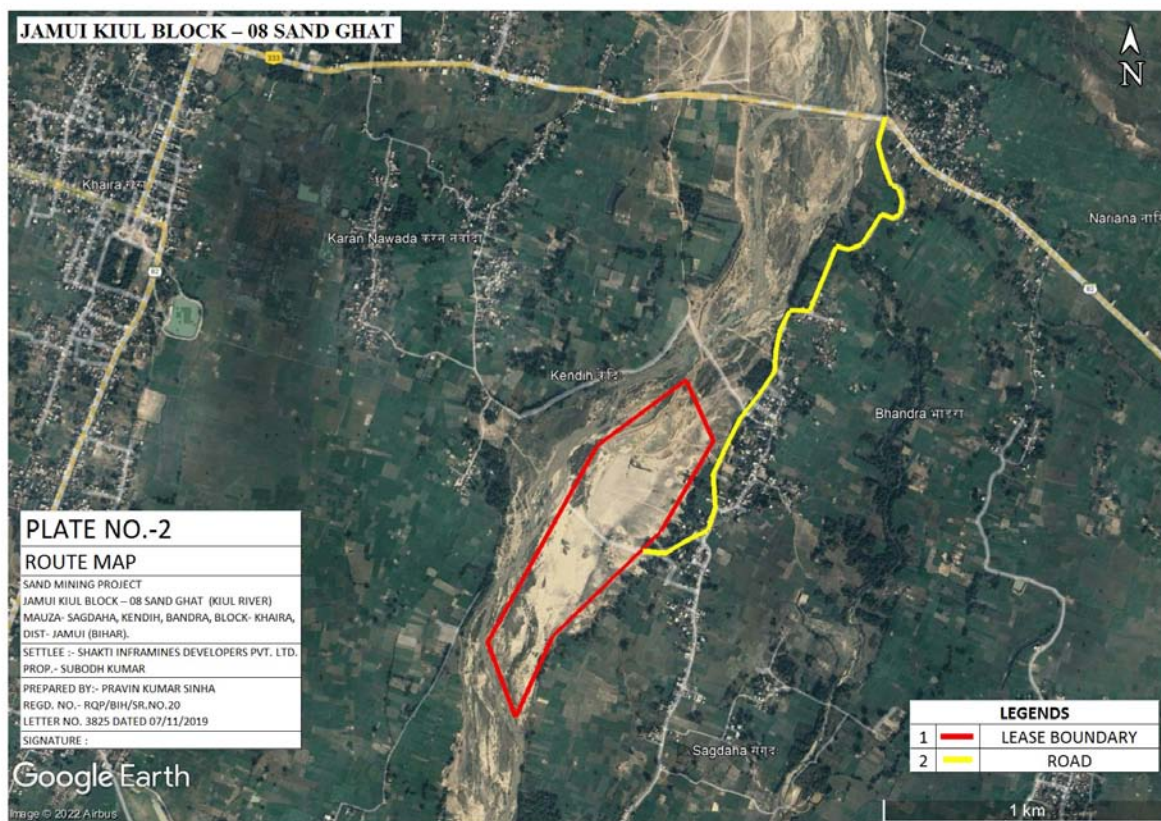


FIGURE 4.1 MAP SHOWING EVACUATION ROUTE FOR JAMUI KIUL BLOCK 08

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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, the number of trucks that will be added to the present scenario will be compared to the carrying capacity.

Table 4.2 (i): Existing Traffic Scenario & LOS for Block 08

Road	V	C	Existing V/C Ratio	LOS
State Highway (SH-82)	2500	15000	0.16	A

Source: Capacity as per IRC: 64-1990

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

The existing Level of Service (LOS) is "A" & "B" i.e. excellent & very good.

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

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Sand **Block 08**

Proposed Capacity of Mine/annum : 379452 TPA

No. of working days : 250 days

Proposed Capacity of mine/day : 1518

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 95

Increase in PCU/day (95*3) : 285

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
State Highway	2500+285=2785	15000	0.18	A

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(SH-82)				
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Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.18 at Highway intersection that is from 'A' to 'A' i.e from Excellent' to 'Very Good' respectively. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given in below

TRAFFIC MANAGEMENT FOR PROJECTS IN CLUSTER

Production Details of Cluster of project(As per DSR):

S no	Block No	Production Details
1	Jamui Kiul Block 05	309000 TPA
2	Jamui Kiul Block 06	164388 TPA
3	Jamui Kiul Block 07	431364 TPA
4	Jamui Kiul Block 08	177984 TPA
Total Production in cluster		10,82,736 TPA

**Table 4.2 (i): Existing Traffic Scenario & LOS for
Proposed Cluster of Block 01, Block-02, Block-03**

Road	V	C	Existing V/C Ratio	LOS
State Highway (SH-82)	2500	15000	0.16	A

Source: Capacity as per IRC: 64-1990

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

The existing Level of Service (LOS) is "A" & "B" i.e. excellent & very good.

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

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0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Proposed **Cluster of Jamui Kiul Block 05, Block 06, Block 07 & Block 08**

Proposed Capacity of Mine/annum : **10,82,736 TPA**

No. of working days : 250 days

Proposed Capacity of mine/day : 4330.9 or say 4331 TPD

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 270.68 or 271

Increase in PCU/day (271*3) : 813

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
State Highway (SH-82)	2500+813=3313	15000	0.22	B

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.22 at Highway intersection that is from 'A' to 'B' i.e from Excellent' to ' Very Good' respectively, as per classification. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given below.

Traffic Management:

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

5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

Presence of sand for commercial exploitation has been identified based on the result of geological investigations and exploration. The mining projects are site specific as such alternate sites were not considered.

5.2 Analysis of Alternative Technology

5.2.1 Choice of Method of Mining

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization, workforce requirements wage rates, replenishment, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be made in the opening up of a mine.

Surface or open cast mining is used for large, near-surface mineral deposits. Mineral is exploited, loaded into trucks, and hauled to a market.

The opencast mining method will be adopted because of the following reasons:

- The opencast mining operations ensure higher mineral conservation.
- Replenishment

The method used for mining is efficient for sand mining, so no alternative mining method is proposed.

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6.0 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 areas 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 & interpretation of data, (iii) Preparation of reports to support environmental management system and (iv) Organizational set up responsible for the implementation of the programme.

6.1 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 site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The preventive approach to environment management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc.

The key aims of environment monitoring are:

1. 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.

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

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air quality monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Table 6.1, Monitoring methodologies and parameters

Parameters	Technique	Technical Protocol
PM ₁₀	Gravimetric method	IS 5182 (Part-XXIII)
Sulphur Dioxide	Improved West and Gaeke	IS-5182 (Part-II)
Nitrogen Dioxide	Modified Jacob & Hochheiser	IS-5182 (Part-VI)

Water quality monitoring

Water quality monitoring involves periodical assessment of quality of surface water and the ground water near the mining project.

- Surface water samples will be analyzed for all the parameters as per EPA, 1986
- Ground water samples will be analyzed for all the parameters as per IS-10500:2012.

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Soil quality monitoring

The soil quality monitoring is carried out to assess the soil characteristic. The soil quality will be analyzed as per CPCB norms.

Noise level monitoring

Noise level monitoring will be done for achieving the following objectives:

- a) To compare sound levels with the values specified in noise regulations
- b) To determine the need and extent of noise control of various noise generating sources

Noise level monitoring will be done at the work zone to assess the occupational noise exposure levels. Noise levels will also be monitored at the noise generating sources like mineral handling arrangements, vehicle movements and also at the nearest village for studying the impact due to higher noise levels for taking necessary control measures at the source.

Socio-economic Survey

Socio economic condition will be monitored to assess the demographic particulars of the area including the impacts on the social & economical condition on the residents nearby.

Plantation Monitoring Programme

Plantation monitoring will be done to ensure survival & growth rate of plantations.

6.3 MONITORING SCHEDULE

The schedule has been shown below for the parameters proposed for monitoring.

Table 6.2, Details of monitoring schedule

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice/Thrice a week in each season except monsoon
2	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
3	Soil Quality	Once in a year in project area

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4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation Monitoring	Once in a season

6.4 MONITORING SCHEDULE - IMPLEMENTATION

An implementation programme has been prepared as it serves no purpose if it is not implemented in letter and spirit.

Implementation of proposed control measures and monitoring programme has an implication on mining site as well as on the surrounding area. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented in the entire study area:

- a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b) Collection of soil samples at strategic locations once every two years and analysis thereof with regard to deleterious constituents, if any.
- c) Measurement of water level fluctuations in the nearby ponds dug wells and bore wells and to assess if mining has got any impact on it or not.
- d) Measurement of noise levels at mine site and adjacent villages will be done twice a year for first two years and thereafter once a year.
- e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

An Environmental Management Cell (EMC) is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet periodically to assess the progress and analyze the data collected during the month.

6.5 BUDGET ALLOCATION FOR MONITORING

The EMC will be responsible to carry on the monitoring. Budget allotment has also been proposed for the same:

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Table 6.3, Budget for monitoring

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Water Quality (Surface & Groundwater)	1.0
2	Soil Quality	0.50
3	Air Quality	1.0
4	Noise Level	0.5
5	Plantation Monitoring	0.5
6	Socio-economic Condition	0.5
TOTAL		4.0

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site to furnish the data to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions. The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

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7.0 PUBLIC CONSULTATION

This is Draft EIA report public hearing is yet to be conducted.

7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

Risk is to expose someone or something to danger, harm or loss. The different steps of risk assessment procedure are as given below:

Step I: Hazard Identification

The purpose of hazard identification is to identify and develop a list of hazards for each job in the organization that are reasonably likely to expose people to injury, illness or disease if not effectively controlled. Workers can then be informed of these hazards and controls put in place to protect workers prior to them being exposed to the actual hazard.

Step II: Risk Assessment

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures.

Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

Step III: Risk Control

Risk control is the process used to identify, develop, implement and continually review all practicable measures for eliminating or reducing the likelihood of an injury, illness or diseases in the workplace.

Step IV: Implementation of risk controls

All hazards that have been assessed should be dealt in order of priority in one or more of the following hierarchy of controls

The most effective methods of control are:

- ✓ Elimination of hazards.
- ✓ Substitute something safer.
- ✓ Use engineering/design controls.

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- ✓ Use administrative controls such as safe work procedures.
- ✓ Protect the workers i.e. by ensuring competence through supervision and training, etc.

Each measure must have a designated person assigned for the implementation of controls. This ensures that all required safety measures will be completed.

Step V: Monitor and Review

Hazard identification, risk assessment and control are an on-going process. Therefore regularly review the effectiveness of your hazard assessment and control measures. Make sure that you undertake a hazard and risk assessment when there is change to the workplace including when work systems, tools, machinery or equipment changes. Provide additional supervision when the new employees with reduced skill levels or knowledge are introduced to the workplace.

A) RISK ANALYSIS

The risk assessment portion of the process involves three levels of site evaluation:

- a) Initial Site Evaluation,
- b) Detailed Site Evaluation,
- c) Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions
- The level of the travelling public's exposure to those conditions.

The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups. The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

Risk analysis is done for:

- Forecasting any unwanted situation

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- Estimating damage potential of such situation
- Decision making to control such situation
- Evaluating effectiveness of control measures

Table 7.1, Risk Likelihood Table for Guidance

Step 1: Assess the Likelihood				Step 2: Assess the Consequences		
L1	Happens every time we operate	Almost Certain	Common or repeating occurrence	C1	Fatality	Catastrophic
L2	Happens regularly (often)	Likely	Known to have occurred "has happened"	C2	Permanent disability	Major
L3	Has happened (occasionally)	Possible	Could occur or "heard of it happening"	C3	Medical/hospital or lost time	Moderate
L4	Happens irregularly (almost never)	Unlikely	Not likely to occur	C4	First aid or no lost time	Minor
L5	Improbable (never)	Rare	Practically impossible	C5	No injury	Insignificant

A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence Table 7.2

Table 7.2, Qualitative Risk Assessment

Risk Rank	L1	L2	L3	L4	L5
Likelihood Consequence	Almost certain	Likely	Possible	Unlikely	Rare
C1 Catastrophic	1	2	4	7	11
C2 Major	3	5	8	12	16
C3	6	9	13	17	20

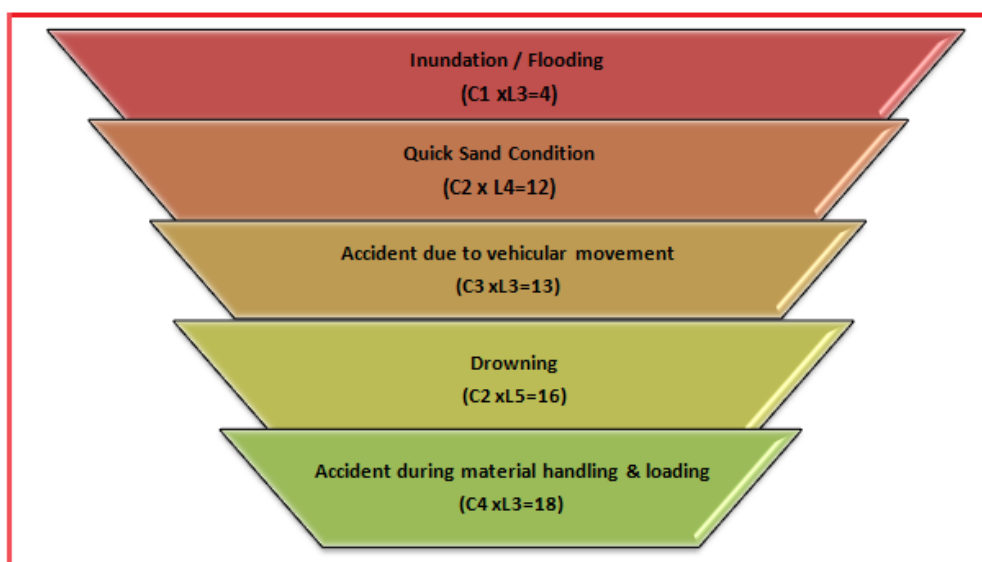
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Moderate					
C4 Minor	10	14	18	21	23
C5 Insignificant	15	19	22	24	25

RISK RATING:

HIGH RISK 1-6	MEDIUM RISK 7-15	LOW RISK 16-25
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7.2 RISK ASSESSMENT



There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from bed of river.

The key risk (hazard x probability) event rating associated with sand mining and to assess its consequences of such events occurring and the likelihood based on above Table 7.1 (ii) are as:-

The Risk rating of such hazards is as follows:

7.2.1 INUNDATION/FLOODING

The risk rating assigned to this activity is assigned as '4' i.e., it is possible and will have catastrophic with major consequences, if work started without assessment of the *river* condition especially during monsoon season.

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Inundation or flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

Measures to prevent consequences of inundation/flooding

Inundation or flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

1. During monsoon months and heavy rains the mining operations are ceased.
2. There should be mechanism/warning system of heavy rains and discharges from the upstream dams.

7.2.2 Quick Sand Condition

The risk rating assigned to this activity is assigned as '12' i.e., it is an unlikely event with major consequences as frequency of this risk is less likely to occur.

Two things may create the conditions to form quicksand. Underground water may seep-up and saturate the sand, thereby reducing the friction between the sand grains and giving the sand a liquid nature. Or, sand or another soil may be sifted by the force of an earthquake so that friction is lessened and the earth becomes unsteady.

This creates danger condition to the trucks plying near the *river* and banks for transportation of minerals.

Measures to Prevent Quick Sand Condition

1. The only way to avoid quick sand condition is by avoiding mineral lifting below water table.
2. Mining will be done in layers rather than going for maximum depth at one time.

7.2.3 ACCIDENT DUE TO VEHICULAR MOVEMENT

The risk rating assigned to this activity is assigned as '13' i.e., it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, bodily injury. The possibilities of road accidents are due to reckless or untrained driver or overloading of trucks or in case pathway is not compacted suitably, etc.

Measures to Prevent Accidents during Transportation

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1. All transportation within the main working should be carried out directly under the supervision and control of the management.
2. The Vehicles will be maintained/repared and checked thoroughly by the competent person.
3. A statutory provision of constant education, training etc. will go a long way in reducing the incidents of such accidents.
4. Overloading will not be permitted and will be covered with tarpaulin.
5. The maximum permissible speed limit will be ensured.
6. The truck drivers will have valid driving license.

7.2.4 DROWNING

The risk rating assigned to this activity is assigned as ‘16’ i.e., it is a rare accident but will have major consequences, if occurred. This may occur due to flash floods etc due to which the workers at the site may get seriously injured or drowned.

Measure to Prevent Drowning

1. The mining will be done under strict supervision and only in the dry part of the *river*.
2. Mining will be completely stopped in monsoon season to avoid such accidents.
3. Deep water areas will be identified and ‘No Go Zones’ will be clearly marked and made aware to the mine workers.

7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING

The risk rating assigned to this activity is assigned as ‘18’ i.e. it is possible event with minor consequences”, as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, abrasion, etc. may be due to bank of *river* collapse, over thrown boulders/pebbles, injuries due to carelessness use of hand tools, etc.

Measures to Prevent Accidents during material handling & loading

1. The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
2. The loading should be done from one side of the truck only to avoid over throw of materials.
3. The workers should be provided with gloves and safety shoes during loading.

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All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered **As Low As Reasonably Practicable (ALARP)** conditions which are adequately safe and healthy.

7.3 DISASTERS & ITS MANAGEMENT

7.3.1 Anticipated Disaster

- 1. Floods:** Most of the areas of this district are flood prone owing to the presence of seasonal rivers. Rivers and its tributaries cause heavy losses to the human lives, livestock, land and property mainly due to flash floods. Hence no mining has been proposed during monsoon and flood alerts will be given, if any.
- 2. Earth Quake:** Jamui District like other areas of Bihar is moderately vulnerable to earthquake as it exists in Zone IV. However the vulnerability to damage near the site is quite low as there are no built in structures at the site.
- 3. Drought:** due to deficiency in rainfall prime reasons of recurring drought in Bihar is the nature of soil with low mineral and humus-contents besides extremely poor water holding capacity. Recurrent rainfall variability and sustained departure from the normal rainfall vis-a-vis low reliability, fluctuating both surface and underground water resources and extremely poor water holding capacity of the major soil group appear to have clubbed together to cause frequent droughts in Bihar. Besides, there is a positive relationship between reducing forest land and the increasing rainfall variability and the phenomenon is well manifested in Bihar scenario of recurrent droughts.

7.3.2 Disaster Management Plan & Strategy

The Disaster Management Plan has three components:

(A) Risk Analysis and Vulnerability Assessment:

The Risk Analysis and Vulnerability Assessment depict the present picture for each disaster-exposure, loss of life, property damage, etc. It also shows geographic distribution of each hazard. The various monitoring facilities, regulatory regimes, countermeasures available for each disaster are identified and listed.

(B) Response Plan:

The response plan presents an organizational structure of the District to effectively handle the disaster in a coordinated and quickest possible manner to mitigate the impact of

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disaster. It identifies functional areas such as relief, restoration, communication, information, transport, emergency health services etc and proposes assignments to various departments; including identifying lead and supporting departments. The response plan also lays down preparedness checklists and standing operating procedure (SOP) guidelines.

(C) Mitigation Strategy:

The mitigation strategy and plan focus on the long-term planning for impact reduction. It deals with the issues of continued commitment to hazard identification and risk assessment, applied research and technology transfer, investment- incentives for mitigation, and leadership and co-ordination for mitigation.

The mine management will be in regular contact with the District administration to gather information on natural disasters and will pass on the message at the site to avoid any loss of health or wealth due to impending disasters.

Though the responsibility of disaster management is vested with the center and state Governments, it is extremely difficult for them to deal effectively all the aspects of disaster management according to the needs of the affected people.

Thus disaster management plan of the Jamui District has been prepared through incorporation of the features of Community Based Disaster Management and involvement of local governments, Municipalities etc.

7.4 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES

INTRODUCTION

Socio-Economic Impact Assessment (SEIA) refers to systematic analysis of various social and economic characteristics of human being living in a given geographical area during a given period. The geographical area is often called Study Area or Impact Area. SEIA is carried out separately but concurrently with Environment Impact Assessment (EIA). The study area consists of core area where the project is located and a buffer area encircling the project area with a radius of 10 km from the periphery of the core area. For every new project or existing project under expansion or tied for modernization or change in product mix, Socio-economic Impact Assessment is mandatory. The Socio-economic impact assessment focuses the effect of the project on social and economic well-being of the

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community. The impact may be direct or indirect. Further, the impact may be positive or negative.

OBJECTIVES OF SEIA

The prime objective of the current study is to assess the impact of the proposed mining project on socio-economic characteristics of people living in the neighborhoods. Further, it is to be established whether the impending impact would be direct or indirect. Furthermore, it is to be examined whether the said impact would be positive or negative. Lastly, it is to be comprehended if the impact is positive how long it would sustain or if it is negative how soon the same could be eased.

SCOPE

The Scope of the study is as follows:

- a) To collect baseline data of the study area
- b) To comprehend socio-economic status of the people living in the study area.
- c) To assess probable impact of the project on social and economic aspects in the study area.
- d) To measure the impact of the project on Quality of life of the people living in the study area.
- e) To ensure sustainability of positive impact.
- f) To suggest mitigation measures and agency responsible for taking action in case of adverse impact.

SOCIO-ECONOMIC IMPACT OF THE PROJECT

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 in-migration 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.

Employment Opportunities

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The proposed Project will provide employment to the local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that around 20 people will get employment in this mining project for a period of ten months in a year. It is a positive impact of the project since it is providing employment opportunities to the local people. The project will not affect the vulnerable groups of people.

Increased supply of sand in the market

The demand for minerals is ever increasing with the growth of the infrastructure development in our country. Both Government departments and private developers have taken up construction of roads, bridges and buildings in a big way. The requirement for the building materials is always high and there is already an acute shortage of sand in the market and the construction industry is the main sufferer. With the commencement of the proposed mining project the supply of minerals will increase and the gap between demand & supply will decrease to some extent, if not fully.

Impact on agriculture

It is non-forest land and the proposed activity is to take place in the bed of the Kiul River. There will be no negative impact on agriculture as no cultivation is taking place on the proposed mining area. Since, scientific mining will be adopted in the proposed mining project the area will be free from annual floods, which destroy standing crops and land & property. This is a positive impact of the proposed mining project.

Impact on road development

Movement of trucks and other vehicles to and fro the mining site is expected to increase, when mining will start. The existing roads are connecting the quarry with the national highway connected by metalled followed by un-metalled roads. Hence, there is need for road maintenance and repairing regularly in the mining area. Further, there are risks of accidents during loading of extracted minerals into trucks and transportation to markets for sells. However, accidents can be avoided by taking due care and precautions.

Income to Government

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

Impact on Law & 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 site.

Impact on Health

There are no chances of occurring diseases, due to mining. The minerals excavated are non-toxic. To avoid respiratory problem from dust necessary protection should be taken.

Few safety measures are outlined below:

- a) **Safe Working Environment:** The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.
- b) **Provision of First Aid:** The first aid treatment reflects the hazards associated with the mining of minerals. The first-aiders will be well trained in handling patients working in the Project.
- c) **Regular Health Examination:** For all mine workers regular health examination will be made compulsory. Treatment of serious back injury; existing asthma or respiratory diseases, existing skin diseases, lung function test (pre and post ventolin), Audiograms, Chest X- ray etc. will also be taken care of.
- d) **Health Education:** Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.
- e) **Tie-up with the Nearest Hospital for Medical Assistance:** To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be

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made to reserve few beds in the above hospitals for the workers of the mining project.

This will ensure timely medical aid to the affected persons.

- f) **Supply of Mask and Gloves:** The workers in the Sand mining project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.
- g) **Administration of Anti-venom Injections:** Provision of Anti-venom therapy will be made available for administration to the workers in case of snake, spider and insect bites, while working in the mine.
- h) **Special Telephone Number:** A special telephone number will be made available to the workers in case of emergency so that they can dial the same for–medical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.
- i) **Special Group Insurance Scheme:** All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

CONCLUSION

The commissioning of the Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar) provides employment to local people who are in search of the same. The granting of environment clearance to make mining of sand legally valid and it will generate revenue for the state. It is expected that prospective entrepreneurs will venture to set up industrial units in the vicinity in the near future making the area a mixed society, dependent on industry, trade and business. With the implementation of the project the occupational pattern of the people in the area will change making more people engaged in mining, industrial and business activities rather in agriculture only. The study area is still lacking in health and educational facilities. It is expected that same will improve to a great extent with opening of the project and associated industrial & business activities.

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8.0 GENERAL

Various benefits are envisaged while planning for the mining of sand from Kiul River Bed. Sand is very important minor mineral and is the principal raw material for meeting the huge demand of construction material required in building construction and infrastructure works, road material for construction and maintenance of roads / highway; elastic ballast material for rail tracks in the State of Bihar & and nearby cities and towns of Bihar. The natural available materials in shoal deposits of Kiul River bed quarry site have been found suitable from techno-economic consideration.

8.1 PHYSICAL BENEFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.
- b. **Market:** Generating useful economic resource for construction. Excavated minor mineral sand will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.
- a. **Creation of community assets** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc, as a part of corporate social responsibility.

8.2 SOCIAL BENEFITS

- a) **Increase in Employment Potential due to the project activity:** Employment opportunities will increase both directly as well indirectly.
- b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.
- c) **Increased Health related activities:** Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp, sports will be arranged.

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Table-8.1, Budget for Public Health

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs) For Each Mine
1	Awareness campaigns regarding health issues in the nearby villages.	1.0
2	Provide free health checkups & medicines to the nearby villagers of the project site.	1.0
3	Assistance to set up a temporary health center during the lease tenure.	0.50
	Total	2.5

- d) **Educational attainments:** Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.
- e) **Strengthening of existing community** facilities through the Community Development Programme.

Table 8.2, Budget for Occupational Health

Particulars	Recurring Cost per year (Rs.) For Each Mine
For routine checkup	1,00,000
Medical aid as per ESI Scheme	2,00,000
Training	1,00,000
Total	4,00,000

8.3 ENVIRONMENTAL BENEFITS

- Protection of banks
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradations of river level.
- Protection of crops being cultivated along the bank.
- A check on illegal mining activity.

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8.4 CORPORATE ENVIRONMENTAL RESPONSIBILITY

2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018. The following has been proposed considering the needs & demand of the people.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare.

CSR COST is Rs. 3,50,98,000/- x 2% = Rs. 7,01,960/-

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during Public Hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.

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9.0 INTRODUCTION

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. The Environmental Management Plan (EMP) consists of a set of monitoring programme, mitigation measures, and management control strategies to minimize adverse environmental impacts.

The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations. Measures to be taken for each of the impact areas are detailed in the following paras:

9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

It is imperative to establish an effective organization to implement, maintain, monitor and control the environmental management system. A separate Environmental Management Cell (EMC) will be formed to look after the environment related matter of the mine. The structure of EMC is as follows:

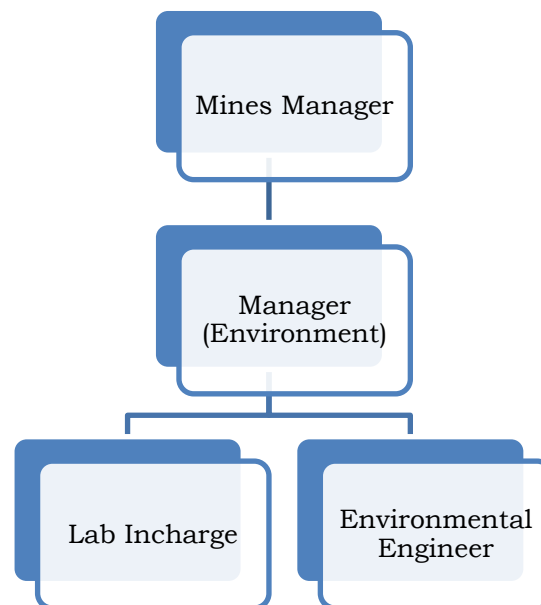


Figure 9.1 Environment Management Cell

The EMC will perform the following activities:

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- EMC will oversee that environmental control measures are implemented as per the plan.
- EMC will ensure ambient Field monitoring like air monitoring, meteorological monitoring and noise monitoring in coordination with outside agencies.
- Coordinating the environment related activities within the organization as well as with outside agencies.
- Reporting the status report to the statutory authorities.
- Systematically document and record keeping w.r.t. environmental issues.
- Plantation and their maintenance
- Collection statistics of health of workers and population of surrounding villages.
- Environmental compliance to the regulatory authorities.
- Communication with the concerned department on the environmental issue.
- Monitoring the progress of implementation of environmental management programme.

9.2 AIR POLLUTION CONTROL MEASURES

During the course of sand mining, no toxic substances are released into the atmosphere, so there seems to be no potential threat to health of human beings. In river bed mining activities, dust will be generated during mining, loading and transportation. The only source of fugitive gaseous emission during mining is vehicles which will be used for transportation. The environmental management for air pollution control includes:

- Plantation will be done along the road-sides and also the vacant land present under Gram Panchayat after consultation with local villagers/authority.
- Dust mask provided to the workers engaged at dust generation points like excavations, loading and unloading points.
- 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 of sand and stone from the trucks.

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- Water sprinkling will be done to reduce the emission of dust due to transportation of minerals.
- Overloading will be prevented. The trucks/ tractor trolley will be covered by tarpaulin covers.
- Plantation activities in consultation with village Panchayat along the roads will also reduce the impact of dust in the nearby villages.

9.3 WATER POLLUTION CONTROL MEASURES

During the operational phase of mine no waste water or industrial effluent will be generated. The environmental management for water pollution control includes:

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.
- 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 septic tank followed by soak pits.
- Mining in the area will be done up to depth of 1.0m maximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.4 NOISE POLLUTION CONTROL MEASURES

As there will be no heavy earth moving machinery there will not be any major impact on noise level due to sand mining and other association activities a detailed noise survey has been carried out and results were cross referenced with standards and were found to be well within limits. Blasting technique is not used for sand mining hence no possibility of land vibration. It was found that the proposed mining activity will not have any significant impact on the noise environment of the region. The only impact will be due to transportation of sand and by excavator involve trucks and tractor trolleys.

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- Proper maintenance of all machines is being carried out, which help in reducing generation of noise during operations.
- No other equipments accept the Transportation vehicles and Excavator and Loaders (as and when required) for loading is allowed.
- Noise generated by these equipments 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.

9.5 BIOLOGICAL ENVIRONMENT

Although, there are no significant adverse impacts from the project, the following measures are proposed to minimize anticipated impacts:

- It will be ensured that no mining activity will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species.
- As the mining site has no vegetation, no clearance of vegetation will be done.
- Prior to closure of mining operations / during the rainy season the eroded bank will be restored / reclaimed to minimize negative impacts on aquatic habitats.
- Sprinkling will be done on the haul roads with water to avoid the dust emission, thus avoiding damage to the crops.
- Mining will be carried out on the dry part of the lease area to avoid disturbance to the aquatic habitat and movement of fish species.
- No discard of food, polythene waste etc. will be allowed in the lease area which would distract/attract the wildlife.
- No night time mining will be allowed which may catch the attention of wild life.
- Workers will be made aware of the importance of the wildlife and signage will be displayed at the sensitive areas to caution the workers & other passerby.

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- **Greenery development:** The project will not lead to any tree cutting. However, as a social responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 234 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016, minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Total Number of plants for cluster of Sand Bloks are given below.

Sand Ghat	Area (Ha)	Plants
Block 08	30.7	30.7*10 Plants= 307 plants
Total Plants		307 plants

Table 9.1:- List of Plant selected for Green Belt Development

	Agro-climatic zone & Sub zone	Middle Genetic Plains, North west alluvial sub zone	
S/n	Scientific name	Common Name	Pollution control features
1	<i>Mangifera indica</i>	Aam	Tolerant to Dust control
2	<i>Tectona grandis</i>	Sagon	Tolerant to Dust control
3	<i>Ficus benghalensis</i>	Bargad	Tolerant to Dust control
4	<i>Scigium cumuni</i>	Jamun	To stop river bank erosion
5	<i>Terminalia arjuna</i>	Arjun	To stop river bank erosion
6	<i>Populus ciliate</i>	Popular	Fast growing, broad leaf
7	<i>Ficus religiosa</i>	Peepal	Dust particles absorbance
8	<i>Acacia nilotica</i>	Babul	Tolerant to SO ₂
9	<i>Azadirachta indica</i>	Neem	Tolerant to SO ₂
10	<i>Pithecolibium duclue</i>	Jungle jalebi	Tolerant to SO ₂ and Dust control

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9.6 LAND USE PLANNING

Degradation of land is not a very significant adverse impact of riverbed mining due to creation of access roads, mining operations, transportation of mined material. In order to prevent the environmental degradation of leased mine area and its surroundings, the following measures shall be taken;

- Mineral will be mined out after leaving sufficient safety zone from the bank as per sustainable sand mining guidelines-2016 for bank stability.
- The pits from where the material will be picked should not get deeper than 3.0 meter & shall follow the normal channel direction of the river.
- No foreign material shall be allowed to remain/spill in river bed and catchment area, or no pits/pockets will be allowed to be filled with such material.
- 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.

9.7 OCCUPATIONAL HEALTH & SAFETY

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factor of occupational health in Sand Ghat of M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto Vill.- Khandpar, P.O.+ P.S.- Sheikhpura, Dist.- Sheikhpura- 811105 (Bihar). (Sand Block 08) is mainly dust. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water, portable toilets etc.
- All safety measures like use of safety appliances, such as dust masks, shoes, non breakable goggles as the case may be, shall be ensured. Safety awareness programs, awards, posters, slogans related to safety etc. will be encouraged.

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- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a Medical Officer.
- First Aid facility will be provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

9.8 SOCIO-ECONOMIC ENVIRONMENT

This project operation will provide livelihood to the poorest section of the society. The overall impact of riverbed mining of sand on the social economics of the area shall be a very positive one, as not only it will generate employment opportunities for local population at mine site for transportation of mined material, etc. It will also give a good boost to the general economy of the area.

The proposed mining activity is expected to provide stimulus to socio-economic activities in the region and thereby accelerate further development processes. However, there is an apprehension that local people may get engaged in illegal activities if the proposed mining operation or the project is shelved or there is inordinate delay in its execution.

9.9 ENVIRONMENT POLICY

M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto Vill.- Khandpar, P.O.+ P.S.- Sheikhpura, Dist.- Sheikhpura- 811105 (Bihar). (Sand Block 08) of Sand Ghat believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection of the mined out land, preservation of biodiversity and proper disposal of waste if any following the best environmental practices during the process of mining.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company operations will implement operational and risk management practices that provide for



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maximum protection of people and the environment. To this end, the owner resolves that company will follow the below mentioned practices:

Operate in accordance with prescribed industry standards while complying with all applicable environmental, health and safety laws and regulations.

- Establish and maintain a well-defined environmental, health and safety management system to guide its operations.
- Ensure that all employees, officers and directors understand and adhere to its environmental, health and safety management program.
- Provide operations with the necessary resources, expertise and training to effectively carry out its EHS management programs.
- Engage employees at all levels in programs directed towards minimizing adverse effects on the environment resulting from mining activity.
- Work proactively with governments and the public in the development of cost effective and realistic regulations that promote enhanced environmental, health and safety protection.
- Promote environmental awareness among its employees, their families and the communities in which it operates.
- Require those who provide services and products to practice good environmental stewardship.
- Mitigate its environmental impacts through efficient use of resources, and the reduction of input materials and waste.
- Maintain a high degree of emergency preparedness.

9.10 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMC is very essential for successful implementation of EMP. Costs will be both Capital and Recurring cost as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this.

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Table 9.2, Budget of EMP (Block-08)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	3.07	0.5
4	Haul road Maintenance Cost	0.15	1.5
TOTAL		3.22	5.5

Note: *307 plants * 1000 Rs (for each plants including hedges and fences) =Rs 307000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *0.06 km haul road) = 15000/-

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10.0 INTRODUCTION

10.1 Purpose of the Report

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF&CC dated 14th September, 2006 and its subsequent amendment there-off and also the EIA Guidance Manual for Mining of Minerals (Feb, 2010) of MoEF&CC, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area.

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar).

The proposed mining is a cluster of 04 mining lease area of Jamui Kiul Block 05, Jamui Kiul Block 06, Jamui Kiul Block 07 & Jamui Kiul Block 08 over an combined area of 77.40 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 05, Block 06, Block 07 & Block 08 are comes in cluster situation whose combined cluster area is 77.40 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

As per the Director of Geology, Bihar, the modification of mining plan has been approved .As per EIA notification 2016 and subsequent amendments, the project is coming under category ‘B’ (B1) and the lease area is more than 5.0 Ha, approved Mining Plan, Pre-feasibility Report and EMP are required for Environment Clearance in respect of the said quarry lease. Copy of letter is enclosed as **Annexure No. II.**

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production
Jamui Kiul Block 05	23.4	309000 TPA
Jamui Kiul Block 06	10.2	164388 TPA
Jamui Kiul Block 07	13.1	431364 TPA
Jamui Kiul Block 08	30.7	177984 TPA
Total	77.40	10,82,736 TPA

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The proposed project is of River bed sand mining and falls under Category- “B1” as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar) over an area of 30.7 hectares.

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed cluster production of 379452 Tonnes per annum. The project has been proposed by (Jamui Kiul Block 08 - M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto Vill.- Khandpar, P.O.+ P.S.- Sheikhpura, Dist.- Sheikhpura- 811105 (Bihar). The proposed project is over an area 30.7 ha on Kiul River at Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui (Bihar). As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B-1’**. The estimated project cost for the proposed project is Jamui Kiul Block 08- **Rs- 3,50,98,000/-** (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72H/13, 72 L/1.

The mine lease co-ordinates and connectivity details are listed below:

Table: 10.1 Mine lease Co-ordinates (Jamui Kiul Block 08)

Pillar No	Latitude (N)	Longitude (E)
A	24°51'17.58"N	86°13'15.35"E
B	24°51'25.95"N	86°13'11.94"E
C	24°51'48.19"N	86°13'25.58"E
D	24°51'55.62"N	86°13'36.63"E
E	24°51'48.64"N	86°13'39.97"E
F	24°51'38.44"N	86°13'33.34"E
G	24°51'26.64"N	86°13'19.84"E

The details of environmental setting are given in **Table-10.2**.

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Table-10.2: Details of Environmental Setting

Sr. No.	Particulars	Details		
1	Location			
a	Village	Mauza – Sagdaha, Kendih, Bandra		
b	Tehsil	Block -Khaira		
c	District	Jamui		
d	State	Bihar		
2	Elevation above	Jamui Kiul Block 08 (91.2 mRL -88.7 mRL)		
3	Nearest National Highway/State Highway	SH-82 at distance of approx. 2.40 Km in North-East direction		
4	Nearest Railway station	Blocks	Railway Station	Distance (Km) Direction
		Jamui Kiul Block 08	Jamui Railway Station	Jamui Railway Station at distance of approx. 13 km in NE direction.
5	Nearest Airport	Blocks	Airport	Distance (Km) Direction
		Jamui Kiul Block 08	Jayprakash Narayan Airport, Patna,	Jayprakash Narayan Airport, Patna, approx. 140 km towards NW direction.
6	Ecological Sensitive Areas (Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.		
7	Seismic Zone	Zone- IV <i>Source BMTC 2nd edition</i> https://www.bmtpc.org/disaster%20resistnace%20technolgies /ZONE%20IV.htm		

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10.4 PROJECT DESCRIPTION

10.4.1 Salient features of mine lease

The salient features of mine lease are given below:

Table-10.3: Salient features of mine lease

Sr. No.	Parameter	Description
1	Name of the Mine	Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)
2	Mining Capacity	379452 TPA
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	30.7 ha
5	Depth of mining	1 m depth
6	Manpower	20 persons
9	Water Requirement	Jamui Kiul Block 08 – 2.10 KLD
10	Source of Water	Tanker/ Nearby village.

10.4.2 Mineral Reserves and production

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.06 kg/m³) to get the tonnage.

The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to paleochannels of the river will be leveled & restored back.

Table 10.4 Classification Mineral Reserves

Sand Ghat	Area (Hect)	Geological Reserves (m ³)	Mineable Reserves (m ³)	Annual Mineable Permitted Reserve As per LoI (m ³)
Jamui Kiul Block 08	30.7	307000	285638	184200

In the lease area the river flow being reduced and sediment load get deposited. During flood season, the area gets replenished with sediments and source of erosion at this location. It is a river bed deposit and mined out area shall be replenished each year during monsoon period

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and depth of quarry shall be filled back by river sand each year and area will restore its original topography.

10.4.3 Conceptual Plan

Mine Applied Area will be worked for Jamui Kiul Block 08 Sand Ghat. However, as the digging depth will be restricted to 1.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

(i) Final Slope Angle to Be Adopted: Height of the bench is limited to 1.5 m while width of individual bench shall be kept 6.0m. River bank side will be protected by working in dry part of the river and by leaving safety distance of the width of the river of 5 meter. Bank side natural slope will not be disturbed. This will prevent collapse of bank and erosion. However, the height of the bank with respect to river bed is varying from 3-4 meters.

(ii) During plan period workings will be carried out in the Sand Ghat at a time of the Applied Area simultaneously. Scattered workings will ensure safety, remove congestion of vehicles and will have better control and management.

(iii) Ultimate Capacity of Dumps: There will be no OB removal / during the plan period. Therefore no proposal has been envisaged for its separate dumping. No outside material will be filled up in the extracted zone.

The conceptual plan & section of each mining plots are attached with mine plan.

10.4.4 Method of Mining

Mining activity will be carried out by open cast semi- mechanized method/OTFM. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.

10.5 AFFORESTATION PROGRAMME

Topsoil if any would be utilized for intensive plantation and greenbelt development, all along the bank of the river. The details of plantation and number of saplings to be planted are given below. Approx. 564 trees will be planted around haul road during the plan period.

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10.6 LAND USE PATTERN

The mine lease area is flat river bed and river banks. There is no forest land or agriculture land in the mine lease area. The entire mining lease lies within River.

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

Three soil samples were collected in and around the mine lease area to assess the present soil quality of the region. The pH of the soil indicates that the soil is slightly alkaline in nature. Based on the results, it is evident that the soils are not contaminated by any polluting sources.

10.7.2 Meteorology

Meteorological data at the site was monitored during March 2023 to May 2023 representing winter season. It was observed that the during study period, temperature ranged from 21 °C to 44.0 °C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 08 locations. The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 53.4 µg/m³ to 79.95µg/m³. The Particulate Matter (PM_{2.5}) ranged from 19.21 µg/m³ to 45.12µg/m³. Sulphur dioxide (SO₂) between 5.84 µg/m³ to 18.56 µg/m³. Oxides of Nitrogen (NO₂) between 9.45 µg/m³ to 20.31 µg/m³. The results thus obtained indicate that the concentrations of PM₁₀, SO₂ and NO₂ in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

10.7.4 Water quality

To assess the physical and chemical properties of water in the region, water samples from 03 locations were collected from various water sources around the mine lease area. The pH was varying for ground waters from 7.2 to 7.77. The total dissolved solids are varying from 360 mg/l to 414 mg/l.

The Surface water sampling was taken from 03 locations. The analysis results indicate that the pH ranges between 7.1 to 8.2. Dissolved Oxygen (DO) was observed in the range of 6.7 to 7.6 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 5.2 to 10.3 mg/l.

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The results indicate groundwater is generally in conformity with the drinking water standards (IS: 10500).

10.7.5 Noise Quality

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 51.0 dB(A) to 58.2 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 40.3 dB (A) & 44.1dB(A) respectively.

10.7.6 Ecological Environment

Based on the field studies and review of published literature, There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.

10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

10.8.1 Impact on Air Environment

The proposed mining activities loading and movement of other transport vehicles used in mining will generate dust (SPM/RSPM). Proper water sprinkling shall be carried out at the mine site. The mineral will be transported by road through covered tarpaulin trucks/tippers to reduce the fugitive emission caused by the wind.

10.8.2 Impact on Water Environment

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.

Project activity will be carried out only in the dry part of the Kiul 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.

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10.8.3 Impact on Water Quality

Analysis results of water samples collected from the buffer zone indicate that the pH, total dissolved solids (TDS) are well below the prescribed limits.

No wastewater generation is envisaged due to the mining operations. The sanitary wastewater will be sent to septic tanks.

10.8.4 Impact on Noise Environment

The proposed mining activity is semi-mechanized/OTFM 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. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

10.8.5 Impact on 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 systematically.

The systematic and scientific removal of sand will not cause bed degradation. The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere. The mining is planned in non monsoon seasons only, so that the excavated area gets replenished gradually during the monsoons each year.

10.8.6 Impact on flora and fauna

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species. The mining site has no vegetation; no clearance of vegetation will be done. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.

10.8.7 Impact on Socio - Economic Aspects

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The mine area does not cover 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 or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated. The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

10.9 ENVIRONMENTAL MANAGEMENT PLAN

- Extraction will be done from the bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the river.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

10.10 ENVIRONMENTAL MONITORING PROGRAM

Table 10.5: Post project environmental monitoring

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a week in each season except monsoon

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2	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation Monitoring	Once in a season

10.11 ENVIRONMENTAL PROTECTION COST

The details of the cost to be incurred for successful monitoring of environmental parameters and implementation of control measures are given in **Table-10.6**.

Table 10.6: Cost of Environmental Protection Measures

Table 10.6 (a), Budget of EMP (Jamui Kiul Block 08)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	3.07	0.5
4	Haul road Maintenance Cost	0.15	1.5
TOTAL		3.22	5.5

Note: *234 plants * 1000 Rs (for each plants including hedges and fences) =Rs 307000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *0.06 km haul road) = 15000/-

10.12 ADDITIONAL STUDIES

10.12.1 Risk Assessment

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

standing orders, model, standing orders and circulars to be followed by the mine management in case of disaster, if any.

10.12.2 Disaster Management Plan

Emergency preparedness is an important aspect in the planning of Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

10.12.3 Public Consultation

This is a draft EIA report. Public Hearing will be incorporated in FEIA report.

10.13 PROJECT BENEFITS

Physical Benefits: Road Transport, Market, Enhancement of green cover & Creation of community assets.

Social Benefits: Increase in Employment Potential, Contribution to the Exchequer, Increased Health related activities, Educational attainments & Strengthening of existing community facilities.

Environmental Benefits:

- Controlling river channel and protection of banks.
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradation of river level.
- A check on illegal mining activity.

Corporate Social Responsibility

2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018. The following has been proposed considering the needs & demand of the people.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare.

CSR COST is Rs. 3,50,98,000/- x 2% = Rs. 7,01,960/-

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during Public Hearing. It has been

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.



10.14 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Monitoring program will be followed till the mining operations continue.
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

CONSULTANT

Name of the Consultant	P and M Solution
Address	C-88, Sector 65, Noida -201301 – U.P
Credentials	Accredited by QCI/NABET
Consultant accreditation details are given below:	


Quality Council of India
 National Accreditation Board for
 Education & Training
 

CERTIFICATE OF ACCREDITATION


P and M Solution
 First Floor, C-88, Sector-65, Noida, Uttar Pradesh- 201301

Accredited as Category -A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	River Valley projects	3	1 (c)	B
3.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	B
4.	Highways,	34	7 (f)	A
5.	Building and construction projects	38	8 (a)	B
6.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IA AC Minutes dated December 20, 2019 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1223 dated February 3, 2020. The accreditation needs to be renewed before the expiry date by P and M Solution, Noida following due process of assessment.


 Sr. Director, NABET
 Dated: February 3, 2020

Certificate No.
 NABET/EIA/1922/IA0053

Valid till
 Dec 10, 2022

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

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)



National Accreditation Board for Education and Training



QCI/NABET/ENV/ACO/23/2770

June 02, 2023

To

P and M Solution

C-88, Sector-65 Noida
Noida, UP

Sub.: Extension of Validity of Accreditation till Sept 01, 2023 – regarding

Ref.. 1. Certificate no. NABET/EIA/1922/IA0053

2. Request e-mail dated May 30, 2023

Dear Sir/Madam

This has reference to the accreditation of your organization under the QCI-NABET EIA Scheme, the validity of **P and M Solution** is hereby extended till Sept 01, 2023 or completion of the assessment process, whichever is earlier.

The above extension is subject to the submitted documents/required information with respect to your application and timely submission and closure of NC/Obs during the process of assessment.

You are requested not to use this letter after expiry of the above stated date.

With best regards.

(A K Jha)
Sr. Director, NABET

NABET

Project: Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar)

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

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S No	Name	EC/FAE	DETAILS
1	Pravin Kumar Sinha	EC	EC
2	Pravin Kumar Sinha	FAE	GEO
3	TapanMajumdar	FAE	HG
4	Subhash Kumar	FAE	SC
5	Manoj Kumar Pandey	FAE	EB
6	R K Tiwary	FAE	RH,AP
7	Rahul kumar	FAE	AQ
8	AbhayNath Mishra	FAE	SE
9	HussainZiauddin	FAE	WP
10	PoonamKumariMangalam	FAE	LU
11	Jatinkumarsrivastava	FAE	NV

EXECUTIVE SUMMARY

FOR SAND MINING PROJECT ON KIUL RIVER AT (JAMUI KIUL BLOCK - 08) SAND GHAT

At

**Mauza – Sagdaha, Kendih, Bandra, Block – Khairia,
District- Jamui, State - Bihar**

Area : 30.70 ha

Production: 379452 TPA

PROJECT PROPONENT

M/S Shakti Inframines Developers Pvt. Ltd.

Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto

Vill.- Khandpar, P.O.+ P.S.- Sheikhpura,

Dist.- Sheikhpura- 81105 (Bihar).

Environment Consultant



**P and M Solution
(Accredited by QCI/NABET)**

Accreditation No. : NABET/EIA/1992/IA0053

C-88, Sector 65 Noida

www.pmsolution.in



EXECUTIVE SUMMARY

INTRODUCTION

As per MoEF & CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B1’** project.

Jamui Kiul Block 08

The project has been proposed by M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar. The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 08 Sand Ghat At Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar). LOI issued to lessee via letter no 2249 dated 22-12-2022. The Draft EIA report has been prepared according to EIA notification 2006 and its subsequent amendment thereof. TOR of the proposed project has been issued by SEIAA Bihar dated 01-06-2023.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 05, Block 06, Block 07 & Block 08 are comes in cluster situation whose combined cluster area is 77.40 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production
Jamui Kiul Block 05	23.4	309000 TPA
Jamui Kiul Block 06	10.2	164388 TPA
Jamui Kiul Block 07	13.1	431364 TPA
Jamui Kiul Block 08	30.7	177984 TPA
Total	77.40	10,82,736 TPA

It has been proposed to mine around 379452 TPA for applied lease. The estimated project cost for the proposed project is **Rs 3,50,98,000/-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72H/13, 72 L/1. The lease area is located in Mauza – Sagdaha, Kendih, Bandra, Block -Khaira, District- Jamui, (Bihar). The mine lease co-ordinates are listed below:

Pillar No	Latitude (N)	Longitude (E)
A	24°51'17.58"N	86°13'15.35"E
B	24°51'25.95"N	86°13'11.94"E
C	24°51'48.19"N	86°13'25.58"E
D	24°51'55.62"N	86°13'36.63"E
E	24°51'48.64"N	86°13'39.97"E
F	24°51'38.44"N	86°13'33.34"E
G	24°51'26.64"N	86°13'19.84"E

Area & production: The total ML area is 30.7 Ha. Proposed rate of production will be 379452 TPA.

Connectivity:

Sand Ghat is well connected to the nearest metalled road 0.06 km distance from the lease. SH-82 at distance of approx. 2.40 Km in North-East direction. Jamui Railway Station at distance of approx. 13 km in NE direction.

Salient Features of Project

Name of the applicant	M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar
Address of Lessee	M/S Shakti Inframines Developers Pvt. Ltd. Prop.- Subodh Kumar; S/o- Lt. Yamuna Mahto Vill.- Khandpar, P.O.+ P.S.- Sheikhpura, Dist.- Sheikhpura- 811105 (Bihar).

Name of Mine	Sand Mining Project on Kiul River at Jamui Kiul Block 08 Sand Ghat
Village	Mauza – Sagdaha, Kendih, Bandra
District & State	Jamui, Bihar
Mineral	Sand
Area (ha)	30.7 hectare

MINING

The mining process is opencast semi-mechanized method without drilling & blasting. This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.

The mining will be done in a rotational way. As the working is going to be methodical i.e. mining will be done in benches. There would be no risk to the employee working in the mines.

Mining will be done in layers.

The deposit will be worked from the surface of the bed up to 1 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table. Mining will be done only during the day time and completely stopped during the monsoon season.

RESERVE AND PRODUCTION

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.06 kg/m³) to get the tonnage.

The bench-wise annual exploitation of sand of is given below:

Table Summary of minable reserves of Jamui Kiul Block 08 Sand Ghat

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
91-90	1138	251	1	285638	588414
Total				285638	588414

Total Mineable Reserve = 285638 CUM or 588414 Tonnes

Classification Mineral Reserves:

Sand Ghat	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Mineable Permitted Reserve As per LoI (m3)
Jamui Kiul Block 08	30.7	307000	285638	184200

It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river sand each year and area will restore its original topography.

SITE FACILITIES AND UTILITIES

Water Supply

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total cluster water of 2.10 KLD will be required for the proposed project. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village.

Temporary Rest Shelter

A temporary rest shelter will be provided for the workers near to the site for rest. In addition, First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any and sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

BASELINE ENVIRONMENTAL STATUS

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Flora & Fauna. The baseline environment study was carried out over an area with radial distance of 10 km around the mining lease area during pre monsoon season from March 2023 to May 2023

Meteorology

The Summarized Meteorological Data for the Monitoring Period (March to May 2023) is given below:

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Average	Max

MARCH 2023	21	38	9.8	21.8
APRIL 2023	26	44	12.8	25.4
MAY 2023	27	44	12.9	25.7

Table Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM _{2.5} amongst all the 08 AQ monitoring stations were found to be 19.21µg/m ³ to 45.12 µg/m ³ respectively; PM ₁₀ was in the range of 53.4 µg/m ³ to 79.95µg/m ³ . As far as the gaseous pollutants SO ₂ and NO ₂ are concerned, the prescribed CPCB limit of 80 µg/m ³ for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the locations monitored.
Water Quality	The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by IS: 10500. Surface water analysis from River Kiul results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating their suitability for outdoor bathing.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.47 to 8.10, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Eco-Sensitive Areas in the study area.

ANTICIPATED ENVIRONMENTAL IMPACTS

Impact on Air Environment

The proposed mining activities loading and movement of other transport vehicles used in mining will generate dust (SPM/RSPM). Proper water sprinkling shall be carried out at the mine site. The mineral will be transported by road through covered tarpaulin trucks/tippers to reduce the fugitive emission caused by the wind.

Impact on Water Environment

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.

Project activity will be carried out only in the dry part of the Kiul 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.

Impact on 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 systematically.

The systematic and scientific removal of sand will not cause bed degradation. The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere. The mining is planned in non monsoon seasons only, so that the excavated area gets replenished gradually during the monsoons each year.

Impact on 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. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

Impact on Biological Environment

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species. The mining site has no vegetation; no clearance of vegetation will be done. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.

Impact on Socio Economic Environment

The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

POST PROJECT ENVIRONMENTAL MONITORING

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice/thrice a week in each season except monsoon
2	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation Monitoring	Once in a season

ADDITIONAL STUDIES

Public Hearing

Public hearing is yet to be conducted.

Risk Assessment

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

Disaster Management Plan

Emergency preparedness is an important aspect in the planning of Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

PROJECT BENEFITS

Physical Benefits: Road Transport, Market, Enhancement of green cover & Creation of community assets.

Social Benefits: Increase in Employment Potential, Contribution to the Exchequer, Increased Health related activities, Educational attainments & Strengthening of existing community facilities.

Environmental Benefits:

- Controlling *river* channel and protection of banks.
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradation of *river* level.
- A check on illegal mining activity.

CORPORATE SOCIAL RESPONSIBILITY

2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018. The following has been proposed considering the needs & demand of the people.

CER cost for Jamui Kiul Block 08 will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 3,50,98,000/- x 2% = Rs. 7,01,960/-

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during Public Hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.

❖ **PLANTATION:**

- The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 307 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016, minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Peepal, Arjun, Jamun, Neem, Mango etc trees will be planted.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

- Extraction will be done from the bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the *river*.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Table, Budget of EMP (Jamui Kiul Block 08)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	3.07	0.5
4	Haul road Maintenance Cost	0.15	1.5
TOTAL		3.22	5.5

Note: *234 plants * 1000 Rs (for each plants including hedges and fences) =Rs 307000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *0.06 km haul road) = 15000/-

CONCLUSION

Based on the EIA study it is observed that there will be an increase in the dust pollution, which will be controlled by sprinkling of water and plantation. There will be an insignificant impact on ambient environment and ecology due to the mining activities moreover the mining operation will lead to direct and indirect employment generation in the area. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the Mine. Monitoring program will be followed till the mining operations continue. Hence, it can be summarized that the development of the mine will have a positive impact on the socio-economic environment of the area and lead to sustainable development of the region.

कार्यकारी सारांश

रेत खनन परियोजना
(जमुई किउल नदी ब्लॉक 08 रेत घाट)
के लिए

मौजा- सगदाहा, केनडीह, बन्द्रा, ब्लॉक- खैरा,
जिला- जमुई, बिहार
क्षेत्रफल- 30.7 हेक्टेयर
उत्पादन: 379452 टन प्रति वर्ष

आवेदन कर्ता

मेसर्स शक्ति इंफ्रामाइन्स डेवलपर्स प्रा. लि.
प्रो०- सुबोध कुमार
पुत्र- स्वर्गीय यमुना महतो
ग्राम- खंडपर, डाकघर + थाना- शेखपुरा,
जिला- शेखपुरा- 811105 (बिहार)



एनवायरनमेंट कन्सल्टेंट
पी & एम सल्यूशन



(क्वालिटी कौंसिल ऑफ़ इंडिया द्वारा मान्यता प्राप्त)
सी-88 सेक्टर 65 नॉएडा उत्तर-प्रदेश

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Accreditation No. : NABET/EIA/1992/IA0053

कार्यकारी सारांश

❖ परिचय

MoEF & CC (एमओईएफ एंड सीसी), नई दिल्ली राजपत्र दिनांक 14 सितंबर 2006 और उसमें समय समय पर किये गए संशोधन के अनुसार, प्रस्तावित खनन परियोजना को श्रेणी 'बी1' परियोजना के रूप में वर्गीकृत किया गया है।

जमुई किउल ब्लॉक 08

परियोजना के प्रस्ताव मेसर्स शक्ति इंफ्रामाइन्स डेवलपर्स प्रा. लि. , प्रो०- सुबोध कुमार ने दिया है। प्रस्तावित रेत खनन परियोजना मौजा - सगदाहा, केनडीह, बन्द्रा, ब्लॉक- खैरा, जिला- जमुई (बिहार) में ब्लॉक संख्या - 08 रेत घाट पर किउल नदी पर स्थित है। पत्र संख्या 2249/एम दिनांक 22.12.2022 के माध्यम से पट्टेदार को एलओआई जारी किया गया।

ईआईए अधिसूचना 2006 और इसके बाद के संशोधन के अनुसार ड्राफ्ट ईआईए रिपोर्ट तैयार की गई है। प्रस्तावित परियोजना का टीओआर SEIAA बिहार दिनांक 01.06.2023 द्वारा जारी किया गया है।

❖ **क्लस्टर स्थिति:** जिला सर्वेक्षण रिपोर्ट जमुई के अनुसार जमुई किउल ब्लॉक 05, ब्लॉक 06, ब्लॉक 07 और ब्लॉक 08 के प्रस्तावित रेत घाट क्लस्टर स्थिति में आते हैं जिनका संयुक्त क्लस्टर क्षेत्र 77.40 हेक्टेयर है। खनिजों का समस्त पट्टा क्षेत्र एक दूसरे से 500 मीटर के दायरे में आ रहा है जो एक समूह स्थिति की पुष्टि करता है।

क्लस्टर का विवरण नीचे दिया गया है:

ब्लॉक का नाम	क्षेत्र (हे),	उत्पादन (टीपीए)
जमुई किउल ब्लॉक 05	23.4	309000
जमुई किउल ब्लॉक 06	10.2	164388
जमुई किउल ब्लॉक 07	13.1	431364
जमुई किउल ब्लॉक 08	30.7	177984
कुल	77.40	10,82,736

आवेदित पट्टे के लिए प्रति वर्ष लगभग 379452 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 3,50,98,000/- रुपये (नीलामी लागत सहित) है।

परियोजना विवरण

स्थिति:

जमुई किउल ब्लॉक 08

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72H/13, 72 L/1 के अंतर्गत आता है। पट्टा क्षेत्र मौजा- सगदाहा, केनडीह, बन्द्रा, ब्लॉक- खैरा, जिला- जमुई, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)	देशांतर (ई)
A	24°51'17.58"N	86°13'15.35"E
B	24°51'25.95"N	86°13'11.94"E
C	24°51'48.19"N	86°13'25.58"E
D	24°51'55.62"N	86°13'36.63"E
E	24°51'48.64"N	86°13'39.97"E
F	24°51'38.44"N	86°13'33.34"E
G	24°51'26.64"N	86°13'19.84"E

❖ **क्षेत्र और उत्पादन:** कुल क्षेत्रफल 30.7 हेक्टेयर है। उत्पादन की प्रस्तावित दर 379452 टीपीए है।

❖ **संयोजकता**

रेत घाट पट्टे से 0.06 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। SH 82 लगभग 2.40 किमी उत्तर पूर्व दिशा में है जमुई रेलवे स्टेशन, लगभग 13.0 किमी उत्तर पूर्व दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

आवेदक का नाम	मेसर्स शक्ति इंफ्रामाइन्स डेवलपर्स प्रा. लि. प्रो०- सुबोध कुमार
पट्टेदार का पता	मेसर्स शक्ति इंफ्रामाइन्स डेवलपर्स प्रा. लि. प्रो०- सुबोध कुमार पुत्र- स्वर्गीय यमुना महतो ग्राम- खैंडपर, डाकघर + थाना- शेखपुरा, जिला- शेखपुरा- 811105 (बिहार)
नाम	रेत खनन परियोजना (जमुई किउल नदी ब्लॉक 08 रेत घाट)
गाँव	मौजा - सगदाहा, केनडीह, बन्द्रा
जिला और राज्य	जमुई, बिहार
खनिज	रेत
क्षेत्र (हेक्टेयर)	30.7 हेक्टेयर

❖ ड्रिलिंग

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

❖ खनिज का उपयोग

रेत का उपयोग निर्माण कार्यों में किया जाता है सड़क निर्माण में भी इसका उपयोग किया जाता है

❖ खनन

खनन प्रक्रिया ड्रिलिंग और ब्लास्टिंग के बिना खुली अर्ध-मशीनीकृत विधि है। यह एक ओपन कास्ट माइनिंग प्रोजेक्ट है। उत्खनन/जेसीबी ट्रक/ट्रैक्टर संयोजन या मैन्युअल आदि के उपयोग के साथ संचालन अर्ध-मशीनीकृत/ओटीएफएम होगा। रेत को अपने मौजूदा रूप में एकत्र किया जाएगा।

खनन रोटेशनल तरीके से किया जाएगा। चूंकि काम व्यवस्थित होने जा रहा है यानी बेंचों में खनन किया जाएगा। खदान में काम करने वाले कर्मचारी को कोई खतरा नहीं होगा। खनन परतों में किया जाएगा।

निक्षेप को संस्तर की सतह से 01 एमबीजीएल या भूजल स्तर से ऊपर, जो भी पहले आए, तक कार्य किया जाएगा। इसलिए, किसी भी समय खनन भूजल स्तर को नहीं काटेगा। खनन केवल दिन के समय किया जाएगा और मानसून के मौसम में पूरी तरह बंद कर दिया जाएगा।

❖ रिजर्व और उत्पादन

खनन योग्य भंडार की गणना सतह से 1 मीटर की गहराई तक की गई है। टनभार प्राप्त करने के लिए वॉल्यूम को बल्क डेंसिटी (2.06 g/cm^3) से गुणा किया जाता है।

हर साल मानसून के मौसम के दौरान नदी तल से उत्खनन किए गए खनिजों की फिर से भरपाई (रिप्लेनिशमेंट) हो जाएगा। नदी के पैलियो चैनल से संबंधित क्षेत्र को समतल करके वापस बहाल किया जाएगा।

बैंचवार रेत का वार्षिक दोहन नीचे दिया गया है:

खनन योग्य भंडार का सारांश: जमुई किउल ब्लॉक 08

बैंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
91-90	1138	251	1	285638	588414
कुल				285638	588414

कुल खनन योग्य रिजर्व = 212076 घन मीटर या 588414 टन

यह नदी तल जमा है और खनन क्षेत्र हर साल मानसून अवधि के दौरान फिर से भर जाएगा और खदान की गहराई हर साल नदी की रेत से भर जाएगा (रिप्लेनिशमेंट) और क्षेत्र अपनी मूल स्थलाकृति बहाल को कर देगा।

❖ साइट सुविधाएं और उपयोगिताएँ

• जलापूर्ति

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 2.10 केएलडी के जल की आवश्यकता होगी। ताजे पानी

का उपयोग केवल पीने के उद्देश्य के लिए किया जाएगा। आसपास के गांव के उपलब्ध स्रोतों से पानी की आपूर्ति की जाएगी।

- **अस्थायी विश्राम गृह**

विश्राम के लिए स्थल के पास श्रमिकों के लिए एक अस्थायी विश्राम आश्रय प्रदान किया जाएगा। इसके अलावा, छोटे कीड़ों की कुछ प्रजातियों द्वारा उत्पादित जहर का मुकाबला करने के लिए एंटी-वेनम के साथ प्राथमिक उपचार बॉक्स, यदि कोई हो और श्रमिकों के लिए स्वच्छता सुविधा जैसे सेप्टिक टैंक या सामुदायिक शौचालय की सुविधा प्रदान की जाएगी।

- **आधारभूत पर्यावरणीय स्थिति**

वायु, ध्वनि, जल, मिट्टी, वनस्पति एवं जीव-जन्तुओं के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डाटा एकत्र किया गया है। बेसलाइन पर्यावरण अध्ययन मार्च 2023 से मई 2023 तक तक ग्री मानसून सीजन के मौसम के दौरान खनन पट्टा क्षेत्र के आसपास 10 किमी की रेडियल दूरी वाले क्षेत्र में किया गया था।

- **मौसम विज्ञान**

निगरानी अवधि मार्च 2023 से मई 2023 के लिए संक्षिप्त मौसम संबंधी डेटा नीचे दिया गया है:

महीना	तापमान °C		हवा की गति (किमी/घंटा)	
	न्यूनतम	अधिकतम	औसतन	अधिकतम
मार्च 2023	21	38	9.8	21.8
अप्रैल 2023	26	44	12.8	25.4
मई 2023	27	44	12.9	25.7

आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 08 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 19.21 $\mu\text{g}/\text{m}^3$ से 45.12 $\mu\text{g}/\text{m}^3$ पाई गई; PM10 53.4 $\mu\text{g}/\text{m}^3$ to 79.95 $\mu\text{g}/\text{m}^3$ की सीमा में था जहां तक गैसीय प्रदूषकों SO2 और NO2 का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 $\mu\text{g}/\text{m}^3$ की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी स्थानों पर शोर के दिन और रात दोनों समय एनएएक्यूएस की निर्धारित सीमा के भीतर थे।
पानी की गुणवत्ता	सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक IS: 10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। किउल नदी के सतही जल विश्लेषण के परिणामों से यह स्पष्ट होता है कि नमूनों के अधिकांश पैरामीटर सीपीसीबी के 'श्रेणी बी' मानकों का अनुपालन करते हैं, जो इंगित करता है यह जल स्नान के लिए उपयुक्त हैं।
मिट्टी की गुणवत्ता	चिन्निहित किए गए स्थानों से एकत्र किए गए नमूने इंगित करते हैं कि मिट्टी रेतीली प्रकार की है और पीएच मान 7.47 से 8.10 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पर्यावरण-संवेदनशील क्षेत्र नहीं है।
सामाजिक आर्थिक	नदी तल पर रेत खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

❖ अनुमानित पर्यावरणीय प्रभाव

• वायु पर्यावरण पर प्रभाव

प्रस्तावित खनन गतिविधियां खनन में प्रयुक्त अन्य परिवहन वाहनों की लोडिंग और आवाजाही से धूल (SPM/RSPM) उत्पन्न होगी। खदान स्थल पर उचित जल छिड़काव किया जाएगा। हवा से होने वाले क्षणिक उत्सर्जन को कम करने के लिए खनिज को ढके हुए तिरपाल ट्रकों/टिप्परों के माध्यम से सड़क मार्ग से ले जाया जाएगा।

• जल पर्यावरण पर प्रभाव

नदी के भीतर या उसके पास से रेत के खनन का मानसून के मौसम के दौरान भौतिक-रासायनिक आवास विशेषताओं पर अप्रत्यक्ष प्रभाव पड़ता है। इन विशेषताओं में धारा खुरदरापन, तत्व, गहराई, वेग, मैलापन, तलछट परिवहन और धारा निर्वहन शामिल हैं।

संस्तर सामग्री खनन से उत्पन्न बायोटा पर हानिकारक प्रभाव, यदि कोई हो, निम्नलिखित के कारण होते हैं:

- नदी के परिवर्तन के परिणामस्वरूप प्रवाह पैटर्न में बदलाव
- मानसून के मौसम में निलम्बित तलछट की अधिकता।

परियोजना गतिविधि केवल किउल नदी के शुष्क भाग में की जाएगी। इसलिए, परियोजना की कोई भी गतिविधि सीधे तौर पर जल पर्यावरण को प्रभावित नहीं करती है। परियोजना में केवल मानसून के मौसम में किसी धारा को मोड़ने या काट देने का प्रस्ताव नहीं है। नदी (मानसून में) या भूजल दोहन से पानी की पंपिंग के लिए किसी प्रस्ताव की परिकल्पना नहीं की गई है।

❖ भूमि पर्यावरण पर प्रभाव

स्ट्रीम बेड सामग्री का प्रस्तावित निष्कर्षण, मौजूदा स्ट्रीमबेड के नीचे खनन, और चैनल-बेड फॉर्म और आकार में परिवर्तन से चैनल बेड और बैंकों के क्षरण, चैनल ढलान में वृद्धि, और चैनल आकारिकी में परिवर्तन जैसे कई प्रभाव हो सकते हैं, यदि, संचालन व्यवस्थित रूप से नहीं किया जाता है।

रेत के व्यवस्थित और वैज्ञानिक तरीके से हटाने से क्यारियों का क्षरण नहीं होगा। कचरे के रूप में उत्पन्न गाद और मिट्टी का उपयोग वृक्षारोपण के लिए या निचले इलाकों को कहीं और भरने के लिए किया जाएगा। खनन की योजना गैर-मानसून मौसम में ही बनाई जाती है, ताकि उत्खनित क्षेत्र प्रत्येक वर्ष मानसून के दौरान धीरे-धीरे भर जाए (रिप्लेनिशमेंट)।

❖ शोर पर्यावरण पर प्रभाव

प्रस्तावित खनन गतिविधि प्रकृति में अर्ध-मशीनीकृत है। खनन गतिविधि के लिए कोई ड्रिलिंग और ब्लास्टिंग परिकल्पित नहीं है। इसलिए, केवल खनिजों के परिवहन के लिए तैनात वाहनों की आवाजाही के कारण प्रभाव का अनुमान लगाया गया है। वाहनों को अच्छी चालू स्थिति में रखा जाएगा ताकि शोर को न्यूनतम संभव स्तर तक कम किया जा सके।

❖ जैविक पर्यावरण पर प्रभाव

चूंकि प्रस्तावित खनन वैज्ञानिक तरीके से किया जाएगा, इसलिए ज्यादा महत्वपूर्ण प्रभाव का अनुमान नहीं है। जलीय जीवन पर प्रभाव को कम करने के लिए मानसून के मौसम के दौरान कोई खनन नहीं किया जाएगा जो कि कई प्रजातियों के लिए मुख्य रूप से प्रजनन का मौसम है। खनन स्थल पर कोई वनस्पति नहीं है; वनस्पति की सफाई नहीं की जाएगी। ढोने वाली सड़कों पर पानी का छिड़काव किया जाएगा जिससे धूल का उत्सर्जन कम होगा और इस प्रकार फसलों को होने वाले नुकसान से बचा जा सकेगा।

❖ सामाजिक आर्थिक पर्यावरण पर प्रभाव

क्षेत्र में खनन गतिविधि का प्रभाव क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक है। रेत खनन से स्थानीय लोगों को जब भी श्रमबल की आवश्यकता होगी रोजगार उपलब्ध होगा।

पोस्ट प्रोजेक्ट पर्यावरण निगरानी

क्रम संख्या	पैरामीटर्स का विवरण	निगरानी की अनुसूची
1	हवा की गुणवत्ता	मानसून को छोड़कर प्रत्येक मौसम में सप्ताह में दो बार/तीन बार 24 घंटे के नमूने
2	जल गुणवत्ता (सतह और भूजल)	साल में 4 सीजन के लिए एक बार

3	मिट्टी की गुणवत्ता	परियोजना क्षेत्र में वर्ष में एक बार
4	शोर स्तर	साल में दो बार पहले दो साल और फिर साल में एक बार
5	सामाजिक-आर्थिक स्थिति	3 साल में एक बार
6	वृक्षारोपण निगरानी	एक बार एक मौसम में

❖ अतिरिक्त अध्ययन

• सार्वजनिक सुनवाई

जन सुनवाई अभी बाकी है।

❖ जोखिम आकलन

पूर्ण खनन कार्य एक योग्य खदान प्रबंधक होल्डिंग के प्रबंधन नियंत्रण और निर्देशन में किया जाएगा। डीजीएमएस नियमित रूप से स्थायी आदेश, मॉडल स्थायी आदेश और आपदा, यदि कोई हो, के मामले में खान प्रबंधन द्वारा पालन किए जाने वाले परिपत्र जारी करता रहा है। साथ ही खनन कर्मचारियों को सतर्क रखने के लिए समय-समय पर रिफ्रेशर कोर्स में भेजा जाएगा।

❖ आपदा प्रबंधन योजना

आपदा प्रबंधन की योजना में आपातकालीन तैयारी एक महत्वपूर्ण पहलू है। कर्मिकों को उचित रूप से प्रशिक्षित किया जाएगा और सावधानीपूर्वक नियोजित, सिम्युलेटेड प्रक्रियाओं के माध्यम से आपातकालीन प्रतिक्रिया में मानसिक और शारीरिक रूप से तैयार किया जाएगा। इसी तरह, प्रमुख कर्मियों और आवश्यक कर्मियों को संचालन में प्रशिक्षित किया जाएगा।

❖ परियोजना लाभ

- **भौतिक लाभ:** सड़क परिवहन, बाजार, हरित आवरण में वृद्धि और सामुदायिक संपत्तियों का निर्माण।
- **सामाजिक लाभ:** रोजगार क्षमता में वृद्धि, राजकोष में योगदान, स्वास्थ्य संबंधी गतिविधियों में वृद्धि, शैक्षिक उपलब्धियां और मौजूदा सामुदायिक सुविधाओं का सुदृढीकरण।

❖ पर्यावरणीय लाभ:

- ❖ नदी चैनल को नियंत्रित करना और बैंकों की सुरक्षा करना।
- ❖ बाढ़ के कारण आसपास की कृषि भूमि के डूबने को कम करना।
- ❖ नदी के स्तर के उन्नयन को कम करना।
- ❖ अवैध खनन गतिविधि पर एक जांच।

❖ कॉर्पोरेट की सामाजिक जिम्मेदारी

दिनांक 1 मई 2018 के कार्यालय ज्ञापन के अनुसार परियोजना लागत की पूंजीगत लागत का 2% कॉर्पोरेट पर्यावरणीय उत्तरदायित्व के लिए आवंटित किया जाएगा। लोगों की जरूरतों और मांग को ध्यान में रखते हुए निम्नलिखित प्रस्तावित किया गया है।

जमुई किउल ब्लॉक 08 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 3,50,98,000/- x 2% = ₹. . 7,01,960/-

प्रत्येक गतिविधि के लिए प्रस्तावक द्वारा निर्धारित की जाने वाली धनराशि का निर्धारण जन सुनवाई के दौरान स्थानीय प्राधिकारी/लोगों एवं हितग्राहियों से चर्चा के बाद किया जायेगा। सीईआर कार्यक्रम के तहत की जाने वाली गतिविधियों का समवर्ती मूल्यांकन करने की योजना बनाई गई है।

❖ वृक्षारोपण:

- परियोजना से कोई पेड़ नहीं कटेगा। तथापि, असामाजिक उत्तरदायित्व, सड़क के दोनों ओर और नदी के किनारे हरियाली विकसित की जाएगी। इन वृक्षारोपण को बढ़ाने के लिए सामुदायिक सेवाओं को तैनात किया जाएगा। आर्थिक महत्व के पेड़ और देशी मूल के पेड़ जैसे फलों के पेड़ लगाए जाएंगे।
- लगभग योजना अवधि में हॉल रोड के आसपास 307 पौधे रोपे जाएंगे।
- वृक्षारोपण के लिए प्रस्तावित पेड़ हैं:

- सस्टेनेबल सैंड मैनेजमेंट एंड माइनिंग गाइडलाइंस 2016 के अनुसार ग्रीनबेल्ट के विकास के लिए प्रति हेक्टेयर न्यूनतम 5 पौधे प्रस्तावित किए जाएंगे लेकिन पर्यावरण की बेहतर स्थिति के लिए परियोजनाओं के इस समूह में 10 पौधे प्रति हेक्टेयर प्रस्तावित किए जाएंगे।
- पीपल, अर्जुन, जामुन, नीम, आम आदि के पेड़ लगाए जाएंगे।

पर्यावरण प्रबंधन योजना (ईएमपी)

- रिवर बैंक से सुरक्षा क्षेत्र छोड़कर नदी तल से निकासी की जाएगी।
- अधिकतम काम करने की गहराई क्षेत्र के भूजल तालिका के ऊपर रहेगी।
- स्वास्थ्य प्रभावों को कम करने के लिए प्रभाव क्षेत्र में श्रमिकों और आसपास के लोगों को स्वास्थ्य सुविधाएं प्रदान किया जायेगा ।
- वन्यजीव संरक्षण सुनिश्चित करना और उसी के लिए जागरूकता अभियान की व्यवस्था किया जायेगा।
- नदी में महीन तलछट छोड़ने वाली गतिविधियों को किया जायेगा।
- खनिजों के परिवहन और प्रबंधन के दौरान गड़बड़ी को कम करने के लिए प्रभावी शमन उपाय अपनाए जाएंगे
- स्थानीय/देशी और तेजी से बढ़ने वाली प्रजातियों के वृक्षारोपण के साथ सुधार कार्यक्रम की स्थापना किया जायेगा
- मानसून के मौसम की शुरुआत में खान के बंद होने के दौरान बहाली योजना की स्थापना किया जायेगा
- आसन्न आपदाओं के प्रभाव से बचने के लिए समय पर एहतियाती उपाय करने के लिए प्रभावी आपदा प्रबंधन योजना की स्थापना।
- पर्यावरण प्रबंधन प्रकोष्ठ द्वारा प्रभावी निगरानी कार्यक्रम की स्थापना किया जायेगा।

❖ ईएमपी कार्यान्वयन के लिए बजट आवंटन

टेबल, ईएमपी का बजट (जमुई किउल ब्लॉक 08)

क्रम संख्या	विवरण	पूँजी लागत (लाख)	आवर्ती लागत (लाख)
1	प्रदूषण नियंत्रण और धूल दमन	Nil	1.5
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और वेतन एक माली के लिए (अंशकालिक आधार पर)	3.07	0.5
4	परिवहन सड़क रखरखाव लागत	0.15	1.5
कुल		3.22	5.5

नोट: *307 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 3,07,000/- रुपये

· दोना सड़क रखरखाव के लिए श्रम का वेतन 2 श्रमिक*300=600 प्रति दिन

· 600* 250= 1,50,000/-

· *2.5 लाख प्रति किलोमीटर (2,50,000*0.06 किमी लंबी सड़क) = 15000/-

निष्कर्ष

ईआईए अध्ययन के आधार पर यह देखा गया है कि धूल प्रदूषण में वृद्धि होगी, जिसे पानी के छिड़काव और वृक्षारोपण द्वारा नियंत्रित किया जाएगा। खनन गतिविधियों के कारण (एम्बिएंट) परिवेशी पर्यावरण और पारिस्थितिकी पर नगण्य प्रभाव पड़ेगा, इसके अलावा खनन संचालन से क्षेत्र में प्रत्यक्ष और अप्रत्यक्ष रोजगार सृजन होगा। क्षेत्र के चारों ओर हरित पट्टी का विकास एक प्रभावी प्रदूषण न्यूनीकरण तकनीक के साथ-साथ खान परिसर से निकलने वाले प्रदूषकों को नियंत्रित करने के लिए भी किया जाएगा। खनन कार्य जारी रहने तक निगरानी कार्यक्रम का पालन किया जाएगा। इसलिए, यह संक्षेप में कहा जा सकता है कि खान के विकास से क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक प्रभाव पड़ेगा और क्षेत्र के सतत विकास को बढ़ावा मिलेगा।
