Draft EIA Report

FOR

SAND MINING PROJECT

AT

Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River

At Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara,

Block- Ekangarsarai, District- Nalanda, Bihar

AREA: 10.0 Hectare or 24.7 Acre,

CAPACITY: 60000 cum per year 124800 TPA

Applicant: Pappu Kumar,
S/o- Chaitu Rai,
Vill- Daudpur, Ward No -3, P.O – Daudpur,
P.S- Shapur, District - Patna-801502

PREPARED BY

ENVIRONMENT CONSULTANT

Rian Enviro Private Limited

QCI – NABET Certificate No: NABET/EIA/2124/SA 0197

Patna Office: 202 & 402 Mangal Market, Sheikhpura, Raja Bazar,

Patna, Bihar- 800014

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1 INTRODUCTION

1.1 Preamble

The term Environment Impact Assessment (EIA) refers to the anticipation of various impacts a project will have on the environment and the local community. It is a decision-making tool, which guides decision makers in taking appropriate decisions prior to sanctioning clearance. Environmental Impact Assessment (EIA) is a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

1.2 General Information

The proposed sand mining project at Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River, Area: 10.0 Ha, Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar. The state government has issued the LOI for a period of five years vide letter no- 1989/Khanan, Nalanda, dated 23-12-2022 in favor of Pappu Kumar. A copy of LOI is attached as **Annexure-I.**

Mine plan and Progressive Mine Closure Plan: Mining Plan and Progressive Mine Closure Plan of the proposed mine lease area is prepared by United Exploration India Pvt. Ltd having QCI NABET accreditation No. NABET/APA-MPPA/IA/006, with validity up to 11th March, 2024.

The mining plan for the **Nalanda Lokain – 02, Lokain Sand Ghat No -05** has been approved with production capacity of 60000 Cum per year 124800 TPA from the Department of Mines & Geology, Govt. of Bihar through vide letter No. 2634/M Patna, dated 19/05/2023 under the Bihar Minor Minerals Concession Rules 2019. Copy of approval Letter of Mining Plan has been attached as **Annexure II.**

Environment Consultant: The lessee has hired an Environment Consultant Rian Enviro Private Limited, H/O- 202 & 402, Mangal Market, Raza Bazar, Sheikhpura, Patna, Pin code: 800014 for preparation of Environment Impact Assessment Report for obtaining Environment Clearance from SEIAA, Bihar.

ToR Letter: It is in this context, hard copy of Form-I and Pre-Feasibility Report has been submitted to SEIAA, Bihar on 12.06.2023 requesting for issue of "Terms of Reference" (ToR). The ToR Letter has been issued on date 14.06.2023 by SEIAA, (File No. SIA/1(a)/2441/2023). Validity of TOR is for period of three years.

Baseline data collection: The baseline data was collected in Summer season form 1st of March 2023 to 31st of May 2023.

1.3 Identification of Project and Project Proponent

1.3.1 Identification of Project

Mining of Minor mineral (Sand) from the river Lokain by **Pappu Kumar** having an area of 10.0 ha with production capacity of 60000 cum per year 124800 TPA. The mine is situated in the Vill-Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar. The mine lease area falls in the survey of India Toposheet no. G45N3, G45N7, G45N4, G45N8.

1.3.2 Identification of Project Proponent

The applicant details are given below: -

Table 1-1: Applicant Details

Sl No.	Name of the Mine lease area	Applicant
1	Nalanda Lokain – 02, Lokain Sand Ghat No -05	Pappu Kumar S/o- Chaitu Rai Vill- Daudpur, Ward No -3, P.O – Daudpur, P.S- Shapur, District - Patna-801502

1.4 Environmental Clearance

The Proposed Sand Mining Project of Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River, Area: 10.0 Hectares, Khata No.- 60, 71, 81, 93, 83, 93, 56, 83, 81, 43, 39, 95, 93, 95, 94,

53, 94, 53, 94, 63, 24, 29, 94, 48, 80, 79, 29, 74, 23, 25, 63, 55, 12, 33, 55, 29, 15, 74, 29, Khasra No. 307, 297, 298, 601, 299, 602, 300, 301, 302, 303, 304, 305, 306, 600, 599, 598, 597, 596, 595, 594, 593, 538, 549, 537, 548, 547, 539, 540, 541, 542, 543, 569, 545, 570, 571, 568, 572, 573, 574, 575, 576, 577, 578, 567, 566, 565, Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar falls in Category "B1", 1(a), due to Mining lease area is more than 5.0 Ha as per honorable NGT order and as per OM dated 12.12.2018. Project will be assessed by SEIAA, Bihar. Lessee will have to take Environmental Clearance from SEIAA, Bihar as per EIA notification September, 2006 amended in December 2009 and April 2011 and amendment thereof to start the mining operation.

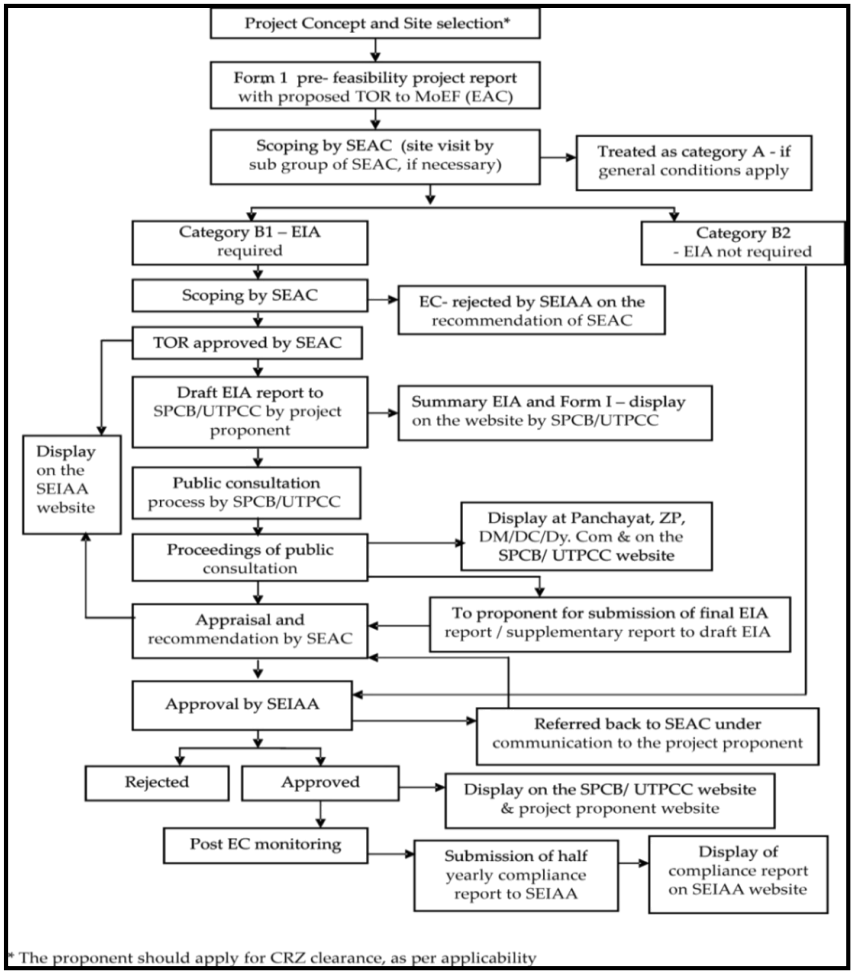

Figure 1-1: Environmental Clearance Process

1.5 Brief Description of Nature, Size, Location of the Project

Table 1-2: Description of the Project

<table>
<tr><th>S. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>1.</td><td>Nature and Size of the Project</td><td>Mining of Sand Minor Minerals with Production Capacity of 60000 Cum per year 124800 TPA (M.L. Area- 10.0 ha).</td></tr>
<tr><td>2.</td><td>Location</td><td></td></tr>
<tr><td></td><td>Plot/Survey/Khasra No.</td><td>
<table>
<tr><th>River Name</th><th>Name of the Ghat</th><th>Area (Ha)</th><th>Khata No.</th><th>Khesra No.</th></tr>
<tr><td rowspan="38">Lokain</td><td rowspan="38">Nalanda Lokain – 02, Lokain Sand Ghat No -05</td><td rowspan="38">10.0</td><td>60</td><td>307</td></tr>
<tr><td>71</td><td>297</td></tr>
<tr><td>81</td><td>298</td></tr>
<tr><td>93</td><td>601</td></tr>
<tr><td>83</td><td>299</td></tr>
<tr><td>93</td><td>602</td></tr>
<tr><td>56</td><td>300</td></tr>
<tr><td>83</td><td>301</td></tr>
<tr><td>81</td><td>302</td></tr>
<tr><td>43</td><td>303</td></tr>
<tr><td>39</td><td>304</td></tr>
<tr><td>95</td><td>305</td></tr>
<tr><td>93</td><td>306, 600, 599, 598, 597, 596, 595, 594, 593</td></tr>
<tr><td>95</td><td>538</td></tr>
<tr><td>94</td><td>549</td></tr>
<tr><td>53</td><td>537</td></tr>
<tr><td>94</td><td>548</td></tr>
<tr><td>63</td><td>547</td></tr>
<tr><td>24</td><td>539</td></tr>
<tr><td>29</td><td>540</td></tr>
<tr><td>94</td><td>541</td></tr>
<tr><td>48</td><td>542</td></tr>
<tr><td>80</td><td>543</td></tr>
<tr><td>79</td><td>569</td></tr>
<tr><td>29</td><td>545</td></tr>
<tr><td>74</td><td>570</td></tr>
<tr><td>23</td><td>571</td></tr>
<tr><td>25</td><td>568</td></tr>
<tr><td>63</td><td>572</td></tr>
<tr><td>55</td><td>573</td></tr>
<tr><td>12</td><td>574</td></tr>
<tr><td>33</td><td>575</td></tr>
<tr><td>55</td><td>576</td></tr>
<tr><td>29</td><td>577</td></tr>
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<tr><td></td><td></td><td><table>
<tr><td></td><td></td><td></td><td>15</td><td>578</td></tr>
<tr><td></td><td></td><td></td><td>74</td><td>567, 566</td></tr>
<tr><td></td><td></td><td></td><td>29</td><td>565</td></tr>
</table></td></tr>
<tr><td></td><td>Village</td><td>Bishunpur</td></tr>
<tr><td></td><td>Block</td><td>Ekangarsarai</td></tr>
<tr><td></td><td>District</td><td>Nalanda</td></tr>
<tr><td></td><td>State</td><td>Bihar</td></tr>
<tr><td>3.</td><td>Geographical Coordinates Latitude and Longitude of</td><td>Nalanda Lokain – 02, Lokain Sand Ghat No -05: -
<table>
<tr><th>Sl. No</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>1</td><td>25°10'29.77"N</td><td>85° 10'17.09"E</td></tr>
<tr><td>2</td><td>25°10'28.16"N</td><td>85° 10'19.94"E</td></tr>
<tr><td>3</td><td>25°10'58.80"N</td><td>85° 10'24.08"E</td></tr>
<tr><td>4</td><td>25°10'57.11"N</td><td>85° 10'20.59"E</td></tr>
</table></td></tr>
<tr><td>4.</td><td>Toposheet (OSM) No.</td><td>G45N3, G45N7, G45N4, G45N8</td></tr>
<tr><td>5.</td><td colspan="2">Lease Area Details</td></tr>
<tr><td></td><td>Lease Area</td><td>10.0 Ha.</td></tr>
<tr><td></td><td>Type of Land</td><td>River bed of Lokain</td></tr>
<tr><td></td><td>Topography</td><td>Undulated (Riverbed)</td></tr>
<tr><td></td><td>Site Elevation Range</td><td>87.35 m to 87.1 m</td></tr>
<tr><td>6.</td><td>Cost Details</td><td></td></tr>
<tr><td></td><td>Cost of the project</td><td>Rs. 65 lakhs. (Including Auction Cost)</td></tr>
<tr><td></td><td>Cost for EMP</td><td>3.5 Lakh (Capital Cost) & 8.94 Lakhs (Recurring Cost)</td></tr>
<tr><td>7.</td><td colspan="2">Environmental Settings of the area</td></tr>
<tr><td></td><td>Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius</td><td>There is no any Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius.</td></tr>
<tr><td></td><td>Nearest Town/ Major City with population</td><td>Bihar Sharif, Approx. 34.75 km towards ENE.</td></tr>
</table>

	Nearest Railway Station	Islampur Railway Station, approx. 6.15 Km towards SE.
	Nearest National/State Highway	SH-04, Approx. 4.15 Km towards East. SH-71, Approx. 2.5 Km towards South.
	Nearest Airport	Jayprakash Narayan International Airport, approx. 46.45 Km towards NNW.
	Nearest Post Office	Murgaon Post Office, Approx, 2.23 Km towards SSW. Dariyapur Post Office, Approx, 3.9 Km towards ESE.
	Medical Facilities	Govt. Primary Hospital, Kajichak, Approx. 4.7 Km towards NE. Bharthu Govt. Hospital, Approx 3.6 Km towards West.
	Education Facilities	Tejpur Middle School, Approx 0.97 Km towards SW. Government School, Barhauna Approx 0.40 Km towards West.
	Ecological Sensitive Area	There is no Ecological Sensitive Area within 10 Km radius from project site.
	Archaeological sites	There is no Archaeological sites within 10 km radius from project site.
	Seismic Zone	Zone IV (IS 1893: 2002)
	Water Body	Lokain River (Riverbed)

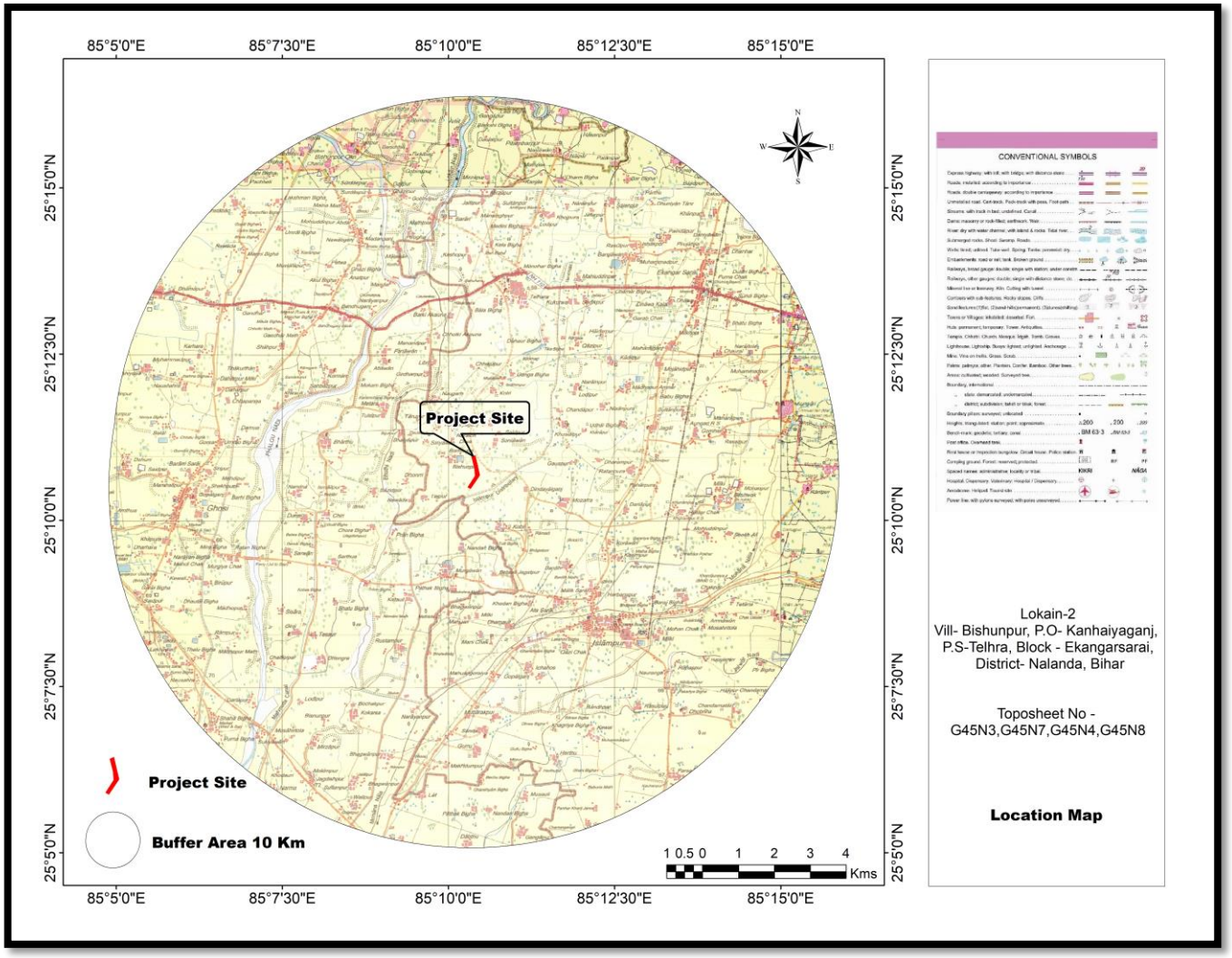


Figure 1-2: Toposheet map

1.6 Scope of Study

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

1.7 Preparation of EIA

The EIA includes the following details:

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

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

- Topography and drainage,
- Climate,
- Water quality (Surface/Ground),
- Hydro-geological Regime,
- Air quality,
- Noise Levels,
- Soil Quality,
- Flora and Fauna,
- Traffic density survey,
- Land-Use,
- Socio-Economic Conditions,
- Habitat,
- Health, culture, human environment including public health, occupational health and safety
- Sensitive Places/Historical Monuments.

This EIA Report is prepared in accordance with has been divided into twelve chapters (in addition to Executive Summary) as briefed hereunder:

Chapter 1 – Introduction

The chapter provides description of project background, site and surroundings, objectives, scope and organization of the study and format of this report as well as Point Wise Term of Reference reply (TOR) Replies.

Chapter 2 – Project Description

This chapter provides information on project and capacity; need for the project; location; size or magnitude of operation; technology and process description; maps showing project layout, component of projects etc.

Chapter 3– Description of the Environment

This chapter deals with the methodology and findings of field studies undertaken with respect to ambient air, meteorology, water, soils, noise levels, ecology to define the various existing environmental status in the area of the project. This also deals with the infrastructural development as a part of project and sources of pollution from the proposed mining project.

Chapter 4 – Anticipated Environmental Impacts and Mitigation Measures

In this chapter, the potential impacts of the proposed mining and allied activities, which could cause significant environmental concerns, are identified and discussed. This discussion will form the basis for environmental management activities.

Chapter 5 – Analysis of Alternatives (Technology and Site)

This chapter will include alternatives to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options, if any.

Chapter 6 – Environmental Monitoring Program

This chapter will include ascertaining the environmental impacts; state of pollution within the mine lease and in its vicinity; planning for predictive or corrective actions in respect of pollution to keep it within permissible limits.

Chapter 7 – Additional Studies

This chapter will include outcomes of public consultation, risk assessment, social impact assessment, R&R action plan, biodiversity conservation plan, watershed management etc which will be studied in surrounding of the project area.

Chapter 8 – Project Benefits

This chapter deals with improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits due to proposed project activity.

Chapter 9: Environmental Cost Benefit Analysis - This chapter includes Project Cost, cost of pollution control facilities and project implementation schedule.

Chapter 10 – Environmental Management Plan

This chapter will include the description of administrative aspects of ensuring that the mitigation measures suggested are implemented and their effectiveness is monitored, after approval of the EIA.

Chapter 11 – Summary

This will constitute the summary of EIA Report.

Chapter 12 – Disclosure of Consultant

This will include the names of the consultants engaged in preparation of EIA and nature of consultancy rendered.

1.8 Laws Applicable to This Project

The Acts, Notifications, Rules and Amendments applicable for setting up a new mining industry or its expansion of an existing mine and for operation of a mine include the following:

- EIA Notification, 2006 under EPA Act, 1986.
- Bihar Sand Mining Policy-2019 as amended and Bihar Minerals (Concession, Prevention of Illegal Mining, Transportation & Storage) Rules, 2019 (as amended in 2021
- The Mines and Mineral (Development and Regulation) Act, 1957.
- The Mines Act, 1952.
- Mines Rules, 1955.
- Mineral Concession Rules, 1960.
- Mineral Conservation and Development Rules, 1968
- The Water (Prevention & Control of Pollution) Acts1974/ Rules1975
- The Air (Prevention & Control of Pollution) Acts 1981/ Rules1982
- The Environment (Protection) Acts1986/Rules 1986
- The Factory Act 1948 (as amended till 1987) & Bihar Factory Rules, 1950
- Contract Labor (Regulation & Abolition) Act 1970 & Its Central Rule 1971
- The Central Motor Vehicle Rules 1989(Under Motor Vehicle Act 1988)
- The Workmen's Compensation Act 1923 as amended up to 2000/ Rule 1924, 1935, 1991 & 1996.
- Enforcement & Monitoring Guidelines for Sand Mining, 2020
- Sustainable Sand Mining Management Guideline, 2016

1.9 Term of Reference (Tor)

The project proposal was submitted to State Level Environment Impact Assessment Authority-Bihar for its appraisal. ToR of proposed Sand mining project has been issued by SEIAA, Bihar vide File no- SIA/1(a)/2441/2023 dated 14-06-2023. The compliance of ToR is described below.

Table 1-3: Point Wise Compliance for ToR

Sr. No.	TOR	Compliance
1	Year-vise production details since 1994 should be given, clearly stating the highest Production achieved in any one year prior to 1994. lt 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 the new auctioned sand mining Ghat project. LOI details Attached as **annexure I** The operation will be started after obtaining 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 its consent to grant mining lease to the proponents. Copy of LOI are enclosed as **Annexure No. I**
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	The documents including mine plan and EIA being submitted are compatible with one another **Mine Lease area-** Nalanda Lokain – 02, Lokain Sand Ghat No -05 – 10.0 Ha. **Production Capacity:** 60000 Cum per year or 124800 TPA. No mines waste will be generated as whole mined material is saleable. Approx. **1.65 Kg/day** amount of Solid waste will be generated on the project site. The waste will be managed as per the Solid Waste Management Rules 2016. Separate bins will be provided near mine site. Mining Method-Opencast semi-mechanized. **Refer Chapter-2** for all above information's.

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 Map has been incorporated in EIA/EMP Report **Refer Chapter-2, Figure no-2-3** The land-use of the study area with proper demarcated features is enclosed with the report, **Refer Chapter-3, section-3.6**
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.	Land Use pattern & land use map is given in **chapter 3**, **section-3.6, Figure No. 3-13.**
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The proposed land is a dry bed of river. The mining process will be done land use policy of the State & there is 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?	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the EIA report., **Refer Chapter-10,**

	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.	
8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Please refer to **Chapter 7** of EIA report
9	The study area will comprise of l0 km zone around the mine lease from lease periphery and the data contained in the EIA	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report. No waste will be generated except small amount of municipal solid waste, which will be managed as per law.

		All the details in the EIA report are for the life of the mine period. **Refer Chapter-2.**
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report. The study area lies in Lokain River. No National parks or WLS is found within 10 km study area, **Refer Chapter-3. Section 3.11.**
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use R&R issues, if any, should be given.	There is no overburden generated from this mining activity.
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	There is no forest land within the lease area.

	Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	
13	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and Compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	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 reorganization 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.	No RF/PF is present within the 10 km radius of the lease area. However, the vegetation details of the study area is incorporated with the report, Refer **Chapter-3, section 3.11**
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	The details Impacts & their mitigation measures are given in **chapter 4** of EIA/EMP Report.

	mitigative measures required, should be worked out with cost implications and submitted.	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed), if any, within l0 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There is no any National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsarsite Tiger / Elephant Reserves are present within 10 km study area. Topomap on Survey of India topo sheet has been incorporated in EIA/EMP report. **Refer Chapter-1, Fig- 1-2**
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	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease for flora fauna, endangered & endemic species has been incorporated in the EIA/EMP report. **Refer Chapter-3, Section-3.11**

	budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be Made as part of the project cost.	
19	Proximity to areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations) should also be indicated and where to required, clearance certifications from the 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.	This project is not coming in critically polluted area.
20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal 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)	This is not applicable.
21	R&R Plan/compensation details for the Project Affected People (PAP)	This is a River Bed Mining Project.

	should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation &Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	There are no inhabited areas in the allotted mine area which lies on the Lokain River, therefore no R&R Plan is proposed.
22	One 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	Baseline study was carried out for Summer Season from 1st March 2023 to 31st May 2023. Details are provided in **Chapter-3** of EIA report. The locations of the monitoring stations were decided on the basis of prevailing micro - 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.

	keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	**Refer Chapter- 3 & 4**
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.	Air quality modeling has been carried out for prediction of impact of the project on the air quality of the area. Air Modeling has been carried out for tracking impact of air pollutant due to mining activity as well as Transportation activity. Details of Air modeling is given in **chapter 4 section 4.4.1**
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 5.41 KLD out of which 5.0 KLD for dust suppression and 0.11 KLD for use for domestic purpose and 0.3 KLD for plantation. Water requirement will be fulfilled by private water tanker A detailed water balance is being provided in the report. **Refer Chapter-2, Table-2.6**

25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Water requirement will be fulfilled by private water tanker. So, no clearance is required.
26	Description of water conservation measures proposed to be adopted in the Project should be given.	The project does not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project in lease area.
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	No groundwater will be intersected during mining activity. Please refer to section **10.5 of Chapter 10 of EIA**

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 Lokain river. No diversion is proposed.
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The Elevation of the applied area is 87.35 ASML to 87.1 ASML in the stretch. Mining will be up to 1 m below ground level or above the ground water table whichever comes first.
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and 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 indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Plantation/afforestation will be done as per program i.e. along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of plants selected for green belt development if incorporated in **Chapter-4. Section-4.6 under Table-4.5**

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.	Trucks/ Tractor will be used for carrying the minerals per day from all the sand ghats. The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report. **Refer Chapter-3 under section 3.13**
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipment's, etc. Details are given in the EIA/EMP Report. **Refer Chapter-2.**
34	Conceptual post mining land use and Reclamation and Restoration of mined out area (with plans and with adequate number of sections) should be given in the EIA report.	**Refer to 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	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-10.**

	the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Each labour will undergo pre-placement medical examination. Thereafter periodical heath checkup will be arranged as stated in the report. **Refer Chapter-10, Table-10-2** for budgetary allocation.
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	The proposed project being a small scale semi-mechanized mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in **Chapter-10.** However protective equipments will be provided & health camps & awareness programs will be arranged for them. Details are given in report. **Refer Chapter-10.**
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, **Refer. Chapter-10, Section- 10.8**
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. **Refer Chapter-10.**

<table>
<tr><td>39</td><td>Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.</td><td>This is drat EIA report, Public hearing yet to be conduct.

The PH Proceeding along with details will be submitted with Final EIA Report.</td></tr>
<tr><td>40</td><td>Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.</td><td>No litigation is pending against the project.</td></tr>
<tr><td>41</td><td>The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.</td><td>The capital cost of 3.5 Lakhs for capital and 8.94 Lakhs recurring cost has been earmarked for EMP. Refer, Chapter-10. Table-10.3

<table><tr><th>Name of Ghat</th><th>Capital Cost(Lakh)</th><th>Recurring Cost (Lakh)</th></tr><tr><td>Nalanda Lokain – 02, Lokain Sand Ghat No -05</td><td>3.5</td><td>8.94</td></tr></table></td></tr>
<tr><td>42</td><td>A Disaster management Plan shall be prepared and included in the EIA/EMP Report.</td><td>A Disaster Management Plan has been given in EIA report. Refer Chapter-7, Section 7.7</td></tr>
<tr><td>43</td><td>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.</td><td>Benefits of the project is discussed in detail under Chapter -8

As per MoEFCC OM dated 30th Sept., 2020 adequate funds shall be earmarked as per the commitments made by project proponent and requirements to address the issues raised during the public hearing in lieu of corporate Environment Responsibility (CER) and this will be covered under EMP. Detailed action plan for the activities along with the budgetary allocation will be incorporated in this EIA/EMP Report upon completion of public hearing.</td></tr>
</table>

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 numbering.	All documents is properly referenced with index and continuous page numbering.
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.	Complied 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.	Details of testing reports of air, water, soil & noise have been enclosed in EIA report. **Refer Chapter-3.**
d)	Where the document provided are in language other than English , an English translation should be provided	Executive Summary and Hindi Executive Summary is attached as **Annexure VI & VII.**
e)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	The Questionnaire will be submitted along with Final EIA Report.
f)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J/11013/41/2006/- IAII (I) dated 4th August, 2009, which are available on the website of this ministry should be followed.	All the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J/11013/41/2006/- IAII (I) dated 4th August, 2009 are being followed.

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 then revised documentation.	Agreed & Complied.
h)	As per the circular no. J-l 1011/618/20l0-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.	The EC points will be complied after grant of EC.
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 dumps, if any, clearly	Surface plan cum geological section, geological is given in **Chapter 2, Figure No. 2-4 & Figure 2-5.**

	showing the land features of the adjoining area.	
	Additional Specific Conditions	
1	Submit a report based on cumulative assessment of increase in air pollutants due to increase in traffic load in view of proposed mining activities on all the roads located within aerial distance of 10 km using suitable air model.	Cumulative assessment of increase in air pollutants due to increase in traffic load in view of proposed mining activities on all the roads located within aerial distance of 10 km using suitable air model has been done. **Please refer to chapter 4.**
2	If the proposed mining lease is overlapping with the previously allotted mining lease or already working or worked out mining lease, the same must be clearly shown (on the map). The details about quantity of sand extracted from overlapped area should also be furnished duly certified from the concerned District Mining Officer.	The Mining Ghat is proposed as per the approved DSR.
3	The Satellite imageries (high resolution) of last three years in succession for summer, rainy and winter seasons of each proposed mining lease shall be submitted. A map on appropriate scale be submitted to show extraction paths to be used outside the mining lease boundary to approach major public roads (Rural/District road or State/National Highway).	Google Image of is shown in **Figure No. 2-1 of Chapter 2**. The Satellite imageries of last three years is attached in **Annexure IV.**

4	Alternative route shall be explored if extraction path is passing through dense population / human settlements.	Map showing extraction path to be used outside the mining lease area to approach major public roads is attached as **Figure 3-27 chapter 3.**
5	A Cumulative traffic management plan for cluster sand mining proposal must be submitted.	**Please refer to Chapter 3 under section 3-.13 & chapter 4 under section 4.10**
6	A map of the area falling within 2.5 km radius from boundary of each mining lease showing all man-made public utility features such as bridge/public civil structure (including water intake points), culverts etc. and highways, and a table showing distance of the above mentioned man-made features from the mining lease boundary to facilitate decision making pertaining to relevant rules / Guidelines be submitted.	A map of the area falling within 2.5 km radius from boundary of each mining lease showing all man-made public utility features such as bridge/public civil structure (including water intake points), culverts etc. and highways is attached in **Annexure V**
7	A report of the cumulative EIA / EMP study for the cluster sand mining blocks of the proposed mining site.	This is not the cluster mine lease.

2 PROJECT DESCRIPTION

2.1 General

This chapter gives broad description of the project, location, type of ore deposit(s), quality of reserve, Mining Methodology, various site utilities and infrastructure, etc. The downstream use of mineral for value addition and its importance is also described.

2.2 Type of the Project

The project is proposed for mining of "Sand" from the allotted mine lease area on River Lokain. It is an opencast Semi mechanized mining project. Pappu Kumar, S/o- Chaitu Rai, Vill- Daudpur, Ward No -3, P.O – Daudpur, P.S- Shapur, District - Patna-801502 is the project proponent who is seeking prior environmental clearance for the proposed project.

The proposed project planning needs "Environmental Clearance" from the MoEF & CC, as per the EIA Notification, 2006. The Proposed Sand Mining Project of Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River, Area: 10.0 Hectares is classified under Category B-1 as 1(a) "Mining of minerals" due to Mining lease area is more than 5.0 Ha as per honorable NGT order and as per OM dated 12.12.2018.

2.3 Need for the Project

Sand is used in almost any type of construction activity. It is also the most important input in Domestic activity. Further, the material can also be used for nonindustrial purposes. Thus, in Current times, where the focus of the governments is on improvement of basic infrastructure like roads, railways, dams and other social infrastructure – both in rural and urban areas, there is a constant need for ensuring regular supply of these minor minerals.

2.4 Description of the Project

The Proposed Sand Mining Project Nalanda Lokain – 02, Lokain Sand Ghat No -05 is located at Khata No.- 60, 71, 81, 93, 83, 93, 56, 83, 81, 43, 39, 95, 93, 95, 94, 53, 94, 53, 94, 63, 24, 29, 94, 48, 80, 79, 29, 74, 23, 25, 63, 55, 12, 33, 55, 29, 15, 74, 29, Khasra No. 307, 297, 298, 601, 299, 602, 300, 301, 302, 303, 304, 305, 306, 600, 599, 598, 597, 596, 595, 594, 593, 538, 549, 537, 548, 547, 539, 540, 541, 542, 543, 569, 545, 570, 571, 568, 572, 573, 574, 575, 576, 577, 578, 567, 566, 565, in Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar, for production capacity of **60000 Cum per Year or**

124800 TPA over an area of 10.0 Hectare or 24.27 Acre.

Table 2-1: Location Details

River Name	Name of the Ghat	Area (Ha)	Khata No.	Khasra No.	Village
Lokain	Nalanda Lokain-02, Lokain Sand Ghat No.-05	10.0	60	307	Bishunpur
			71	297	
			81	298	
			93	601	
			83	299	
			93	602	
			56	300	
			83	301	
			81	302	
			43	303	
			39	304	
			95	305	
			93	306, 600, 599, 598, 597, 596, 595, 594, 593	
			95	538	
			94	549	
			53	537	
			94	548	
			63	547	
			24	539	
			29	540	
			94	541	
			48	542	
			80	543	
			79	569	
			29	545	
			74	570	
			23	571	
			25	568	
			63	572	
			55	573	
			12	574	
			33	575	
			55	576	
			29	577	
			15	578	
			74	567, 566	
			29	565	

2.4.1 Location Details

Table 2-2: Location of the Project

<table>
<tr><td>Location</td><td>Nalanda Lokain – 01, Lokain Sand Ghat No -04: -
<table><tr><th>Sl. No</th><th>Latitude</th><th>Longitude</th></tr><tr><td>1</td><td>25°9'57.90"N</td><td>85° 10'58.00"E</td></tr><tr><td>2</td><td>25°9'56.15"N</td><td>85° 11'5.51"E</td></tr><tr><td>3</td><td>25°10'10.24"N</td><td>85° 11'7.41"E</td></tr><tr><td>4</td><td>25°10'12.12"N</td><td>85° 10'59.64"E</td></tr></table>
Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Vill- Bishunpur, P.O-Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar</td></tr>
<tr><td>Toposheet Number</td><td>G45N3, G45N7, G45N4, G45N8.</td></tr>
<tr><td>Nearest Settlements</td><td>Barhauna, Approx. 0.51 Km towards West.
Kobil, Approx. 1.28 Km towards SE.</td></tr>
<tr><td>Nearest Highway</td><td>SH-04, Approx. 4.15 Km towards East.
SH-71, Approx. 2.5 Km towards South.</td></tr>
<tr><td>Nearest Railway Station</td><td>Islampur Railway Station, approx. 6.15 Km towards SE.</td></tr>
<tr><td>Nearest Airport</td><td>Jayprakash Narayan International Airport, approx. 46.45 Km towards NNW.</td></tr>
<tr><td>Nearest River</td><td>Lokain River</td></tr>
</table>

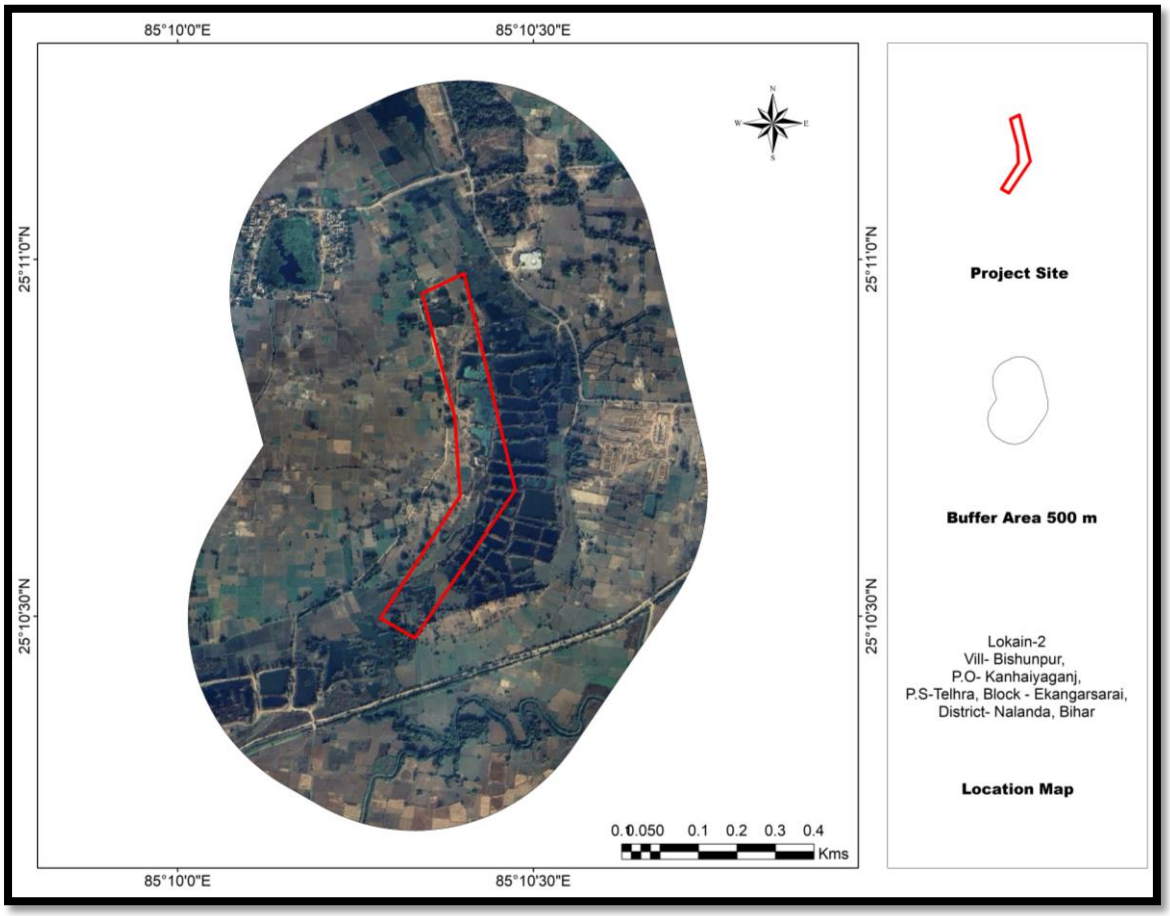


Figure 2-1: 500 m Buffer Google Map

The location map and pillar co-ordinate maps of the project site is given below:

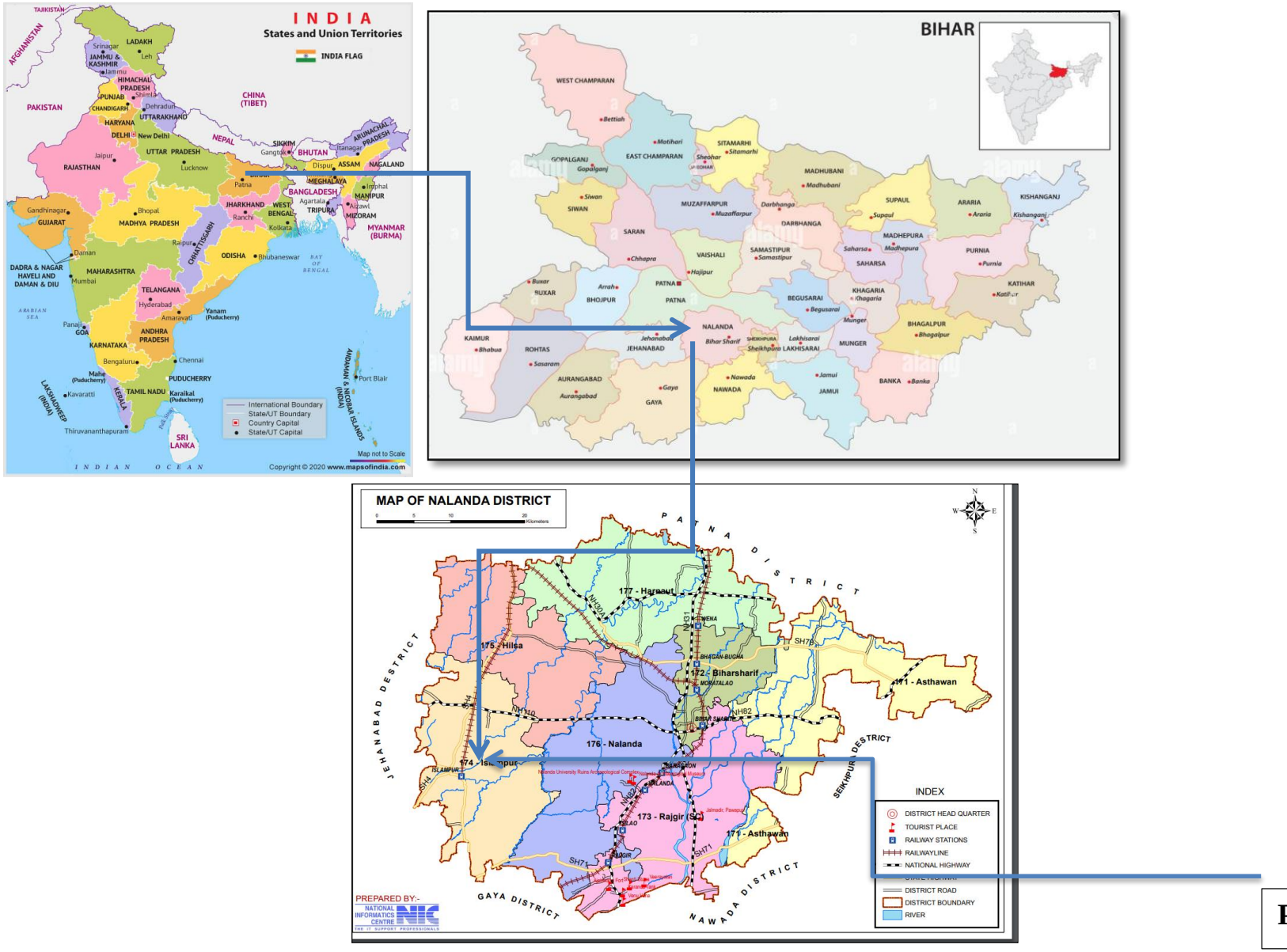


Figure 2-2: Location Map of the Project Site

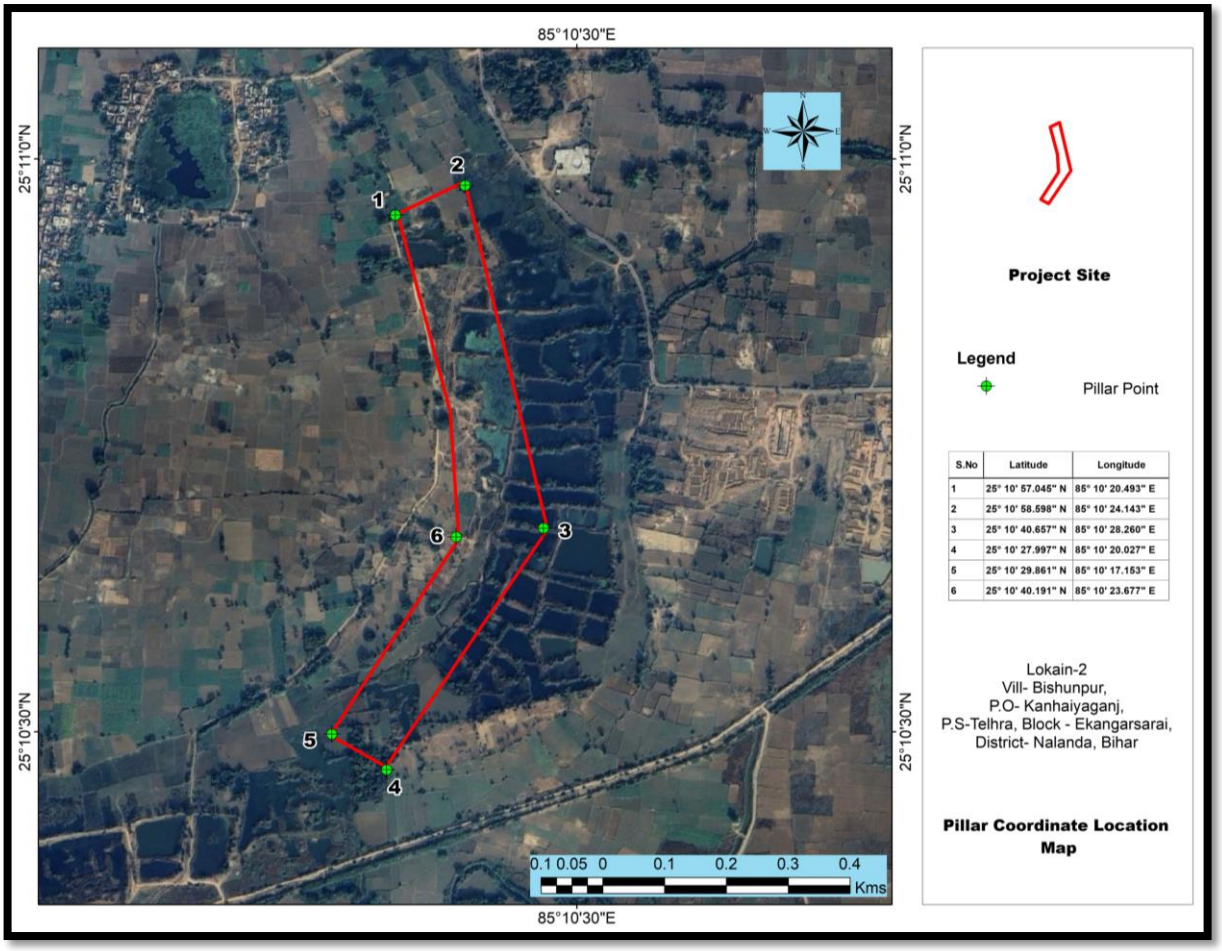


Figure 2-3: Pillar co-ordinate map of the Project Site

2.5 Available Reserves and Production

2.5.1 Geological Reserves

The geological reserve of the sand has been estimated keeping the river water level as ultimate Pit Level where the mining for sand shall cease. Considering 7.5 meter of safety zone all along the lease boundary, effective area for resource calculations has been done. Resources are falling in measured (331) category while, pit slope resources are considered as 221 categories and are termed as blocked resources. After deductions of the blocked resources, remaining resources are considered as mineable and is categorized as 211 as per UNFC because the feasibility and economic axis are already analyzed prior to auction.

2.5.2 Local Geology

The area is dominated by medium to fine sand geologically. The area comprising of Terrace alluvium deposited in depositional terraces of old rivers & contain cyclic sequence of fine to course grained sand. It is angular to sub angular and the angularity of the grains of this category of sand decreases with depth. The Litho unit shown on the geological map of the leased out area have been plotted on the basis of physical characteristics observed in the field. Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the riverbanks. Soil/alluvium varying in thickness from 0.20m to 0.60 m constitutes the top horizons in the area suitable for agriculture. River Sakri, Panchane, Mohana, Lokain, Jirain, Paimar, Soiwa, through the area exposing the alluvium and soil at the banks. Sand is found in the river bed upto a depth of more than 5.0 m.

(Source: As per Approved DSR, Nalanda)

River bed sand mining shall be restricted within the central 3/4th width of the river/rivulet or 7.5 meters (inward) from river banks but up to 10% of the width of the river. Mandatory distance to be left from both banks of river channel is kept in mind while deriving the mineable reserves from the geological reserves.

Table 2-3: Geological and Minable Reserve Estimation

S. No.	Particulars	Details
1.	Name of Sand Ghat	Nalanda Lokain – 02, Lokain Sand Ghat No -05
2.	Total ML Area in Hectare	10.0
3.	Average Depth (m)	1
4.	Sp. gr. of sand	2.08
5.	Geological reserves of sand cu. m per annum	100000
6.	Geological reserves (tonnes per annum)	208000
7.	Mineable reserves c.u.m per annum	60000
8.	Mineable Reserves (tonnes per annum)	124800

2.5.3 Targeted Production

Year wise sand reserve according to EMGSM guideline is given below. The targeted production is 60000 cum per year.

Serial Year	Production in Cum per Annum	Production in Tonnes Annum
Year-1	60000	124800
Year-2	60000	124800
Year-3	60000	124800
Year-4	60000	124800
Year-5	60000	124800
Total	**300000**	**624000**

2.5.4 Life of Mine

It is presumed that the mineral will be replenished every year during the rainy season. New mineral will be added every year in the river bed. The present reserves are sufficient for the proposed rate of production.

Source: Approved Mine Plan

2.6 Mine Drainage

During the course of mining, the water table in the river shall not be intercepted. The mining shall be restricted to the top 1 m from the general ground level.

Ground water shall not be intercepted during the mining of sand. In view of it, dewatering of sand pits shall not be required or discharged elsewhere.

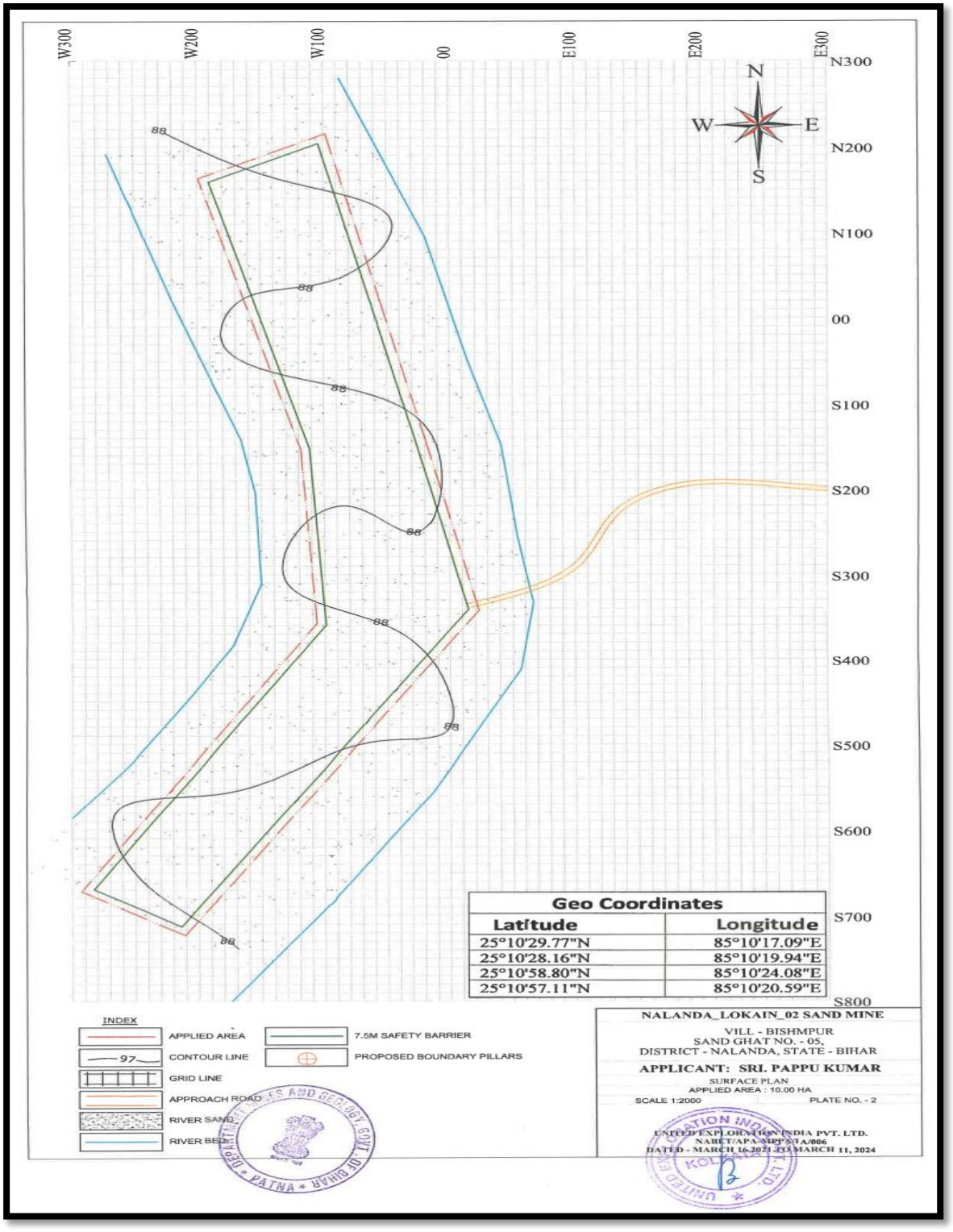


Figure 2-4: Surface Plan of Nalanda Lokain – 02, Lokain Sand Ghat No -05

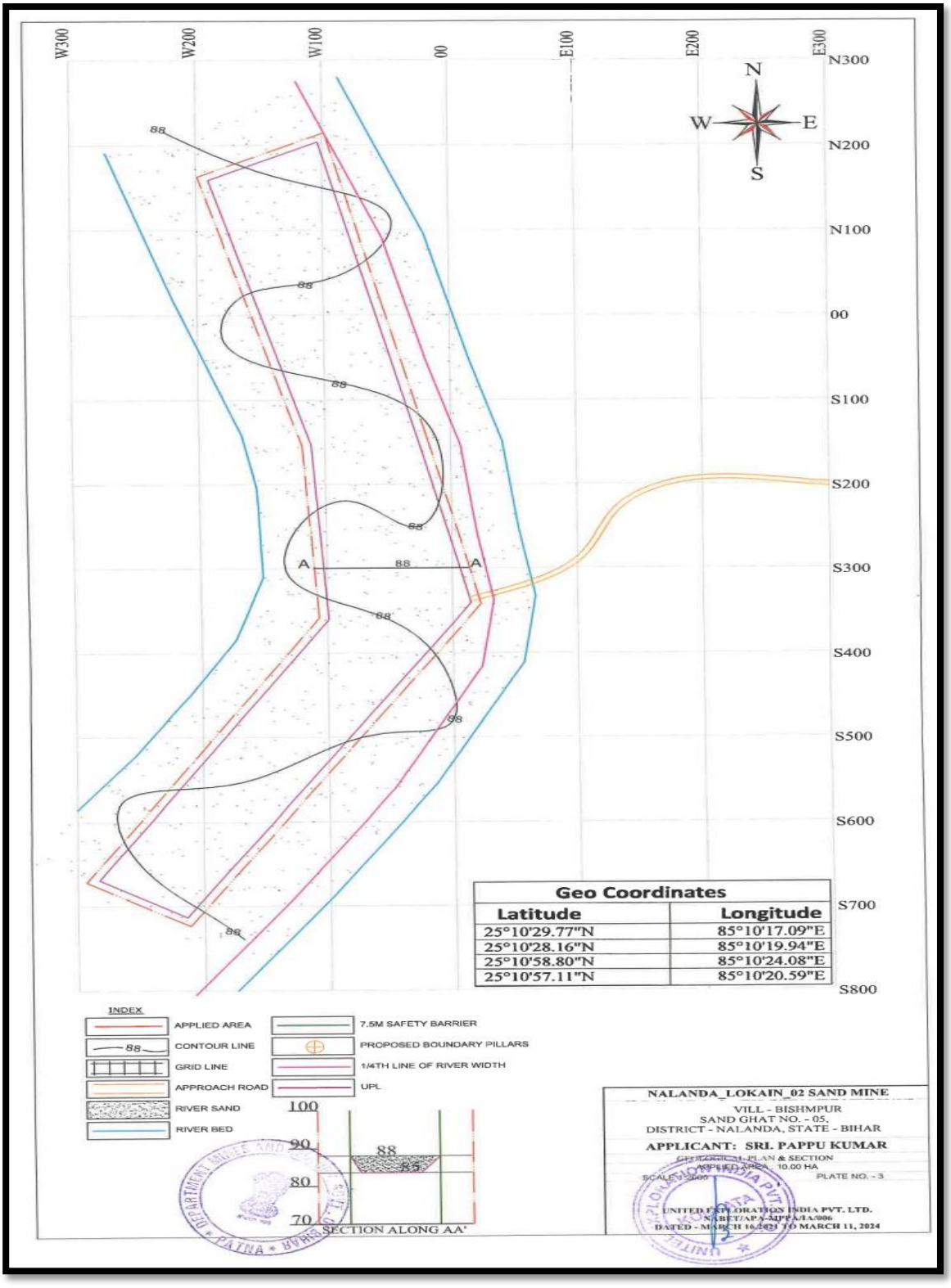


Figure 2-5: Geological Section of Nalanda Lokain – 02, Lokain Sand Ghat No -05

2.7 Method Mining

2.7.1 Proposed Mining Method –Semi Mechanized Mining.

1. The mining for the entire stretch of proposed sand ghats of river Lokain, using Semi-Mechanized Method comprising use of crawler mounted JCB / Poclain back hoe (bucket capacity varying between 0.42 m^3 to 1.2 m^3 depending upon the quantity of sand reserves) for primary excavation/winning and loading of sand, and JCB loader for secondary loading of sand on the river banks. Trucks or tippers of 12 metric tonne capacity and requisite manpower shall be put to use to support the operating machinery.
2. The mining lease area shall be demarcated and pillars of appropriate material shall be erected at reasonable distance to identify the same. The distance of 7.5 m shall be further marked from the lease boundary and this zone constituting the 'safety zone' shall be identified.
3. The excavated sand shall be sieved at pit head to remove the silt load washed in. It shall be used in making river bank embankment to raise the bank height. This shall prevent flooding of adjoining areas.
4. The sand only fraction shall be loaded primarily at the pit head and unloaded at the secondary loading point/location on the river bank.
5. At the secondary loading point requisite, no of JCB loaders shall be deployed as given in Table to follow. The secondary loading operations shall be day and night in order to meet the demands.
6. No mining activities shall be undertaken within this 'safety zone'. This shall be in accordance of Metalliferous Mines Regulations 1961 (MMR-1961) vide Chapter-XI sr.no. 111 and section 3[(2)].
7. The sand shall be mined out in successive vertical benches/slices from top of ground surface or sand surface downwards, and shall be 1.0 meter thick.
8. At no point of time the vertical mine face shall be more than 1.0 m high. Further, the width of the bench shall be minimum 1.5 m in width in horizontal plane in accordance with the MMR-1961 sub rules. This shall prevent development of mine face more than 1.0 m high which may be cause of concern from the safety aspects. This is important to prevent machine operators/ workers from falling into the pit while working near the machinery.
9. The mining operations shall be performed between sunrise to sun set hours.

10. The use of semi mechanized mining shall require use of electricity to illuminate the working area and accordingly electricity shall be tapped after grant of due approval/ permission from competent authorities concerned.

2.7.2 Conceptual Plan of Mining

The lease period for Five years from the date of execution. Considering individual sand deposits and restricting the mining to top 1 m from the present ground surface, the sand deposit shall be worked upon up to a depth of 1 m. The mining shall cease at a depth of 1 m.

The mineralized zone or the sand zone in particular of the river does not follow any specific trend. It occurs as lensoid body. The relative occurrence of ground surface with the sand zone thickness varies from place to place and depends upon factors such as stream/river flow characteristics, geometry of the river banks, sediment load, rate of water flow, rainfall and surface run off characteristics etc. However, due to UNFC guidelines on reserve estimation, sand reserves have been considered too few meters below the minable depth of 1 m.

In view of this, it is not possible to prepare a conceptual plan due to lack of specific spatial trend of the sand zone.

2.7.3 Machinery Requirement

This is a new mining contract. Following equipment's are proposed to be deployed for the desired production.

Table 2-4: List of Machinery

S. L. No.	Name of Machinery	Capacity (Cum) / Ton	Max. Nos.	Fuel Consumptions (Lit Per Hour)	Fuel Consumption in day (Liters)
1	JCB/ Shovel	1.2	1	12	120
2	Trucks Tippers	12	3	7.0	210
3	Water Sprinklers	4	1	4	40
4	Light vehicles	-	1	3	30
5	Tractor	4	2	2.5	50
			TOTAL		**450**

2.8 Transportation of Minerals

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

2.9 Stacking of Mineral Rejects and Disposal of Waste

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

The sand deposits inherit gravels, pebbles with them being a part and parcel of river system. During the field visit and information gathered during discussions with concerned people, 5% of the geological reserves occurring in the sand ghats are provided for these inclusions and accordingly these have been considered during the minable sand reserves.

2.9.1 Disposal of Waste (Reject) materials Silt

The proposed project is the mining of sand from dry part of riverbed, all the excavated material will be saleable, therefore no mines reject will be generated. Some amount of silt may generate will be used in haul road development.

2.10 Use of Mineral

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

(Source: Approved Mine Plan)

2.11 Utilities and Proposed Site Facilities

2.11.1 Manpower

Total manpower required for the project will be **11** Workers. Break up of manpower requirement is given below.

Table 2-5: Manpower Details

Sl No.	Category	No. of Shift	Absenteeism	Total Manpower

1	Transport Manager	1	10%	1
2	Supervisor	1	10%	1
3	Time Office	1	10%	1
4	Others	1	-	7
5	Operators	1	10%	1
Total				**11**

2.11.2 Water Requirement

The total water requirement will be **5.41 KLD**. This water will be supplied by private tankers. Drinking water will be made available at site by the private tankers.

The details of Water uses are given below:

Table 2-6: Water Requirement

Activity	Water requirement (KLD)
Dust suppression	5.0
Domestic	0.11
Green Belt Development	0.3
Total	**5.41**

2.11.3 Power

The material will be excavated by open cast semi method and loaded directly into tractors by the workers themselves. The operation will be done only from sun rise to sun set. So there is no power requirement for the mining activity.

2.12 Infrastructure and Site Facilities

Infrastructure facilities like site office, first aid station, rest shelter, potable drinking water facility etc. will be established within the mine area. The following infrastructure facilities will be made available for the workers.

a. First Aid Facility

A first aid facility will be made available at site with proper equipment will be maintained as per Mines Act and Mine Rules at the mine site office. First aid -box with all necessary facilities will be maintained and provided.

b. Temporary rest shelter

The Temporary rest shelter for the workers working in the mine and also to provide tea etc. as the laborers will come from nearby villages at day time only.

c. Washroom

The mobile toilet along with Mobile STP will be provided for sanitation purposes to the laborers nearby the site.

2.13 Sources of Pollution and Control Measures

a) Air Pollution

There will be impact on air up to a certain limit due to dust generation during loading operation, transportation of Sand. Similarly, due to mining operation noise pollution will be there, due to movement of transportation vehicles. However effective measures shall be taken to maintain the pollution limit within prescribed CPCB guidelines.

- ✓ Water sprinkling will be done on the haul roads twice in a day.
- ✓ Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- ✓ Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
- ✓ Deploying PUC certified vehicles to reduce their emissions.
- ✓ Plantation will be done on both sides of the road.

b) Noise Pollution

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.

- ✓ Proper maintenance of vehicles will be done to minimize the noise pollution. Pollution under Control certificates will be maintained for the trucks.
- ✓ Unnecessary Blowing of horn will be avoided.

c) Solid Waste

Solid waste will be generated on the project site approx. **1.65 Kg/day**. The waste will be managed as per the Solid Waste Management Rules 2016.

d) Green Belt Development

Total of **100** trees will be planted with various types of species. Details of greenbelt development along with number of plants is given below:

Table 2-7: Details of greenbelt development

Sl. No.	River Name	Name of Ghats	Mining Area in Ha	No. of Saplings@10/Ha.
1	Lokain	Nalanda Lokain – 02, Lokain Sand Ghat No -05	10.0	100
Total			**10.0**	**100**

2.14 Project Cost

The project proponent will incur a total cost of Rs. **65.0 Lakhs s**and may vary from place to place and with magnitude of the sand mining. This will include cost of labour, cost of transportation, fuel charges etc.

Table 2-8: Breakup of Proposed Project Cost

S. No.	Description	Cost in Lakh
1	Auction cost	65/-
2	Cost of Labour & Equipment	10.0 /-
3	Miscellaneous	1.0/-
TOTAL		**65.0**
EMP Budget		3.5
Grand Total		**68.5**

3 DESCRIPTION OF ENVIRONMENT

3.1 General

Sand is site specific mineral, which occurs mostly along the river beds and flood plain. Mining activities invariably affect the existing environmental status of the site. It has it's own pros and cons and in order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components.

3.2 Study area

The study area is divided into core and buffer zone in view of scientific study. The core zone is the lease area of the mining site and from the boundary of the lease area up to 10 km radius is called buffer zone. The study of the proposed project was undertaken for assessing the base line status of Environmental Parameters like Land, Air, Water (both ground and surface), Soil, Noise and Biological (both flora and fauna) and socio-economic status.

Baseline data has been collected out during the Summer Season **1st March 2023 to 31st May 2023** by ENVIRO-TECH SERVICES. NABL & MOEF accredited Lab. Correspondence address & Lab: -Plot No. 1/32, South Side G.T. Road Industrial Area Ghaziabad (UP)-201001. Head Office: - G-232, M.G. Road Industrial Area, Harpur -Ghaziabad (UP)-201015, in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Team of Experts visited the study area for Social & Biological Environment study. The following data, through field survey and other sources, has been collected by ENVIRO-TECH SERVICES, for preparing the EIA/EMP for the proposed mining area with related facilities.

- Physical environment (Air, Water, Soil and Noise) baseline data.
- Relevant meteorological data, for previous decades from Indian Meteorological Department (IMD) and primary data.
- Identification of water bodies, hills, roads etc. within 10 Km radius.
- Eco-sensitive places, sanctuaries, biosphere reserves within 10 Km radius.
- Religious places / historical monuments and tourist places within 10 Km radius.
- Study of present environmental protection and mitigation measures in nearby operating similar projects, if any.

3.3 Geological Profile of the Area

3.3.1 Topography of the Area

Nalanda district is located at an elevation of 67 metres above the sea level and occupying an area of about 2367 sq. kms, Nalanda shares its border with Gaya district and Jehanabad district to the West, Nawada district to the South, Patna district to the North, Sheikhpura district to the East. Nalanda has rugged topography that sometimes proves unfavourable for agriculture, yet agriculture is the main occupation here. The Nalanda District is divided in two main parts:

Hills Land of Rajgir and Giriyak - The hills consist of two parallel ridges extending around 65 km. between these two ridges lies a number of places of historical importance and are sacred in both Buddhism and Jainism.

Cultivated Agriculture Land – Paddy, potatoes, onions are mainly grown in the agricultural land. Uneconomic holdings, fragmentation of land are some of the problems faced.

The Phalgu river flowing through Nalanda is considered sacred for the Hindus.

The other rivers in Nalanda include Mohane, Jirayan, Kumbhari.

Rock Types

The crystalline rocks exposed in Rajgir Hills and forming the bedrock slopping towards north consist of phyllites and quartzites alongwith pegmatitic intrusions. The Precambrian crystalline in the area have undergone intense structural disturbance manifested in the form of multiple folding. *(Source: As per Approved DSR, Nalanda)*

3.3.2 Geology

Nalanda district is mainly occupied by Quarternary sediments, except a small portion in South occupied by metasediments of Munger group belonging to middle Proterozoic age. The metasediments include highly folded and fractured quartzite, phyllite and schiest with intrusive granite and pegmatites. These are overlain by various sequence of clay, Kankar, sand, silt, gravel of Diara, Fatwa and Nawada formation of quarternary age having a thickness of about 300m. The Proterozoic metamorphic sequence is affected by ENE-WSW and NW-SE trending faults and three distinct sets of fractures viz. NE-SW, NW-SE and E-W. These could be the expression of deep sheeted lineaments which are associated with the thermal springs of Rajgir area.

Ground water occurs both in Alluvium and metasediments. In alluvium ground water is in unconfined condition whereas in metasediments ground water present in the formation due to secondary porosity that is between fault and fractures within rocks.

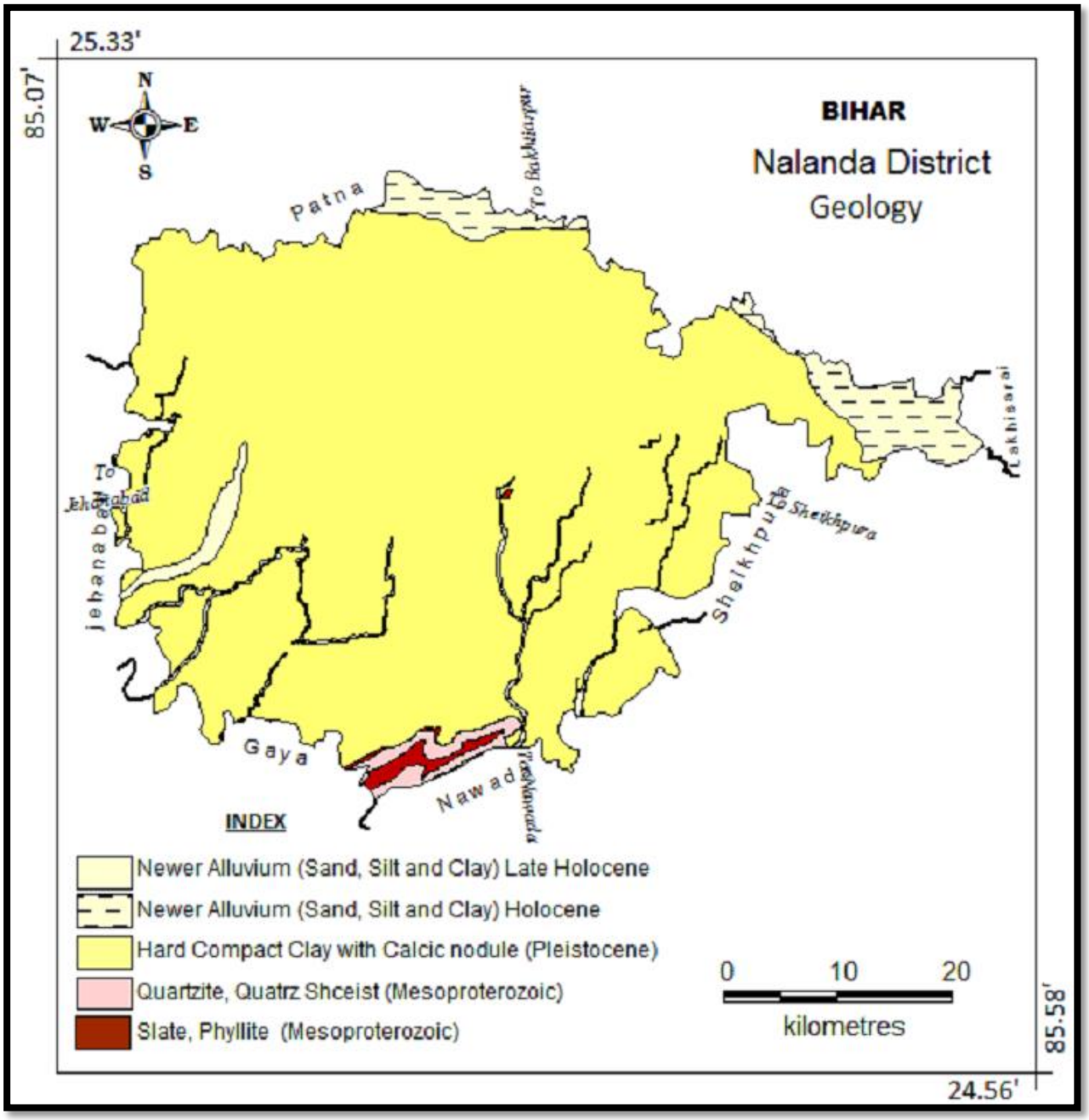


Figure 3-1: Geological Map of Nalanda District

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

3.3.3 Basin/Sub- Basin/Dianage/ River

Nalanda district is located within the Mid-Ganga basin, in the southern margin of the Gangetic plains. The district mainly represents flat alluvium terrain except Rajgir Hill in the south. Nalanda district is mainly occupied by Quarternary sediments, except a small portion in South occupied by metasediments of Munger group belonging to middle Proterozoic age. Nalnada district falls under Harohar Basin. The general slope of the area is towards northeast. The Major rivers are Harohar, Lokain, Nonain, Mohana Panchane and Sakri River.

All rivers flow towards NE and meets Ganges towards North. The Harohar Nadi originates from Jamui district flows through Nawada district as Sakri river and enters Nalanda district near Katrisarai and flows as Harohar nadi and flows towards north east and through sarmera it meets the Ganges. Panchane river originates in Jharkhand flows thorugh Nawada district and enter Nalnada district flows side by side to rajgir ridges meets in Giriak. Near Pawapuri it divides into three and continues towards NE. Lokain, Nonain and Mohana river flows as brunches of Phalgu River.

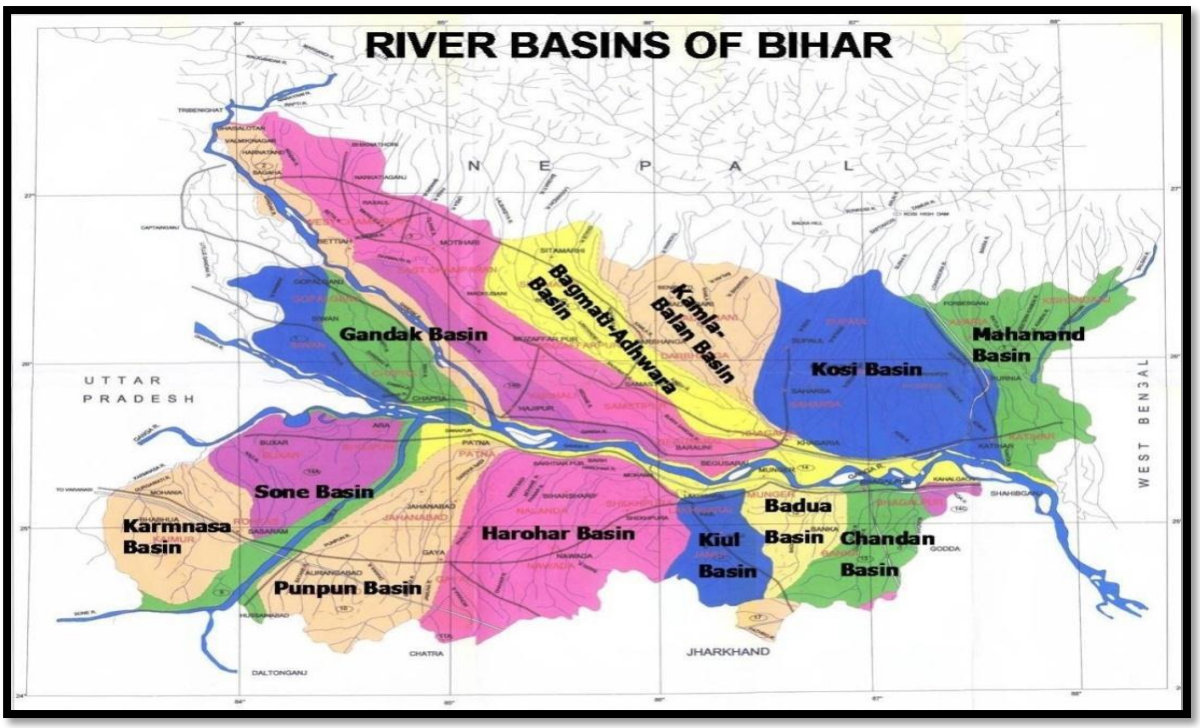


Figure 3-2: River Basins of Bihar

3.3.4 Geomorphology

Nalanda district is located within the Mid-Ganga basin, in the southern margin of the Gangetic plains. The district mainly represents flat alluvium terrain except Rajgir Hill in the south. The maximum elevation of Rajgir Hill is around 443 m above MSL. The Rajgir Hill, forms a part of the long structural hill trending in SE-NW direction. A little south of the present town of Rajgir, the parallel ranges of Rajgir Hill encompasses a valley. Other than south rest part is made up of mainly alluvium. Small part in north in Harnaut block and east in Sarmera block is older alluvium other part is of younger alluvium made by rivers of the districts flowing south to north/north east. There are Pedi planes making the junction of younger alluvium and hilly area. A series of inselbergs surrounded by Indo-Gangetic alluvium of Pleistocene age are also a notable feature of the district. These inselbergs mark the northern most boundary of the Precambrian peninsular shield.

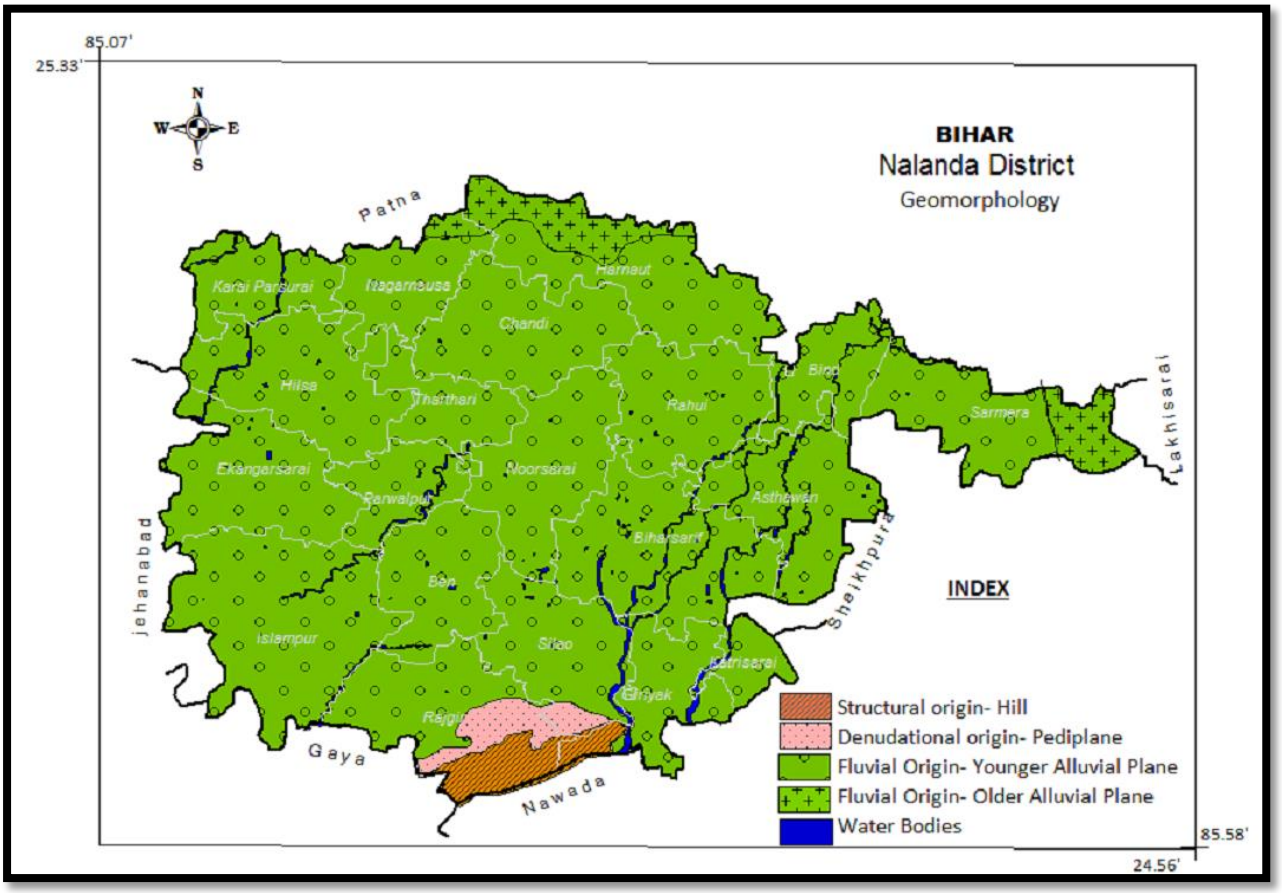


Figure 3-3: Geomorphology of Nalanda District

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

3.3.5 Soil

Nalanda district is characterized by four types of soil viz. Clay loam, fine loam, loam and course loam, mainly derived from alluvial deposit of southern Ganga Plain.

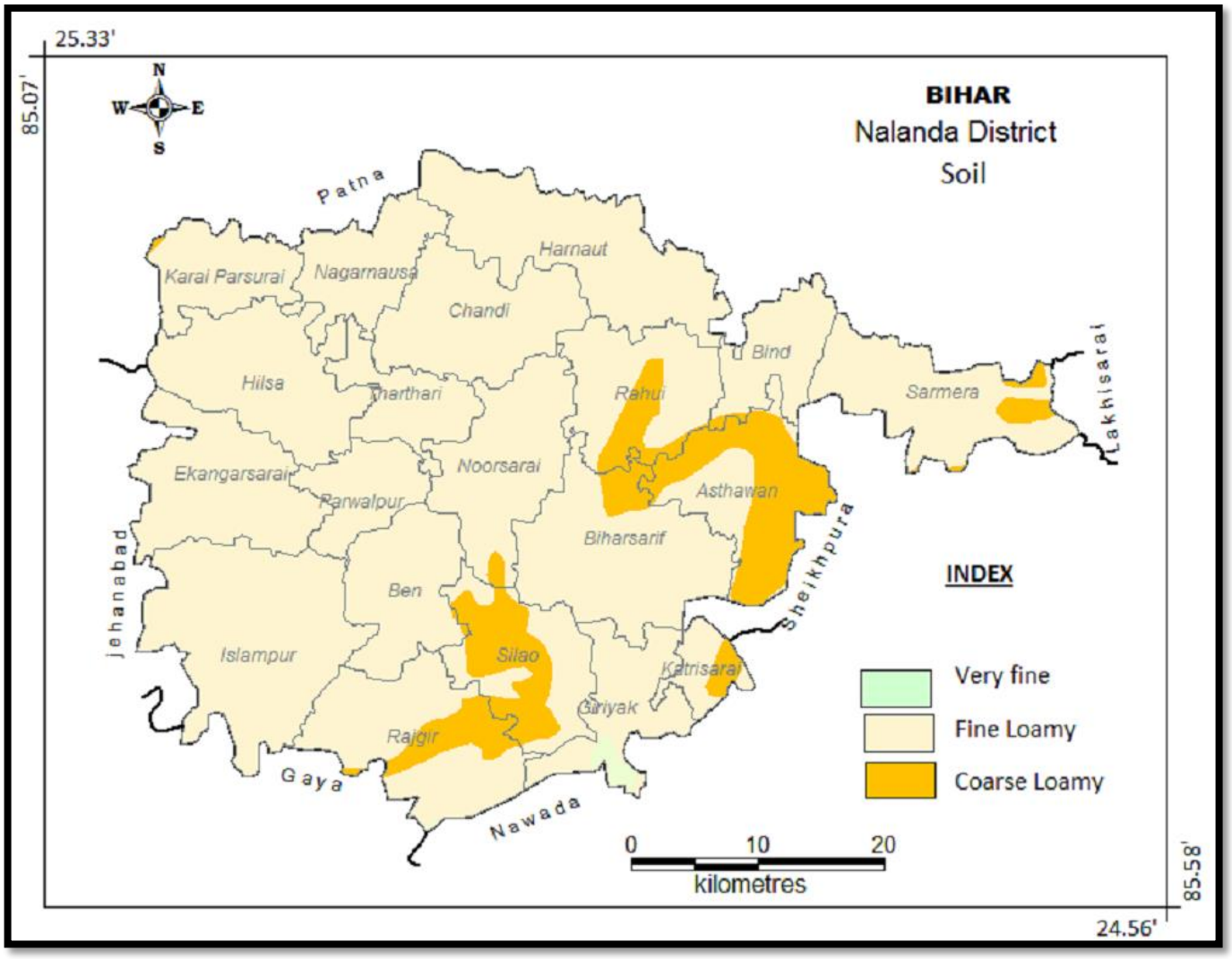


Figure 3-4: Soil Map of Nalanda District

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

3.3.6 Drainage

River Phalgu, Mohane, Jirayan and Kumbhar are Main River of the Nalanda district, which are ephemeral in nature. Number of distributaries also covers the entire area of the district.

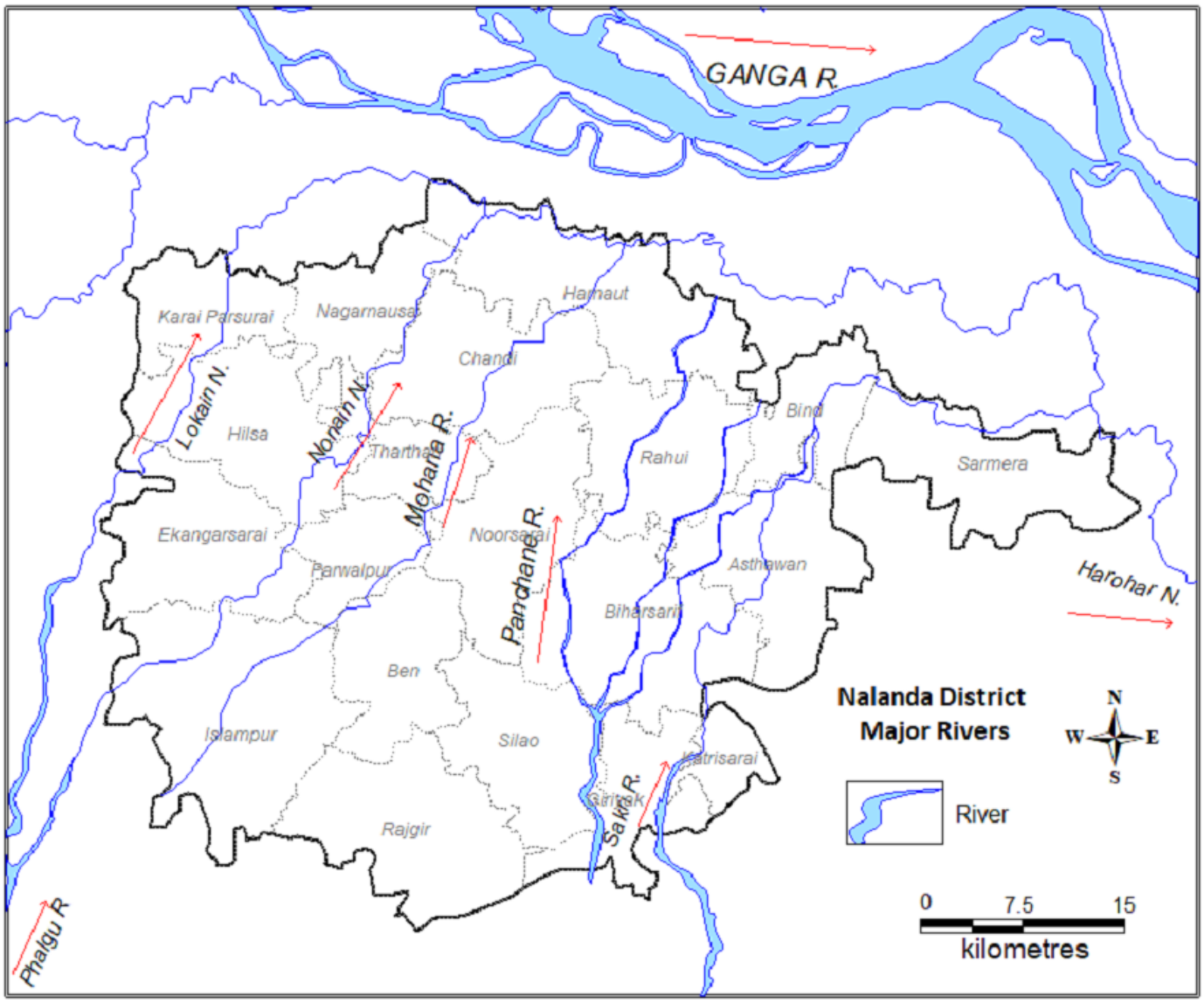


Figure 3-5: Drainage Map of Nalanda District

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

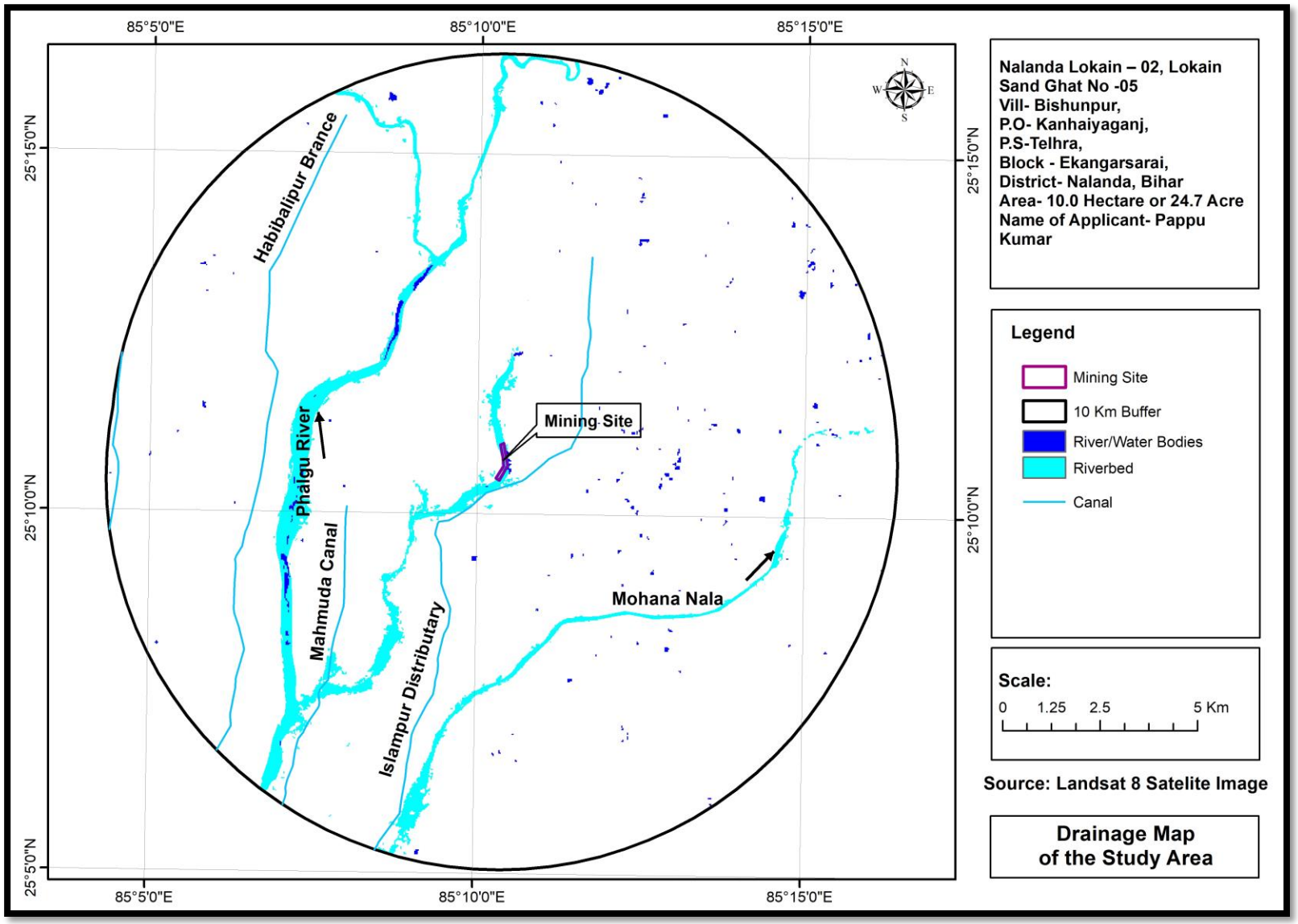


Figure 3-6: Drainage map of Study area

3.3.7 Climate and Rainfall

The district comes under the "Sub-tropical" type i.e., mild and dry winter and hot summer. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season. The average annual rainfall in the district is 995.4 mm. The rainfall in the southwest monsoon season constitutes about 87% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 292.5 mm. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. Minimum temperatures may sometimes go down to 2°C. May is the hottest month of the year with the mean maximum temperature at about 39°C and the mean minimum temperature at about 25°C. May and June the maximum temperatures may sometimes go above 44°C.

The average annual rainfall is 974.5mm. The climate is sub-tropical to sub-humid and it is characterized by a hot summer and a pleasant cold season, about 89% of rainfall takes place from June to September. During the summer months i.e., April-May, the maximum temperature goes beyond 41 degrees Celsius and in winter months of Dec.-Jan. it is around 8.7 degrees. During monsoon surplus water is available for deep percolation to ground water. 5 years' monthly rainfall is given below:

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

Table 3-1: ***Details of rainfall data of five years (from 2014 to 2018)***

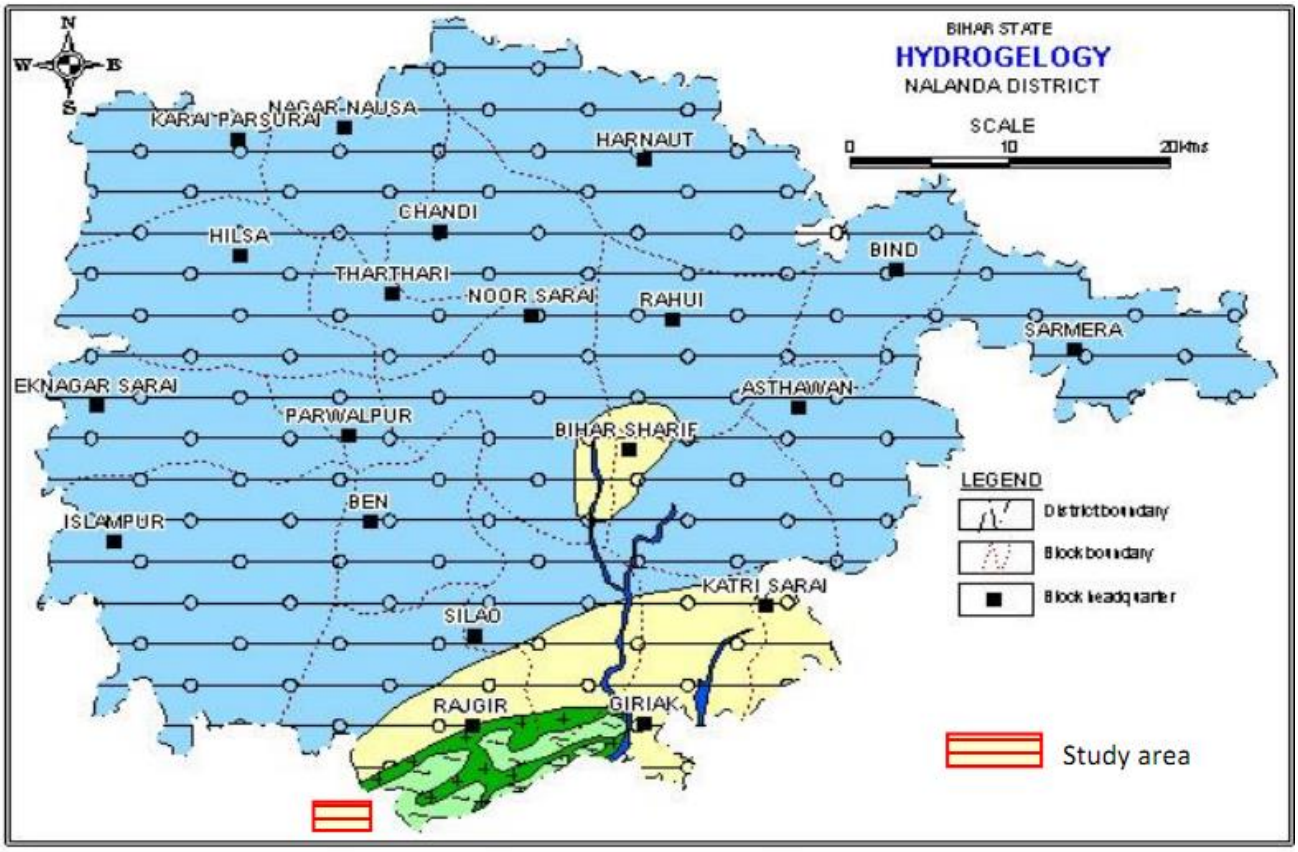
Year	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
	RF	% D	RF	% D	RF	% D	RF	% D	RF	% D	RF	%D	RF	%D	RF	%D	RF	%D	RF	%D	RF	%D	RF	%D
2014	30.2	156	19.4	116	9.2	1	0	-100	96.2	245	79.3	-38	239.4	-16	455.8	73	117.5	-42	4.4	-91	0	-100	2.3	-60
2015	11.3	-4	0	-100	15	65	19.7	222	2.6	-91	131.4	3	186.3	-34	221.7	-16	79.9	-60	0	-100	0	-100	0	-100
2016	9.3	-21	0	-100	9.3	3	0	-100	44	58	99.1	-22	394.8	39	143.7	-45	272.9	35	67	32	0	-100	0	-100
2017	0	-100	0	-100	2.1	-77	0	-100	19.9	-29	34.1	-73	356.1	26	183.1	-30	93.5	-54	11.9	-76	0	-100	0	-100
2018	0	-100	3.5	-61	0	-100	0.9	-85	14.1	-49	85.6	-33	221.8	-22	196	-26	102.8	-49	8.3	-84	0	-100	6.1	6

(Source: IMD)

3.4 Hydrogeology

Nalanda district located in the south-central parts of Bihar is covered mostly by alluvium, except the hard rock areas in Rajgir. In the alluvial areas, a number of aquifers exist. The alluvial deposits have been explored to the depth of 250 m below ground in the northern part of the district. In the hard rock areas, the well discharges are highly variable. The hydrogeological map of Nalanda district is presented in Fig 3-7.

Major part of the district covered by thick quaternary alluvium, showing both single or double sand zones grading from fine medium to coarse, with alternate clay lenses. As per drilling data, in the central part thickness of sand layer generally less and thicker clay layer is present. In some places bed rock is encountered within the depth range of 100m. A 70 to 100 m wide belt of pediplain made up of thick heterogeneous material inter fingering with alluvial deposits and boarders the northern edge of Rajgir Hills. In further north it merges with the alluvial deposits laid down by the Ganga River and its right hand tributaries.



AGE GROUP	LIHOLOGY	SYMBOL	HYDROGEOLOGICAL CONDITIONS	GROUND WATER POTENTIAL	GROUND WATER STRUCTURE FEASIBLE
Quaternary	Recent alluvium- clay, silt, sand, etc.		Thick unconfined to confined aquifer thickness varies from 50 to 150m.	Yield potential 50 to 200 cu. m./hr.	Medium to heavy duty tubewell
			Marginal alluvium unconfined aquifer 20 to 50m.	Yield potential 20 to 50 cu. m./hr.	Shallow tube well
Archaeans	Weathered zone		Thickness of weathered zone to 10 to 20m.	Large to moderate yield prospect 5 to 20 cu.m./hr	Dugwell
	Granite gneisses, Quartzites, and Quartz schist		Ground water restricted to fracture zones having secondary porosity	Limited yield potential less than 5 cu.m./hr.	Borewell/ Dugwell

Figure 3-7 : Hydrogeology map of Nalanda district

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

(a) Shallow aquifer zone: The shallow aquifer occurring within a depth of 50 m from land surface. It constituents the mixture of sand, silt and clay with calcareous nodules at places. The thickness of saturated aquifer varies from 5 to 20 m. Ground water in these sediments occurs under water table to semi-confined condition. Open wells and shallow tubewells are used to develop groundwater from this aquifer. This aquifer gets recharged mainly from local precipitation.

Separated from this shallowest water bearing zone by few meter-thick clay, second saturated horizon often tapped by dug-cum-borewell with some boring from the base of the open wells.

(b) Deeper aquifer zone: Considerably, there is a variation of granularity and thickness of the aquifer in this zone. Even tube wells which are in proximity of each other are tapping aquifer at different depth. The aquifers consist of fine to medium sand with intercalation of clay. Within the depth ranges of 50 to 300 m bgl, there are three to four major aquifer zones exists within this depth range where ground water occurs under semi-confined to confined condition.

Depth to Water Level: The pre-monsoon depth to water level data varies from 2.47 m bgl (Islampur) and 12.65 m bgl (Vena). The depth to water level map pre-monsoon 2019 (Fig 3-8) shows maximum area of the district shows depth to water level 5 to 10 mbgl, from the pre-monsoon depth to water level data, 33% of well shows water level within the range of 2-5 mbgl, 56% of well shows depth to water level within the range of 5 to 10 m. and 10% of well shows depth to water level within the range >10m.

The post monsoon depth to water level varies from 0.86 (Biharsharif) and 12.65 (Vena). The depth to water level map of post monsoon (Fig 3-9) shows that maximum area shows 2 to 5 m bgl range of depth to water level. From the post-monsoon depth to water level data, the percentage of well showing depth water level within the range of 2-5 mbgl has decreased to 18%, the percentage of well showing depth water level within the range of 5-10 mbgl has decreased to 46%, and the percentage of well showing depth water level >10 mbgl has also increased to 36%.

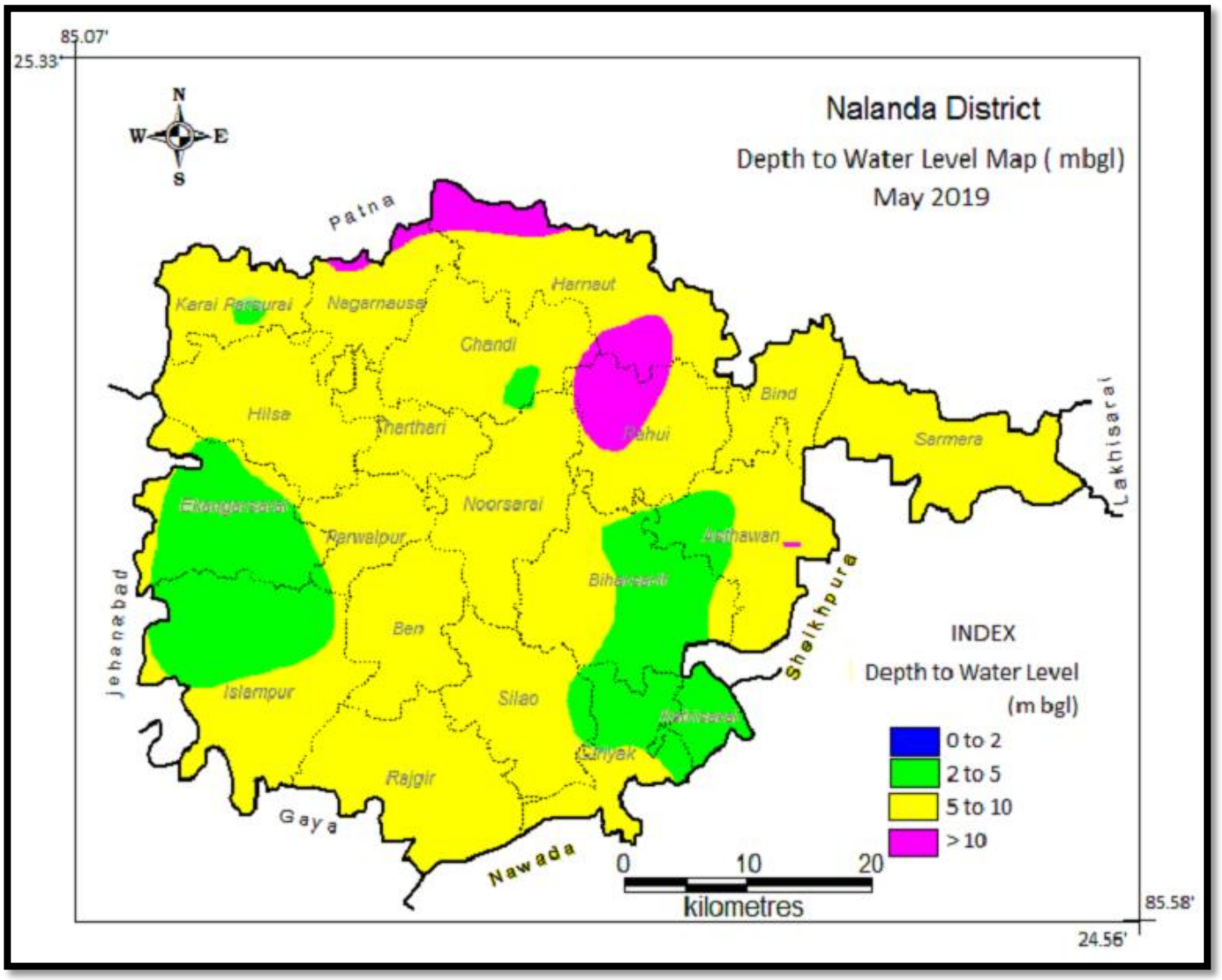


Figure 3-8: Depth to water level map of pre-monsoon May 2019

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

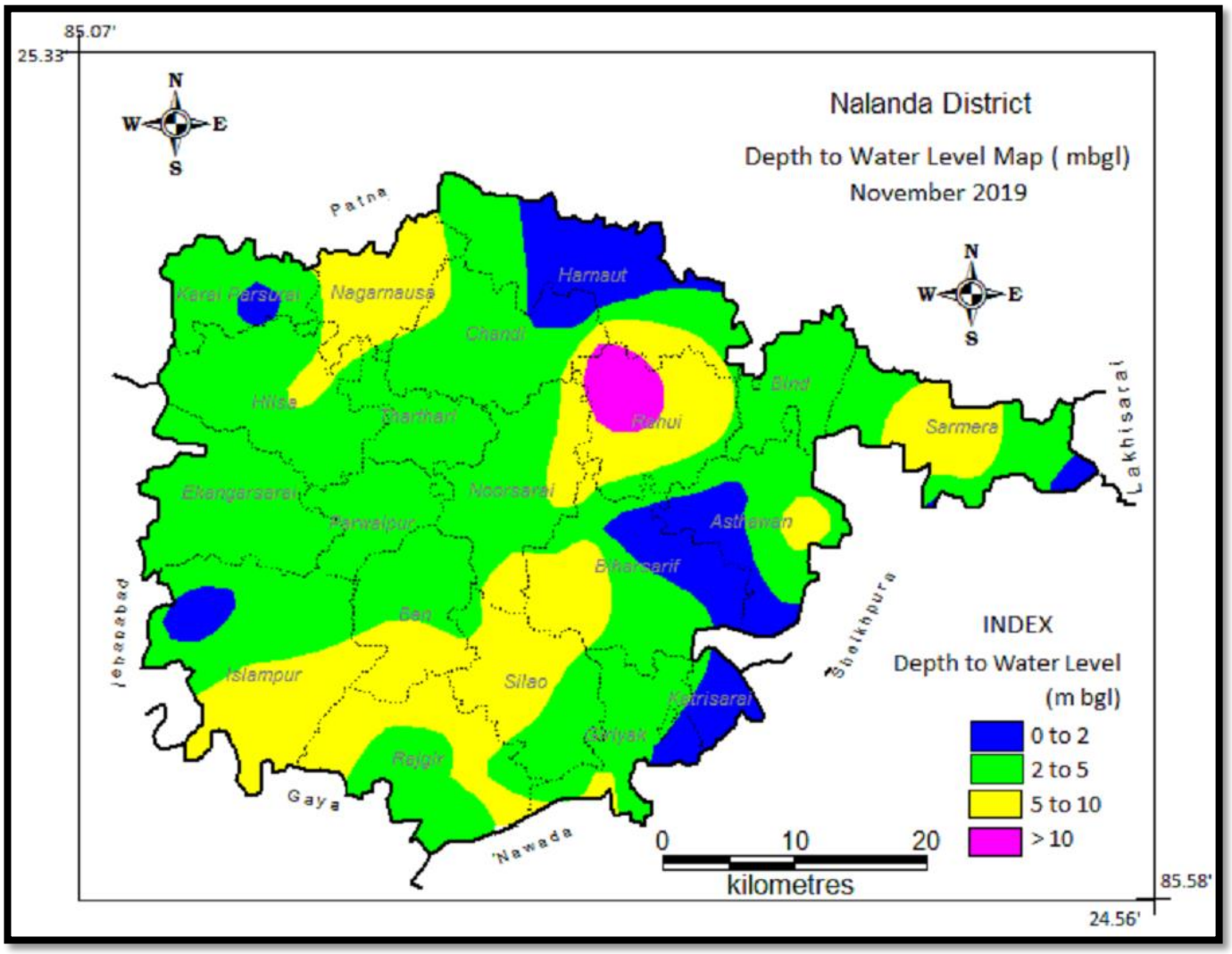


Figure 3-9: Depth to water level map of post-monsoon Nov 2019

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Bihar/NALANDA%20FINAL.pdf)

3.5 Seismicity of the Area

The state of Bihar lies in a region with moderate to low to high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, this state also falls in Zones III, IV and V. Historically, this region has experienced earthquake in the M5.0-7.0 range. The mine lease area is located in seismic Zone IV. This region is liable to MSK (IX- VIII) and is classified as the High Damage Risk Zone.

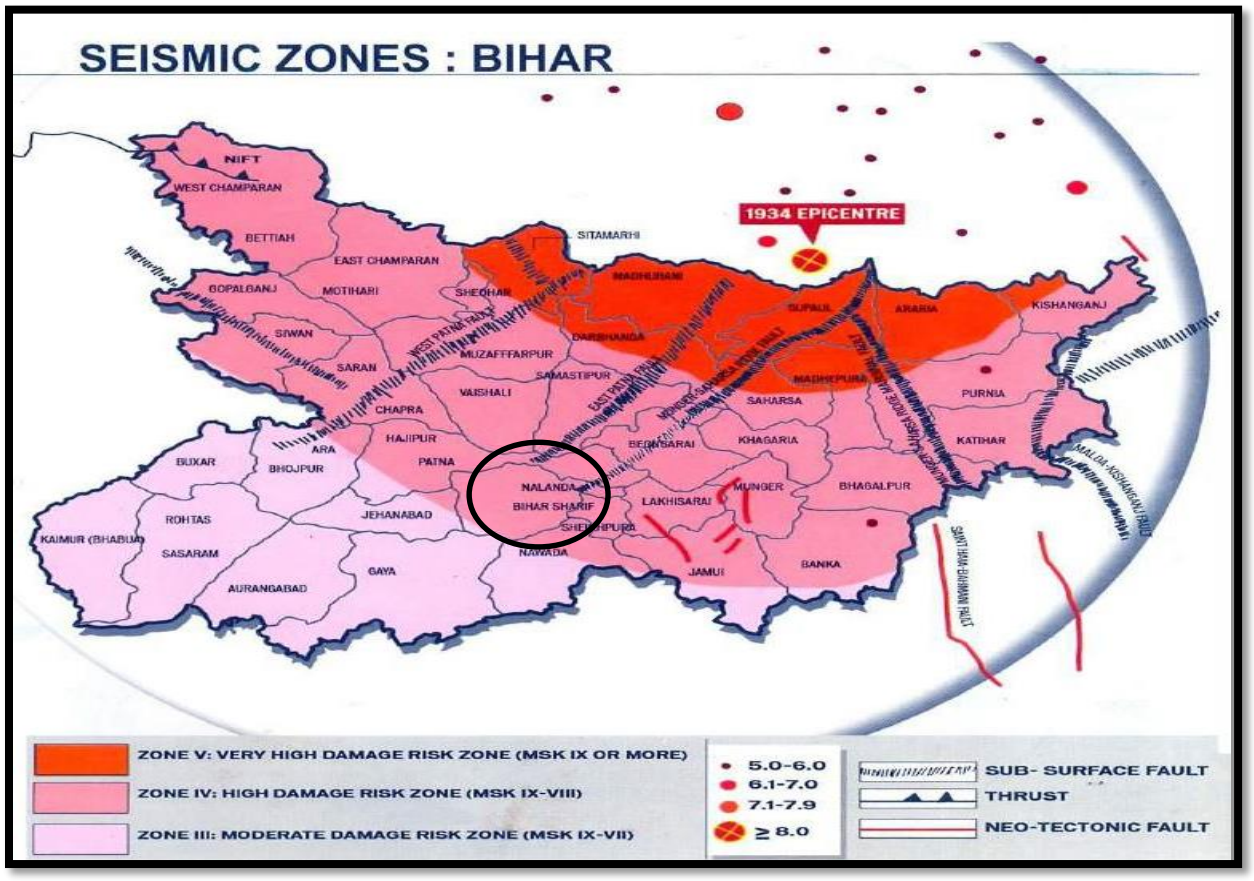


Figure 3-10: Earthquake Hazard Map of Bihar

3.6 Land Environment

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

1. **Objectives:** Main objectives are:

   - To prepare the landuse landcover map of study area based on recent satellite imageries.
   - To assess the impact of proposed project on existing landuse and landcover
   - To suggest mitigations measures

2. **Hardware:** The equipment used during the present investigation includes ground truth by hand held GARMIN 12 GPS receiver for ground truth collection, besides the visual observation and analysis.
3. **Software:** The following software were applied to extract indicators and maps:

- **ERDAS Imagine:** The Erdas imagine version 2016 is used to process Landsat-8 satellite data and to extract the required indicators through spatial & spectral analysis.
- **ArcGIS:** The ArcGIS version 10.3 has been used to prepare the final Maps for indicators through the outcomes of ERDAS software.

4. **Methodology:** The methodology applied for the study involved obtaining satellite images from open source, and then using a range of software to process the images and also by GPS coordinates (ground truthing) for drawing observations. The detailed methodology is explained as below:

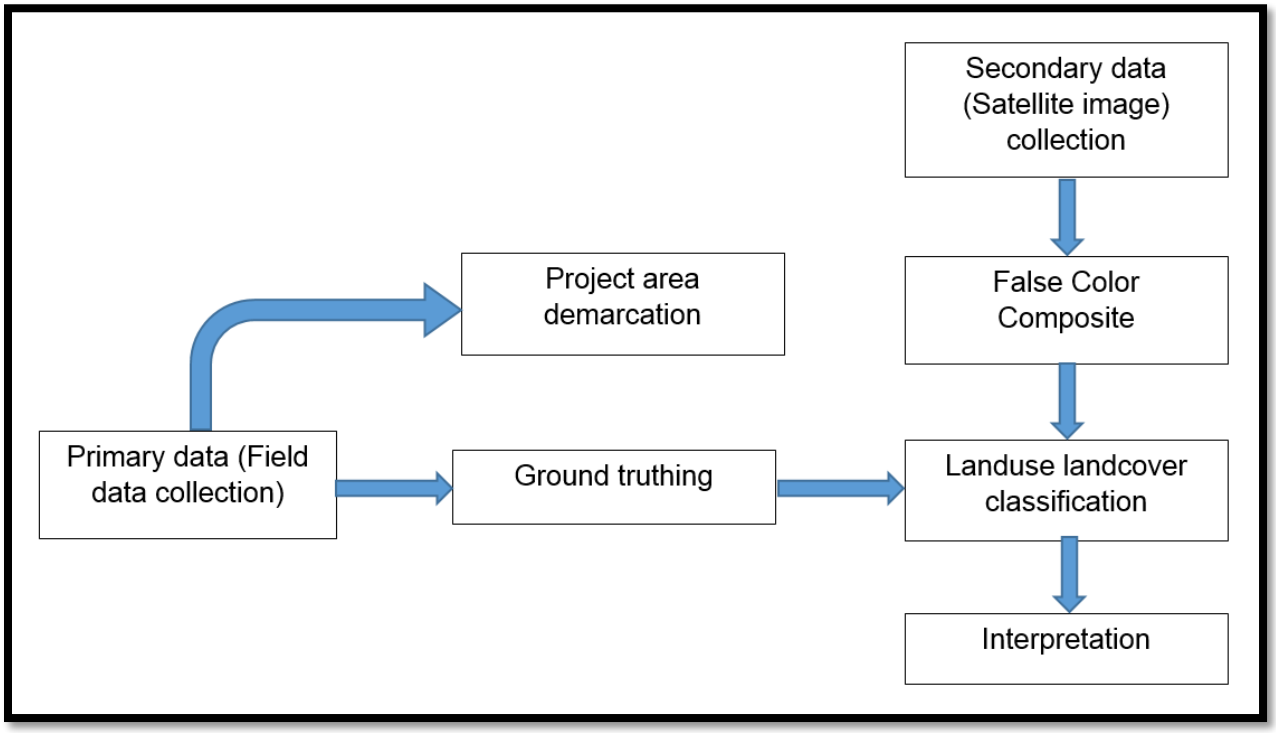


Figure 3-11: Flow Chart: Methodology

- **Primary Data:** The coordinates along land features of project area is collected with the help of GPS device for ground truthing. This data is primary data. On the basis of this data, land use landcover analysis is appropriate.

- **Secondary Data:** Satellite image (secondary data) is required to show the current land features of the project area and buffered area (10 km). **Landsat 8** Satellite image is used, which is collected from open source.

The path, row, date, resolution of satellite data used were as follows.

Path	141
Row	42
Date of pass	03 March 2023
Resolution (panchromatic)	15 Meter

Landsat 8 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) images consist of nine spectral bands with a spatial resolution of 30 meters for Bands 1 to 7 and 9. The ultra-blue Band 1 is useful for coastal and aerosol studies. Band 9 is useful for cirrus cloud detection.

- **False Color Composite (FCC):** False color (or false colour) refers to a group of color rendering methods used to display images in color which were recorded in the visible or non-visible parts of the electromagnetic spectrum. A false-color image is an image that depicts an object in colors that differ from those a photograph (a true-color image) would show. False-color image sacrifices natural color rendition in order to ease the detection of features. The FCC for 10 km buffer zone of the project area is shown in **Figure 3-12.**

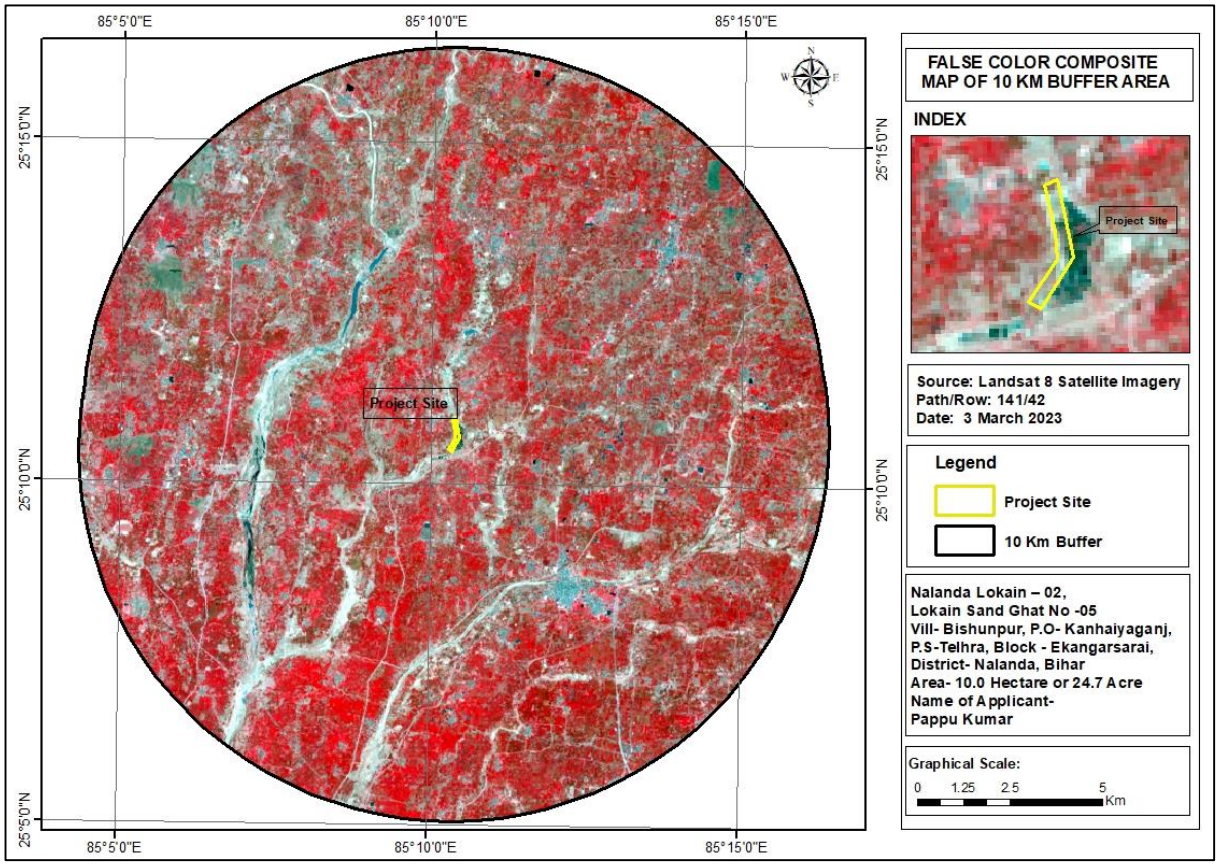


Figure 3-12: Shows the False color Composite Map of the study area

- **Landuse landcover classification & Interpretation:** The classification approach is applied on the basis of various characteristics like colour, texture, shape, association etc. The Landuse landcover map for 10 km buffer zone of the project area is shown in **Figure 3-13**.

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

  I. Built-up land: 2.71 per cent of the total project area is covered by built-up land. The entire built-up land comes under rural areas. This area is identified by grey color and square/rectangular shape in the satellite image. Built-up land can be described as an area of intensive use with much of the land covered by structures. Areas included in this category are cities, towns, villages, strip developments along with highways, transportation, power, and communications facilities, and other areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from built-up areas.

  II. Agricultural land: 57.62 per cent of the total project area is covered under agricultural land. Agricultural land may be defined as the land that is used primarily for the production of food and fiber. In the satellite imageries, cropland is identified by light pinkish to dark pinkish color or red, fine texture and rectangular/square shape.

  III. Agricultural fallow land: It is the type of cropland which is not seeded for a season so as to allow the fields become fertile again. The practice of allowing fields to remain fallow dates back to ancient times when farmers realized that using soil over and over again depletes its of its nutrients. Agricultural fallow land covers 33.83 per cent of the total project area.

  IV. Open Land: Open land is any degraded land or a land which is currently underutilized but can be brought under vegetative cover with reasonable efforts. This type of land

covers 2.88 per cent of the total project area. This area is identified by off-white color and rough texture in the satellite image.

V. **River/Water Bodies:** All natural and man-made ponds, reservoirs, river come under this class. A river is a natural flowing watercourse, usually freshwater, flowing towards an ocean, sea, lake or another river. In some cases, a river flows into the ground and becomes dry at the end of its course without reaching another body of water. This feature is identified by dark blue to black color, fine texture in the satellite image and cover only 0.40 percent of the total project area.

VI. **Riverbed:** A riverbed or streambed is the channel bottom of a stream or river, the physical confine of the normal water flow. The riverbed of the project area is consisting of sand and cover only 2.57 percent of the total project area. This area is identified by white color and fine texture in the satellite image.

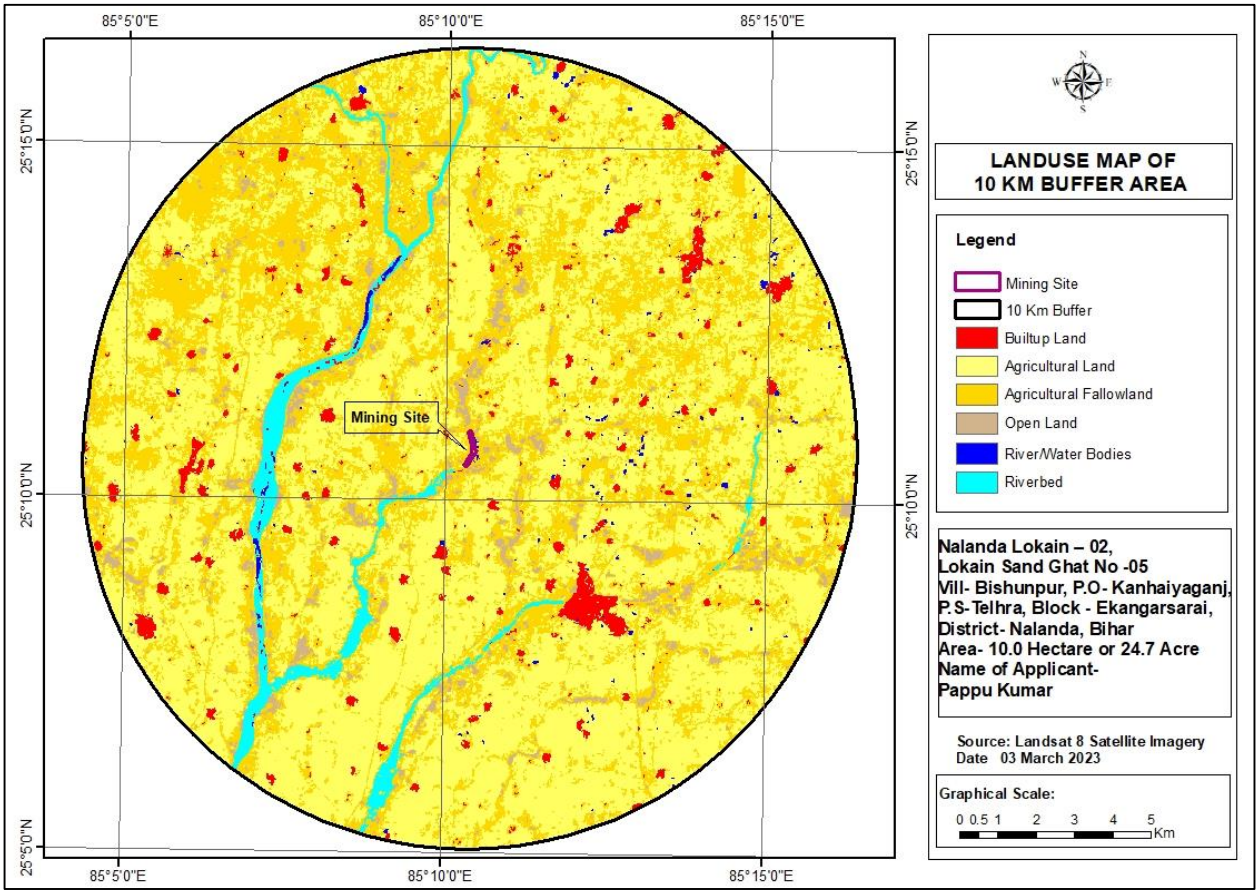


Figure 3-13 :- Land use land cover classification

On the basis of the land use land cover classification, the area of different land features is as follows:

Table 3-2 :-Land use classification

Class Name	Area(Ha)	Area (%)
Built-up Land	908.48	2.71
Agricultural Land	19326.20	57.62
Agricultural Fallow land	11346.80	33.83
Open Land	964.96	2.88
River/Water Bodies	133.72	0.40
Riverbed	862.11	2.57
Total	**33542.27**	**100.00**

In this connection, pie chart of the land use landcover is shown in **Figure 3-14** which is prepared on the basis of the above table.

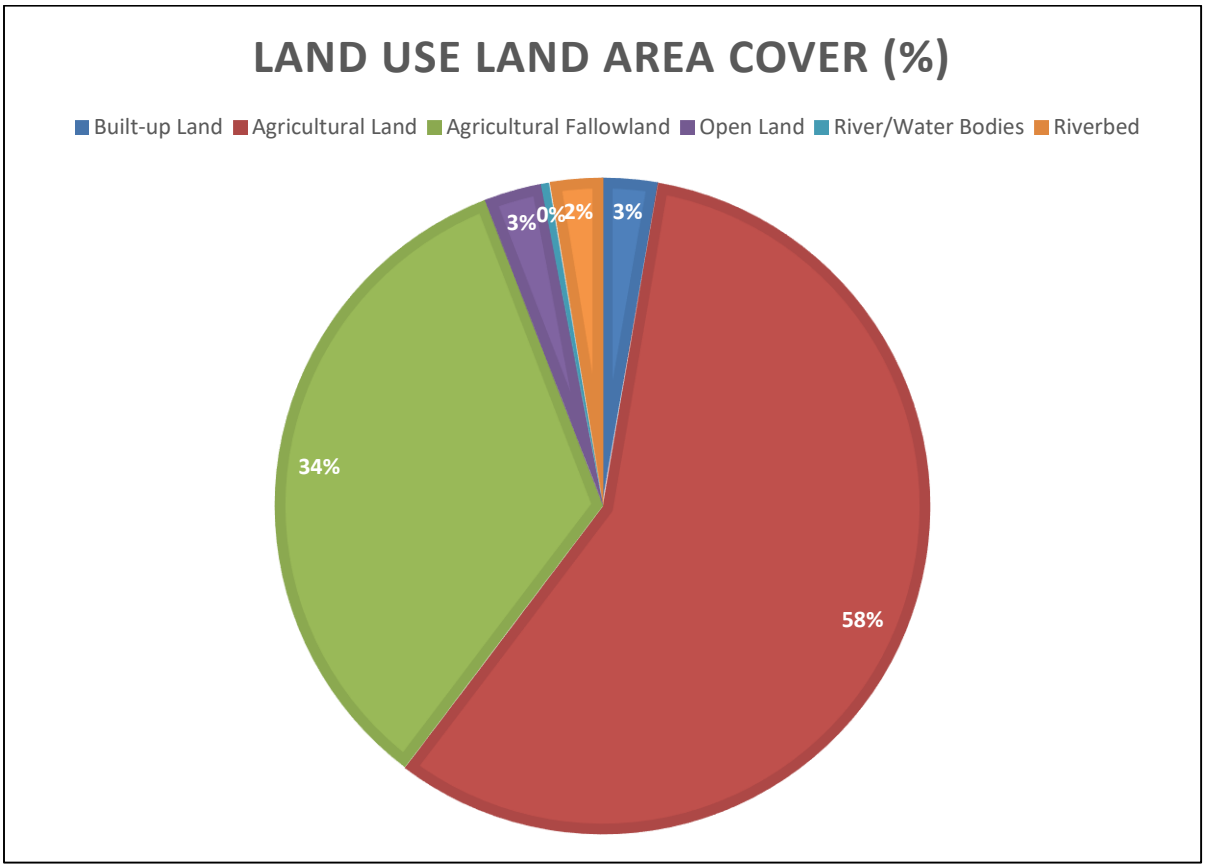


Figure 3-14 :- Pie-chart of Land use landcover area

3.6.1 Impact Analysis:

Indiscriminate river sand mining directly influences the shape of the riverbed. This often results in many indirect and cumulative effects on the physical characteristics and the dynamic equilibrium of erosion and sedimentation of a river. Excessive sand mining can alter the river bed, force the river to change course, erode banks and lead to flooding

3.6.2 Mitigation measurement:

Mitigation measures are means to prevent, reduce or control adverse environmental effects of a project, and include restitution for any damage to the environment caused by those effects through replacement, restoration, compensation or any other means. The mitigation measures are as follows:

1. Excessive sand mining should not be done.
2. Ensure conservation of the river equilibrium and its natural environment by protection and restoration of the ecological system. Ensure the rivers are protected from bank and bed erosion beyond its stable profile.

3.7 Soil Sampling

Soil, defined as a thin layer of earth's crust, is the medium for the growth of plants, comprises of both physical and chemical properties significant to the project. The baseline study covers collection of soil samples and determining relevant physical and chemical properties. Nalanda district is characterized by four types of soil viz. Clay loam, fine loam, loam and course loam, mainly derived from alluvial deposit of southern Ganga Plain.

3.7.1 Methodology

Soil sample collection was done making a pit about 15 inches deep and heaping the loose soil dug out. The loose soil is spread up in a circle and divided into 4 quadrants. The opposite quadrants are chosen and again the process is repeated till we get the required quantum of sample for analysis purpose. Collection of samples was done from 4 locations as shown in **Table 3-3** & **Figure 3.15.** Samples were analyzed as per CPCB guidelines.

The physio-chemical characteristics of these soil samples are given in **Table No. 3-4.**

3.7.2 Selection of stations for Sampling

To understand the soil characteristics**, 04** locations in the study area were selected for soil sampling. For selection of soil sampling locations, the following criterion was considered:

- Soil from agricultural land, park open land.

3.7.3 Analysis of Soil Samples

The soil samples were examined for various physicochemical parameters, to determine the existing soil characteristics of the study area.

Table 3-3 :- Soil Quality monitoring locations

SITE	Location	Distance & Direction from project site	Co-ordinates
SQ1	Barhauna	0.57 Km, West	25°10'50.25"N 85°10'2.39"E
SQ2	Bijalipur Metara	2.09 Km, WNW	25°11'17.69"N 85° 9'12.60"E
SQ3	Kobil	1.40 Km, SE	25° 9'52.63"N 85°10'49.02"E
SQ4	Mozaffara	2.28 Km, ESE	25°10'15.13"N 85°11'39.97"E

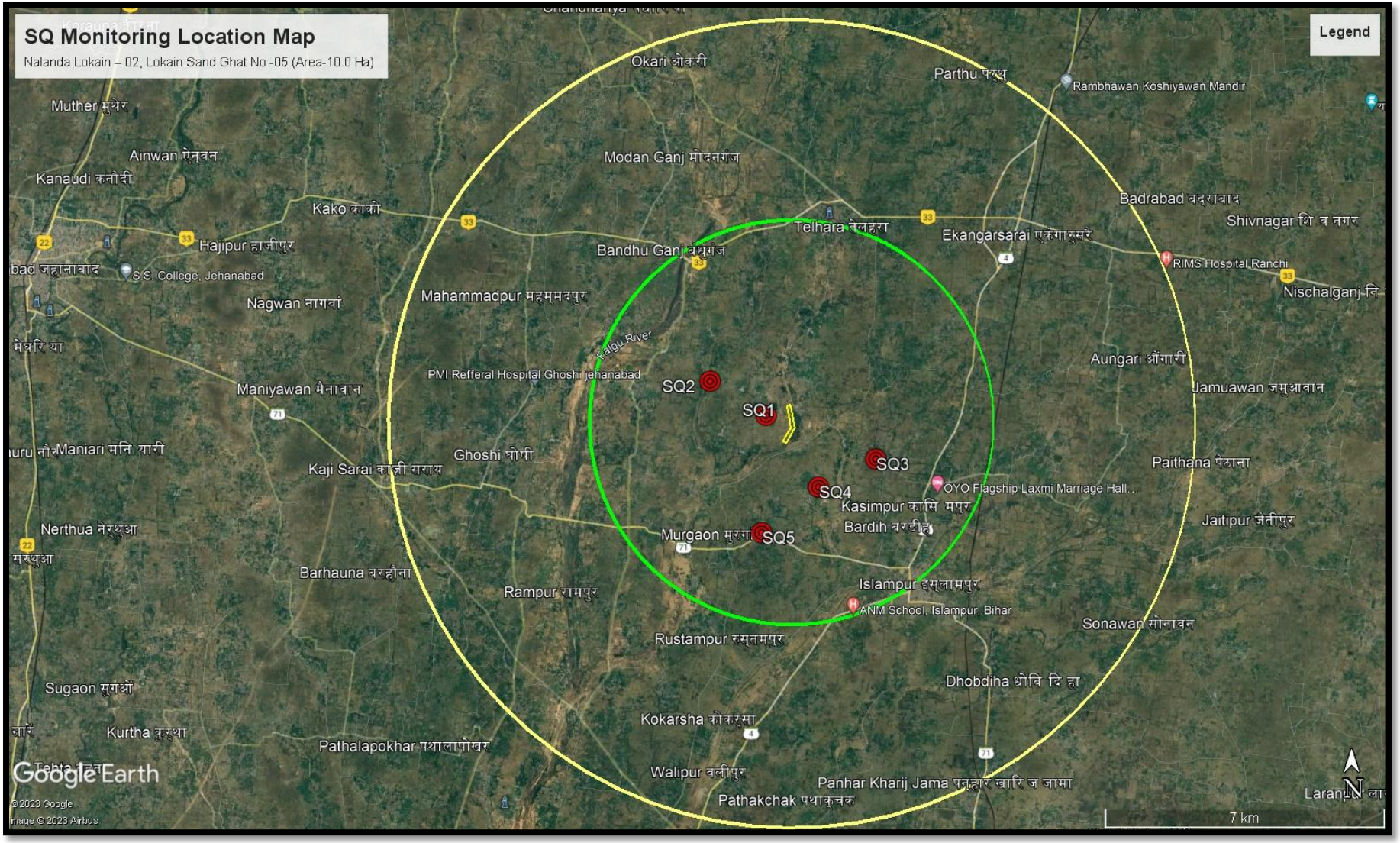


Figure 3-15 : Map showing Soil Quality Monitoring Locations

Analysis results of physical and chemical parameters of soil samples are given in **Table no. 3-4.**

Table 3-4: Chemical Classification of Soil Quality

Sr. No.	Soil Analysis Parameters	Classification
1	pH	4.5 Extremely acidic 4.51- 5.50 Very strongly acidic 5.51-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline 9.01 very strongly alkaline
2	Salinity Electrical Conductivity (mmhos/cm) (1ppm = 640 mmho/cm)	Up to 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon (%)	Up to 0.2: very less 0.21-0.4: less 0.41-0.5 medium, 0.51-0.8: on an average sufficient 0.81-1.00: sufficient >1.0 more than sufficient
4	Nitrogen (Kg/ha)	Up to 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient
5	Phosphorus (Kg/ha)	Up to 15 very less 16-30 less 31-50 medium 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potash (Kg/ha)	0 -120 very less 120-180 less 181-240 medium 241-300 average 301-360 better >360 more than sufficient

Table 3-5:- Soil Quality Parameters

S. No.	Parameter	Unit	SQ1	SQ2	SQ3	SQ4	Test Method
1.	Texture	…	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam	IS:2720 (Pt-4)
2.	Sand	%	68.3	64.0	61.0	60.3	IS:2720 (Pt-4)
3.	Silt	%	23.5	25.5	23.5	21.0	IS:2720 (Pt-4)
4.	Clay	%	8.2	10.5	15.5	18.7	IS:2720 (Pt-4)
5.	pH (1:2 Suspension)	..	7.70	7.48	7.75	7.80	IS:2720 (Pt-26)
6.	Cation Exchange Capacity(CEC)	meq/100	37.3	36.2	33.3	20.4	IS:2720 (Pt-24)
7.	Electrical Conductivity (1:2)	µmho/cm	356.9	346.5	354.9	301.5	IS:14767
8.	Water Holding Capacity(WHC)	%	44.0	42.7	34.4	34.4	IS 2720 (Part-2)
9.	Sodium (Na)	mg/kg	152.9	148.4	147.1	130.2	APHA-3055B
10.	Calcium (Ca)	mg/kg	1165.1	1131.2	1139.0	1150.8	IS 2720 (Part-23)
11.	Magnesium (Mg)	mg/kg	593.9	576.6	505.6	495.2	ETS/STP/SOIL-08
12.	Bulk Density	g/cm^3	1.39	1.35	1.67	2.00	IS 2386 (Part-4)
13.	Total Nitrogen (PO4)	mg/kg	178.8	173.6	206.6	137.8	APHA,Pt 4500:(N)
14.	Phosphorus (P)	mg/kg	47.1	45.7	37.3	40.2	ETS/STP/SOIL-19
15.	Potassium (K)	mg/kg	279.7	271.6	351.5	240.2	APHA-3055B
16.	Organic Matter	%	1.10	1.07	1.00	1.05	IS : 2720 (P-22)
17.	Organic Carbon	%	2.18	2.12	3.33	1.64	BS 1377 -3)
18.	Sulphate as (SO_4)	mg/kg	2.42	2.35	2.00	0.99	IS:3025(P-24)
19.	Porosity	%	27.82	27.01	14.0	13.5	IS 13030

3.7.4 Interpretation of Soil Quality Results

3.7.4.1 Analysis of result of soil data

a) Physical characters

The physical characters include Bulk density, grain size distribution (textural analysis), Porosity, Infiltration, Water holding capacity.

Grain size distribution: Texture indicates relative proportion of various sizes of primary soil particles such as sand, silt and clay present in the soil. Based on their quantities present in the soil sample and using the textural classification diagram. The textural classes of eight soil samples are sandy clay loam, i.e coarse to fine texture. Bulk density values confirm the textural class.

Bulk Density: In case of bulk density total soil space (space occupied by solid and pore spaces combined) are taken in to consideration. Thus, Bulk Density is defined as the mass (weight) of a unit volume of a dry soil. This volume would, off course includes both solids and pores. Soil texture, soil structure and organic matter content are the factors influencing the bulk density of a soil. Bulk Density, besides being an interesting and significant physical characteristic, is very important as a basis for certain computations. The Bulk density of the four-soil sample under consideration ranges between 1.35 to 2.00 g/cm3, and confirms the texture of the soil samples of the area under study.

Water Holding Capacity (WHC): Water holding capacity of soil is the maximum amount of moisture, a dry soil is capable of holding, under given standard condition. If the moisture content is increased further percolation result WHC is of great value to practical agriculture, since it provides a simple means to determine moisture content. WHC required for good crop growth is 35 to 70%. The WHC of the four soil samples ranges between 34.4 to 44.0 % indicating somewhat frequent water application for growing crops.

b) Chemical Characters

The parameters considered for chemical analysis are: Soil reaction (pH), Cation Exchange Capacity(CEC), Electrical conductivity (EC), Water Holding Capacity(WHC), Sodium (Na), Calcium (Ca), Magnesium (Mg), Bulk Density, Total Nitrogen (N), Phosphorus (PO4), Potassium (K), Organic Matter, Organic Carbon, Sulphate as (SO4) and Porosity.

Soil reaction (pH): The nutritional importance of pH is illustrated, thus hydrogen ion concentration has influence not only on, solubility of nutrients, but also upon facility with which these nutrients are absorbed by plants, even already in soil solution for e.g. Fe, Mn and Zn become less available as pH rises from 4.5 to 7 to 8. At pH 6.5 to 7.0 utilization of nitrate and ammonia nitrogen becomes more available. In case of phosphorus, it becomes less available to plant as pH increases above 8.5, due to its fixation in exchange complex of soil. For the four-soil sample under consideration the pH range between 7.48 to 7.80 indicating soils are slightly alkaline and are almost normal for crop growth.

Electrical conductivity (EC): The salt content of the soils is estimated by EC measurements, and is useful to designate soils as normal or sodic (saline). Electrical conductivity is expressed as µmhos/cm at 25^0C, µmhos/cm, mmhos/cm or µs/cm. The EC of four soil samples are between 301.5 to 356.9 µmhos/cm and are below the limits to be called as saline and hence the soils are normal for crop growth.

Organic Carbon / Organic matter (%): Although accounting for only a small part of the total soil mass in mineral soils, organic matter influences physical, chemical, and biological activities in the soil. Organic matter in the soil is plant and animal residue which serves as a reserve for many essential nutrients, especially nitrogen. Determination of organic matter helps to estimate the nitrogen which will be released by bacterial activity for the next season depending on the conditions, soil aeration, pH, type of organic material, and other factors. The four soil samples under consideration contain 1.64 % to 3.33 % organic carbon calculated from organic carbon estimation. As per crop requirements different soils samples are more than sufficient in organic matter content.

Available Nitrogen (N): Nitrogen is a part of all living cells and is a necessary part of all proteins, enzymes and metabolic processes involved in the synthesis and transfer of energy. Nitrogen is a part of chlorophyll, the green pigment of the plant that is responsible for photosynthesis. Helps plants with rapid growth, increasing seed and fruit production and improving the quality of leaf and forage crops. The available nitrogen in the four samples in question, as per analysis, ranges between 137.8 to 206.6 mg/kg showing better available nitrogen content in different samples, for crop growth.

Available Phosphorus (P): Like nitrogen, phosphorus (P) is an essential part of the process of photosynthesis involved in the formation of all oils, sugars, starches, etc. Helps with the transformation of solar energy into chemical energy; proper plant maturation; withstanding stress. Effects rapid growth, Encourages blooming and root growth. The phosphorus content of soil of four samples ranges between 37.3 to 47.1 mg/kg and falls under on medium category for crop growth.

Available Potassium (K): Potassium is absorbed by plants in larger amounts than any other mineral element except nitrogen and in some cases, calcium helps in the building of protein, photosynthesis, fruit quality and reduction of diseases. The Potassium content of four soil samples ranges between 240.2 to 351.5 mg/kg and is better for crop growth.

Comments: The interpretation of field data, physical and chemical data it can be concluded that:

As per the physical data soils are coarse to fine texture, imperatively moderate water holding capacity, and moderate to slow permeability. As per physical characters' soils are rated as moderately good for agriculture.

As per chemical characters' soil reaction (pH) soils are slightly alkaline and normal for crop growth. Organic carbon is on an average sufficient. Macro nutrient like nitrogen is better and phosphorus is medium to average potassium. Base saturation is very high.

3.8 Water Environment

3.8.1 General

This section describes the prevailing water environment in the study area in terms of water resources i.e. quantitatively and qualitatively. This has been achieved by performing qualitative analysis of water samples collected from ground water source and surface water body falling within the study area. Ground & Surface water samples are collected from locations as shown in **Fig. 3.16** and **Fig. 3.17** respectively. Primary objective of the study is to assess the water quality for critical parameters and evaluate its impact on habitat and aesthetics in the surrounding areas of the project. This assessment will be useful in formulating mitigation measures to minimize the impacts of the project on the surrounding environment.

3.8.2 Methodology

Samples were collected from upstream and downstream areas of the project site and third sample was also collected near the project site.

Contour and Drainage pattern are the most important factors governing the choice of sampling locations. It can be assumed that run-off from project site, if any will follow the natural drainage and contour of the landscape. Therefore, downstream areas are mostly likely to experience the impacts of the project. On this basis, four surface water and five ground water sampling locations were chosen for determining quality of water for the category of end use and for parameters as per IS:10500 -2012. Thus, it helps in predicting the entry of potential pollutant or merging tributaries acts as a source of pollution in the river which affects the quality of water. It helps in determining the extent of pollution.

Based on the above factors, sampling locations for Ground and surface water quality have been finalized and shown in **Table 3.6, Figure 3.16** & **Table 3.9, Figure 3.17**, respectively. AIS 10500:2012 (for drinking water) has been used for analysis of the water samples for drinking purpose and for the designated use of water as per the categories of CPCB guidelines.

3.8.3 Groundwater

3.8.3.1 Ground water Potential

The Study area falls under Western part of the district. As per CGWB report , water level varises in these areas between 2- 8 mgbl. Most of villages in the project area have borewell and tube well facilities, as most of the residents of these villages make use of this water for agriculture and domestic purposes. Therefore, Ground water sampling was done from villages within 10 km radius of the project site. Ground water sampling locations are given in **Table**

3.6. All Ground water samples are analyzed as per IS-10500:2012. The results of the analyzed ground water samples result are given in **Table 3.7** & **Figure 3.16** shows Ground water sampling location on Topographic map.

Table 3-6: Ground water monitoring locations

S. No.	Name	Distance & Direction from project site	Co-ordinates
GW1	Barhauna	0.57 Km, West	25°10'50.25"N 85°10'2.39"E
GW2	Bijalipur Metara	2.09 Km, WNW	25°11'17.69"N 85° 9'12.60"E
GW3	Kobil	1.40 Km, SE	25° 9'52.63"N 85°10'49.02"E
GW4	Mozaffara	2.28 Km, ESE	25°10'15.13"N 85°11'39.97"E
GW5	Murgaon	2.29 Km, SSW	25° 9'16.04"N 85° 9'58.41"E

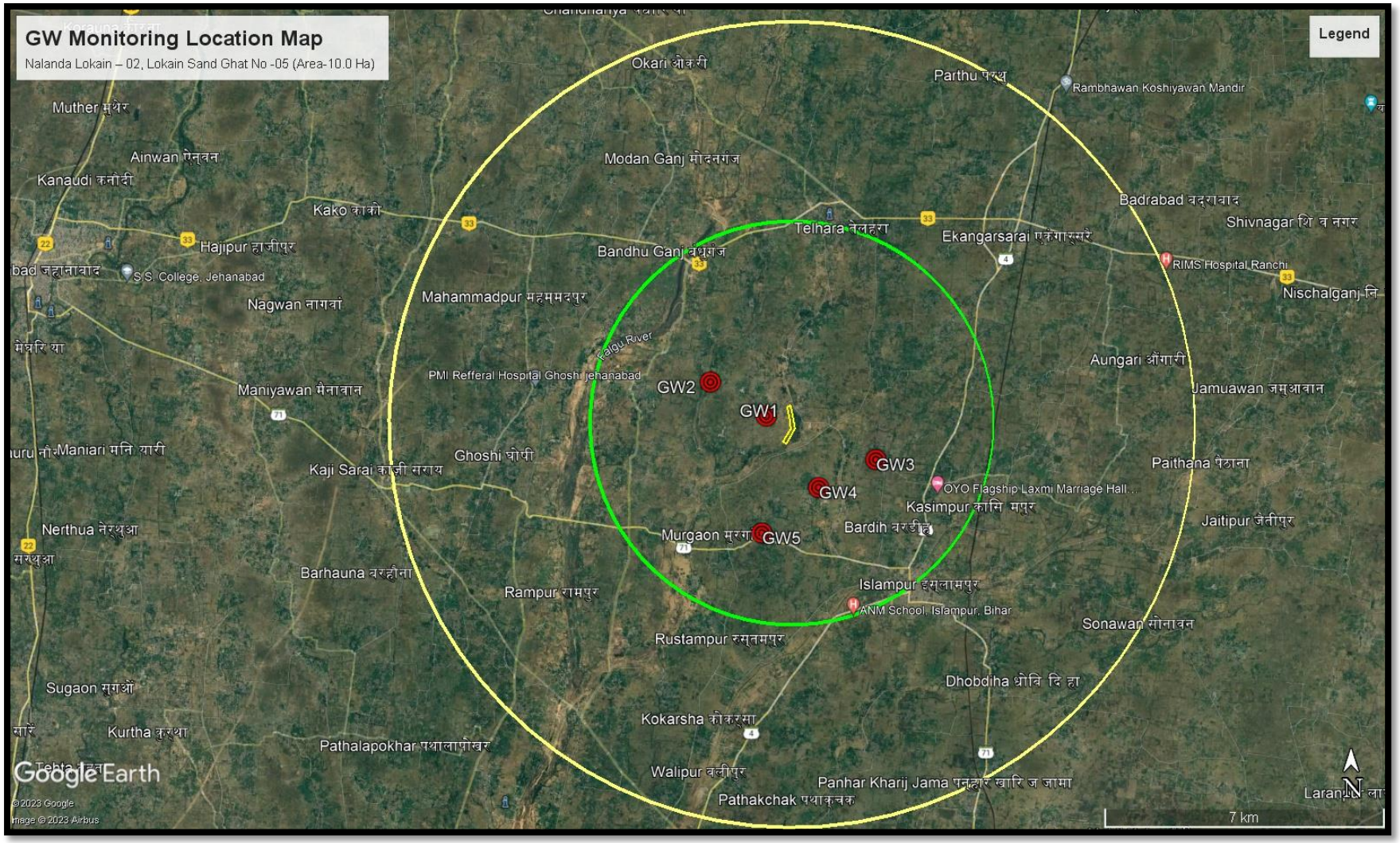


Figure 3-16: Map showing Ground Water Monitoring Location

Table 3-7 :- : Ground water quality results

S.No.	Parameter	Unit	GW1	GW2	GW3	GW4	GW5	Drinking Water Standards / Limit (IS:10500 2012)		Test Method
								Desirable	Permissible	
01.	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	<5.0	5	15	IS:3025 (Pt-4)
02.	Odour	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS:3025 (Pt-5)
03.	pH	---	7.41	7.08	7.04	7.20	7.39	6.5 - 8.5	No Relaxation	IS:3025 (Pt-11)
04.	Taste	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS:3025 (Pt-8)
05.	Turbidity	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	1	5	IS:3025 (Pt-10)
06.	Total Dissolve Solid (TDS)	mg/L	481.2	478.2	538.7	547.1	291.6	500	2000	IS:3025 (Pt-16)
07.	Total Alkalinity ($CaCO_3$)	mg/L	217.6	146.0	185.1	237.0	130.6	200	600	IS:3025 (Pt-23)
08.	Total Hardness(CaCO3)	mg/L	246.2	250.2	309.8	319.8	136.7	200	600	IS:3025 (Pt-21)
09.	Chloride (Cl)	mg/L	131.6	110.0	107.2	108.9	79.3	250	1000	IS:3025 (Pt-32)
10.	Calcium (Ca)	mg/L	80.4	55.1	56.1	46.1	64.6	75	200	IS:3025 (Pt-40)
11.	Mineral Oil	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.5	No Relaxation	IS:3025 (Pt-39)
12.	Sulphate (SO_4)	mg/L	39.75	40.5	36.96	38.70	33.16	200	400	IS:3025 (Pt-24)
13.	Nitrate (NO_3)	mg/L	1.52	1.50	1.05	1.27	0.74	45	No Relaxation	IS:3025 (Pt-34)
14.	Fluoride (F)	mg/L	0.35	0.26	0.29	0.29	0.34	1	1.5	IS:3025 (Pt-60)
15.	Iron (Fe)	mg/L	0.12	1.116	0.08	0.42	0.12	0.3	No Relaxation	IS:3025 (Pt-53)

16.	Aluminium (Al)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.2	APHA-3500 (B)
17.	Selenium (Se)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No. Relaxation	APHA-3113 (B)
18.	Cyanide (Cn)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No. Relaxation	APHA-4500 (C)
19.	Copper(Cu)	mg/L	0.15	0.18	0.10	0.03	0.07	0.05	1.5	APHA-3111(B)
20.	Magnesium (Mg)	mg/L	42.02	28.5	36.7	35.0	21.3	30	100	IS:3025 (Pt-45)
21.	Manganese(Mn)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	APHA-3111(B)
22.	Zinc(Zn)	mg/L	0.70	0.59	0.43	0.45	0.08	5	15	APHA-3111 (B)
23.	Cadmium(Cd)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	No. Relaxation	APHA-3111 (B)
24.	Lead(Pb)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No. Relaxation	APHA-3111 (B)
25.	Mercury(Hg)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	No. Relaxation	APHA-3112 (B)
26.	Nickel (Ni)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	No. Relaxation	APHA-3111 (B)
27.	Arsenic(As)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05	APHA-3500 (B)
28.	Chromium (Cr+6)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No. Relaxation	APHA-3500 Cr-B
29.	Phenolic Compound (C6H5OH)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	APHA-5530
30.	Conductivity (25 °C)	mhos/cm	687.7	660.1	745.1	785.2	515.7	Not Specified	Not Specified	APHA-2510
31.	E. Coli	Coli/100ml	Absent	Absent	Absent	Absent	Absent	Shall Not Be Detectable		IS:1622-1981
32.	Total Coliform	MPN/100ml	Absent	Absent	Absent	Absent	Absent	Shall Not Be Detectable		IS:1622-1981
33.	Temperature	°C	19.70	24.6	19.60	18.80	18.40	Not Specified	Not Specified	IS:3025 (Pt-9)

34.	Sodium (Na)	mg/L	47.94	53.01	43.0	61.8	52.5	Not Specified	Not Specified	APHA-3500 (Na)
35.	Fecal Coliform	MPN/100ml	Absent	Absent	Absent	Absent	Absent	Shall Not Be Detectable		IS:3025 (Pt-4)

3.8.3.2 Interpretation of Ground Water Quality

- All the samples were colourless meeting desirable norms (<5 Hazen).
- All the samples meet the desirable standards (pH ranges from 7.04 to 7.41).
- TDS in samples ranges from 291.6 mg/L to 547.1 mg/L. All the samples meet the permissible limit of 2000 mg/L.
- Total Hardness in the water ranges from 136.7 mg/L to 319.8 mg/L. All the samples meet the permissible limit of 600 mg/L.
- Calcium content in the water ranges from 46.1 mg/L to 80.4 mg/L all the samples meet the permissible limit of 200 mg/L.
- Magnesium (Mg) content in the water ranges from 21.3 mg/L to 42.02 mg/L. All the samples meet the permissible limit of 100 mg/L.
- Sulphate content in the water ranges from 33.16 mg/L to 40.5 mg/L. The permissible limit of Sulphate is 400 mg/L for drinking water.
- Total alkalinity in the water samples ranges from 130.6 mg/L to 237.0 mg/L. All the samples are within the permissible limit of drinking water (600 mg/L).
- Chloride ranges from 79.3 mg/L to 131.6 mg/L. Which are below permissible limits (1000 mg/l).

3.8.3.3 Result& conclusion

The examination of the physicochemical analysis of the ground water shows that the quality of ground water is generally good with respect to the limits laid down in Bureau of India Standards (IS: 10500:2012) for drinking water. Based on the above result it is concluded that the ground water samples are fit for drinking purpose.

3.8.4 Surface water

Surface Water Quality monitoring is carried out in the study area of 10 km based on the land use pattern and ground truth of nearby villages. Surface water samples were collected from **04** locations during the study period of **1st March 2023 to 31st May 2023**and analyzed for a number of physico-chemical parameters. The surface water parameters have been analyzed as per APHA procedure and compared with CPCB water quality criteria mentioned in **Table 3-8** and the Surface water sample results are mentioned in **Table-3-10.**

Table 3-8 :- Water Quality Criteria as per Central Pollution Control Board

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

Table 3-9: - Surface water monitoring locations

S. No.	Name	Distance & Direction from project site	Co-ordinates
SW1	Pond, Tajpur	1.04 Km, SW	25°10'11.23"N 85° 9'47.26"E
SW2	Pond, Naraich	0.36 Km, West	25°10'55.46"N 85°10'8.96"E
SW3	Pond, Tarupur	1.79 Km, NW	25°11'35.36"N 85° 9'34.34"E
SW4	Pond, Bijokhari	2.91 Km, NE	25°12'18.88"N 85°11'16.79"E

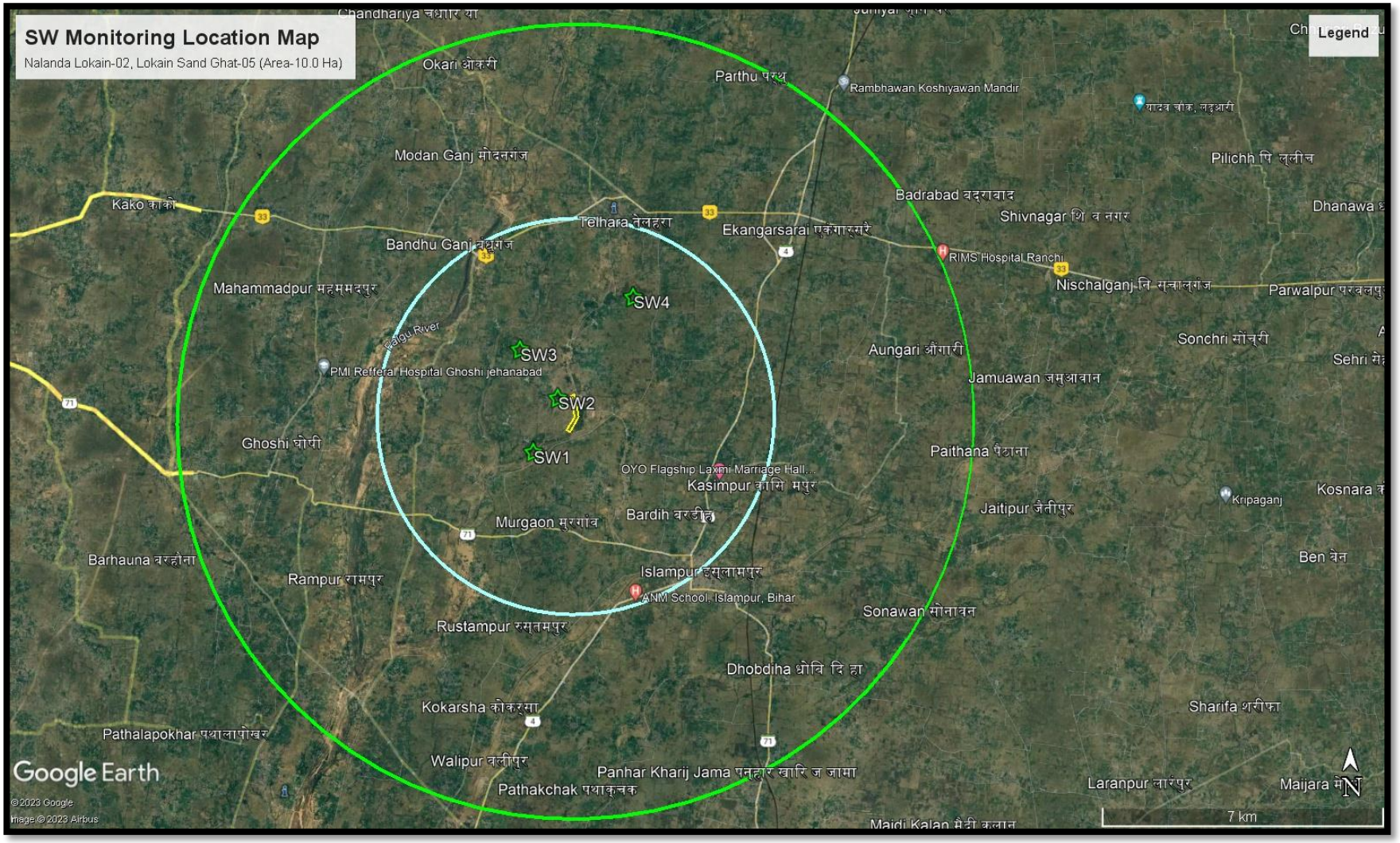


Figure 3-17: Map showing Surface Water Monitoring Locations

Table 3-10 : - Surface Water Monitoring Results

S.No.	Parameter	Unit	SW1	SW2	SW3	SW4	Test Method
01.	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	IS:3025 (Pt-4)
02.	Odour	---	Agreeable	Agreeable	Agreeable	Agreeable	IS:3025 (Pt-5)
03.	pH	---	7.57	7.84	7.72	7.98	IS:3025 (Pt-11)
04.	Turbidity	NTU	9.5	14.1	18.7	12.9	IS:3025 (Pt-10)
05.	Total Dissolve Solid (TDS)	mg/L	464.8	516.7	617.3	452.2	IS:3025 (Pt-16)
06.	Total Alkalinity ($CaCO_3$)	mg/L	171.7	163.4	384.3	185.6	IS:3025 (Pt-23)
07.	Total Hardness(CaCO3)	mg/L	202.7	267.9	250.8	218.3	IS:3025 (Pt-21)
08.	Chloride (Cl)	mg/L	83.12	90.6	141.1	135.0	IS:3025 (Pt-32)
09.	Calcium (Ca)	mg/L	40.75	57.2	108.3	87.6	IS:3025 (Pt-40)
10.	Mineral Oil	mg/L	<0.01	<0.01	<0.01	<0.01	IS:3025 (Pt-39)
11.	Sulphate (SO_4)	mg/L	32.58	33.7	71.9	58.8	IS:3025 (Pt-24)
12.	Nitrate (NO_3)	mg/L	0.62	0.68	65.27	3.81	IS:3025 (Pt-34)
13.	Fluoride (F)	mg/L	0.16	0.30	0.37	0.48	IS:3025 (Pt-60)
14.	Iron (Fe)	mg/L	0.35	0.16	0.54	0.20	IS:3025 (Pt-53)
15.	Aluminium (Al)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3500 (B)
16.	Selenium (Se)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3113 (B)
17.	Cyanide (Cn)	mg/L	<0.02	<0.02	<0.02	<0.02	APHA-4500 (C)
18.	Copper(Cu)	mg/L	<0.05	<0.05	<0.05	<0.05	APHA-3111(B)
19.	Magnesium (Mg)	mg/L	27.7	14.6	16.01	24.3	IS:3025 (Pt-45)
20.	Manganese(Mn)	mg/L	<0.1	<0.1	<0.1	<0.1	APHA-3111(B)
21.	Zinc(Zn)	mg/L	0.49	0.49	0.55	0.56	APHA-3111 (B)
22.	Cadmium(Cd)	mg/L	<0.001	<0.001	<0.001	<0.001	APHA-3111 (B)
23.	Lead(Pb)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3111 (B)
24.	Boron	Mg/L	<0.05	<0.05	<0.05	<0.05	IS:3026(Pt-57)
25.	Mercury(Hg)	mg/L	<0.001	<0.001	<0.001	<0.001	APHA-3112 (B)
26.	Molybdenum(mo)	mg/L	<0.05	<0.05	<0.05	<0.05	IS:3025(Pt-2)
27.	Nickel (Ni)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3111 (B)
28.	Arsenic(As)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3500 (B)
29.	Chromium (Cr+6)	mg/L	<0.01	<0.01	<0.01	<0.01	APHA-3500 Cr-B
30.	Conductivity (25 °C)	µs/Cm	668.9	778.8	882.2	675.8	APHA-2510
31.	Chemical Oxygen Demand (COD)	mg/L	15.5	16.6	26.2	25.5	APHA-5220 (B)

32.	Biological Oxygen Demand (BOD at 27^{O}C for 3 day)	mg/L	3.2	2.7	3.19	3.47	APHA-4500 (D)
33.	Dissolve Oxygen (DO)	mg/L	6.4	5.4	4.1	4.16	APHA-5210
34.	E. Coli	MPN/100ml	380	170	580	280	IS:1622-1981
35.	Total Coliform	MPN/100ml	420	250	870	360	IS:1622-1981

3.8.4.1 Observation on Surface water Quality

The baseline quality of water based on the results of the surface water quality monitoring within the study area, it is observed that,

- pH was observed in the range of 7.57 – 7.98 with minimum at Pond, Tajpur (SW1) and maximum at Pond, Bijokhari (SW4).
- COD was in the range of 15.5 – 26.6 mg/L with minimum at Pond, Tajpur (SW1) and maximum at Pond, Tarupur (SW3).
- BOD was in the range of 2.7 – 3.47 mg/L with minimum at Pond, Naraich (SW2) and maximum at Pond, Bijokhari (SW4).
- TDS was in the range of 452.2 – 617.3 mg/L with minimum at Pond, Bijokhari (SW4) and maximum at Pond, Tarupur (SW3).
- DO was in the range of 4.1 – 6.4 mg/L with minimum at Pond, Tarupur (SW3) and maximum at Pond, Tajpur (SW1).

3.8.4.2 Result & Conclusion

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

3.9 Air Environment

3.9.1 General

This section describes the prevailing air environment in the study area for evaluating the impacts of mining activity in surrounding areas. This has been achieved by determining the ambient air quality within the study area, represented by 10 km radius area around the project site, as shown in **Figure 3-19.** Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hourly monitoring was carried out for SO_2, NO_2, PM_{10} & $PM_{2.5}$ twice a week at each station. This study was done during Summer season from **1st March 2023 to 31st May 2023**. The analysis reports are appended below in the **Table-3-13.**

Table 3-11:- Site-specific meteorological data

	January	**February**	**March**	**April**	**May**
Avg. Temperature °C (°F)	16.1 °C	19.9 °C	25.7 °C	30.8 °C	32.2 °C
	(60.9) °F	(67.9) °F	(78.2) °F	(87.4) °F	(89.9) °F
Min. Temperature °C (°F)	9.9 °C	13.2 °C	18.2 °C	23.4 °C	26.1 °C
	(49.8) °F	(55.8) °F	(64.8) °F	(74.1) °F	(79) °F
Max. Temperature °C (°F)	22.4 °C	26.5 °C	32.9 °C	38 °C	38.2 °C
	(72.3) °F	(79.7) °F	(91.2) °F	(100.4) °F	(100.8) °F
Precipitation / Rainfall mm (in)	16	15	11	11	39
	0	0	0	0	-1
Humidity (%)	68%	59%	41%	35%	48%
Rainy days (d)	2	2	2	2	5
avg. Sun hours (hours)	8.7	9.7	10.6	11.1	10.8

(Source: https://en.climate-data.org/asia/india/bihar/bihar-sharif-2841/t/january-1/)

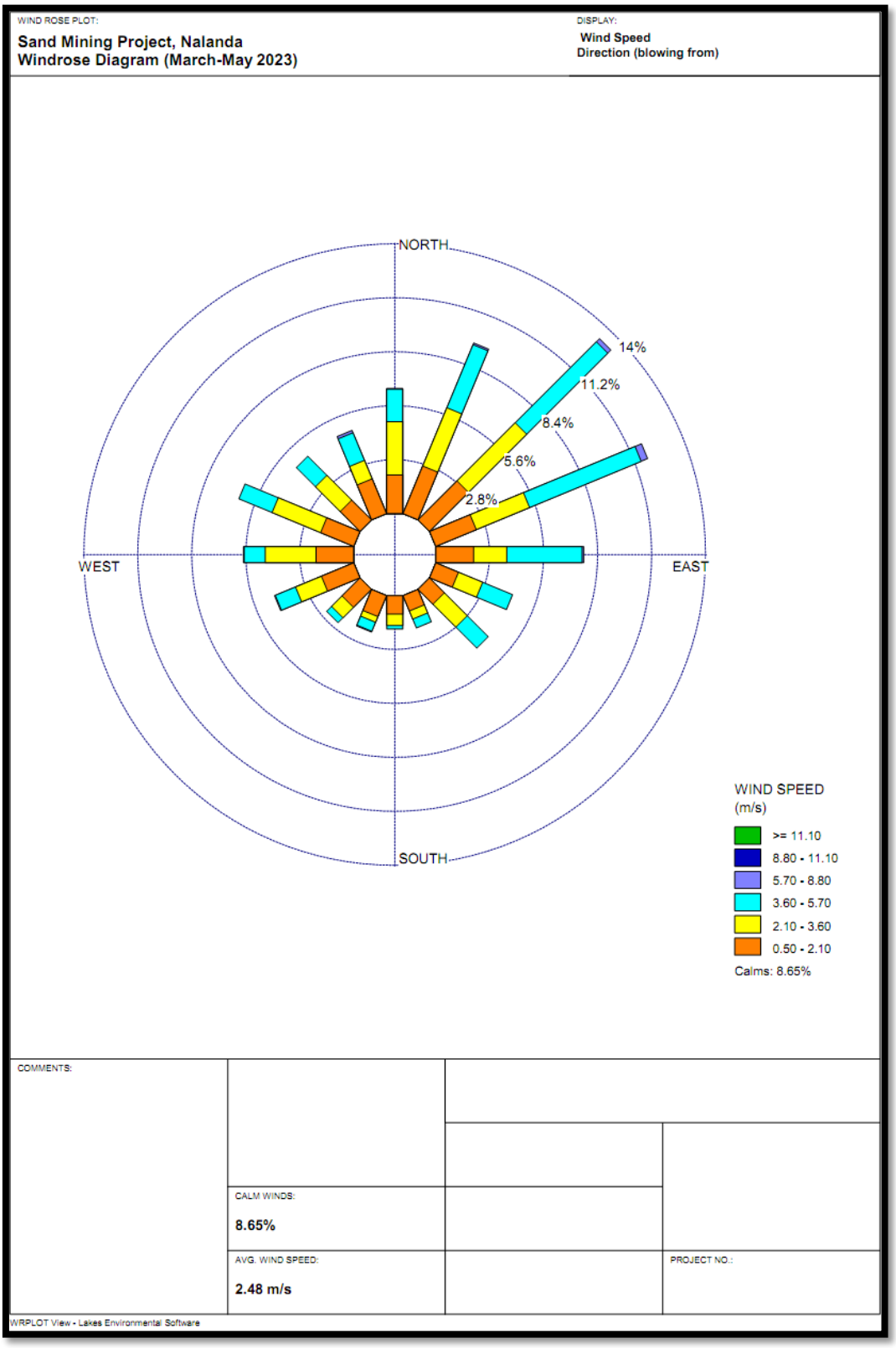


Figure 3-18: Wind Rose Pattern

3.9.2 Observation

The prominent seasonal wind direction is from NE to SW contributing approximately 8.65 % of the total.

3.9.3 Methodology

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

1. Meteorology of the area: From the meteorological data the frequency and duration of wind is preliminary determined, from which the wind rose diagram is first drawn. Eight monitoring stations have been selected to assess the Air quality in study area.
2. The location of nearest human habitation is also considered for selecting the location of air quality monitoring station. The quality of air at this location is important to know the impact of the proposed mining activities in terms of emission of particulate matter and gaseous emissions.
3. It is equally important to know the accessibility to the selected air quality stations. Therefore, the availability of roads along with electricity also plays an important role in finalizing the ambient air quality monitoring locations.

Based on these factors, Eight monitoring locations were identified as shown in **Table 3-12** and **Figure 3-19.** CPCB guidelines for the measurement of ambient air quality on 24 hourly monitoring was carried out for SO_2, NO_2, $PM_{2.5}$& PM_{10} twice a week at each station for a study period of 3 months 1st March 2023 to 31st May 2023.

Table 3-12 : Ambient Air monitoring locations

S. No.	Name	Distance & Direction from project site	Co-ordinates
AAQ1	Barhauna	0.57 Km, West	25°10'50.25"N 85°10'2.39"E
AAQ2	Bijalipur Metara	2.09 Km, WNW	25°11'17.69"N 85° 9'12.60"E
AAQ3	Navgarh	1.87 Km, NW	25°11'50.92"N 85° 9'51.27"E
AAQ4	Chhajjupur	2.53 Km, North	25°12'19.33"N 85°10'27.93"E
AAQ5	Narayanpur	3.30 Km, NE	25°12'0.12"N 85°11'54.86"E
AAQ6	Mozaffara	2.28 Km, ESE	25°10'15.13"N 85°11'39.97"E
AAQ7	Kobil	1.40 Km, SE	25° 9'52.63"N 85°10'49.02"E
AAQ8	Murgaon	2.29 Km, SSW	25° 9'16.04"N 85° 9'58.41"E

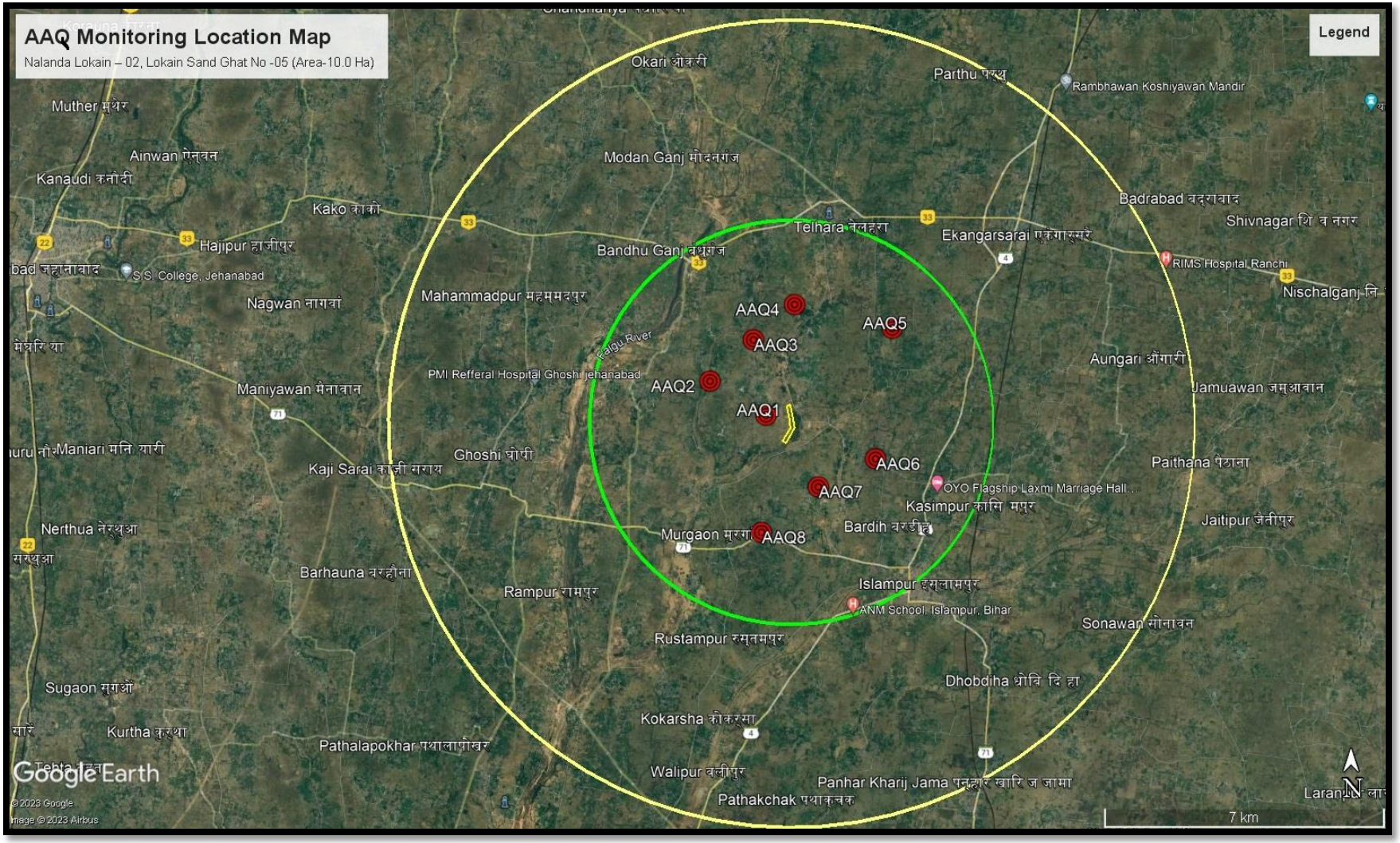


Figure 3-19: Map showing Ambient Air Quality Monitoring Locations

Table 3-13 :- Ambient Air Quality Monitoring Results (1st March 2023 to 31st May 2023)

Parameter		AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8	NAAQS
		Barhauna	Bijalipur Metara	Navgarh	Chhajjupur	Narayanpur	Mozaffara	Kobil	Murgaon	
PM_{10} ($\mu g/m^3$)	**Min.**	68.9	55.0	63.5	64.7	52.2	55.6	66.8	59.4	**100**
	Max.	86.0	78.2	90.3	92.7	65.2	69.3	83.3	74.2	
	Mean	76.1	66.6	76.9	72.4	57.8	61.5	73.9	65.8	
	98 %*	85.6	77.9	89.9	88.3	64.9	69.0	82.9	73.8	
$PM_{2.5}$ ($\mu g/m^3$)	**Min.**	31.6	31.6	36.5	34.6	23.9	25.5	30.6	27.2	**60**
	Max.	47.8	45.8	58.2	52.4	36.3	38.6	46.4	41.3	
	Mean	37.1	36.4	42.3	40.5	28.3	30.1	36.1	32.2	
	98 %*	47.6	44.8	57.5	52.1	36.0	38.3	46.1	41.0	
SO_2 ($\mu g/m^3$)	**Min.**	9.4	11.1	10.0	9.6	7.1	7.6	9.1	8.1	**80**
	Max.	15.7	16.8	15.1	14.3	11.9	12.6	15.2	13.5	
	Mean	12.8	13.6	12.2	11.7	9.7	10.3	12.4	11.0	
	98 %*	15.6	16.5	14.9	14.2	11.8	12.6	15.1	13.4	
NO_X ($\mu g/m^3$)	**Min.**	24.4	31.3	25.4	21.8	18.5	19.7	23.7	21.1	**80**
	Max.	31.1	45.9	37.2	27.7	23.6	25.1	30.1	26.8	
	Mean	27.1	39.0	31.6	24.3	20.6	21.9	26.3	23.4	
	98 %*	30.5	45.4	36.8	27.2	23.1	24.6	29.5	26.3	
(CO) (mg/m^3)	**Min.**	0.30	0.30	0.39	0.28	0.19	0.20	0.24	0.21	**1 Hrs.=04**
	Max.	0.79	0.76	0.87	0.80	0.54	0.57	0.68	0.61	
	Mean	0.53	0.56	0.67	0.54	0.38	0.40	0.48	0.43	
	98 %*	0.77	0.75	0.86	0.78	0.53	0.56	0.67	0.60	

3.9.4 Results

The ambient air quality study for the 8 villages (AAQ) monitoring stations shows that the maximum and minimum ground level concentration for PM_{10} is respectively 92.7 µg/m^3 at Chhajjupur (AAQ4) and 52.2 µg/m^3 at Narayanpur (AAQ5). Whereas the maximum and minimum ground level concentration for $PM_{2.5}$ ranges between 58.2 µg/m^3 at Navgarh (AAQ3) and 23.9 µg/m^3 at Narayanpur (AAQ5) respectively. Similarly, for SO_2, the maximum and minimum ground level concentration varies between 16.8 µg/m^3 and 7.1 µg/m^3 for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For NO_2 the maximum and minimum ground level concentration varies between 45.9 µg/m^3 & 18.5 µg/m^{3}for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For CO the maximum and minimum ground level concentration varies between 0.87 µg/m^3 & 0.19 µg/m^{3}for respectively Navgarh (AAQ3) and Narayanpur (AAQ5) stations.

3.10 Noise Environment

3.10.1 General

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

3.10.2 Methodology

The proposed project activity is expected to affect ambient noise quality in the surrounding areas only by the movement of sand excavation and sand carrying vehicles. Therefore, the choice of monitoring locations is based on human habitation factors. **Table 3-14** and **Figure 3-20** shows noise quality monitoring locations.

Table 3-14: Noise Quality Monitoring Stations

S.No.	Name	Distance & Direction from project site	Co-ordinates
NQ1	Barhauna	0.57 Km, West	25°10'50.25"N 85°10'2.39"E

NQ2	Bijalipur Metara	2.09 Km, WNW	25°11'17.69"N 85° 9'12.60"E
NQ3	Navgarh	1.87 Km, NW	25°11'50.92"N 85° 9'51.27"E
NQ4	Chhajjupur	2.53 Km, North	25°12'19.33"N 85°10'27.93"E
NQ5	Narayanpur	3.30 Km, NE	25°12'0.12"N 85°11'54.86"E
NQ6	Mozaffara	2.28 Km, ESE	25°10'15.13"N 85°11'39.97"E
NQ7	Kobil	1.40 Km, SE	25° 9'52.63"N 85°10'49.02"E
NQ8	Murgaon	2.29 Km, SSW	25° 9'16.04"N 85° 9'58.41"E

Table 3-15: Noise Level Status

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	Barhauna	Residential Zone	55	45	47.1	32.6
2	Bijalipur Metara	Residential Zone	55	45	45.0	32.7
3	Navgarh	Residential Zone	55	45	46.6	31.1
4	Chhajjupur	Residential Zone	55	45	45.2	34.5
5	Narayanpur	Residential Zone	55	45	50.8	38.7
6	Mozaffara	Residential Zone	55	45	47.8	36.9
7	Kobil	Residential Zone	55	45	49.3	32.8
8	Murgaon	Residential Zone	55	45	46.4	37.2

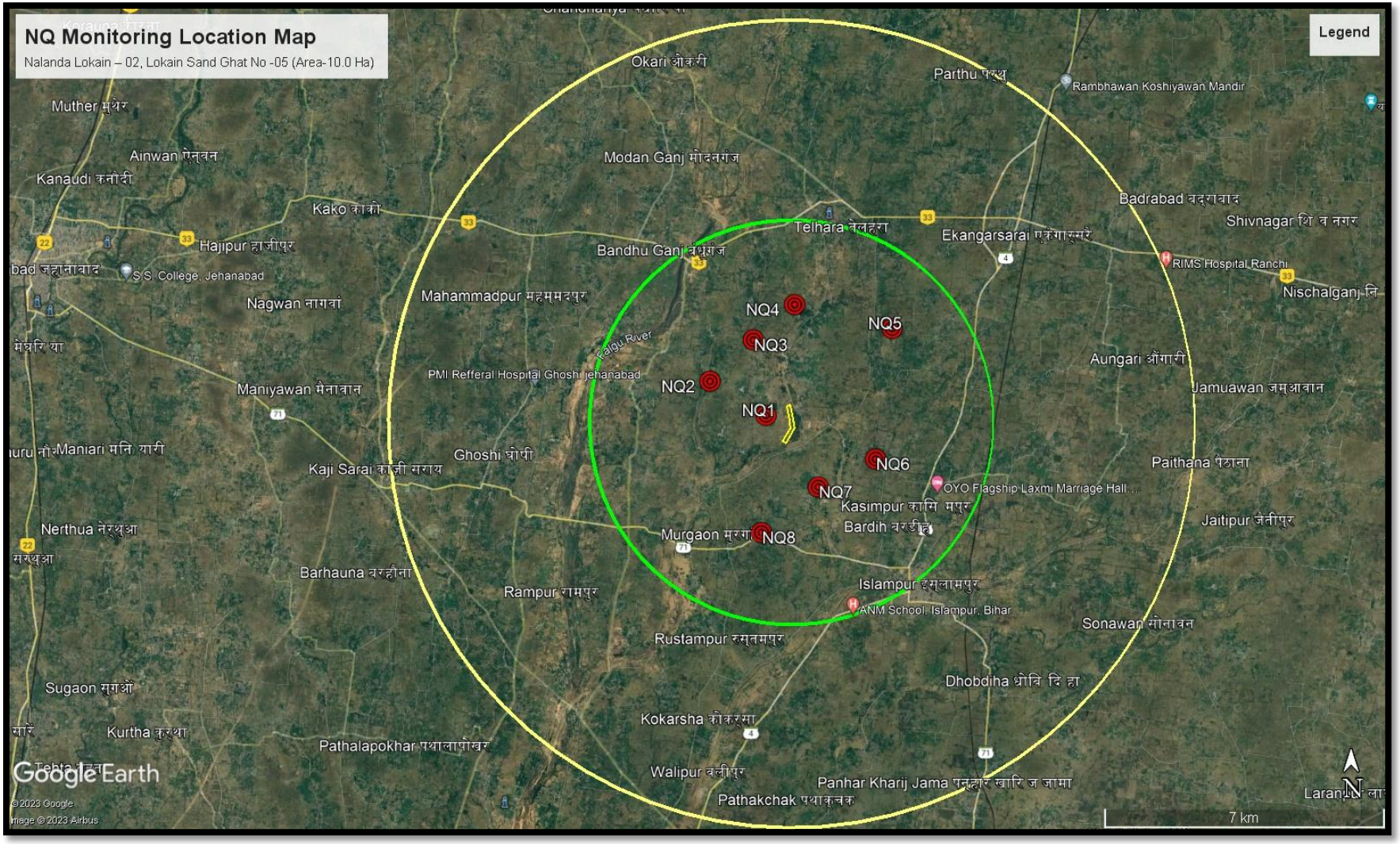


Figure 3-20: Map showing Noise Quality Monitoring Locations

3.10.3 Results

Noise monitoring study reveals that the minimum & maximum noise levels at day time were recorded as 45.2 dB (A) at Chhajjupur (NQ4) & 50.8 dB (A) at Narayanpur (NQ5). The minimum & maximum noise levels at night time were found to be 31.1 dB (A) at Navgarh (NQ3) & 38.7 dB (A) at Narayanpur (NQ5).

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

3.11 Biological Environment

3.11.1 Introduction

The biological environment is very crucial for living environment of any area. The Biological diversity includes the variation of all of life forms mainly genetic, species and population. However, Flora and Fauna diversity is broadly understood type. They are further divided in to terrestrial and aquatic life form. Forests are repository of the bio-diversity, gene pool resources, sequester carbon dioxide and provide lot of other environmental services. They play a very vital role in sustaining the life of people and are crucial for the food and water security. In India, the sustained flow of water in our rivers, streams and rivulets and recharge of ground water is necessary for the food security and drinking water availability. The hydrological functions of forests include interception of rainfall and regulating the stem flows, binding soil to prevent soil erosion and conserving the soil moisture. The Forests are the source of major water resource both surface, subsoil and ground water in the country. Forests supply nutrients to agriculture crops through runoff water with much other complementariness with agriculture ecosystem. The division of core and buffer zone is the best way to study the pattern of biodiversity for environmental impact assessment.

3.11.2 Results and Discussion

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

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

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

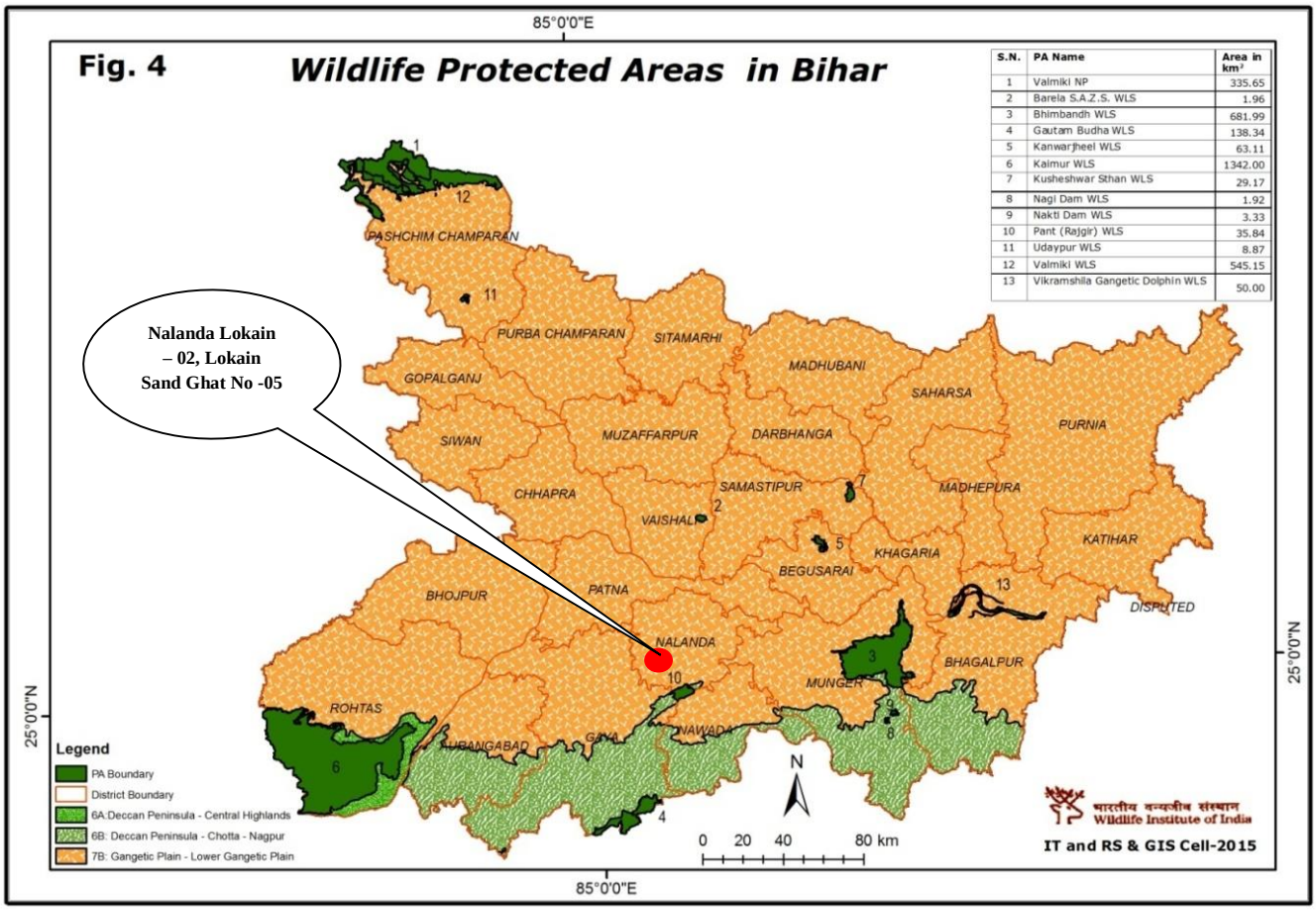


Figure 3-21: Wildlife Protected area of Bihar

3.11.3 Floral biodiversity

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

Buffer Zone: Some of the most dominant species in not forest area are, Neem (*Azadirachta indica*), Gulmohar (*Delonix regia*.), Amaltas (*Cassia fistula*), Ber (*Ziziphusjujube*), Peepal (*Ficusreligiosa*), Shisham (*Dalbergiasissoo*), Sagwan (*Tectona grandis)* etc. were observed within 10 km radius of the study area. Predominant plant vegetation is Dalbergia shisoo, Acacia catechu, Borassus flaberiformis and Bombax ceiba respectively. The other plant is Acacia nilotica, Acacia sp, Azadirachta indica, Zizyphus sp, Cassia tora, Parthenium sp, Cassia sp. The important floras of the study area are given in **Table 3.16, 3.17.**

Table 3-16: Flora (Trees) of the Study Area

Sr. No.	Local Names	English Name	Botanical Names	Family	Uses
1.	Aam	Mango	*Mangifera indica*	Anacardiaceae	Multipurpose tree
2.	Amaltas	Golden shower tree	*Cassia fistula*	Fabaceae	Ornamental Plant
3.	Arjun	Arjun Tree	*Terminalia arjuna*	Combretaceae	Leaves are used for silk worms and have medicinal uses
4.	Amrud	Guava	*Psidium guajava*	Myrtaceae	Fruit is eaten
5.	Bargad	Banyan	*Ficus benghalensis*	Moraceae	Banyan tree has potential to act against the agents causing air pollution.
6.	Bel	Bengal quince	*Aegle marmelos*	Rutaceae	Religious & Multipurpose tree
7.	Ber	Indian date	*Ziziphus jujube*	Rhamnaceae	Fruits are eaten and have medicinal value
8.	Dhatura	Locoweed	*Datura stramoniu*	Solanaceae	Widely used in traditional medicine
9.	Gulmohar	Flamboyant	*Delonix regia*	Fabaceae	Ornamental Plant
10.	Imli	Tamarind	*Tamarindus indica*	Fabaceae	Multipurpose tree
11.	Jamun	black plum	*Syzygium cumini*	Myrtaceae	Multipurpose tree
12.	Jungle Jalebi	Jungle Jalebi	*Pithecellobium dulce*	Fabaceae	Fruit is eaten
13.	Kadamb	Burflower-tree	*Neolamarckia cadamba*	Rubiaceae	Fruit is eaten & the flowers are used in a sandalwood based perfume 'attar' &fresh leaves are fed to cattle.
14.	Kathal	Jackfruit	*Artocarpus heterophyllus*	Moraceae	Multipurpose tree
15.	Khajoor	Date palm	*Phoenix sylvestris*	Arecaceae (Palmae)	It has rich in Protein, Iron & Vitamins, Lowers cholesterol. Improves bone health Strengthens the nervous system.
16.	Kela	Banana	*Musa acuminata Colla*	Musaceae	Fruit is eaten
17.	Mahua	Indian butter tree	*Madhuca longifolia*	Sapotaceae	It is used as an oil and alcoholic drink, Flowers are edible, pressed cake are used

					killing fishes in aqua culture pond.
18.	Neem	Indian Lilac	*Azadirachta indica*	Meliaceae	Multipurpose tree
19.	Peepal	Sacred fig	*Ficus religiosa*	Moraceae	Religious & Multipurpose tree
20.	Sagwan	Teak	*Tectona grandis*	Lamiaceae	Timber plant
21.	Sal	Indian Dammer	*Shorea robusta*	Dipterocarpaceae	It is used as an astringent in Ayurvedic medicine and also used to caulk boats and ships. Sal seeds and fruit are a source of lamp oil and vegetable fat.
22.	Semal	Silk Cotton Tree	*Bombax ceiba*	Malvaceae	It is used in the treatment of asthma, diarrhea, wound, leucorrhoea, anemia, seminal disorders and skin problems.
23.	Shaijan	Drum stick	*Moringa Oleifera*	Moringaceae	Its young seed pods and leaves are used as vegetables. It can also be used for water purification and hand washing, and is sometimes used in herbal medicine.
24.	Siris	Lebbek tree	*Albizia lebbeck*	Mimosaceae	Its uses include environmental management, forage, medicine and wood.
25.	Sisham	North Indian rosewood	*Dalbergia sissoo*	Fabaceae	Best known economic timber species

Table 3-17: **Flora (Shrubs/Herbs/Climbers) of the Study Area**

S. NO.	Common Name	Botanical Name	Family Name
Shrubs/herbs/Climbers			
1.	Aloe vera	*Aloe vera*	Asphodelaceae
2.	Ban Tulsi	*Croton bonplandianum*	Euphorbiaceae
3.	Giant Milkweed	*Calotropis procera*	Apocynaceae
4.	Holy Basil (Tulsi)	*Ocimum tenuiflorum*	Lamiaceae

5.	Harsingar	*Nyctanthes arbor-tristis*	Oleaceae
6.	Indian Catmint	*Anisomeles indica*	Lamiaceae
7.	Nag Phani	*Opuntia elatior*	Cactaceae
8.	Pink Node Flower	*caesulia axillaris*	Asteraceae
9.	Sadabahar	*Catharanthus roseus*	Apocynaceae
10.	Yellow Kaner	*Thevetia peruviana*	Apocynaceae
Grasses			
11.	Bermuda grass	*Cynodon dactylon*	Poaceae
12.	Doob	*Cynodon dactylon*	Poaceae
13.	Elephant Grass	*Arundo donax*	Poaceae
14.	Kush grass	*Desmostachya bipinnata*	Poaceae
15.	Weeping grass	*Eragrostis curvula*	Poaceae

Source :(i) * Field Observation and discussion with local people in Study Area,

3.11.4 Faunal Biodiversity

The fauna visiting core zone includes snakes (*Ptyas mucosus*), rabbits (*Lepus nigricollis*), fish (*Catla catla*), crows (*Corvus splendens*) etc. As per the information collected by the field team, the common animals of the study area are frogs (*Hoplobatrachus tigerinus*), Indian garden lizards (*Calotes versicolor*), House lizards (*Hemidactylus frenatus*). In addition, the commonly found domestic animals such as cow, dog, cat etc. and lower life forms such as ants, spider, butterfly, bee, wasp, and termite are also found in the study area. The common birds inhabiting in the study area are Bulbul (*Pycnonotus jocosus*), Pigeon (*Columba livia*), and Koel (*Eudynamys scolopaceus*) along with some water birds like Cattle egret (*Egretta garzetta*) and White- throated Kingfisher (*Halcyon smyrnensis*). Table 3.18 gives a list of fauna in the study area.

Table 3-18: Fauna of the Study Area

Sr.No.	Common Names	Scientific Name	Wildlife Schedule
Amphibians			
1	Common Indian Green Frog	*Rana hexadactyla*	Schedule-IV
2	Indian Bull Frog	*Hoplobatrachus tigerinus*	Schedule-IV
Reptiles			
1	Indian garden lizards	*Calotes versicolor*	Schedule-IV
2	House Lizards	*Hemidactylus frenatus*	Schedule-IV
3	Indian cobra	*Naja naja*	Schedule II: Part -II
4	Rat snake	*Ptyas mucosus*	Schedule II: Part -II
Mammals			
1.	Black Rat	*Rattus rattus*	Schedule-V
2.	Domestic Cow	*Bos Taurus*	Schedule-IV
3.	Indian Flying Fox	*Pteropus giganteus*	Schedule- V

Sr.No.	Common Names	Scientific Name	Wildlife Schedule
4.	Indian palm squirrel	*Funambulus pennantii*	Schedule-IV
5.	House Goat	*Capra hircus*	Schedule-IV
6.	Indian Field Rat	*Mus booduga*	Schedule-V
7.	Indian Gray Langur	*Semnopithecus entellus*	Schedule-II
8.	Indian Hare	*Lepus nigricollis*	Schedule-IV
9.	Indian Pariah Dog	*Canis lupus familiaris*	Schedule-IV
10.	Water Buffalo	*Bubalus bubalis*	Schedule-IV
Aves			
1.	Asian Koel	*Eudynamys scolopaceus*	Schedule-V
2.	Bank Myna	*Acredotheres ginginianus*	Schedule-IV
3.	Baya Weaver	*Ploceus philippinus*	Schedule-IV
4.	Barn Swallow	*Hirundo rustica*	---
5.	Black kite	*Milvus migrans*	Schedule-IV
6.	Bronze- winged Jacana	*Metopidius indicus*	Schedule-IV
7.	Cattle Egret	*Egretta garzetta*	Schedule-IV
8.	Common Myna	*Acridotheres tristis*	Schedule-IV
9.	House Crow	*Corvus splendens*	Schedule-IV
10.	House Sparrow	*Passer domesticus*	Schedule-IV
11.	Indian Moorhen	*Gallinula Chloropus*	Schedule-IV
12.	Indian Pond Heron	*Ardeola grayii*	Schedule-IV
13.	Indian Roller	*Coracias benghalensis*	Schedule-IV
14.	Jungle Babbler	*Turdoides striata*	Schedule-IV
15.	Little Egret	*Egretta garzetta*	Schedule-IV
16.	Purple Sunbird	*Cinnyris asiaticus*	Schedule-IV
17.	Red- Vented Bulbul	*Pycnonotus cafer*	Schedule-IV
18.	Red Wattled Lapwing	*Vanellus indicus*	Schedule-IV
19.	Red- Whiskered Bulbul	*Pycnonotus jocosus*	Schedule-IV
20.	Rock Pigeon	*Columba livia*	Schedule-IV
21.	Rose- ringed Parakeet	*Pssitaculata krameri*	Schedule-IV
22.	Spotted Dove	*Spilopelia chinensis*	Schedule-IV
23.	White- breasted Waterhen	*Amaurornis phoenicurus*	Schedule-IV
24.	White- throated Kingfisher	*Halcyon smyrnensis*	Schedule-IV
Insects			
S. No.	**Common Name**	**Scientific Name**	**Family Name**
1.	Crab spiders	*Thomisus spectabilis*	Thomicideae
2.	Common Wanderer (Butterfly)	*Pareronia valeria*	Pierideae
3.	Common Social Wasp	*Ropalidia marginata*	Vespideae
4.	Fire ants (red ants)	*Selonopsis invicta)*	Formicideae
5.	Indian Drywood Termites	*Cryptotermes dudleyi*	Termitoideae

Most of animals found in the study area are of least concern.

3.12 Socio-Economic Environment

This section of the EIA report deals with Socio-Economic Impact assessment of the Proposed Sand Mining Project of Area 10.0 Ha at Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River at Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar.

Data Collection: Following steps were considered for the collection of primary data:

1. Identifying of Study Area
2. Site Visit
3. Analysis of Data Collected

The data on socio-economic aspects in the study area has been carried out through the analysis of the primary data as well as secondary data available for the study area.

The broad objectives of the socio-economic impact assessment are as follows:

a) To study the socio-economic status of the people living in the study area of the Proposed Sand Mining Project.
b) To assess the impact on socio-economic environment due to Proposed Sand Mining Project.
c) To assess the impact of the project on State Gross Domestic Product (SGDP)
d) To evaluate the community development measures proposed to be taken up by the Project
   Proponent, if any.
e) To suggest Community Development measures needs to be taken for the study area

3.12.1 Methodology

The methodology adopted for impact assessment is as follows:

a) The details of the activities and population structure have been obtained from Census 2011 and analyzed.
b) Primary data was collected by a door-to-door survey in urban area and household's living therein. The data collected during the above survey were analyzed to evaluate the prevailing socio-economic profile of the area.
c) Based on the above data, impacts due to construction operation on the community have been assessed and recommendations for further improvement have been made

3.12.2 Demography structure of the district

According to the 2011 census Nalanda district was a population of 2368000 in which male's population was 1497060 and Females was 13,80,593. The district has a population density of 1,220 inhabitants per square kilometre (3,200/sq mi). Its population growth rate over the decade 2001-2011 was 21.18%. Nalanda has a sex ratio of 921 females for every 1000 males, and a literacy rate of 66.41%. 15.91% of the population lives in urban areas. Scheduled Castes and Scheduled Tribes make up 21.12% and 0.05% of the population respectively. At the time of the 2011 Census of India, 56.27% of the population in the district poke Magahi, 37.28% Hindi and 5.69% Urdu as their first language.

Table 3-19: List of Villages in Study Area

Sr. No.	Name of the Village	No. House Hold	Total Population	Total Male	Total Female	Total Population (0-06 year)	Total Male Population (0-06 year)	Total Female Population (0-06 year)
1	Bazidpur	112	696	370	326	99	59	40
2	Parthu	407	2562	1327	1235	384	192	192
3	Naiawan	387	2440	1249	1191	501	250	251
4	Pitamberpur	353	2206	1146	1060	373	193	180
5	Lat	179	1380	706	674	199	99	100
6	Walipur	306	1938	1013	925	306	156	150
7	Mokimpur	195	1186	632	554	204	112	92
8	Arhit	215	1206	616	590	180	96	84
9	Musauli	180	1205	618	587	216	114	102
10	Sanda	559	3801	2004	1797	653	351	302
11	Kewai	174	1172	597	575	242	127	115
12	Rasalpur	255	1477	775	702	285	155	130
13	Sarthua Khurd	159	1136	594	542	212	106	106
14	Banchhilli	82	482	238	244	97	43	54
15	Sonawan	353	2247	1168	1079	423	222	201
16	Ashrafpur	174	1224	656	568	246	134	112
17	Danapur	174	1025	535	490	183	96	87
18	Bhimalpur	310	1914	1008	906	320	167	153
19	Waina	516	3085	1613	1472	488	270	218
20	Mohiuddinpur	185	1207	601	606	230	116	114
21	Mundipur	677	3749	1930	1819	579	297	282
22	Aungari	921	5261	2779	2482	885	458	427
23	Paharpura	115	689	347	342	146	80	66
24	Dariapur	205	1361	689	672	204	100	104
25	Nisanpura	213	1571	823	748	295	146	149
26	Dharampur	351	1986	1037	949	384	202	182
27	Kobil	457	2945	1507	1438	495	271	224
28	Barhauna	406	2752	1470	1282	418	220	198
29	Nawada	14	54	25	29	6	4	2
30	Dhorhari	122	651	324	327	84	35	49

31	Naraich	140	782	387	395	186	84	102
32	Tarupur	40	357	186	171	46	27	19
33	Chiri	495	2981	1552	1429	511	239	272
34	Bharthu	617	3987	2061	1926	648	360	288
35	Damaua	104	610	319	291	90	40	50
36	Mehdipur	61	396	191	205	78	41	37
37	Khopura	110	779	409	370	148	78	70
38	Shekhpura	212	1258	656	602	256	132	124
39	Siripur	182	1111	582	529	186	93	93
40	Golakpur	1361	8122	4222	3900	1386	734	652
41	Bishunpur	76	499	247	252	90	48	42
42	Selai	303	1988	1067	921	368	216	152
43	Ahiasa	505	3274	1686	1588	671	341	330
44	Daharpur Milik	31	233	123	110	34	19	15
45	Mahammadpur	203	1263	670	593	247	126	121
46	Mansinghpur	205	1219	609	610	248	130	118
47	Jaitipur	70	510	261	249	85	45	40
48	Sultanpur	114	691	357	334	91	52	39
49	Kanjas	111	580	304	276	93	46	47
50	Khajepura	283	1797	923	874	361	185	176
51	Hajipur	108	587	316	271	67	40	27
52	Barsiawan	386	2573	1365	1208	462	238	224
53	Maharaj Ganj	173	1080	555	525	192	92	100
54	Dhawan	314	1900	992	908	291	171	120
55	Chaurai	241	1313	700	613	223	111	112
56	Rasulpur	194	1430	767	663	293	153	140
57	Amthua	898	5245	2704	2541	900	467	433
58	Madarpur	114	876	458	418	153	73	80
59	Habibpur	37	212	116	96	47	30	17
60	Lakhawar	1778	11737	6011	5726	2226	1183	1043
61	Pewta	115	639	327	312	121	69	52
62	Nurpur	142	994	516	478	163	83	80
Total		**18479**	**115631**	**60036**	**5595**	**20298**	**10617**	**9681**

3.12.3 Demographic structure of the study area

Socio-economic status of the population is an indicator of development of the region. Any developmental project of any magnitude will have a bearing on the living condition and the economic bearing of the population in particular and the region as a whole. The section delineates the overall appraisal of the socially relevant attributes. The data on socio-economic aspects in the study area has been carried out through the analysis of the secondary data available for the study area.

3.12.4 Population in Core Zone

The project site is vacant area.

3.12.5 Population in Buffer Zone

The study area is involving 62 villages. The Total Population of study area is 115631 individuals and 18479 numbers of households. A comparative assessment has been made for

the respective demographic aspects, based on the year 2011 data, which has been discussed in the following sections.

The total population of study area is 115631 the percentages of male & female population are 52 % & 48 % respectively. Breakup of the population for male and female is given in **Table No. 3-21.**

Table 3-20: Breakup of the Population

Particulars	Number
No of households	18479
Total population	115631
Male population	60036
Female population	55595
Average family size	6

(Source: As per Census Data 2011)

3.12.6 Social structure

In 2011, about 19 % of the total population belonged to Scheduled Castes (SC) and 0.1 % of the total population belonged to Scheduled Tribes (ST). The distribution of population in the study area by social structure is presented in **Table No. 3-22.**

Table 3-21: Distribution of Population by Social structure in Study Area

Particulars	Number
Total Scheduled Castes	21598
Scheduled Castes Male	11175
Scheduled Castes Female	10423
Total Scheduled Tribes	107
Scheduled Tribes Male	53
Scheduled Tribes Female	54

(Source: As per Census Data 2011)

3.12.7 Literacy levels

In 2011, about 55 % of the total population belonged to Literates population and 45 % of the total population belonged to Illiterates population. The male literacy rate is 61 % and the female literacy rate was 39 %. The details are presented in **Table No. 3-23.**

Table 3-22: Distribution of Literates in Study Area

Particulars	Number
Total Literates	63871
Male	38738
Female	25133

Total illiterates	51760
Male	21298
Female	30462

(Source: As per Census Data 2011)

3.12.8 Occupation Pattern of the study area

The occupational structure of the population in the study area has been studied with reference to the total workers and non-workers. Further total workers grouped into two categories main workers and marginal workers. Main workers have been grouped into four categories namely: Cultivators, agricultural laborers, household workers and other workers.

3.12.8.1 Total workers

Work is defined as participation in any economically productive activity with or without compensation, wage. Such participation may be physical and/ or mental in nature. Work involves not only actual work but also include supervision and direction of work. It even includes part time help or unpaid work on farm, family enterprise or its economic activity. All persons engaged in 'work' as defined above are workers.

The number of total workers in the study area is 40892 which are 35 % of total population. Out of total 40892 workers, which are 27828 males (68 %) and 13064 are Females (32 %). Total workers further divided into main workers and marginal workers.

3.12.8.2 Main workers

Those workers who had worked for the major part of the reference period (i.e., 6 months or more) are term main workers. Total number of main workers is 26545 which are male 75 % & Female 25 % and 23 % of total population.

3.12.8.3 Marginal Workers

The marginal workers are those workers, who are engaged in some work for a period of less than six months, during the reference year prior to the census survey. Total number of marginal workers is 14347 which are approx. 56 % Males & 44 % Females.

3.12.8.4 Cultivator

A person is classified as cultivator if he or she is engaged in cultivation of land own or from government or held from private persons or institutions for payment in money, kind or share. Cultivation work includes effective supervision or direction in cultivation. A person who has given out her/his land to another person or institution(s) for cultivation for money, kind or share of crop and who does not even supervise or direct cultivation process is not treated as cultivator. Similarly, a person working on another person's land for wages in cash or kind or combination of both is not treated as cultivator.

Total cultivators are 6543 which are 16 % of Total workers. The distribution of cultivators is male percentage is 83 % and female percentage is 17 %.

3.12.8.5 Agricultural Labourers

A Persons working on the land of others for wages or share in the yield have been treated as agricultural labourers. The total Agriculture workers of this category are about 13737 which are 12 % of the total population.

3.12.8.6 Other Workers

The Other-workers are in study area 5 % of the total population in 2011. Out of total 5281 Other- workers, males are 3918 while females are 1363. Also, the male percentage is 74 % and the female percentage is 26 %.

3.12.8.7 Non Workers

The non-workers are in study area 65 % of the total population in 2011. Out of total 74739 non- workers, males are 32208 while females are 42531. Also, the male percentage is 43 % and the female percentage is 57 %.

Table 3-23: Distribution of Workers in Study Area

S. No.	Particulars	Number of Workers in the study area		
		Total	Male	Female
1.	Total Workers	40892	27828	13064
2.	Main Workers	26545	19855	6690
3.	Marginal Worker	14347	7973	6374
4.	Cultivators	6543	5408	1135
5.	Agricultural Labour	13737	9973	3764
6.	Other Workers	5281	3918	1363
7.	Non-workers	74739	32208	42531

(Source: As per Census Data 2011)

3.12.9 Rehabilitation &Resettlement (R&R) Action Plan

No further land acquisition required for the project; hence no R & R Action plan is required. There is no Land Acquisition.

3.12.10 Social infrastructure nearby project site

a) Nearest Habitation: -

- Barhauna, Approx. 0.51 Km towards West.
- Kobil, Approx. 1.28 Km towards SE.

b) Educational Facilities: -

- Tejpur Middle School, Approx 0.97 Km towards SW.
- Government School, Barhauna Approx 0.40 Km towards West.

c) Medical Facilities:

- Govt. Primary Hospital, Kajichak, Approx. 4.7 Km towards NE.
- Bharthu Govt. hospital Approx. 3.6 Km towards West.

d) Religious facilities: -

- Jagdamba Temple, Approx. 0.57 Km towards West
- Devi Mandir, Approx. 0.48 Km towards NE

e) Post office & Police Station: -

- Murgaon Post Office, Approx, 2.23 Km towards SSW
- Dariyapur Post Office, Approx, 3.9 Km towards ESE.
- Islampur Police, Approx. 4.80 km towards SE direction.

f) Drinking water: - Drinking water facility will be provided by the Project proponent. It will be managed by private tankers.

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

3.12.11Impact Assessment & Conclusion

The project activity together with inflow of capital, in-migration and employment of local inhabitants will show positive impact on the overall social and economic condition of the people of the area. The project will provide a direct job opportunity to the local persons as both technical and non-technical workers. Literacy may further increase because of better income and awareness amongst the people. The project will provide direct employment opportunity to local people. Indirect employment is being generated in trade and other ancillary services. Employment in these sectors is both permanent and temporary or contractual and involvement of unskilled labour. A major part of this labour force is mainly from nearby villages that are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area. The following socio-economic changes may take place due to project activities:

- The project will have a positive employment and income effect, both direct as well as indirect.
- Expected Improvement of infrastructure& transportation.
- The project will have positive impact on consumption behavior by way of raising average consumption and income through multiplier effect.
- The project will bring changes in the pattern of demand from food to non-food items as sufficient income will generate.
- People located in the project area and in close vicinity, enjoying positive changes in life style and better quality of life.

Table 3-24 :- Demographic particulars of the study area

SL No.	Descriptions	Number	Percentage (%)
1	Total no. of villages in the study area	62	
2	Total Population of the Study Area	115631	
	Male	60036	52
	Female	55595	48

	Sex Ratio (No. of females per 1000 males)	926	
3	0-6 Year Population in Study Area	20298	18
	Male	10617	52
	Female	9681	48
	Sex Ratio (No. of females per 1000 males)	912	
4	Total number of Households	18479	
	Average Household size in the Study Area as a whole	6	
5	Total Population of Schedule Caste Community in the Study Area	21598	19
	Male	11175	52
	Female	10423	48
6	Total Population of Schedule Tribe Community in the Study Area	107	0.1
	Male	53	50
	Female	54	50
7	Total Literates in the Study Area	63871	55
	Male	38738	61
	Female	25133	39
8	Total illiterates in the Study Area	51760	45
	Male	21298	41
	Female	30462	59
9	Total Worker Population	40892	35
	Male	27828	68
	Female	13064	32
10	Main Worker Population	26545	23
	Male	19855	75
	Female	6690	25
11	Marginal Workers	14347	
	Male	7973	56
	Female	6374	44
12	Cultivators	6543	16
	Male	5408	83
	Female	1135	17
13	Agricultural Labour	13737	12
	Male	9973	73
	Female	3764	27
14	Household Worker	5281	5
	Male	3918	74
	Female	1363	26
15	Others Workers	74739	65
	Male	32208	43
	Female	42531	57

16	Non- Workers	62	
	Male	115631	
	Female	60036	52

Source: Census of India 2011

3.13 Traffic Analysis

Transportation Route:

The minerals excavated will be loaded directly into trucks and transported to the concerned market. The Mining Site Nalanda Lokain – 02, Lokain Sand Ghat No -05 is well connected to nearest metaled road going towards SH-71 via an approach road of approx. 2.5 km towards South direction. Two skilled persons were deployed on SH-71 road for a day on dated 20.04.2023 for traffic analysis. The evacuation route is shown in the map as given below:

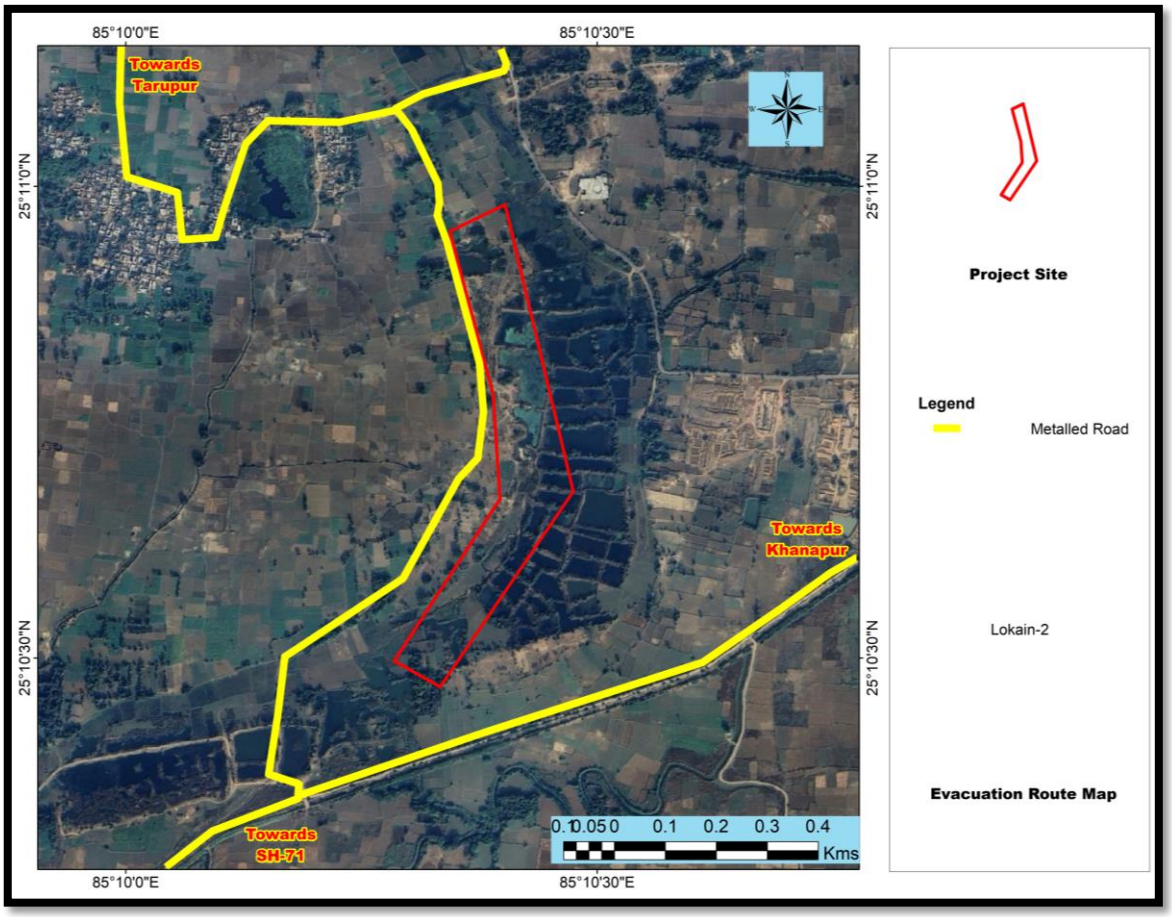


Figure 3-22: Map Showing Evacuation Route

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity. Traffic density measurement were made continuously for 24 hours by

visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers.

Table 3-25: Traffic Analysis

DURING MINE OPERATION						
Proposed Capacity of mine/annum	**No. of working days**	**Proposed Capacity of mine/day**	**Truck Capacity -tonnes**	**Frequency of trucks deployed/day**	**No. of working hours per days**	**Frequency of trucks deployed/hour**
124800 TPA	240	520	12 Ton	43	10	4

Table 3-26: Current Traffic Analysis

Classification of Traffic	**Adopted PCU Value**	**Traffic on SH-71**	
		ADT (Existing)	**PCU (Existing)**
Cars	1	625	625
Three Wheeler	1	55	55
Two wheeler	0.5	1600	800
Buses	3	60	180
LCV	1.5	326	489
Trucks	3	320	960
Tractor-Trailer	4.5	410	1845
Cycle	0.5	406	203
Total Vehicles			**5157**

Existing V/C: 5157/18000 = 0.29

Table 4.45: Traffic due to proposed Project

Trucks due to proposed project: 43

Trucks per day

PCU: 43 x 3 = 129

Cumulative PCUs = 129+5157 = 5286

V/C: 5286 / 18000 = 0.30

Table 3-27: Capacity as per IRC: 64-1990

V/C	**LOS**	**Performance**
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good

0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

V/C Ratio for the existing and proposed project comes under 0.4 hence, the Level of Service of the Road will be of B quality i.e. Very Good LOS.

4 ANTICIPATED IMPACTS AND THEIR MITIGATION MEASURES

4.1 General

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

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

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

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

- Land Environment
- Water Environment
- Air Environment
- Noise Environment
- Biological Environment
- Socio Economic Environment
- Soil Environment

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

4.2 Land Environment

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

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

4.2.1 Anticipated Impacts

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

4.2.2 Mitigation measures

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

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

4.3 Water Environment

4.3.1 Anticipated Impacts

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

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

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

4.3.2 Mitigation measures

Project activity will be carried out only in the dry part of the Lokain 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 1 m below ground level or above the ground water table whichever comes first. Hence mining will not affect the ground water regime as well.

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

4.4 Air Environment

4.4.1 Anticipated Impacts

Emission of fugitive dust is envisaged due to:

- Mining Activities includes excavation and lifting of minerals. The whole process will be done by semi-mechanized process without drilling and blasting. Therefore, the

dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

- Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads. Evaluation of fugitive dust emission has been done by using line source model as given below:

4.4.2 Air quality modeling

Objective

Atmospheric modelling is used by air quality managers to make decisions on effective and efficient ways to implement the National Ambient Air Quality Standards (NAAQS) and improve air quality. Air quality modelling is done to estimate the relationship between sources of pollution and their effects on ambient air quality, predict the impacts from potential emission sources, and simulate ambient pollution concentrations under different policy scenarios. They are critical for determining the relative contributions from different sources, monitoring compliance of air quality regulations, and making policy decisions.

4.4.3 The Air Quality Model

In order to estimate the ground level concentrations due to the emissions from the proposed project, EPA approved American Meteorological Society/Environmental Protection Agency Regulatory Model - AERMOD View 10.0.1 dispersion Model has been used. AERMOD View Dispersion Model provides option to model emissions from a wide range of sources that are present at a typical industrial source complex. The model considers the sources and receptors in undulated terrain as well as plain terrain and the combination of both. The basis of the model is the steady state Gaussian Plume Equation, with modifications to model simple point source emissions from stacks that experience the effect of aerodynamic down wash due to nearby buildings, isolated vents, multiple vents, storage piles etc. AERMOD View dispersion model with the following options has been used to predict the cumulative ground level concentrations due to the proposed emissions. Area being rural, the rural dispersion parameters are considered as below:

- Predictions have been carried out to estimate concentration values over radial distance of 10 km around the sources.
- Cartesian receptor network has been considered.
- Emission rates from the sources were considered as constant during the entire period.

- The ground level concentrations computed were as in basis without any consideration of decay coefficient.
- Calm winds recorded during the study period were also taken into consideration.
- 24-hour mean meteorological data, extracted from the meteorological data collected during the study period as per guidelines of IMD/CPCB has been used to compute the mean ground level concentrations to study the impact of proposed activity.
- Stability class was evaluated based on wind direction fluctuation.
- The mathematical equations used for the dispersion modelling assumes that the earth surface acts as a perfect reflector of plume and physico-chemical processes such as dry and wet deposition and chemical transformation of pollutants are negligible.
- Washout by rain is not considered.
- Source of emission is continuous and at steady state.

Sources of Pollution/Emission

1. Active Mining Area: 100X100m x 100m (**Area Source)**
2. Mine Road **(Line Source)**

4.4.4 Emission Calculation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The general equation for emissions estimation is:

$$E = A \times EF \times (1 - ER/100)$$

Where;

E = emissions in (gm/sec);

A = activity rate (Tonnes/Hr);

EF = emission factor (Kg/Tonnes), and

ER = Overall emission reduction efficiency, %

Emission rate of pollutants from operation of mining is calculated based on the emission factors given in the AP-42 published by USEPA. As per the emission factors published in the above documents, the emission rate has been computed and is provided below**.**

Sr. No.	Emission Source Details	Value
1	Average Wind Velocity, m/s	2.48
2	Moisture Content, %	20
	Mineral Excavation	
1	Production capacity of the mine, TPA	124800
2	Operational hours (Working Days x Working Hours, 240x8)	1920
3	Activity rate, TPH	65
4	USEPA emission factor (EF), kg/MT	2.60511E-05
5	Emission rate (A*EF*1000/3600), g/s	0.000470367
6	Area of activity, m2	10000
7	Uncontrolled emission rate, g/m2/s	4.70367E-08
8	Controlled (90%)emission rate, g/m2/s, a	**4.70367E-09**
	Mineral Loading	
1	USEPA emission factor (EF), kg/MT	0.00015
2	Emission rate,g/s	0.002708333
3	Area of activity, m2	10000
4	Uncontrolled emission rate, g/m2/s	2.70833E-07
5	Controlled (90%)emission rate, g/m2/s, b	**2.70833E-08**
Overall Emission Factor, g/m2/s (a+b)		**3.1787E-08**
Haulage Emission		
1	Surface Silt Content, % by Wt	3
2	Gross Vehicle Weight, Tonnes	30
3	Truck Capacity, MT	12
4	No of Trips /Yr	10400
5	Lead Length/Trip, KM (To & Fro)	20
6	Emission factor, kg/VKmT	0.357526481
7	Total VKT/yr	208000
8	Emission in Kg/Year	74365.50813
9	Emission in g/s	2.358114794
10	Uncontrolled Emission g/s/m2 (considering road width 10 m)	1.17906E-05
11	**Controlled Emission g/s/m2 considering 99% suppression due to water sprinkling**	**1.17906E-07**

4.4.5 Quantitative estimation of impacts on air environment

An attempt has been made to predict the incremental rise of various ground level concentrations (GLCs) above the baseline status in respect of air pollution due to mining operations. The mathematical model used for predictions in the study is USEPA approved AERMOD View 10.0.1 software which is designed for point source, line source and area sources for the

prediction of impacts due to mine operations. For estimation of the GLC in worst case scenario, the mining operations are assumed to be carried out on the flat terrain. The predicted GLC computed using AERMOD View developed by Lakes Environment model is plotted on isopleths and are shown in Figure given below.

4.4.6 Meteorological Data

The meteorological data recorded continuously during season of **Summer Season (1st March to 31st May)** on hourly basis for wind speed, wind direction, relative humidity, precipitation and temperature and the same is processed to extract the 24-hour mean meteorological data as per the guidelines of IMD and MoEF for application of AERMOD Version 10.0.1 model. Stability classes computed for the mean hours is based on the guidelines issued by CPCB on modelling. Mixing heights representative of the region have been taken from the available published literature.

4.4.7 Stability Classification

Wind direction fluctuation method (CPCB PROBES/70/1997-1998) is adopted for hourly stability as determined by wind direction fluctuation method as suggested by Slade (1965).

$$\sigma_\Theta = Wdr/6$$

Wdr: the overall wind direction fluctuation or width of the wind direction in degrees, over the averaging period.

σ_Θ : the standard deviation of wind direction fluctuation.

The stability classes are as detailed below:

Table 4-1: Slades Stability Classification based Wind direction fluctuation

Stability Class	σ_Θ (degree)
A (Extremely Unstable)	**>22.5**
B (Moderately Unstable)	**22.4-17.5**
C (Slightly Unstable)	**17.4-12.5**
D (Neutral)	**12.4-7.5**
E (Slightly Stable)	**7.4-3.5**
F (Stable)	**<3.5**

4.4.8 Mixing Height

As site specific mixing height were not available, mixing height based on CPCB publication, "Spatial Distribution of Hourly Mixing Depth over Indian Region", PROBES/88/2002-03 has been considered for model to establish the worst-case scenario.

4.4.9 Monthly Wind Speed and Wind Direction

The weather is one of the main factors affecting the air quality. Weather can help to clear away pollutants from atmosphere to improve air quality, or it can make air pollution extremely worse by helping to form highly polluted regions. The concentration of air pollutants in ambient air is governed by the meteorological parameters such as atmospheric wind speed, wind direction, relative humidity, and temperature. Rainfall can effectively remove atmospheric particulate pollutants, and the removal rate of PM10 is greater than the removal rate of PM2.5. In general wind speed more than 7 m/s can lift dust. Heavier particles will settle near the source area, with the smaller ones settling farther away. The site-specific weather data has been collected by installation of weather monitoring station at site.

Table 4-2: Weather Monitoring Data of the Site

	March	**April**	**May**
Avg. Temperature °C (°F)	25.7 °C	30.8 °C	32.2 °C
	(78.2) °F	(87.4) °F	(89.9) °F
Min. Temperature °C (°F)	18.2 °C	23.4 °C	26.1 °C
	(64.8) °F	(74.1) °F	(79) °F
Max. Temperature °C (°F)	32.9 °C	38 °C	38.2 °C
	(91.2) °F	(100.4) °F	(100.8) °F
Precipitation / Rainfall mm (in)	11	11	39
	0	0	-1
Humidity (%)	41%	35%	48%
Rainy days (d)	2	2	5
Avg. Sun hours (hours)	10.6	11.1	10.8

(Source: https://en.climate-data.org/asia/india/bihar/bihar-sharif-2841/t/january-1/)

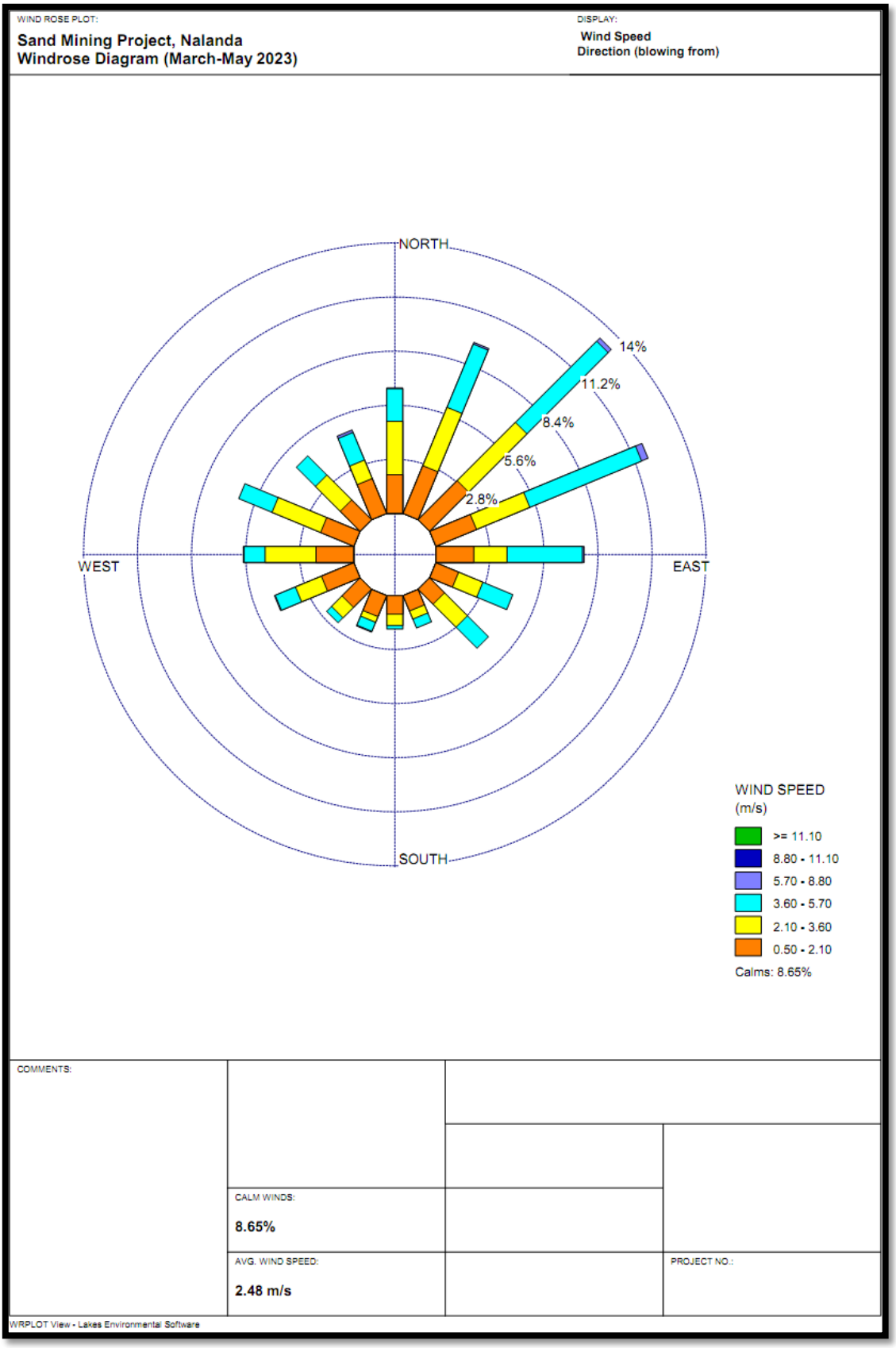


Figure 4-1: Windrose Data of the Site

4.4.10 Model Results

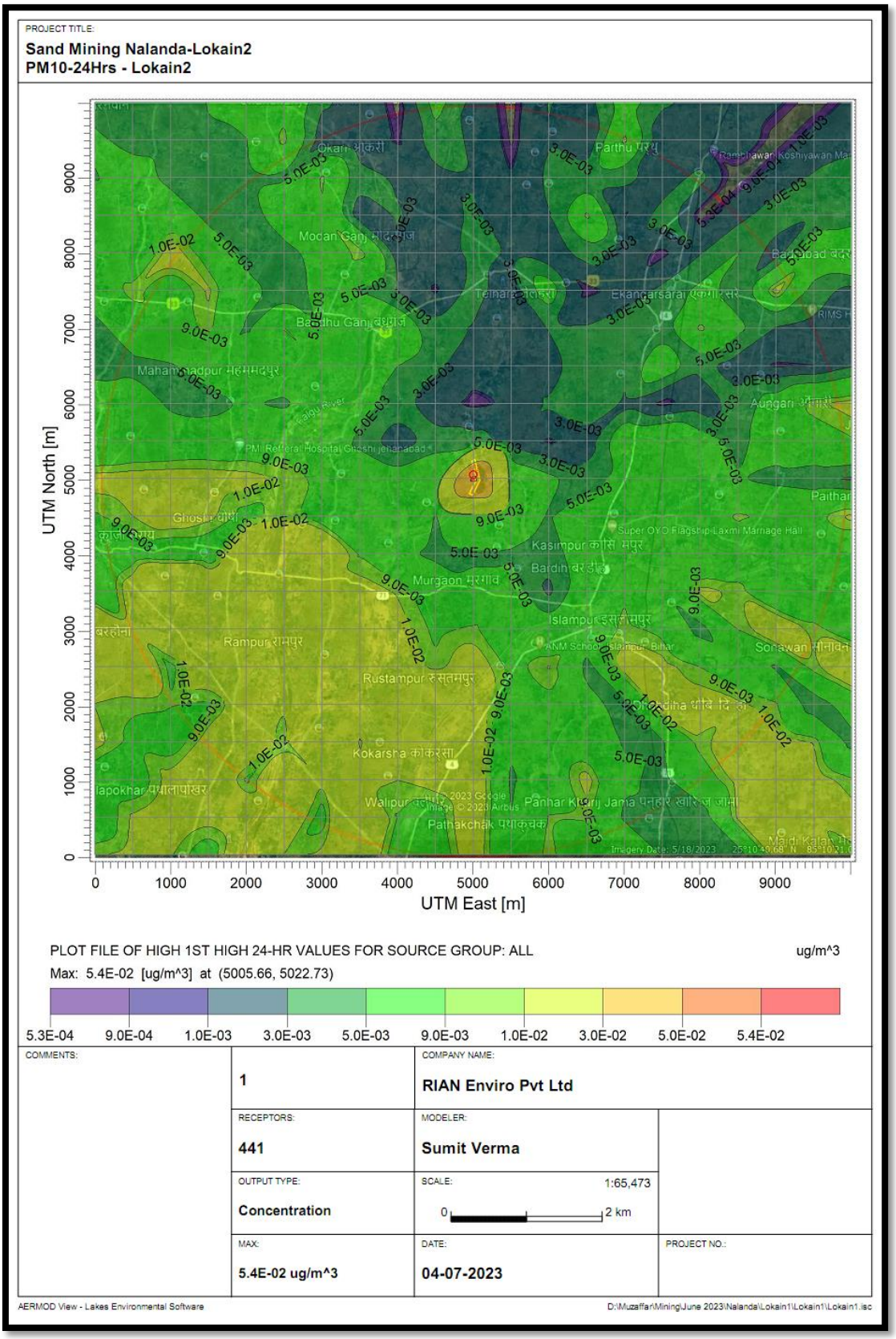


Figure 4-2: Predicted GLC concentration of PM10

4.4.11 Mitigation measures

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

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

4.5 Noise Environment

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

4.5.1 Anticipated Impacts

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

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

Table 4-3 :- 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	

6.0	92	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.
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.

4.6 Biological Environment

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

4.6.1 Anticipated Impacts

a) Flora

The proposed project of river bed sand mining shall be carried out on the riverbed of Lokain River. There are no trees in the project area. The project shall also not lead to any change in land use and will be replenished every year after successive rains. The proposed mining activity, which although is an economically gainful activity, also constitutes river training work. It allows for necessary dredging activity which may otherwise lead to flooding of the valley.

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

b) Fauna

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

4.6.2 Mitigation measures

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

a) Flora

Although, the project will not lead to any tree cutting, plantation activities shall be undertaken to improve the vegetation cover of the area. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

The list of plants proposed for green belt is as follows.

Table 4-4 : List of Trees proposed for Greenbelt (Evergreen, quick growing)

S. No.	*Scientific Name*	Family	Common Name	Hindi Name
1	*Aegle marmelos*	Rutaceae	Stone apple	Bael
2	*Azadirachta indica*	Meliaceae	Indian Lilac	Neem
3	*Alstonia scholaris*	Apocynaceae	Blackboard tree	Chitvan
4	*Cassia fistula*	Fabaceae	Cassia fistula Linn	Amaltas
5	*Callistemon*	Myrtaceae	Bottle brush	Cheel
6	*Delonix regia*	Fabaceae	Royal Poinciana	Gulmohar
7	*Ficus racemosa*	Moraceae	Cluster fig	Gular

8	*Mangifera indica*	Anacardiaceae	Mango Tree	Aam
9	*Psidium guajava*	Myrtaceae	Guava Tree	Amrud
10	*Phyllanthus emblica*	Phyllanthaceae	Indian gooseberry	Amla
11	*Putranjiva roxburghii*	Putranjivaceae	Putranjiva	Putijia
12	*Saraca asoca*	Fabaceae	Asoka- Tree	Ashok
13	*Syzgium cumini*	Myrtaceae	Java Plum	Jamun
14	*Terminalia arjuna*	Combretaceae	Arjun	Kahu
15	*Tectona grandis*	Lamiaceae	Teak	Sagwan

b) Fauna

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

4.7 Socio-Economic Environment

4.7.1 Management Plan for Socio-Economic Environment

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

4.8 Soil Environment

Movement of vehicles on the mine lease will also cause soil erosion. It is also anticipated that the garbage from the labour force and discharge of domestic wastewater will also cause the soil pollution.

I. Wastes and debris generated at the site will be collected time to time and disposed suitably to avoid any contamination.
II. Fuel oil for mining equipment will be stored on the cemented floor.

4.9 Solid Waste Management

Waste management is an important facet of environment management. Thus, solid waste management is important from both aesthetics and environment viewpoints. The solid waste will be generated approx. **1.65 Kg/day** on the project site.

I. Generated food waste or any other domestic waste will be collected in dustbins and will be properly disposed of as per Solid Waste Management Rules 2016.

II. There are no toxic elements present in the mineral which may contaminate the soil or river water.

4.10 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 or sign board will be constructed with near accident-prone areas to calm the traffic and its speed.
5. Signage will be erected at the sensitive & precarious places to caution or provide information to road users.

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 Introduction

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

5.2 Alternative for Mine Lease

Sand (minor mineral) deposits are site specific. It is present in inside river bed **(10.0 Ha.)** The mining of the material will be done by open cast semi-mechanized method inside riverbed. The mining will be done as per laid down procedures Bihar Minerals (Concession, Prevention of Illegal Mining, Transportation & Storage) Rules, 2019 (as amended in 2021. **No overburden** from inside riverbed block will be produced. Therefore, no alternates it is suggested as the mineral is site specific.

5.3 Alternative for Technology and other Parameters

Some alternatives considered during EIA study are discussed below:

Table 5-1: Alternative for Technology and other Parameters

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
1.	Technology	Opencast Semi mechanized and mechanized mining.	Opencast Mechanized mining.	Opencast semi-mechanized for Riverbed is preferred **Benefits:** •No electric power requirement •Minimal noise will be generated •Minimal air pollution will be generated.
2.	Employment	Local employment	Outsource employment	Local employment is preferred. **Benefits:** •Provides employment to local people along with financial benefits •No residential building/housing is required.
3.	Laborer transportation	Public transport	Private transport	Local labors will be deployed so They will either reach mine site by

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

5.4 Summary

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

6 ENVIRONMENTAL MONITORING PROGRAM

6.1 Introduction

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding area are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program. Environmental Monitoring Program will be implemented once the project activity commences. Environmental Monitoring Program includes: (i) Environmental surveillance (ii) Analysis and interpretation of data (iii) Preparation of reports to support environmental management system and (iv) Organizational set up responsible for the implementation of the programme. Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC and Consent to Operate issued by the State Pollution Control Board. Compliance of same will be submitted to respective authorities on regular basis.

6.2 Environmental Management Cell

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

6.2.1 Hierarchy

An EHS Manager will be appointed to look after all environmental issues and ensure compliance with Environmental Clearance conditions/SPCB norms. An Assistant Manager and Executive Environment Engineer will be appointed under the EHS Manager. EHS Manager will report to the Lessee directly and discuss the non-compliance if so any. An immediate solution will be arrived to ensure compliance with norms.

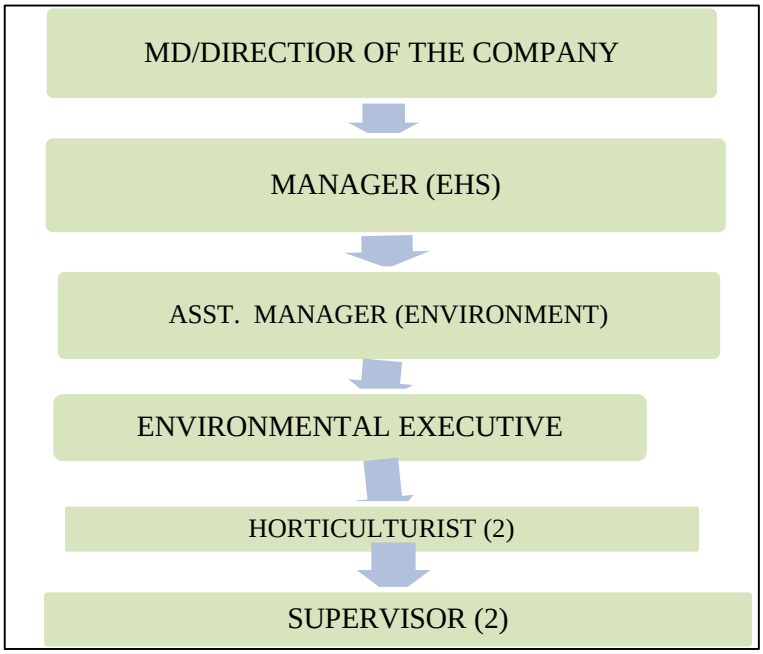


Figure 6-1:- Hierarchy of Environment System for Dealing Environmental Issues

6.2.2 Responsibilities for Environmental Management Cell (EMC)

The responsibilities of the EMC include the following:

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

6.3 Environmental Monitoring and Reporting Procedure

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

The key aims of environmental monitoring are:

- To ensure that results/ conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.
- To verify the evaluations made during the planning process, in particular with risk and impact assessments and standards and target setting and to measure operational and process efficiency.
- Monitoring will also be required to meet compliance with statutory and corporate requirements. Finally, monitoring results provide the basis for auditing, *i.e*. to identify unexpected changes.

6.4 Monitoring Schedule

Regular Monitoring of all the environmental parameters *viz.*, air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year in order to detect any changes from the baseline status.

Table 6-1 :- Monitoring Schedule

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice 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

6.4.1 Locations of Monitoring Stations

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

Table 6-2: Locations of Monitoring Stations

S. No.	Description	Location
1.	Ambient Air Quality	Lease area, Villages in down Wind direction from the Lease Boundary
2.	Noise Level Monitoring	Lease Boundary, High noise generating areas within the lease boundary like joining highways, nearest village, sensitive areas in the surrounding of the mine lease.
3.	Water Level and Quality	Nearby Surface and Ground water sources
4.	Soil Quality	Lease area and Villages within study area.

Table 6-3 :- Budget for monitoring

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Water Quality (Surface & Groundwater) Soil Quality, Air Quality, Noise Level	2.0
TOTAL		**2.0**

6.5 Reporting Schedule during Operation of Mine

After completion of analysis, copies of all the analysis reports will be sent to MoEF&CC Regional Office and SPCB. Copies of the reports will be maintained in the office and will be made available to the concerned inspecting authorities.

6.6 Budget Allocation for Monitoring

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

6.7 Summary

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will be complied as per

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

7 ADDITIONAL STUDIES

7.1 General

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

7.2 Items Identified by Proponent

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

7.3 Items Identified by Regulatory Authority

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

7.4 Items Identified by the Public and Other Stakeholders

The public hearing will be conducted after the draft EIA submission to the concerned authorities. The issues and items identified by the public and other stake holders will be granted in the form of public hearing minutes, accordingly it will be included in Final EIA report.

7.5 Risk Analysis and Disaster Management Plan

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

Risk assessments will help mine operators to identify high, medium and low risk levels. This is a requirement of the Occupational Health and Safety Act 2000. Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and

operators will be able to implement safety improvements. The following natural/industrial problem may be encountered during the mining operation.

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

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

7.5.1 Risks due to Inundation

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

7.5.2 Risks Due to Failure of Pit Slope

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

7.5.3 Risks due to Failure of Waste Dumps

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

7.5.4 Risks of Accidents due to Trucks and Dumpers

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

- ✓ Rough access roads
- ✓ Time pressure
- ✓ Inadequate brakes (Possibly from lack of maintenance)
- ✓ Careless parked vehicles (*e.g*. being parked on aslope without being adequately secured)
- ✓ Unsafe coupling and uncoupling of trailers, and
- ✓ Untrained drivers
- ✓ Overturning vehicles
- ✓ Over speeding of the vehicles

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

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

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

7.6 Disasters and Its Management

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

7.6.1 Identification of Hazards

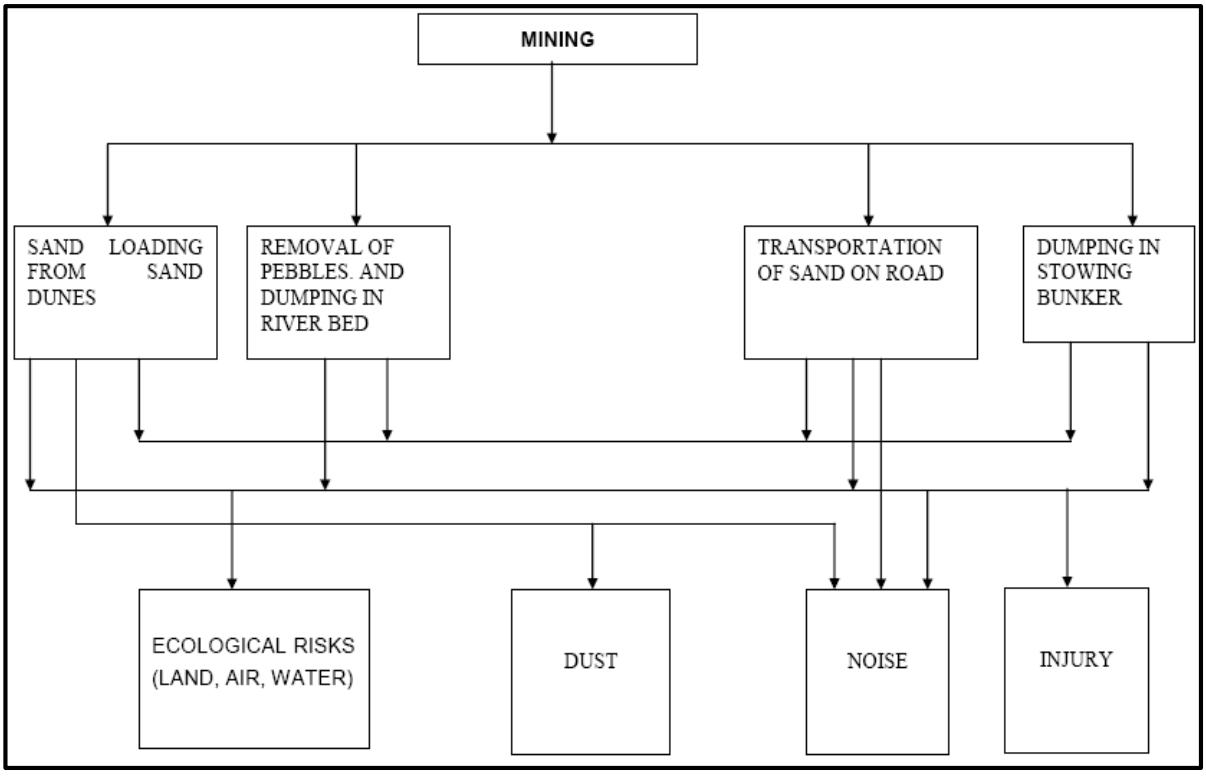
There are various factors, which can create disaster in sand mine. These hazards are as follows:

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

7.6.2 Sand Loading

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

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



7.6.3 Heavy Machinery

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

7.6.4 Inundation / Flooding

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

7.6.5 Safety Features Required in Tippers/Trucks

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

7.6.6 Mitigation of Hazards

7.6.6.1 Measures to Prevent Accidents during Sand Loading.

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

7.7 Replenishment of Sand Deposits

The replenishment study has been carried out during the preparation of DSR by Sub Divisional Committee, Nalanda after analyzing datasets of consecutive calendar years. Both field-based surveys coupled with satellite imagery study and empirical study were carried out to determine the rate of replenishment in each river of the district. The determined values of various methods as adopted for replenishment study gives a comparable value and in all cases the values are found to be much more as compared to the capping limit (60%) as suggested in the Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) January 2020, Issued by Ministry of Environment, Forest and Climate Change (MoEF & CC) 2020. It is suggested to have a periodical review along with field data acquisition during pre and post monsoon periods to record the seasonal variance of the sedimentation rate on annual basis and update this DSR in case of any abnormal findings.

Replenishment Study not carried out, so Quantity of sand been calculated based on 1-meter depth from the surface in proposed sand ghats.

(Source Approved DSR, Nalanda)

7.8 Social Impact Assessment, Rehabilitation & Resettlement (R&R) Action Plan

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. SEIA is carried out separately but concurrently with Environment Impact Assessment (EIA). It focuses the effect of the project on social and economic well-being of the community.

7.8.1 Impact on Demographic Composition

The proposed project will hardly make any difference in the demographic composition of the study area as the additional employment is envisages to create that 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.

7.8.2 Employment Opportunities

The proposed project will provide employment to the local people. It has been estimated that **11** people will get direct employment in this mining project. It is a positive impact of the project since it is providing employment opportunities to the local people.

7.8.3 Increased Supply of Sand in the Market

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

7.8.4 Impact on Agriculture

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

7.8.5 Impact on Road Development

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

7.8.6 Income to Government

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

7.8.7 Impact on Law and Order

As most of the workers to be employed in the proposed mining project are local residents no law &order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work. There would have been law & order problem

if the workers were migrants and lived in shanties closed to the mining area. However, to meet any untoward incident one police post may be set up closed to the mining area.

7.8.8 Impact on Health

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

Rehabilitation and Resettlement (R&R) action plan is not applicable for this project.

7.9 Summary

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

8 PROJECT BENEFITS

8.1 General

The proposed sand mining project will improve the socio-economic and reduce the chances of flood. This will be in form of roads, water supply, employment and economic growth.

8.2 Physical benefits

- ✓ Generate useful economic resource for construction.
- ✓ Improve Socio-economic conditions of surrounding areas.
- ✓ Protecting river banks.
- ✓ Reduce the probability of submergence of adjoining agricultural lands.
- ✓ Protection of crops being cultivated along the river bank.
- ✓ Reducing aggradations of river level.
- ✓ **Improvements in the physical infrastructure: -**The Proposed Sand mine will have numerous induced impacts on society such as growth in schools, hospitals, hotels & restaurants, transport etc.
- ✓ **Improvements in the social infrastructure: -**The social infrastructure like repairing of handpumps, submersibles for agriculture, maintenance of nearby school infrastructure and maintenance of haulage path and village roads.
- ✓ **Employment potential –-** The present project will provide employment to **11** people.
- ✓ **Other tangible benefits: -**Deepening and cleaning of the river flood plain/bed will help in reduction of flood in the area, job opportunity to the labours. The CER activity will add aid to educational infrastructure, maintenance of the village road and also health check -up of the nearby villagers.

8.3 Social Benefits

The mining in the area will create rural employment. It has been observed that conditions of the village around mining areas are better than that of distant villages. The mining activity in the region will have positive impact on the social economic condition of the area by way of providing employment to the local in-habitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture.

A detailed programme for socio economic development of the area has been framed. The salient features of the programme are as follows:

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

8.4 Corporate Environmental Responsibilities

As per MoEFCC OM dated 30th September 2020 adequate funds shall be earmarked as per the commitments made by project proponent and requirements to address the issues raised during the public hearing in lieu of corporate Environment Responsibility (CER) and this will be covered under EMP. Detailed action plan for the activities along with the budgetary allocation will be incorporated in this EIA/EMP Report upon completion of public hearing.

8.5 Ecological Benefits

A green belt will be developed along the boundary of the mining lease area. The area for green belt plantation consists of undisturbed soil; hence plantation could be made as in any garden or road side plantation. Green belt is erected not from biodiversity conservation point of view but is basically developed as a screen to check the spread of dust pollution. It is proposed to plant **100** Nos. of **native species** along with some fruit bearing and medicinal trees during the plan period and a budget of **Rs 2.0 Lakhs** for plantation is given in **EMP.**

8.6 Conclusion

The management will recruit the semi-skilled and unskilled workers from the nearby villages. The project activity and the management will definitely support the local Panchayat and provide other

form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant **100 Nos**. native species per during the mining plan period.

9 ENVIRONMENTAL COST BENEFIT ANALYSIS

9.1 Environmental Cost Benefit Analysis

As per EIA Notification dated 14th September, 2006 as amended from time to time; the chapter on "Environmental Cost Benefit Analysis" is applicable only, if the same is recommended at the Scoping Stage.

As per the ToR points issued on dated 14-06-2023 by SEIAA Bihar, (File No. SIA/1(a)/2441/2023) the Environmental Cost Benefit Analysis is not required.

10 ENVIRONMENT MANAGEMENT PLAN

10.1 General

Environmental Management Plan is a guiding document for environmental impacts associated with the proposed projects. It is a guiding document for management of good environmental condition on the site & surrounding of the proposed sand mine. The Environmental Management Plan (EMP) has been formulated and integrated with the sand mine planning keeping in view overall scientific development of local habitat and reduce the adverse impact that may be caused due to the sand mining operation. A scientific assessment of these impacts those are likely to influence the existing environmental scenario is needed. This could also facilitate in formulating a suitable environmental management plan depicting all mitigation measures. It can help in implementing the project in an eco-friendly manner. The project activities influencing the following environmental attributes have been studied and their impacts on the following attributes have been assessed.

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

I. Assists proponent in the preparation of an effective and user friendly EMP.
II. Improve the contribution that an EMP can make to the effectiveness of the environmental management process.
III. Ensure a minimum standard and consistent approach to the preparation of EMP's.

IV. Ensure that the commitments made as part of the project's EIA are implemented throughout the project life.

V. Ensure that environment management details are captured and documented at all stages of a project.

The design of EMP for operational phase has been aimed to achieve the following objectives:

I. To ensure adoption of state of art technological environmental control measures and implementing them satisfactorily.

II. Effectiveness of mitigatory measures in mitigation of impacts.

III. Description of monitoring program of the surrounding environment.

IV. Institution arrangements to monitor effectively and take suitable corrective steps for implementation of proper EMP.

V. An Environmental Management Cell (EMC) should be set up to take care of all environment aspects and to maintain environmental quality in the project area.

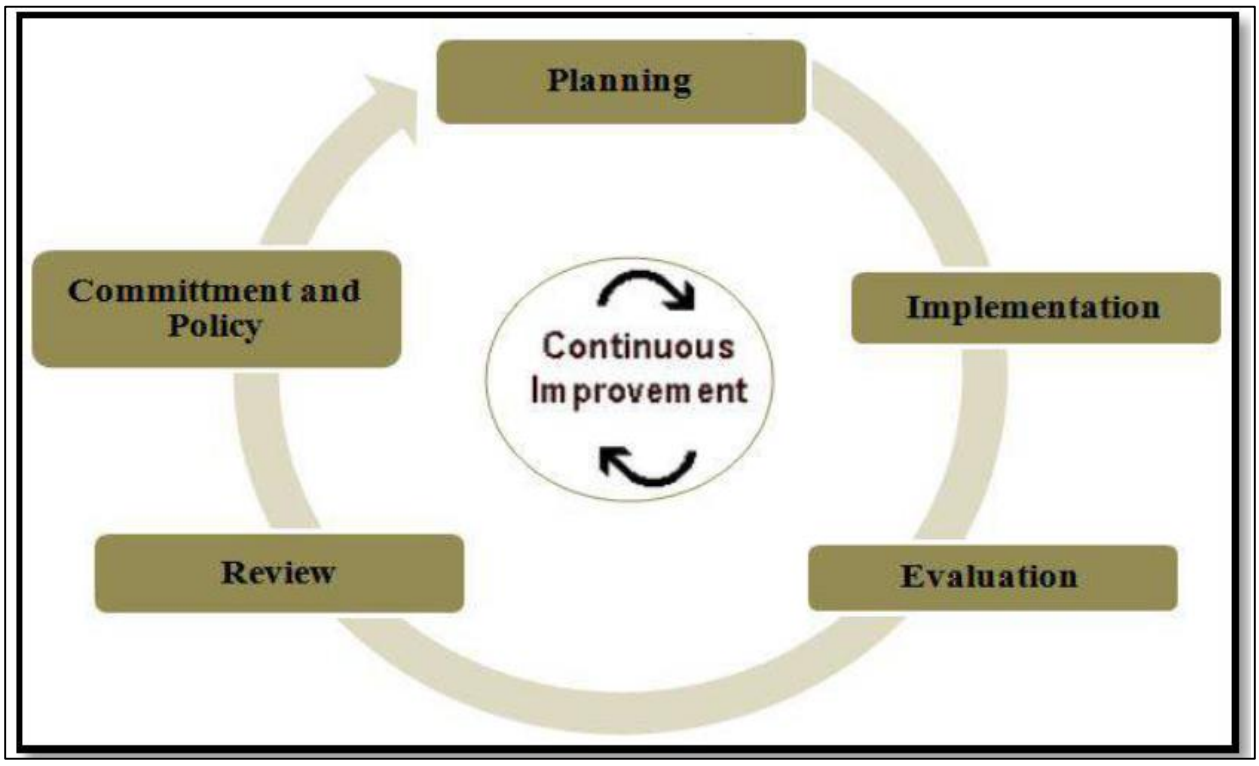


Figure 10-1 :-Flow Chart of EMP

10.2 Land Use Pattern

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

I. Mineral will be mined out after leaving sufficient safety zone from the bank as per sand Enforcement & Monitoring Guidelines for Sand Mining 2020.
II. The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
III. Pits will get replenished naturally every year after monsoon.
IV. Grass/plants will be planted on the bank of the river for their stability.

10.3 Air Environment Management

Mitigative measures suggested for air emission control will be based on the baseline ambient air Quality monitoring data. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that the air quality needs to be monitored on a regular basis to check it vis-à-vis the NAAQS prescribed by MoEF&CC and in cases of non-compliance, appropriate mitigative measures will be adopted. In order to minimize impacts of mining on air and to maintain it within the prescribed limits of CPCB/ SPCB, an Environmental Management Plan (EMP) has been prepared. This will help in resolving all environmental and ecological issues likely to cause due to mining in the area.

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

10.3.1 Control of Gaseous Pollution

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

10.3.2 Control of Dust Pollution

The main pollutant in air is PM10, which is generated due to various mining activities. However, to reduce the impact of dust pollution the following steps have been taken during various mining Activities.

a) During loading operation

I. Latest loading equipment like hydraulic excavators will be used with dumpers. This reduces the number of buckets to fill from height and thus have comparatively less dust generation. The propagation of this dust is confined to loading point only and does not affect any person both the operators of excavator and dumpers who will sit in closed chamber and will be equipped with dust mask.
II. Skilled operators will operate excavators.
III. Avoid overloading of dumpers and consequent spillage on the roads.

b) During Transport operation

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

c) Plantation work carried out

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

d) Monitoring of air pollution

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

10.4 Noise and Vibration Environment

The ambient noise level monitoring carried out in and around the proposed mine lease area shows that ambient noise levels are well within the stipulated limits of MoEF&CC. There is no drilling and blasting for mineral extraction. Noise pollution will only be due to loading and transporting equipment. Effective steps will be taken to keep the noise level well below the limit of 85 dbA as prescribed by DGMS.

10.4.1 Noise Abatement and Control

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

10.5 Surface and Ground Water Management

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

I. Mining will neither intersect the ground water table of the area. So not at all disturbing water environment.
II. The mining does not have any impact on topography and natural drainage of surrounding area.
III. 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 of into septic tank followed by soak pits.

IV. 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.

10.5.1 Waste Water Management

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

10.5.2 Water Conservation

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

10.6 Solid Waste Management

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

III. Generated food waste or any other domestic waste will be collected in dustbins and will be properly disposed of.

IV. There are no toxic elements present in the mineral which may contaminate the soil or river water.

10.7 Green Belt Development

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

10.7.1 Plantation Program

Under the afforestation plan, plantation in nearby villages and connecting roads will be undertaken. The implementation for development of greenbelt will be of paramount importance as it will not only add up as an aesthetic feature but will also act as a pollution sink. The species to be grown in the areas will be dust tolerant and fast growing species so that a permanent greenbelt is created. Plantation in the barrier zone and roads is necessary as these areas will contain fine particulates resulting from mining operation and vehicle movement. Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks in the river. It is proposed to have plantation on both sides of the roads as greenbelt to provide cover against dust dissemination. River banks will be strengthened by way of plantation on the banks. Plantation will also be carried out as social forestry programme in village, school and the areas allocated by the Panchayat/State authorities. Native plants and other local species will be planted. A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt. It is proposed to plant **100 numbers** of native species will be planted during the plan period. List of Species for Greenbelt Development is given in Table 10-1. Plantation will increase the water holding capacity and help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project.

Table 10-1 : List of Species for Greenbelt Development

S. No.	*Scientific Name*	Family	Common Name	Hindi Name
1	*Aegle marmelos*	Rutaceae	Stone apple	Bael
2	*Azadirachta indica*	Meliaceae	Indian Lilac	Neem
3	*Alstonia scholaris*	Apocynaceae	Blackboard tree	Chitvan
4	*Cassia fistula*	Fabaceae	Cassia fistula Linn	Amaltas
5	*Callistemon*	Myrtaceae	Bottle brush	Cheel
6	*Delonix regia*	Fabaceae	Royal Poinciana	Gulmohar
7	*Ficus racemosa*	Moraceae	Cluster fig	Gular
8	*Mangifera indica*	Anacardiaceae	Mango Tree	Aam
9	*Psidium guajava*	Myrtaceae	Guava Tree	Amrud
10	*Phyllanthus emblica*	Phyllanthaceae	Indian gooseberry	Amla
11	*Putranjiva roxburghii*	Putranjivaceae	Putranjiva	Putijia
12	*Saraca asoca*	Fabaceae	Asoka- Tree	Ashok
13	*Syzgium cumini*	Myrtaceae	Java Plum	Jamun
14	*Terminalia arjuna*	Combretaceae	Arjun	Kahu

15	*Tectona grandis*	Lamiaceae	Teak	Sagwan

10.8 Socio-Economic Environment

10.8.1 Management Plan for Socio-Economic Environment

I. In general, socio-economic environment will have positive impact due to the mining project in the area.

II. The deployed laborers will be from nearby villages only as these people are mainly dependent upon such mining activities.

III. In order to further improve the socio-economic conditions of the area, the management will contribute for development works in consultation with local bodies.

10.9 Occupational Health and Safety

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

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

I. The collection of minor minerals from the Sand mine does not cause any occupational ill effects.

II. Except fugitive dust generation there is no source which can show a low probability for health-related diseases and proper dust suppression will control dust generation and dispersion.

III. Dust masks will be provided to the workers working in the dust prone areas as additional personal protective equipment.

IV. The occupational health hazards have so far not been reported.

V. Awareness program will be conducted about likely occupational health hazards so as to have preventive action in place.

VI. Any worker's health related problem will be properly addressed.

VII. Periodical medical checkup will be conducted.

VIII. Promote occupational health and safety within their organization and develop safer and healthier ways of working;

IX. Help supervise the investigation of accidents and unsafe working conditions, study possible causes and recommend remedial action;

X. Develop and implement training sessions for management, supervisors and workers on health and safety practices and legislation;

XI. Coordinate emergency procedures, mine rescues, firefighting and first aid crews;

XII. Communicate frequently with management to report on the status of the health and safety strategy and risk management strategy, and Develop occupational health and safety strategies and systems, including policies, procedures and manuals.

Table 10-2: Budget for occupational health

S. No.	Activities recommended for communities' level services	Tentative cost (Lakh Rs.)
1	Awareness campaigns regarding health issues in the nearby villages.	**0.50**
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.	**1.0**

10.10 Cost of EMP Measures

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

Table 10-3: Budget for EMP (Lakhs)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	Nil	2.5
2	Pollution Monitoring i) Air pollution	--	2.0

	ii) Water pollution iii) Noise Pollution iv) Soil Pollution		
3	Plantation and salary for one gardener (part time basis).	2.0	0.5
4	Haul road Maintenance Cost	1.5	1.44
TOTAL		**3.5**	**6.44**
Budget for Occupational Health		-	2.5
Grand Total		**3.5**	**8.94**

10.11 Summary

As per Above discussion there is no measure impact on the environment due to mining except fugitive mission in the form of dust generated during handling of mineral. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation development will be carried out in the mine premises, along the approach roads, around Govt. buildings, schools approx**. 100 trees** during plan period**.** It will prove an effective pollution mitigate technique, and help avoid soil erosion during monsoon season. Employment opportunities will be provided to the locals only as providing extraction of minerals from the mine site is the only prevailing occupation for them for their livelihood. A budget of Rs. **3.5** Lakh (Capital Cost) & **8.94** Lakhs (Recurring Cost) for EMP is incurred by Project Proponent.

11 SUMMARY & CONCLUSION

11.1 Introduction

As per MoEF & CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as category B-1 due to project area is more than 5.0 Ha. The LOI was granted in favor of Pappu Kumar, S/o- Chaitu Rai, Vill- Daudpur, Ward No -3, P.O – Daudpur, P.S- Shapur, District - Patna-801502 vide letter no- 1989/Kh, dated 23-12-2022., for the period of 5 years. (A copy of LOI is attached as Annexure-I.)

Mining Plan: The mining plan for the Nalanda Lokain – 02, Lokain Sand Ghat No -05 has been approved with production capacity of 60000 Cum per year 124800 TPA from the Department of Mines & Geology, Govt. of Bihar through vide letter No. 2634/M Patna, dated 19/05/2023 under the Bihar Minor Minerals Concession Rules 2019.

ToR Letter: It is in this context, hard copy of Form-I and Pre-Feasibility Report has been submitted to SEIAA, Bihar on 12.06.2023 requesting for issue of "Terms of Reference" (ToR). The ToR Letter has been issued on date 14.06.2023 by SEIAA, (File No. SIA/1(a)/2441/2023). Validity of TOR is for period of three years.

Baseline data collection: The baseline data was collected in Summer season form 1st of March 2023 to 31st of May 2023.

The Proposed Sand Mining Project at Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block-Ekangarsarai, District- Nalanda, Bihar. Mine Lease Area – 10.0 Ha for production of 60000 cum per year 124800 TPA.

Table 11-1: Details of the Project

<table>
<tr><th>S. No.</th><th>Particulars</th><th colspan="5">Details</th></tr>
<tr><td>1.</td><td>Nature and Size of the Project</td><td colspan="5">Mining of Sand Minor Minerals with Production Capacity of 60000 Cum per year 124800 TPA (M.L. Area- 10.0 ha).</td></tr>
<tr><td>2.</td><td>Location</td><td colspan="5"></td></tr>
<tr><td></td><td>Plot/Survey/Khasra No.</td><td>River Name</td><td>Name of the Ghat</td><td>Area</td><td>Khata No.</td><td>Khesra No.</td></tr>
<tr><td></td><td></td><td rowspan="4"></td><td rowspan="4">Nalanda Lokain –</td><td rowspan="4"></td><td>60</td><td>307</td></tr>
<tr><td></td><td></td><td>71</td><td>297</td></tr>
<tr><td></td><td></td><td>81</td><td>298</td></tr>
<tr><td></td><td></td><td>93</td><td>601</td></tr>
</table>

		Lokain	02, Lokain Sand Ghat No -05	10.0	83	299
					93	602
					56	300
					83	301
					81	302
					43	303
					39	304
					95	305
					93	306, 600, 599, 598, 597, 596, 595, 594, 593
					95	538
					94	549
					53	537
					94	548
					63	547
					24	539
					29	540
					94	541
					48	542
					80	543
					79	569
					29	545
					74	570
					23	571
					25	568
					63	572
					55	573
					12	574
					33	575
					55	576
					29	577
					15	578
					74	567, 566
					29	565
	Village	Bishunpur				
	Block	Ekangarsarai				
	District	Nalanda				
	State	Bihar				

<table>
<tr><td>3.</td><td>Geographical Coordinates Latitude and Longitude of</td><td>Nalanda Lokain – 02, Lokain Sand Ghat No -05: -
<table>
<tr><th>Sl. No</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>1</td><td>25°10'29.77"N</td><td>85° 10'17.09"E</td></tr>
<tr><td>2</td><td>25°10'28.16"N</td><td>85° 10'19.94"E</td></tr>
<tr><td>3</td><td>25°10'58.80"N</td><td>85° 10'24.08"E</td></tr>
<tr><td>4</td><td>25°10'57.11"N</td><td>85° 10'20.59"E</td></tr>
</table></td></tr>
<tr><td>4.</td><td>Toposheet (OSM) No.</td><td>G45N3, G45N7, G45N4, G45N8.</td></tr>
<tr><td>5.</td><td colspan="2">Lease Area Details</td></tr>
<tr><td></td><td>Lease Area</td><td>10.0 Ha.</td></tr>
<tr><td></td><td>Type of Land</td><td>River bed of Lokain</td></tr>
<tr><td></td><td>Topography</td><td>Undulated (Riverbed)</td></tr>
<tr><td></td><td>Site Elevation Range</td><td>87.35 m to 87.1 m</td></tr>
<tr><td>6.</td><td>Cost Details</td><td></td></tr>
<tr><td></td><td>Cost of the project</td><td>Rs. 65 lakhs. (Including Auction Cost)</td></tr>
<tr><td></td><td>Cost for EMP</td><td>3.5 Lakh (Capital Cost) & 8.94 Lakhs (Recurring Cost)</td></tr>
<tr><td>7.</td><td colspan="2">Environmental Settings of the area</td></tr>
<tr><td></td><td>Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius</td><td>There is no any Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius.</td></tr>
<tr><td></td><td>Nearest Town/ Major City with population</td><td>Bihar Sharif, Approx. 34.75 km towards ENE.</td></tr>
<tr><td></td><td>Nearest Railway Station</td><td>Islampur Railway Station, approx. 6.15 Km towards SE.</td></tr>
<tr><td></td><td>Nearest National/State Highway</td><td>SH-04, Approx. 4.15 Km towards East.
SH-71, Approx. 2.5 Km towards South.</td></tr>
<tr><td></td><td>Nearest Airport</td><td>Jayprakash Narayan International Airport, approx. 46.45 Km towards NNW.</td></tr>
<tr><td></td><td>Nearest Post Office</td><td>Murgaon Post Office, Approx, 2.23 Km towards SSW.
Dariyapur Post Office, Approx, 3.9 Km towards ESE.</td></tr>
<tr><td></td><td>Medical Facilities</td><td>Govt. Primary Hospital, Kajichak, Approx. 4.7 Km towards NE.</td></tr>
</table>

		Bharthu Govt. Hospital, Approx 3.6 Km towards West.
	Education Facilities	Tejpur Middle School, Approx 0.97 Km towards SW. Government School, Barhauna Approx 0.40 Km towards West.
	Ecological Sensitive Area	There is no Ecological Sensitive Area within 10 Km radius from project site.
	Archaeological sites	There is no Archaeological sites within 10 km radius from project site.
	Seismic Zone	Zone IV (IS 1893: 2002)
	Water Body	Lokain River (Riverbed)

11.2 Project Description

The proposed project is for mining of Sand (Minor Mineral) by open cast semi-mechanized method in over an area of **10.0 Ha.** By **Pappu Kumar** throughout Nalanda Lokain – 02, Lokain Sand Ghat No -05 of district Nalanda. The project site falls under seismic zone IV which is a High Damage Risk zone (MSK IX-VIII). The total geological reserve is **100000 cum per Annum** and mineable reserve is **60000 cum per Annum.** Mine lease area will be worked in benches and the digging depth will be restricted to 1.0 m only or before water table, whichever come fast. This will be further replenished during rainy season. Mineral Sand will be transported by trucks. The deposit is moderate to good quality sand. It is widely used in construction, buildings, bridges and other infrastructure. It is free from clay and non-sticky in nature. Total water requirement for the project is **5.41 KLD**. Total man power requirement for the project is **11.** The site facilities like temporary, rest-shelter, first aid facility; drinking water facility etc. will be provided as per requirement. There is no litigation pending against this project.

11.3 Description of Environment

The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried in Summer Season during 1st March 2023 to 31st May 2023. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from mine lease boundary (buffer zone), both of which together comprise the study area. Baseline environment was determined within the study area, which represents 10 km radius of the surrounding area to the project site. This collected data was further used to identify potential impacts of the mining activity on the surrounding environment and formulate mitigation measures. Summary of the baseline data collected is detailed in **Table 11.2.**

Table 11-2 :- Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	The ambient air quality study for the 8 villages (AAQ) monitoring stations shows that the maximum and minimum ground level concentration for PM_{10} is respectively 92.7 µg/m^3 at Chhajjupur (AAQ4) and 52.2 µg/m^3 at Narayanpur (AAQ5). Whereas the maximum and minimum ground level concentration for $PM_{2.5}$ ranges between 58.2 µg/m^3 at Navgarh (AAQ3) and 23.9 µg/m^3 at Narayanpur (AAQ5) respectively. Similarly, for SO_2, the maximum and minimum ground level concentration varies between 16.8 µg/m^3 and 7.1 µg/m^3 for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For NO_2 the maximum and minimum ground level concentration varies between 45.9 µg/m^3 & 18.5 µg/$m^3$for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For CO the maximum and minimum ground level concentration varies between 0.87 µg/m^3 & 0.19 µg/$m^3$for respectively Navgarh (AAQ3) and Narayanpur (AAQ5) stations.
Noise Levels	Noise monitoring study reveals that the minimum & maximum noise levels at day time were recorded as 45.2 dB (A) at Chhajjupur (NQ4) & 50.8 dB (A) at Narayanpur (NQ5). The minimum & maximum noise levels at night time were found to be 31.1 dB (A) at Navgarh (NQ3) & 38.7 dB (A) at Narayanpur (NQ5). There are no other major noise producing sources in the study area except some domestic activities, which contributes to the local noise level of the area. Traffic movements in nearby villages also add to the ambient noise level of the area.
Water Quality	5 Groundwater samples and 4 surface water samples were analyzed and concluded that: The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards by Indian Standards IS: 10500. From the Surface water analysis it is evident that most of the parameters of the samples comply with 'Category 'D' of DBU Criteria of CPCB for its suitability for wild life and fisheries.
Soil Quality	Samples collected from identified locations indicate pH value ranging from 7.48 to 7.80, which shows that the soil is slightly alkaline in nature. Organic Matter ranges from 1.00 % to 1.10 % in the soil samples and, whereas the Potassium is found to be ranging from 240.2 mg/kg to 351.5 mg/kg.
Ecology and Bio-diversity	There are no Ecologically Sensitive Areas present in the study area.

11.4 Anticipated Impacts and Mitigation Measures

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

11.4.1 Impact on Land Use Pattern

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

11.4.2 Impact on Air Quality

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

11.4.3 Impact of Noise Levels

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

11.4.4 Impact on Water Quality

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

11.4.5 Impact on Soil Quality

The soil textures a yellowish, light-colored variety of red soil. The basin land of the rivers is mostly sandy soil, and the land adjacent to the rivers is sandy loam. It is due to settling of air borne dust or

due to wash off of solid particulates by surface or ground water. This may lead to change in porosity, permeability & other such physical characteristics of soil of the area.

11.4.6 Flora & Fauna

Flora

Floral environment is affected by mining activities due to:

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

Pollutant like dust, gaseous emanations, solid & liquid effluents will be minimized at the generation point itself and adequate measures will be taken to prevent their impact on environment.
ii) There is no forest in the core zone of mining lease area and its surrounding. So, there will be no deforestation due to mining.
iii) The mining lease area is devoid of vegetation. So, the greenery to be developed under green belt development programme will improve the floral environment of the area.

Fauna

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

11.4.7 Socio-Economic Profile

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

11.5 Analysis of Alternatives (Technology and Site)

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

11.6 Environmental Monitoring Program

This chapter includes the technical aspects of monitoring the effectiveness of mitigation measures (including measurement methodologies, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules). In order to maintain the environmental

quality within the stipulated standards, regular monitoring of various environmental components is necessary which will have complied as per conditions. For this lessee **Pappu Kumar** taken decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the proposed mine with the objectives mentioned in approved Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a sit using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters *viz.*, air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year. The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature. A budget for monitoring of Air, water, Noise and Soil will be **Rs. 2.0 Lakhs** to be incurred by the project proponent for undertaking pollution prevention measures during the mining activity.

11.7 Additional Studies

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

11.8 Project Benefits

The management will recruit the semi-skilled and unskilled workers from the nearby villages. The project activity and the management will definitely support the local Panchayat and provide other form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant **100** Nos. of native species will be planted during the mining plan period. Other than this social development of village will be considered as per social activities. Socio-economic environment will have positive impact due to the mining project in the area. The mining activity will create employment opportunities to local communities. The project will not only improve the living standard of local people but also create an aesthetic value to the river banks where green belt will be developed.

11.9 Environment Management Plan

As per Above discussion there is no measure impact on the environment due to mining except fugitive emission in the form of dust generated during handling of mineral. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation development will be carried out in the mine premises, along the approach roads, around Govt. buildings, schools approx**. 100 trees during plan period.** It will prove an effective pollution mitigate technique, and he provided to the locals only as providing extraction of minerals from the mine site is the only prevailing occupation for them for their livelihood. A budget **of Rs. 3.5 Lakh (Capital Cost) & 8.94 Lakhs (Recurring Cost)** per year for **EMP** is incurred by Project Proponent.

11.9.1 Air Quality Management

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

11.9.2 Management for Noise Pollution

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

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

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

11.9.3 Water Management

The deposits occur in the middle/bottom of the river. During the entire lease period, the deposit will be worked from the top surface to 1 m bgl or above ground water level, whichever comes first.

11.9.4 Soil Management

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

11.9.5 Green Belt Development

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

11.10 Conclusion

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

facts and baseline study, the proposed activity is recommended for the commencement with proper mitigation measure as suggested.

12 DISCLOSURE OF CONSULTANTS ENGAGED

Declaration by Experts contributing to the Draft EIA/EMP Report for Proposed Sand Mining Project of Area 10.0 Ha at Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River of District-Nalanda, State-Bihar.

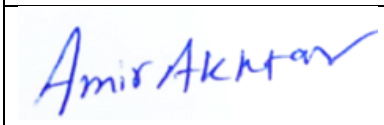
The one season baseline data used in the report was collected in Summer Season (1st March 2023 to 31st May 2023) by our empanelled lab Enviro Tech Services.

12.1 Brief profile of REPL is as given below

Director	Mr. Manish Kumar
Name of the Consultant	Rian Enviro Pvt. Ltd.
Address	Mangal Market Patna -800014

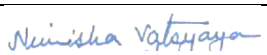
12.2 Personnel involved in the preparation of Final EIA/EMP report are stated below

Accreditation Certificate of the Consultant Engaged:

EIA coordinator:	**Date**
Name: - Amir Akhtar	**01/06/2023**
	

Functional Area Experts:

S. No.	**Functional Area**	**Name of the experts**	**Involvement Period and Task**	**Signature**
1.	WP	Bhuwan Bhaskar (WP)	Preparation of WP input, impact assessment & mitigation measures	
2.	AP	Muzaffar Ahmad	Collected the ambient air data through secondary sources and suggested Air pollution control measures	

S. No.	Functional Area	Name of the experts	Involvement Period and Task	Signature
3.	LU	Debarati Ghosh	Development of landuse maps of study area using GIS / related tools, site visit for ground reality survey, finalization of landuse maps, and contribution to EIA documentation.	
4.	Geo	Mohan Shriram Bhagwat	Collection of secondary data as well as drafting of report with respect to Geological Aspect.	
5.	HG		Collection of secondary data as well as drafting of report with respect to Hydro-geological condition in around the study.	
6.	SW	Sumit Verma	Preparation of SW input, impact assessment & mitigation measures	
7.	AQ	Vishal Duggal (AQ)	Collected the meteorological data and AAQ data through secondary sources, predicted impacts on air quality using suitable AQ model and suggested air pollution control measures	
8.	SC	Mrs. Nimisha Vatsyayan	Proposing the soil management practices during construction and operation phase of project.	
9.	EB	Neha Kumari	Generating the ground truthing ecological assessment with secondary data from different departments, earmarking rare and endangered species.	
10.	SE	Manish Kumar	Collected the primary and Secondary data, livestock inventory/ impacts, identified village-wise amenities/ needs.	

S. No.	Functional Area	Name of the experts	Involvement Period and Task	Signature
11.	RH	Kailash Nath Sharma	Preparation of RH input, impact assessment & mitigation measures	
12.	HW	Kailash Nath Sharma	Preparation of HW input, impact assessment & mitigation measures	
13.	NV (Team Member)	Bhuwan Bhaskar	Collected the ambient noise data through secondary sources and suggested Noise pollution control measures during project	

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National Accreditation Board for Education and Training

NABET

Certificate of Accreditation

Rian Enviro Private Limited (REPL)
202 & 402, Mangal Market, Sheikhpura, Raja Bazar, Patna, Bihar- 800 014

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

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals (opencast only)	1	1 (a) (i)	A
2	Thermal power plants	4	1 (d)	B
3	Metallurgical industries - both primary & secondary	8	3 (a)	B
4	Cement Plants	9	3(b)	A
5	Synthetic organic chemicals industry	21	5 (f)	B
6	Distilleries	22	5 (g)	A
7	Bio-medical waste treatment facilities	32A	7 (da)	B
8	Highways	34	7 (f)	A
9	Building and construction projects	38	8 (a)	B
10	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated May 16, 2023 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/23/2793 dated July 07, 2023. The accreditation needs to be renewed before the expiry date by Rian Enviro Private Limited (REPL), Patna following due process of assessment.

NABET

Sr. Director, NABET
Dated: July 07, 2023

Certificate No.
NABET/EIA/2124/SA 0197

Valid up to
Sep. 11, 2024

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

Annexure –I

Letter of Intent (LOI)

समाहरणालय, नालन्दा
(खनन शाखा)

पत्रांक 1589 /खनन, नालन्दा	फोन नं० :– 06112–235203(O), 06112–235204, 235205(R)
दिनांक: 23/12/ 2022	ई–मेल :– dm-nalanda.bih@nic.in

प्रेषित,

श्री पप्पु कुमार,
पिता– चैतु राय,
ग्राम–दाउदपुर, वार्ड नं0–3 पो0– दाउदपुर,
थाना– शाहपुर, जिला– पटना पिन– 801502
ई–मेल– pappu8709930@gmail.com
मो0– 9835540493

विषयः– **नालन्दा जिलान्तर्गत लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05) की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक–25.11.2022 को सम्पन्न ई–नीलामी में उच्चतम डाकवक्ता घोषित होने के फलस्वरूप सैद्धांतिक स्वीकृत्यादेश के संबंध में।**

महाशय,

उपर्युक्त विषयक नालन्दा जिलान्तर्गत **लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05), रकवा–10 हेक्टेयर** की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक–25.11.2022 को सम्पन्न ई–नीलामी में आपके द्वारा रू0– 45,00,000/– (पैंतालिस लाख रू0 मात्र) की सुरक्षित जमा राशि के विरूद्ध **उच्चतम डाक की राशि रू0– 54,00,000/– (चौंवन लाख रू0 मात्र)** की बोली लगाये जाने के फलस्वरूप आप उच्चतम डाकवक्ता घोषित हुए हैं। निविदा दस्तावेज की कंडिका–20 (i) के आलोक में आपके द्वारा नीलामी राशि की 25 प्रतिशत राशि (जमा अग्रधन राशि समायोजनोपरान्त) **प्रतिभूति जमा के रूप में राशि रू0– 13,50,000/– (तेरह लाख पचास हजार रू0 मात्र)** के भुगतान का साक्ष्य **दिनांक–29.11.2022** को कार्यालय में प्रस्तुत किया गया है।

निविदा दस्तावेज की कंडिका 20(i) (ii) (iii) (iv) (v) के आलोक में जिलान्तर्गत लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05) का सैद्धांतिक स्वीकृति के शर्त्त एवं बंधेज निम्नवत् हैः–

1. बालूघाट संख्या–05 से संबंधित विवरणी निम्नवत् हैः–

क्र0 संख्या	नदी का नाम	रकवा (हेक्टेयर में)	Geo Coordinates	
			Latitude	Longitude
1	लोकाईन (Lokain)	10	25°10'29.77"N	85°10'17.09"E
			25°10'28.16"N	85°10'19.94"E
			25°10'58.80"N	85°10'24.08"E
			25°10'57.11"N	85°10'20.59"E
2	वन क्षेत्र से दूरी		लागू नहीं	
3	सुरक्षित क्षेत्र/वन अभ्यारण्य क्षेत्र/पक्षी अभ्यारण्य/वन्य जीव आश्रयण क्षेत्र से दूरी		लागू नहीं	
4	बालूघाट/बालूखण्ड से 500 मीटर के अन्दर खनन पट्टा क्षेत्र की स्थिति		लागू नहीं	
5	पुरातात्विक स्थल से दूरी		लागू नहीं	
6	खनन योग्य मात्रा		124800 MT	

2. <u>भुगतान की शर्त्तेः–</u>

(i) नीलामीत–राशि केवल प्रथम वर्ष के लिए बंदोबस्ती की राशि मानी जाएगी। दूसरे वर्ष और उसके अनुक्रमी वर्षों में बंदोबस्ती की राशि गत् वर्ष की बंदोबस्ती राशि के 120 प्रतिशत अथवा समय–समय पर सरकार द्वारा निर्धारित निदेशों के अनुरूप होगा।

(ii) प्रतिभूति जमा के अतिरिक्त आपको निम्नलिखित समय सारणी/भुगतान अनुसूची के अनुसार बन्दोबस्ती की राशि का भुगतान करना होगाः–

किस्त	भुगतान की नियत तारीख
प्रथम किस्त (50%)	(क) पट्टा संविदा निष्पादन से पहले (पहले वर्ष के लिए) (ख) प्रथम वर्ष में पट्टा संविदा निष्पादन की तिथि से एक वर्ष पूरा होने के 60 दिन पूर्व और अनुक्रमिक वर्षों में इसी प्रक्रिया का पालन करते हुए जमा किया जायेगा।
द्वितीय किस्त (25%)	पट्टा संविदा निष्पादन की तिथि से 03 महीना पूरा होने से पहले।
तृतीय किस्त (25%)	पट्टा संविदा निष्पादन की तिथि से 06 महीना पूरा होने से पहले।

3. **GST का भुगतानः–** जी0एस0टी0 के रूप में प्रचलित दर के अनुसार राशि वाणिज्य कर विभाग को भुगतान करना होगा। जिला खनन कार्यालय, नालन्दा में जी0एस0टी0 भुगतान का प्रमाण प्रत्येक किस्त के साथ देना होगा।
4. **आयकर/अन्य करों का भुगतानः–** आयकर अधिनियम के तहत आयकर एवं उस पर नियमानुसार देय अधिभार का भुगतान आयकर विभाग के प्रचलित दर के अनुसार एक मुश्त करना होगा। यह राशि बंदोबस्ती राशि के प्रत्येक किस्त के साथ देय होगी। जिला खनन कार्यालय, नालन्दा द्वारा यह राशि आयकर मद में जमा करा दी जायेगी।
5. **जिला खनिज फाउन्डेशन :–** Bihar District Mineral Foundation Rules, 2018 के अनुसार बंदोबस्ती राशि की दो (2) प्रतिशत राशि जिला खनिज फाउण्डेशन, नालन्दा के नाम भुगतेय बैंक ड्राफ्ट के माध्यम से करना होगा।
6. **वैधानिक अनापत्ति :–**बालूघाट संचालन हेतु आवश्यक समस्त वैधानिक अनापत्ति/अनुमति यथाः– खनन योजना, पर्यावरणीय स्वीकृति, जल एवं वायु सहमति आदि निर्धारित अवधि के अन्दर आपके द्वारा प्राप्त करना होगा। वैधानिक अनापत्ति/अनुमति प्राप्त करने के पश्चात् ही बालू खनन प्रारंभ किये जाने हेतु कार्यादेश निर्गत किया जा सकेगा।
–वैधानिक अनापत्ति/अनुमति निम्नानुसार हैः–

i. **खनन योजनाः–** खनन योजना प्रभावी नियमों में उल्लेखित प्रावधानों के अनुसार सफल डाकवक्ता/बन्दोबस्तधारी द्वारा QCI/NABET से मान्यता प्राप्त Professional RQP से तैयार कर निदेशक, खान या विभाग द्वारा प्राधिकृत पदाधिकारी के समक्ष लेटर ऑफ इंटेंट निर्गत होने से 30 दिनों के अन्दर अनुमोदन के लिए प्रस्तुत करेगा। खनन योजना बनाने पर होने वाले व्यय का वहन संबंधित खनिज डाकवक्ता/बन्दोबस्तधारी द्वारा किया जायेगा। साथ ही खनन योजना की जाँच हेतु समाहर्त्ता/विभाग अन्य एजेंसी चयनित कर सकेगा, जिसका निर्धारित फीस/खर्च भी बंदोबस्तधारी को ही वहन करना होगा। सफल डाकवक्ता/बन्दोबस्तधारी खनन योजना के अनुसार खनन करना सुनिश्चित करेंगे।

ii. **पर्यावरणीय स्वीकृतिः–** सफल डाकवक्ता/बन्दोबस्तधारी खनन योजना अनुमोदन के 15 दिनों के अन्दर पर्यावरण, वन एवं जलवायु परिवर्त्तन मंत्रालय, भारत सरकार के सक्षम प्राधिकार के समक्ष पर्यावरणीय स्वीकृति (EC) के लिए प्रस्ताव समर्पित करेगा। समयबद्ध रीति से पर्यावरणीय एवं अन्य वैधानिक स्वीकृति प्राप्त करना सफल डाकवक्ता की जिम्मेवारी होगी। अपेक्षित पर्यावरणीय स्वीकृति एवं अन्य आवश्यक स्वीकृति प्राप्त करने में किसी भी प्रकार की देरी के लिए सफल डाकवक्ता स्वयं जिम्मेवार होंगे एवं इस संबंध में किसी भी प्रकार की क्षतिपूर्ति के लिए कोई भी दावा मान्य नहीं होगा।

iii. **जल एवं वायु सहमतिः–** पर्यावरणीय स्वीकृति प्राप्त करने के पश्चात् सफल डाकवक्ता अधिकतम 07 (सात) दिवस के अन्दर जल (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1974 तथा वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 के अधीन सक्षम पदाधिकारी के समक्ष सहमति/ Consent to Establish/Consent to Operate प्राप्त करने हेतु आवेदन प्रस्तुत करेगा।

iv. **खनन के लिए अनुमत मात्राः–** खनन योजना, पर्यावरणीय स्वीकृति तथा जल (प्रदूषण निवारण एवं नियंत्रण) अधिनियम 1974 तथा वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 के तहत् प्राप्त सहमति में वर्णित बालू की मात्रा (इनमें से जो भी कम हो) तक ही खनन अनुमान्य होगा।

अनुमोदित खनन योजना, पर्यावरणीय स्वीकृति तथा जल एवं वायु सहमति में खनन योग्य मात्रा कम किये जाने पर भी वार्षिक देय बन्दोबस्ती राशि किसी स्थिति में कम नहीं की जाएगी।

v. बिना किसी वैध कारण के पर्यावरणीय स्वीकृति, Consent to Establish/Consent to Operate /जल एवं वायु सहमति प्राप्त नहीं कर पाते हैं या प्राप्त करने में रूचि नहीं लेते हैं तो, समाहर्त्ता द्वारा अग्रधन की राशि को जप्त कर लिया जायेगा।

7. <u>बन्दोबस्ती विलेख/पटटा संविदा (डीड) निष्पादन करनाः–</u>

i. सफल डाकवक्ता द्वारा सभी वैधानिक अनापत्ति प्राप्त करने के उपरान्त 5 वर्षो की अवधि के लिए बालू खनन करने हेतु समानुदान/बन्दोबस्ती स्वीकृत किया जाएगा। सफल डाकवक्ता विहित प्रपत्र में संबंधित नियमानुसार बन्दोबस्ती विलेख अथवा उसके समरूप एक प्रपत्र, कार्य आरंभ करने के पहले, निष्पादित करेगा तथा विहित अपेक्षित राशि संबंधित विभाग में जमा कर देगा। बन्दोबस्तधारी के पट्टे की अवधि विलेख/संविदा निष्पादन की तिथि से पाँच वर्षों के लिए विधिमान्य होगा।

ii. बन्दोबस्तधारी को निष्पादित **संविदा का निबंधन संबंधित विभाग के प्रचलित नियमों के अधीन 01 माह के अन्दर** कराना अनिवार्य होगा।

8. सफल डाकवक्ता/बन्दोबस्तधारी द्वारा बन्दोबस्ती प्रत्यर्पण/कारोबार छोड़ने का विकल्प बिहार खनिज (समानुदान, अवैध खनन, परिवहन एवं भण्डारण निवारण) नियमावली, 2019 के नियम–50 के अनुरूप किया जा सकेगा।

9. <u>सामान्य शर्त्तेः–</u>

(i) निविदादाता/सफल डाकवक्ता/बन्दोबस्तधारी द्वारा ई–मेल के माध्यम से किया गया पत्राचार ही मान्य होगा।

(ii) बन्दोबस्ती लेने के बाद सभी बालूघाटों के लिए बालू के उत्तोलन कार्य में संलग्न सभी सहयोगी व्यक्तियों/प्रबंधकों की सूची, पूर्ण पता एवं फोटो के साथ एक माह के अन्दर समाहर्त्ता को उपलब्ध कराना एवं पोर्टल पर अपलोड/उपलब्ध करायेंगे।

(iii) बन्दोबस्तधारी नदी तट से बालू प्रेषण के बिन्दु पर एक साईनबोर्ड एवं सीमा स्तंभ का अधिष्ठापन करायेगा जिसपर बन्दोबस्तधारी का नाम एवं पता, बन्दोबस्ती की अवधि, स्थानीय मैनेजर का नाम एवं पता तथा बालू का विक्रय मूल्य प्रदर्शित किया जाएगा। यदि साईन बोर्ड निरीक्षण में नहीं पाया गया तो शास्ति अधिरोपित की जाएगी।

(iv) बन्दोबस्तधारी श्रम विधियों के प्रावधानों के अनुसार आश्रय गृह, पीने का पानी, शिशु गृह (क्रेचेज) तथा फर्स्ट एड किट की व्यवस्था संबंधित बालूघाटों में लगे श्रमिकों के लिए करेगा।

(v) बन्दोबस्तधारी संबंधित क्षेत्रों का निरीक्षण करेगा तथा स्वयं अथवा अपने द्वारा अधिकृत प्रतिनिधियों के माध्यम से बालूघाटों का प्रचालन करेगा। किसी रूप में किये गये उपपट्टा (सबलेटिंग) के लिए बन्दोबस्ती रद्द कर दी जाएगी। बालूघाटों/नदी तल तक बालू के परिवहन के प्रयोजनार्थ पहुँच–पथ (अप्रोच रोड) का निर्माण सफल डाकवक्ता/बन्दोबस्तधारी द्वारा स्वयं अपने खर्च से किया जाएगा।

(vi) बालूघाट की सुरक्षा की जिम्मेवारी सफल डाकवक्ता/बन्दोबस्तधारी की होगी।

(vii) सफल डाकवक्ता/बन्दोबस्तधारी बंदोबस्त क्षेत्र के भीतर किसी अवैध खनन के लिए जिम्मेवार होंगे और पाई गई किसी शिकायत पर गंभीरता से विचार किया जाएगा तथा सफल डाकवक्ता/बन्दोबस्तधारी के विरूद्ध नियमानुसार कार्रवाइ किया जाएगा।

(viii) सफल डाकवक्ता/बन्दोबस्तधारी समाहर्त्ता द्वारा बालूघाटों के संचालन के संबंध में लोकहित में जारी निबंधनों और शर्त्तों तथा निदेशों का पालन करेगा।

(ix) यथोक्त शर्त्तों, बंधेजों एवं निबंधनों का पालन नहीं करने पर कारण पृच्छा निर्गत कर बंदोबस्ती रद्द करने की कार्रवाई की जा सकेगी।

(x) सफल डाकवक्ता/बन्दोबस्तधारी को खनन राजस्व/जी0एस0टी0/आयकर/स्टाम्प शुल्क/ रजिस्ट्रेशन फीस का भुगतान नहीं करने की दशा में 30 दिनों के अन्दर कारण स्पष्ट करने हेतु नोटिस दी जायेगी। निर्धारित अवधि के अंदर सफल डाकवक्ता/बन्दोबस्तधारी द्वारा बकाया का भुगतान करने में असफल रहने की दशा में राशि वसूली की कार्रवाई के साथ–साथ बंदोबस्ती रद्द करने की भी कार्रवाई की जा सकेगी।

(xi) नीलामी हेतु प्रस्तावित बालूघाटों से संबंधित तकनीकी तथा अन्य बिन्दुओं यथा भूमि के अंचल, थाना, मौजा, खाता, खेसरा, रकबा तथा GPS Co-ordinate के संबंध में विवाद/त्रुटि पाए जाने पर संशोधन का अधिकार जिला खनन कार्यालय, नालन्दा का होगा। बालूघाटों का सीमांकन एवं नियमानुसार निर्धारित आयाम/विशिष्टियों का सीमा स्तंभ का अधिष्ठापन GPS Co-ordinate के अनुसार बालू बन्दोबस्तधारी को कराना होगा तथा खनन के क्रम में संधारित कराना सफल डाकवक्ता/बन्दोबस्तधारी की जवाबदेही होगी, जिसे RQP/ अंचलाधिकारी की उपस्थिति में प्रमाणित कर बालूघाटों के निर्धारित क्षेत्र का Reduced Level (RL)/Pre-Level (PL) एवं Satelite images खनन कार्य प्रारंभ करने के पहले जिला खनन कार्यालय, नालन्दा में समर्पित करना होगा।

(xii) बालूघाट से लिंक रोड और बालूघाट के बीच कोई प्राकृतिक जल मार्ग सिंचाई नहर पड़ती हो तो सफल डाकवक्ता/बन्दोबस्तधारी जल संसाधन विभाग की पूर्व अनुमति से अस्थायी संरचनाएँ खड़ा कर सकेगा। पूर्व अनुमति के लिए ऐसे आवेदन जल संसाधन विभाग के संबंधित मुख्य अभियंता के समक्ष दिए जाएंगे।

(xiii) बालूघाट में रैयती/बंदोबस्त जमीन होने पर संबंधित रैयत से सहमति प्राप्त कर बालू का खनन करना होगा। यह जिम्मेदारी पूर्णतः बंदोबस्तधारी की होगी एवं विभाग से कोई क्षतिपूर्ति का दावा मान्य नहीं होगा।

(xiv) बंदोबस्तधारी द्वारा बंदोबस्ती अवधि के दौरान किसी भी कारण से खनन कार्य नहीं करने की स्थिति में किसी भी प्रकार का मुआवजा/नुकसान एवं क्षतिपूर्ति का दावा मान्य नहीं होगा।

(xv) ई–नीलामी एवं बालूघाट की बंदोबस्ती अवधि के दौरान उत्पन्न किसी भी प्रकार का विवाद बिहार खनिज (समानुदान, अवैध खनन, परिवहन एवं भण्डारण निवारण) नियमावली, 2019, (यथा संशोधित) के अधीन होगा।

(xvi) सफल डाकवक्ता/बन्दोबस्तधारी को ईलेक्ट्रॉनिक माध्यम से भेजी गयी कोई भी सूचना/निदेश/आदेश इत्यादि IT-Act के तहत् स्वीकार्य साक्ष्य के रूप में माना जाएगा।

समाहर्त्ता
नालन्दा।

DEPARTMENT MINES AND GEOLOGY, GOVT. OF BIHAR, PATNA

Annexure –II

(Mine Plan Approval Letter)

(1)

बिहार सरकार
खान एवं भूतत्व विभाग।

पत्रांक– ..... 2634 ...../एम0, पटना, दिनांक– 19/05/2023

प्रेषक,

सुरेश प्रसाद,
विशेष कार्य पदाधिकारी।

सेवा में,

Email

श्री पप्पु कुमार,
पिता– चैतु राय,
ग्राम–दाउदपुर, वार्ड नं0–3 पो0– दाउदपुर,
थाना– भाहपुर, जिला– पटना पिन– 801502
ई–मेल– pappu8709930@gmail.com

विषयः– **नालन्दा जिलान्तर्गत लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05) के खनन योजना के अनुमोदन के संबंध में।**

महाशय,

उपर्युक्त विषय के संबंध में कहना है कि बिहार बालू खनन नीति–2019 यथा संशोधित एवं बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 (यथा संशांधित 2021) के नियम–17 में वर्णित प्रावधानों के तहत् **नालन्दा जिलान्तर्गत लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05)** से संबंधित समर्पित खनन योजना के अनुमोदन पर प्राधिकृत समिति द्वारा समीक्षा की गई। समीक्षोपरांत निम्न शर्त्तों एवं बंधेजों के तहत् खनन योजना अनुमोदित की जाती है –

1. उक्त खनन योजना केन्द्र सरकार/राज्य सरकार द्वारा विनियमित अन्य सभी अधिनियम/ नियमावली में वर्णित प्रावधानों को तथा किसी न्यायालय/अन्य न्यायिक संस्था द्वारा पारित किये गये न्यायादेश को बिना प्रभावित किये अनुमोदित किया जा सकता है।
2. उक्त खनन योजना का अनुमोदन खान एवं खनिज (विकास एवं विनियमन) अधिनियम, 1957 (यथा संशोधित), बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 के नियम–17, वन संरक्षण अधिनियम, 1980, पर्यावरण सुरक्षा अधिनियम, 1986, श्रम संबंधी नियम, EMGSM 2020 तथा अन्य सभी सुसंगत अधिनियम/ नियमावली तथा उनमें वर्णित प्रावधानों के प्रतिकूल नही होगा। लीज के रकवा के अनुसार प्रति हेक्टेयर कम से कम 10 पौधा लगाना होगा तथा 50 प्रतिशत Survival सुनिश्चित करना होगा।
3. खनन योजना में निहित शर्त्तों का पालन करते हुए ही बालू खनिज का खनन् तथा प्रेषण किया जायेगा।
4. संबंधित सक्षम प्राधिकार से यथा वांछित प्रमाण–पत्र प्राप्त कर विभाग को अवगत कराना अनिवार्य होगा।
5. यदि किसी भी समय खनन योजना में वर्णित शर्त्तों के अनुपालन में अनियमितता पायी जाती है, तो खनन पदाधिकारी को नियमानुसार आवश्यक कार्रवाई करने का अधिकार होगा।
6. संबंधित बालूघाट में खनिज की उपलब्धता, पहुँच पथ का निर्माण तथा अन्य खनन् कार्यों से संबंधित सम्पूर्ण जबाबदेही बालूघाट संचालनकर्त्ता की होगी तथा इसमें किसी भी तरह का कोई दावा अथवा क्षतिपूर्ति मान्य नहीं होगा।
7. खनन योजना मे वर्णित सभी तकनीकि तथा अन्य बिन्दुओं से संबंधित ऑकड़ों की सत्यता / वैधता की जिम्मेवारी RQP/बंदोबस्तधारी की होगी तथा भविष्य में उपर्युक्त के संबंध में किसी प्रकार की भिन्नता/अनियमितता की पूरी जबावदेही RQP/बंदोबस्तधारी की होगी।

P.T.O.

8. खनन् कार्य के दौरान घाट संचालनकर्त्ता द्वारा पर्यावरण संबंधी मानकों का नियमित रूप से अनुश्रवण करने की व्यवस्था करनी होगी।खनन् कार्य के दौरान नदियों के प्राकृतिक बहाव आदि में किसी भी तरह का व्यवधान/रूकावट/बदलाव करना पूर्ण रूप से प्रतिबंधित होगा।
9. बालूघाट में Secondary Loading की व्यवस्था इस प्रकार सुनिश्चित की जाएगी ताकि गीला बालू का परिवहन नहीं हों।
10. यद्यपि खनन योजना में Semi-mechanised mining को प्राथमिकता दी गयी है तथापि Manual Mining पर कोई प्रतिबंध नहीं रखा जाएगा एवं स्थानीय व्यक्तियों को नियोजन देने के दृष्टिकोण से Manual Mining को उचित अवसर प्रदान करना होगा।
11. सफल डाकवक्ता/बंदोबस्तधारी द्वारा खान एवं खनिज (विकास एवं विनियमन) अधिनियम, 1957, बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 (यथा संशोधित 2021) तथा बिहार बालू खनन नीति, 2019 के प्रावधानों का अनिवार्य रूप से पालन किया जायेगा।
12. सफल डाकवक्ता/बंदोबस्तधारी को पर्यावरण सुरक्षा हेतु सभी उपाय करने होगें तथा नियमित रूप से जल/वायु की गुणवत्ता की जाँच/अनुश्रवण की व्यवस्था सुनिश्चित करनी होगी।
13. सफल डाकवक्ता/बंदोबस्तधारी को उत्पादन/प्रेषण का आँकड़ा एवं पंजी संधारित करना अनिवार्य होगा जिसे नियमित रूप से अद्यतन किया जाएगा।
14. संचालन करने वाले घाटों की सीमांकन कराना, RL/PL प्राप्त करना एवं उसे खनन के क्रम में संधारित कराना सफल डाकवक्ता/बंदोबस्तधारी की जवाबदेही होगी, जिसे RQP/अंचलाधिकारी की उपस्थिति में प्रमाणित करवाकर खनन कार्य करना होगा।
15. बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 (यथा संशोधित 2021) में वर्णित प्रतिबंधित क्षेत्रों में किसी प्रकार का खनन् कार्य वर्जित होगा।
16. बालूघाटों से बालू का निष्कासन एवं प्रेषण आबादी से सटे ग्रामीण सड़क को छोड़कर अलग मार्ग से करना होगा।
17. खनन योजना की एक–एक प्रति, जो संबंधित RQP द्वारा प्रत्येक पृष्ठ पर हस्ताक्षरित होगी, निदेशक, खान एवं भूतत्व विभाग के कार्यालय के अतिरिक्त समाहर्त्ता, नालंदा के गोपनीय कोषांग, उपनिदेशक, पटना अंचल के कार्यालय में उपलब्ध कराना सुनिश्चित किया जायेगा, ताकि किसी भी समय इसकी जाँच की जा सके।

प्राधिकृत समिति की अनुशंसा के आलोक में उपरोक्त शर्त्तों के साथ **नालन्दा जिलान्तर्गत लोकाईन 2 बालूघाट (नदी का नाम– लोकाईन नदी, बालूघाट सं0– 05)** से संबंधित समर्पित खनन योजना के अन्तर्गत ही बालू उत्खनन् कार्य सुनिश्चित कराया जायेगा।

विश्वासभाजन
19.5.2023
(सुरेश प्रसाद)
विशेष कार्य पदाधिकारी

Annexure –III

Terms of Reference (ToR)

File No.SIA/1(a)/2441/2023

Goverment of India

State Level Environment Impact Assessment Authority

Bihar

***

To,

M/s PAPPU KUMAR
Village- Daudpur, Ward No.- 03, Post- Daudpur,
Patna-801502
Bihar

Tel.No.-; Email:lokain02riversandghat05@gmail.com

Sub. Terms of Reference to the Proposed Sand Mining Project of Area 10.0 Ha at Nalanda Lokain – 02, Lokain Sand Ghat No -05 on Lokain River of District- Nalanda, State-Bihar., Village- Daudpur, Ward No.- 03, Post- Daudpur

Dear Sir/Madam,

This has reference to the proposal submitted in the Ministry of Environment, Forest and Climate Change to prescribe the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006. For this purpose, the proponent had submitted online information in the prescribed format (Form-1) along with a Pre-feasibility Report. The details of the proposal are given below:

1. Proposal No.:	SIA/BR/MIN/433099/2023
2. Name of the Proposal:	Proposed Sand Mining Project of Area 10.0 Ha at Nalanda Lokain – 02, Lokain Sand Ghat No - 05 on Lokain River of District- Nalanda, State-Bihar.
3. Category of the Proposal:	Non-Coal Mining
4. Project/Activity applied for:	1(a) Mining of minerals
5. Date of submission for TOR:	12 Jun 2023

Date : 14-06-2023

Mr. Sudhir Kumar
(Member Secretary)

Office : **2nd Floor, Beltron B**
Phone No : Mobile : **9835540493**
Email id : **seiaa.ms.br@gmail.com**

Note : This is auto tor granted letter.

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TOR for the purpose of preparing environment impact assessment report and environment management plan for obtaining prior environment clearance is prescribed with public consultation as follows:

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

Terms of Reference (TOR) for preparation of Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for "Mining of Minerals" as per the EIA Notification, 2006 has been devised to improve the quality of the reports and facilitate decision-making transparent and easy. TOR will help the project proponents to prepare report with relevant project specific data and easily interpretable information. TOR for mining of minerals is expected to cover all environmental related features.

Mining of minerals plays a positive role in the process of country's economic development. In addition to the contribution towards economic growth, mining can also be a major source of degradation of physical as well as social environment, unless it is properly managed. Environmental impacts can arise during all activities of the mining process. Minimizing the damage due to mining operations depends on sound environmental practices in a framework of balanced environmental legislation. The potential adverse effects of mining activities include air pollution, surface and groundwater pollution, noise and vibration, damage to local ecology, natural topography and drainage, depletion of water resources etc. All these environmental components are required to be considered while selecting a proper methodology of mining, mitigation measures to reduce pollution load, conservation of natural resources etc.

The projects of mining of minerals as stated in the schedule require prior environment clearance under the EIA notification, 2006. Category 'A' Projects are handled in the MoEF&CC and Category 'B' projects are being handled by the respective State Environment Impact Assessment Authorities (SEIAAs) notified by MoEF&CC and following the procedure prescribed under the EIA Notification, 2006. As per this Notification, as amended, the projects of mining of minor minerals with mining lease area equal to or greater than 50 hectare are to be handled at the level of the MoEF&CC for grant of EC. Such projects with mining lease area less than 50 hectare are to be handled by the respective State Environment Impact Assessment Authority (SEIAA).

1(a):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR NON-COAL MINING PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP 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.

2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.

4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of

the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.

6) Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.

8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

9) The study rea will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study rea delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlifeand copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining 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).

21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered

under plantation and the species to be planted. The details of plantation already done should be given.The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

38) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) Besides the above, the below mentioned general points are also to be followed:-

a) All documents to be properly referenced with index and continuous page numbering.

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.

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.

d) Where the documents provided are in a language other than English, an English translation should be provided.

e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

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.

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.

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.

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 dumps, if any, clearly showing the land features of the adjoining area.

****

Annexure –IV

(Satellite Imaginary Last 3 Years)

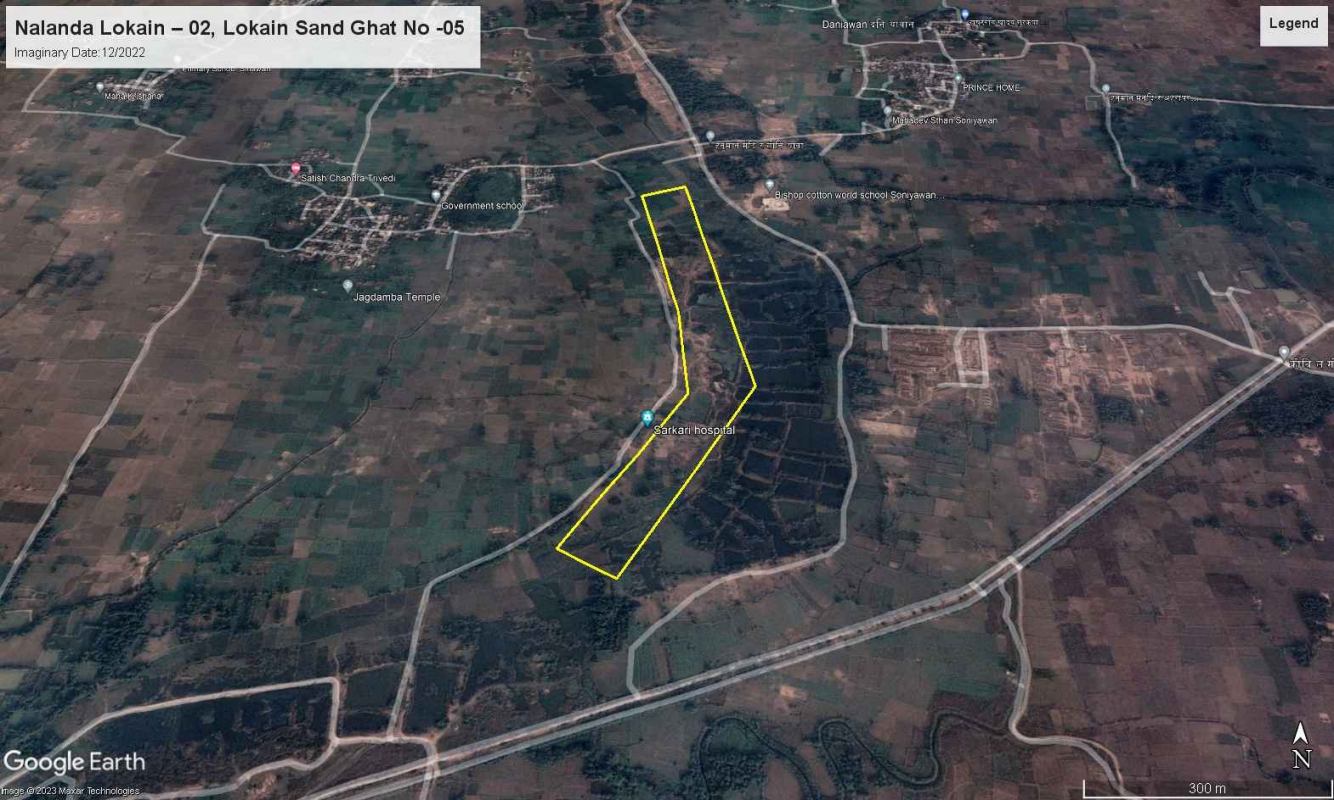

Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date:04/2019
Legend
Sarkari hospital
Jagdamba Temple
Bishop cotton world school Sonyawan
PRINCE HOME
Google Earth
300 m
N


Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date:02/2020
Legend
Jagdamba Temple
Sarkari hospital
Google Earth
300 m
N


Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date: 12/2020
Legend
Satish Chandra Trivedi
Government school
Jagdamba Temple
Sarkari hospital
PRINCE HOME
Bishop cotton world school Soniyawan...
Google Earth
300 m
N


Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date: 09/2021
Legend
Satish Chandra Trivedi
Government school
Jagdamba Temple
Sarkari hospital
PRINCE HOME
Bishop cotton world school Soniyawan...
Google Earth
300 m
N

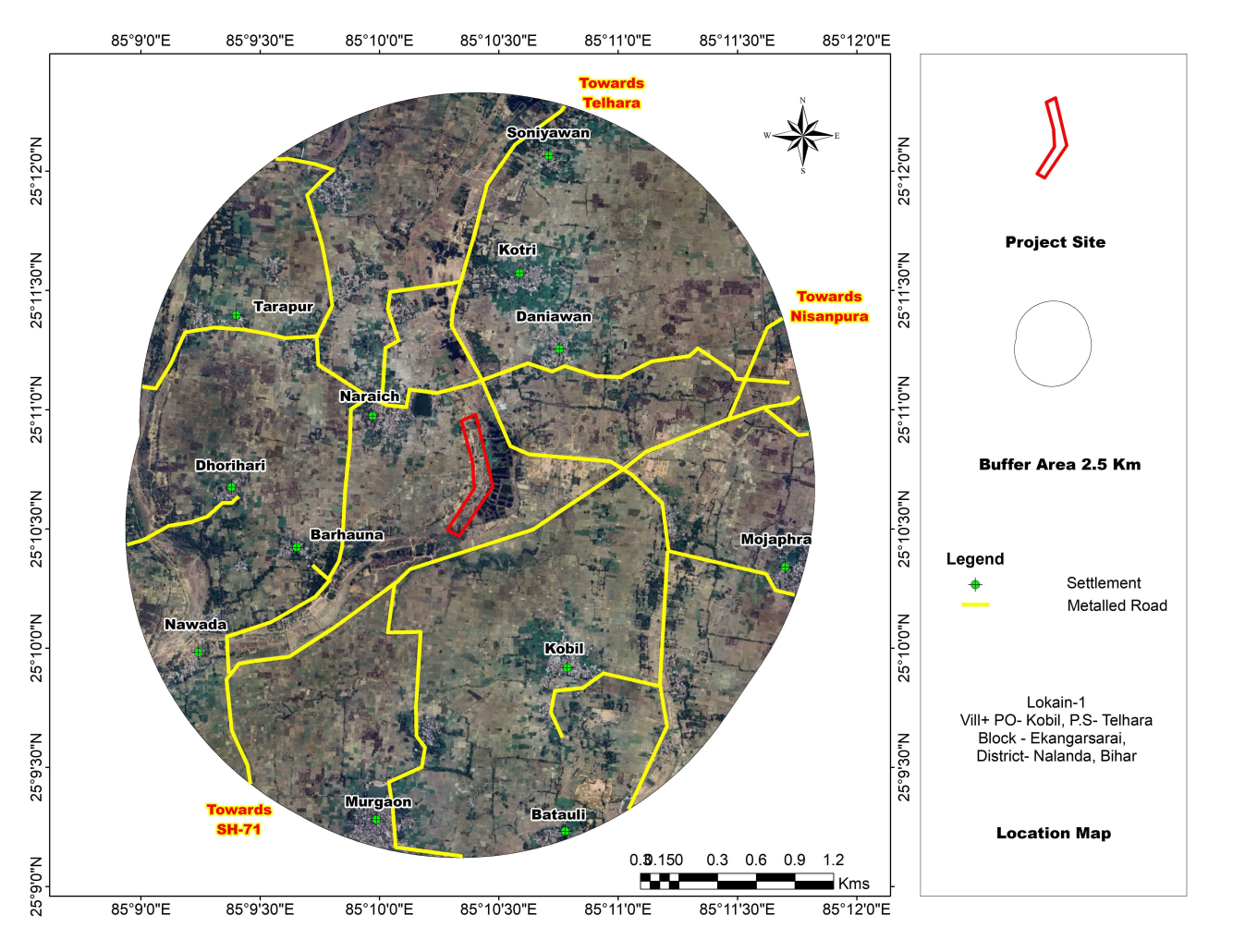

Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date:12/2021
Legend
Maha Kishana
Satish Chandra Trivedi
Government school
Jagdamba Temple
PRINCE HOME
Mahadev Sthan Soniyawan
Bishop cotton world school Soniyawan...
Sarkari hospital
Google Earth
Image © 2023 Airbus
300 m
N


Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date: 12/2022
Legend
Satish Chandra Trivedi
Government school
Jagdamba Temple
Sarkari hospital
Bishop cotton world school Soniyawan ..
PRINCE HOME
Mahadev Sihari Soniyawan
Google Earth
Image © 2023 Maxar Technologies
300 m
N


Nalanda Lokain – 02, Lokain Sand Ghat No -05
Imaginary Date:07/2023
Legend
Satish Chandra Trivedi
Government school
Jagdamba Temple
Sarkari hospital
Bishop cotton world school Soniyawan
Mahadev Sthan Soniyawan
PRINCE HOME
Google Earth
300 m
N

Annexure –V

(2.5 Km Utility Map)


85°9'0"E
85°9'30"E
85°10'0"E
85°10'30"E
85°11'0"E
85°11'30"E
85°12'0"E
25°12'0"N
25°11'30"N
25°11'0"N
25°10'30"N
25°10'0"N
25°9'30"N
25°9'0"N
Towards Telhara
Soniyawan
Kotri
Tarapur
Daniawan
Towards Nisanpura
Naraich
Dhorihari
Barhauna
Mojaphra
Nawada
Kobil
Towards SH-71
Murgaon
Batauli
N
W
E
S
0.3 0.150 0.3 0.6 0.9 1.2
Kms
Project Site
Buffer Area 2.5 Km
Legend
Settlement
Metalled Road
Lokain-1
Vill+ PO- Kobil, P.S- Telhara
Block - Ekangarsarai,
District- Nalanda, Bihar
Location Map

Annexure –VI

(English Executive Summary)

1 EXECUTIVE SUMMARY

1.1 Introduction

As per MoEF & CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as category B-1 due to project area is more than 5.0 Ha. The LOI was granted in favor of Pappu Kumar, S/o- Chaitu Rai, Vill- Daudpur, Ward No -3, P.O – Daudpur, P.S- Shapur, District - Patna-801502 vide letter no- 1989/Kh, dated 23-12-2022., for the period of 5 years. (A copy of LOI is attached as Annexure-I.)

Mining Plan: The mining plan for the Nalanda Lokain – 02, Lokain Sand Ghat No -05 has been approved with production capacity of 60000 Cum per year 124800 TPA from the Department of Mines & Geology, Govt. of Bihar through vide letter No. 2634/M Patna, dated 19/05/2023 under the Bihar Minor Minerals Concession Rules 2019.

ToR Letter: It is in this context, hard copy of Form-I and Pre-Feasibility Report has been submitted to SEIAA, Bihar on 12.06.2023 requesting for issue of "Terms of Reference" (ToR). The ToR Letter has been issued on date 14.06.2023 by SEIAA, (File No. SIA/1(a)/2441/2023). Validity of TOR is for period of three years.

Baseline data collection: The baseline data was collected in Summer season form 1st of March 2023 to 31st of May 2023.

The Proposed Sand Mining Project at Vill- Bishunpur, P.O- Kanhaiyaganj, P.S- Telhara, Block- Ekangarsarai, District- Nalanda, Bihar. Mine Lease Area – 10.0 Ha for production of 60000 cum per year 124800 TPA.

Table 1-1: Details of the Project

S. No.	Particulars	Details				
1.	Nature and Size of the Project	Mining of Sand Minor Minerals with Production Capacity of 60000 Cum per year 124800 TPA (M.L. Area- 10.0 ha).				
2.	Location					
	Plot/Survey/Khasra No.	River Name	Name of the Ghat	Area	Khata No.	Khesra No.

		Lokain	Nalanda Lokain – 02, Lokain Sand Ghat No - 05	10.0	60	307
					71	297
					81	298
					93	601
					83	299
					93	602
					56	300
					83	301
					81	302
					43	303
					39	304
					95	305
					93	306, 600, 599, 598, 597, 596, 595, 594, 593
					95	538
					94	549
					53	537
					94	548
					63	547
					24	539
					29	540
					94	541
					48	542
					80	543

						79	569
						29	545
						74	570
						23	571
						25	568
						63	572
						55	573
						12	574
						33	575
						55	576
						29	577
						15	578
						74	567, 566
						29	565

	Village	Bishunpur
	Block	Ekangarsarai
	District	Nalanda
	State	Bihar
3.	**Geographical Coordinates Latitude and Longitude of**	**Nalanda Lokain – 02, Lokain Sand Ghat No -05: -**

Sl. No	**Latitude**	**Longitude**
1	25°10'29.77"N	85° 10'17.09"E
2	25°10'28.16"N	85° 10'19.94"E
3	25°10'58.80"N	85° 10'24.08"E
4	25°10'57.11"N	85° 10'20.59"E

4.	**Toposheet (OSM) No.**	G45N3, G45N7, G45N4, G45N8.
5.	**Lease Area Details**	
	Lease Area	10.0 Ha.
	Type of Land	River bed of Lokain

	Topography	Undulated (Riverbed)
	Site Elevation Range	87.35 m to 87.1 m
6.	**Cost Details**	
	Cost of the project	Rs. 65 lakhs. (Including Auction Cost)
	Cost for EMP	3.5 Lakh (Capital Cost) & 8.94 Lakhs (Recurring Cost)
7.	**Environmental Settings of the area**	
	Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius	There is no any Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius.
	Nearest Town/ Major City with population	Bihar Sharif, Approx. 34.75 km towards ENE.
	Nearest Railway Station	Islampur Railway Station, approx. 6.15 Km towards SE.
	Nearest National/State Highway	SH-04, Approx. 4.15 Km towards East. SH-71, Approx. 2.5 Km towards South.
	Nearest Airport	Jayprakash Narayan International Airport, approx. 46.45 Km towards NNW.
	Nearest Post Office	Murgaon Post Office, Approx, 2.23 Km towards SSW. Dariyapur Post Office, Approx, 3.9 Km towards ESE.
	Medical Facilities	Govt. Primary Hospital, Kajichak, Approx. 4.7 Km towards NE. Bharthu Govt. Hospital, Approx 3.6 Km towards West.
	Education Facilities	Tejpur Middle School, Approx 0.97 Km towards SW. Government School, Barhauna Approx 0.40 Km towards West.
	Ecological Sensitive Area	There is no Ecological Sensitive Area within 10 Km radius from project site.
	Archaeological sites	There is no Archaeological sites within 10 km radius from project site.
	Seismic Zone	Zone IV (IS 1893: 2002)
	Water Body	Lokain River (Riverbed)

1.2 Project Description

The proposed project is for mining of Sand (Minor Mineral) by open cast semi-mechanized method in over an area of **10.0 Ha.** By **Pappu Kumar** throughout Nalanda Lokain – 02, Lokain

Sand Ghat No -05 of district Nalanda. The project site falls under seismic zone IV which is a High Damage Risk zone (MSK IX-VIII). The total geological reserve is **100000 cum per Annum** and mineable reserve is **60000 cum per Annum.** Mine lease area will be worked in benches and the digging depth will be restricted to 1.0 m only or before water table, whichever come fast. This will be further replenished during rainy season. Mineral Sand will be transported by trucks. The deposit is moderate to good quality sand. It is widely used in construction, buildings, bridges and other infrastructure. It is free from clay and non-sticky in nature. Total water requirement for the project is **5.41 KLD**. Total man power requirement for the project is **11.** The site facilities like temporary, rest-shelter, first aid facility; drinking water facility etc. will be provided as per requirement. There is no litigation pending against this project.

1.3 Description of Environment

The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried in Summer Season during 1st March 2023 to 31st May 2023. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from mine lease boundary (buffer zone), both of which together comprise the study area. Baseline environment was determined within the study area, which represents 10 km radius of the surrounding area to the project site. This collected data was further used to identify potential impacts of the mining activity on the surrounding environment and formulate mitigation measures. Summary of the baseline data collected is detailed in **Table 1.2.**

Table 1-2 :- Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	The ambient air quality study for the 8 villages (AAQ) monitoring stations shows that the maximum and minimum ground level concentration for PM_{10} is respectively 92.7 µg/m^3 at Chhajjupur (AAQ4) and 52.2 µg/m^3 at Narayanpur (AAQ5). Whereas the maximum and minimum ground level concentration for $PM_{2.5}$ ranges between 58.2 µg/m^3 at Navgarh (AAQ3) and 23.9 µg/m^3 at Narayanpur (AAQ5) respectively. Similarly, for SO_2, the maximum and minimum ground level concentration varies between 16.8 µg/m^3 and 7.1 µg/m^3 for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For NO_2 the maximum and minimum ground level concentration varies between 45.9 µg/m^3 & 18.5 µg/$m^3$for respectively Bijalipur Metara (AAQ2) and Narayanpur (AAQ5) stations. For CO the maximum and minimum ground level concentration varies between 0.87

	µg/m^3 & 0.19 µg/$m^3$for respectively Navgarh (AAQ3) and Narayanpur (AAQ5) stations.
Noise Levels	Noise monitoring study reveals that the minimum & maximum noise levels at day time were recorded as 45.2 dB (A) at Chhajjupur (NQ4) & 50.8 dB (A) at Narayanpur (NQ5). The minimum & maximum noise levels at night time were found to be 31.1 dB (A) at Navgarh (NQ3) & 38.7 dB (A) at Narayanpur (NQ5). There are no other major noise producing sources in the study area except some domestic activities, which contributes to the local noise level of the area. Traffic movements in nearby villages also add to the ambient noise level of the area.
Water Quality	5 Groundwater samples and 4 surface water samples were analyzed and concluded that: The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards by Indian Standards IS: 10500. From the Surface water analysis it is evident that most of the parameters of the samples comply with 'Category 'D' of DBU Criteria of CPCB for its suitability for wild life and fisheries.
Soil Quality	Samples collected from identified locations indicate pH value ranging from 7.48 to 7.80, which shows that the soil is slightly alkaline in nature. Organic Matter ranges from 1.00 % to 1.10 % in the soil samples and, whereas the Potassium is found to be ranging from 240.2 mg/kg to 351.5 mg/kg.
Ecology and Bio-diversity	There are no Ecologically Sensitive Areas present in the study area.

1.4 Anticipated Impacts and Mitigation Measures

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

1.4.1 Impact on Land Use Pattern

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

1.4.2 Impact on Air Quality

Information on air quality was studied and predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, and transportation operations may cause the deterioration in air quality. In the present case, only wet materials will be

handled. The collection and lifting of minerals will be done Semi mechanized mining method shall be adopted for the mining of sand. Therefore, the dust generated is insignificant. Water sprinkling will be done in regular manner for dust suppression.

1.4.3 Impact of Noise Levels

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

1.4.4 Impact on Water Quality

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

1.4.5 Impact on Soil Quality

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

1.4.6 Flora & Fauna

Flora

Floral environment is affected by mining activities due to:

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

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

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

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

Fauna

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

1.4.7 Socio-Economic Profile

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

1.5 Analysis of Alternatives (Technology and Site)

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

1.6 Environmental Monitoring Program

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

The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature. A budget for monitoring of Air, water, Noise and Soil will be **Rs. 2.0 Lakhs** to be incurred by the project proponent for undertaking pollution prevention measures during the mining activity.

1.7 Additional Studies

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

1.8 Project Benefits

The management will recruit the semi-skilled and unskilled workers from the nearby villages. The project activity and the management will definitely support the local Panchayat and provide other form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. A suitable combination of trees that can grow fast and also have good leaf cover will be adopted to develop the green belt. It is proposed to plant **100** Nos. of native species will be planted during the mining plan period. Other than this social development of village will be considered as per social activities. Socio-economic environment will have positive impact due to the mining project in the area. The mining activity will create employment opportunities to

local communities. The project will not only improve the living standard of local people but also create an aesthetic value to the river banks where green belt will be developed.

1.9 Environment Management Plan

As per Above discussion there is no measure impact on the environment due to mining except fugitive emission in the form of dust generated during handling of mineral. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation development will be carried out in the mine premises, along the approach roads, around Govt. buildings, schools approx**. 100 trees during plan period.** It will prove an effective pollution mitigate technique, and he provided to the locals only as providing extraction of minerals from the mine site is the only prevailing occupation for them for their livelihood. A budget **of Rs. 3.5 Lakh (Capital Cost) & 8.94 Lakhs (Recurring Cost)** per year for **EMP** is incurred by Project Proponent.

1.9.1 Air Quality Management

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

1.9.2 Management for Noise Pollution

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

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

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

1.9.3 Water Management

The deposits occur in the middle/bottom of the river. During the entire lease period, the deposit will be worked from the top surface to 3 m bgl or above ground water level, whichever comes first.

1.9.4 Soil Management

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

1.9.5 Green Belt Development

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

1.10 Conclusion

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

Annexure –VII

(Hindi Executive Summary)

कार्यकारी सारांश

पर्यावरण प्रभाव आंकलन

नालंदा लोकाईन – 02, लोकाईन बालूघाट - 05

मौजा+ग्राम - बिशुनपुर, पी.ओ.- कन्हैयागंज, पी.एस.- तेल्हारा, ब्लॉक- (Ekangarsarai), जिला - नालंदा, राज्य- बिहार ।

द्वारा

परियोजना प्रस्तावक

आवेदक – पप्पू कुमार, पिता - चैतू राय, पता - ग्राम +मौजा - दाउदपुर, वार्ड न0 - 3, पो.- दाउदपुर, थाना – शापुर, जिला - पटना – 801502.

पर्यावरणीय सलाहकार

रियान एनवायरो प्राइवेट लिमिटेड

1 कार्यकारी सारांश

1.1 परिचय

पर्यावरण एवं वन मंत्रालय, नई दिल्ली राजपत्र दिनांक **14** सितंबर **2006** और उसमें संशोधन के अनुसार, प्रस्तावित खनन परियोजना को श्रेणी बी- **1** के रूप में वर्गीकृत किया गया है क्योंकि परियोजना क्षेत्र **5.0** हेक्टेयर से अधिक है। नालंदा **DMO** के द्वारा **LOI आवेदक - पप्पू कुमार, पिता - चैतू राय, पता- ग्राम – दाउदपुर, वार्ड नं . 3, पो. - दाउदपुर, थाना - शापुर, जिला – पटना - 801502.** बिहार के पक्ष में पत्र संख्या - **1989/ख**, दिनांक **23.12.2022** के माध्यम से **5** वर्ष की अवधि के लिए प्रदान किया गया हैं।

खनन योजना - नालंदा लोकाईन – 02 लोकाईन बालूघाट - 05 के लिए खनन योजना को **60000** घन मीटर प्रति वर्ष या **124800 TPA** की उत्पादन क्षमता के साथ खान एवं भूतत्व विभाग, बिहार सरकार के पत्रांक **2634/एम पटना**, दिनांक **19.05.2023** के माध्यम से अनुमोदित किया गया है।

TOR पत्र: **Terms of Referance (TOR),** दिनांक- **12.06.2023** को **SEIAA,** बिहार को फॉर्म- **I** और पूर्व-व्यवहार्यता रिपोर्ट की हार्ड कॉपी प्रस्तुत की गई है। **TOR** पत्र दिनांक- **14.06.2023** को **SEIAA** द्वारा जारी किया गया है, **(फाइल संख्या. SIA/1(a)/2441/2023) TOR** वैधता तीन साल की अवधि के लिए है।

बेसलाइन डेटा संग्रह बेसलाइन डेटा ग्रीष्म ऋतु के रूप में : **1** मार्च **2023** से **31** मई **2023** तक एकत्र किया गया था।

परियोजना स्थल का विवरण: प्रस्तावित बालू खनन परियोजना **नालंदा लोकाईन - 02 लोकाईन बालूघाट-** 05, खाता संख्या – **60, 71, 81, 93, 83, 93, 56, 83, 81, 43, 39, 95, 93, 95, 94, 53, 94, 63, 24, 29, 94, 48, 80, 79, 29, 74, 23, 25, 63, 55, 12, 33, 55, 29, 15, 74, 29.** खसरा संख्या –**307, 297, 298, 601, 299, 602, 300, 301, 302, 303, 304, 305, 306, 600, 599, 598, 597, 596, 595, 594, 593, 538, 549, 537, 548, 547, 539, 540, 541, 542, 543, 569, 545, 571, 568, 572, 573, 574, 575, 576, 577, 578, 567, 566, 565. मौज+ग्राम- बिशुनपुर, पी.ओ.- कन्हैयागंज, पी.एस.- तेल्हारा, ब्लॉक -Ekangarsarai,**

जिल - नालंदा, राज्य - बिहार । खान पट्टा क्षेत्र – **10.0 Ha** है जो **60000** घन मीटर या **124800 TPA** के उत्पादन के लिए हैं । प्रस्तावित खनन पट्टा क्षेत्र भारतीय सर्वेक्षण **Toposheet G45N3, G45N7, G45N4, G45N8** के अंतर्गत आता है ।

1.2 परियोजनाका विवरण

<table>
<tr><td>बालू घाट का नाम</td><td colspan="3">नालंदा लोकाईन - 02 लोकाईन बालूघाट0 - 5,</td></tr>
<tr><td>क्षेत्रफल (हेक्टेयर)</td><td colspan="3">10.0 Ha</td></tr>
<tr><td>टन/वर्ष में उत्पादन</td><td colspan="3">60000 घन मीटर या 124800 TPA</td></tr>
<tr><td>जल की आवश्यकता</td><td>धूल दमन</td><td>घरेलू</td><td>ग्रीन बेल्ट डेवलपमेंट</td></tr>
<tr><td></td><td>5.0</td><td>0.11</td><td>0.3</td></tr>
<tr><td></td><td colspan="3">कुल: 5.41 KLD</td></tr>
<tr><td>कामगारों की संख्या</td><td colspan="3">11</td></tr>
<tr><td>परियोजना की अनुमानित लागत (लाख में)</td><td colspan="3">65 लाख</td></tr>
<tr><td>EMP लागत (लाख में)</td><td colspan="3">पूंजी लागत: 3.5 लाख और आवर्ती लागत: 8.94 लाख</td></tr>
</table>

1.3 माइनिंग लीज कोऑर्डिनटस नालंदा लोकाईन - 02 लोकाईन बालूघाट - 05

क्र. संख्या	अक्षांश	देशांतर
1	**25°10'29.77"N**	**85° 10'17.09"E**
2	**25°10'28.16"N**	**85° 10'19.94"E**
3	**25°10'58.80"N**	**85° 10'24.08"E**
4	**25°10'57.11"N**	**85° 10'20.59"E**

1.4 खनन पद्धति का विवरण

- खनन प्रक्रिया ड्रिलिंग और ब्लास्टिंग के बिना ओपनकास्ट अर्ध-मशीनीकृत विधि के द्वारा की जाएगी ।
- बाढ़ के दौरान खनन की कोई गतिविधि नहीं की जाएगी ।
- खनन की प्रक्रिया केवल 3 मीटर की गहराई तक ही की जाएगी ।
- बालू का खनन मानसून के दौरान पूरी तरह से बंद रहेगी ।
- बालू खनन नदी के बहाव क्षेत्र तक ही रहेगा ।
- नदी के सूखे क्षेत्र में खनन किया जायेगा ।
- नदी के प्राकृतिक प्रवाह को बाधित नहीं किया जायेगा ।

1.5 खनिज का उपयोग

बालू का उपयोग जैसे: सड़को, इमारतों, पुलों आदि के निर्माणकार्य में किया जायेगा।

1.6 पर्यावरण संवेदनशीलता

1.	**पारिस्थितिक संवेदनशील क्षेत्र राष्ट्रीय उद्यान, वन्य जीवन अभयारण्य, बायोस्फीयर रिजर्व / रिजर्व संरक्षित वन आदि 10 किलोमीटर के दायरे में।**	10 किलोमीटर के दायरे में कोई भी पारिस्थितिक संवेदनशील क्षेत्र (राष्ट्रीय उद्यान, वन्य जीवन अभयारण्य, बायोस्फीयर रिजर्व, रिजर्व/संरक्षित वन आदि) नहीं है।
	जनसंख्या के साथ निकटतम शहर / प्रमुख शहर	बिहार शरीफ, लगभग **34.75 Km ENE.** की ओर।
2.	**निकटतम रेलवे स्टेशन**	इस्लामपुर रेलवे स्टेशन, लगभग **6.15 Km**. दक्षिण पूर्व की ओर।
	निकटतम राष्ट्रीय / राज्यमार्ग	SH - 04, लगभग **4.15 Km**. पूर्व की ओर। SH - 71 लगभग **2.5 Km**. दक्षिण की ओर।
	निकटतम हवाई अड्डा	जयप्रकाश नारायण अंतर्राष्ट्रीय हवाई अड्डा, लगभग **46.45 Km NNW** की ओर ।
	निकटतम डाकघर	मुरगांव डाकघर, लगभग **2.23 Km. SSW** की ओर। दरियापुर डाकघर, लगभग **3.0 Km. ESE** की ओर।
3.	**चिकित्सकीय सुविधाएं**	सरकार. प्राथमिक अस्पताल, काजीचक, लगभग **4.7 Km. उत्तर पूर्व** की ओर। भरथू सरकार अस्पताल, लगभग **3.6 Km** पश्चिम की ओर।
4.	**शिक्षा सुविधाएं**	तेजपुर मिडिल स्कूल, लगभग **0.97 Km** दक्षिण पश्चिम की ओर । सरकारी स्कूल, बरहौना, लगभग **0.40 Km** . पश्चिम की ओर।
5.	**भूकंपीय क्षेत्र**	जोन **I V (IS 1893-2002)**
6.	**जल निकाय**	लोकाईन नदी

1.7 स्थल सुविधाएं और उनकी उपयोगिता

जलआपूर्ति: खनन के दौरान पानी की आवश्यकता मुख्य रूप से धूल के दमन, हरित पट्टी के विकाश, पेय जल प्रयोजन और अन्य घरेलु कार्यो के लिए होगी। पानी की आवश्यकता नजदीकी स्रोतों जैसे हैंड पंप एवं प्राइवेट टैंकरों से पूरी की जाएगी।

अस्थायी आवास: श्रमिकों को विश्राम के लिए खनन स्थल के नजदीक एक अस्थायी आवास उपलब्ध कराया जायेगा। इसके अतिरिक्त श्रमिकों के लिए प्राथमिक चिकत्सा बॉक्स, कल्याण सुविधाएं इत्यादि उपलब्ध कराये जायेंगे। खनन कार्य में लगे लोगो की सुरक्षा को देखते हुए उन्हें दस्तानो और जूते भी उपलब्ध कराये जायेंगे।

1.8 पर्यावरण का विवरण

वेसलाईन पर्यावरण खनन पट्टा के सीमा से **10** किलो मीटर का क्षेत्र है जिसका अध्ययन **1** मार्च **2023** से **31** मई **2023** के बीच की गई थी।

एकत्र किए गए बेसलाइन डेटा का सारांश नीचे की तालिका में दी गई है:

गुण	आधारभूत स्थिति
परिवेशी वायु गुणवत्ता	**8 AAQ** निगरानी स्टेशनों के लिए परिवेशी वायु गुणवत्ता अध्ययन से पता चलता है कि **PM10** के लिए अधिकतम और न्यूनतम जमीनी स्तर की सांद्रता छज्जूपुर **(AAQ4)** में क्रमशः **92.7 µg/m3** और नारायणपुर **(AAQ5)** में **52.2 µg/m3** है। **PM2.5** के लिए अधिकतम और न्यूनतम जमीनी स्तर की सांद्रता निकट नवगढ़ **(AAQ3)** में **58.2 µg/m3** और नारायणपुर **(AAQ5)** में **23.9 µg/m3** के बीच है। इसी प्रकार, **SO2** के लिए, बिजलीपुर, मेटारा **(AAQ2)** और नारायणपुर **(AAQ5)** स्टेशनों के लिए अधिकतम और न्यूनतम जमीनी स्तर सांद्रता क्रमशः **16.8 µg/m3** और **7.1 µg/m3** के बीच भिन्न होती है। **NO2** के लिए अधिकतम और न्यूनतम जमीनी स्तर की सांद्रता क्रमशः बिजलीपुर, मेटारा **(AAQ2)** और नारायणपुर **(AAQ5)** स्टेशनों के

	लिए **45.9 µg/m3** और **18.5 µg/m3** के बीच भिन्न होती है। **CO** के लिए अधिकतम और न्यूनतम जमीनी स्तर की सांद्रता क्रमशः नवगढ़ **(AAQ3)** और नारायणपुर **(AAQ5)** स्टेशनों के लिए **0.87 mg/m3** और **0.19 mg/m3** के बीच भिन्न होती है।
ध्वनि का स्तर	ध्वनि निगरानी अध्ययन से पता चलता है कि दिन के समय न्यूनतम और अधिकतम ध्वनि स्तर छज्जूपुर **NQ4** में **45.2 dB (A)** और नारायणपुर **NQ5** में **50.8 dB (A)** दर्ज किया गया था। रात के समय न्यूनतम और अधिकतम ध्वनि स्तर नवगढ़ **NQ3** में **31.1 dB (A)** और नारायणपुर **NQ5** में **38.7 dB (A)** पाया गया। अध्ययन क्षेत्र में कुछ घरेलू गतिविधियों को छोड़कर कोई अन्य प्रमुख ध्वनि पैदा करने वाला स्रोत नहीं है, जो क्षेत्र के स्थानीय ध्वनि स्तर में योगदान देता है। आस-पास के गाँवों में यातायात की गतिविधियाँ भी क्षेत्र के परिवेशीय ध्वनि स्तर को बढ़ाती हैं।
पानी की गुणवत्ता	भूजल के **5** और सतही पानी के **4** नमूनों का किए गए विश्लेषण से निष्कर्ष निकाला गया कि सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त है। सभी नमूने पीने के पानी द्वारा निर्धारित सीमा के भीतर हैं। भारतीय मानक **IS: 10500** द्वारा मानक सतही जल विश्लेषण से यह स्पष्ट होता है कि अधिकांश नमूने जो की **CPCB** के **DBU** मानदंड की 'श्रेणी **'D'** का अनुपालन करते हैं एवं वन्य जीवन और मत्स्य पालन के लिए उपर्युक्त हैं।
मिट्टी की गुणवत्ता	पहचान किए गए स्थानों से एकत्र किए गए नमूने **pH** मान को इंगित करते हैं **7.48** से **7.80** जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है। कार्बनिकमिट्टी के नमूनों में पदार्थ **1.00%** से **1.10%** तक होता है, जब कि पोटेशियम **240.2 mg/kg** से **351.5 mg/kg** तक पाया जाता है।
पारिस्थिति की और जैववि विधता	अध्ययन क्षेत्र में कोई पारिस्थितिक रूप से संवेदनशील क्षेत्र मौजूद नहीं है।

1.9 पर्यावरण पर प्रभाव एवं उसकी रोकथाम

वायु पर्यावरण

वायु की गुणवत्ता का अध्ययन किया गया तथा देखा गया की खनन की गतिविधि से वायु की गुणवत्ता पर कोई खास प्रभाव नहीं पड़ेगा। वायु प्रदुषण का जो मुख्य स्रोत ट्रकों एवं ट्रैक्टरों का स्थान्तरण और खनन की गतिविधियों में लोडिंग स्थान्तरण और अनलोडिंग के कारण शुष्क सामग्री की वजह से वायु की गुणवत्ता में कुछ गिरावट आ सकती है।

शमन के उपाय

- धूल को उड़ने से बचाने के उपाय किये जायेंगे जैसे सड़को पर पानी का छिड़काव किया जायेगा।
- तिरपाल से ढक कर बालू का परिवहन होगा ताकि बालू को उड़ने या गिरने से रोका जा सके।
- वाहनों की ओवर लोडिंग नहीं की जायेगी।
- पुराने और खराब हो चुके ट्रकों एवं ट्रैक्टरों का इतेमाल नहीं किया जायेगा।
- नदी के किनारों और सड़क के दोनों तरफ वृक्षारोंपण का कार्य किया जायेगा।

जल पर्यावरण

भूमिगत जल पर प्रभाव को जानने के लिए एक व्यापक जल भूवैज्ञानिक अध्ययन किया गया है अधययन से निष्कर्ष निकाला गया की खनन के कारण आस पास के भूमिगत जल स्तर पर कोई प्रत्यक्ष प्रभाव नहीं पड़ेगा। खनन की गतिविधि के लिए जल की कोई आवश्यकता नहीं होती है। खनन कार्य नदी के सूखे भाग पर ही किया जायेगा। नदी के मुख्य चैनल से कोई छेड़-छाड़ नहीं की जाएगी।

ध्वनि पर्यावरण

खान में उत्पन्न ध्वनि अर्द्ध-यांत्रिक खनन गतिविधियों और ट्रकों की स्थानांतरण गतियों के कारण होगा। खनन गतिविधि के कारण उत्पन्न ध्वनि खान के भीतर तक ही सीमित रहेगा। आस पास के गांव पर खनन का की गतिविधि का कोई खास प्रभाव नहीं पड़ेगा, हालांकि ध्वनि के उपरोक्त स्तर का प्रभाव केवल सक्रिय कार्यशील क्षेत्र के आस पास ही महसूस किया जायेगा।

निम्न स्तर का ध्वनि सहनीय है और इसका मानव पर कोई बुरा प्रभाव नहीं पड़ता, लेकिन जब यह बहुत ज्यादा होता है तब इसके हानिकारक प्रभाव हो सकते है।

इस मामले में आस पास की आबादी पर ध्वनि का प्रभाव नगण्य है क्योकि आबादी खनन क्षेत्र से दूर है।

शमन के उपाय

- गांव के क्षेत्रो में ध्वनि यंत्र (Horn) का न्यूनतम उपयोग किया जायेगा।
- नदी के किनारों और सड़क के दोनों तरफ वृक्षारोंपण का कार्य किया जायेगा।
- खनिकों के कानो की सुरक्षा के लिए ईयर-मफ उपलब्ध कराये जायेंगे।
- वाहनों का उचित रख रखाव किया जायेगा।

1.10 पर्यावरणीय प्रबंधन योजना

- रेलवे लाईन, जलाशय, नदी के दोनों किनारों एवं जल के प्रवाह से अथवा सड़क से सुरक्षित दुरी को छोड़कर ही खनन कार्य किया जायेगा।
- वन क्षेत्र में खनन की अनुमति नहीं होगी।
- पट्टा की अवधि के दौरान, खनन कार्य सतह से **3** मीटर की गहराई तक या भूजल स्तर से उपर, जो भी काम हो, किया जायेगा।
- बाढ़ के दौरान खनन की कोई गतिविधि नहीं की जाएगी।
- पर्यावरण प्रबंधन योजना के तहत इस परियोजना के लिए कुल 10.44 लाख रूपये की व्यवस्था की गई है जो हॉल रोड को बनाने, कच्चे सड़क पर धूल शमन के लिए पानी की छिड़काव, वृक्षरोंपण एवं उनके रख रखाव के लिए होंगे।
- खनन कार्य में लगे मजदूरों के नियमित स्वास्थ्य की जाँच की जाएगी।
- स्वास्थ्य पर पड़ने वाले प्रभाव को काम करने के लिए प्रभाव क्षेत्र में श्रमिकों और आस पास के लोगो को स्वस्थ्य सुविधाएं मुहैया कराई जाएगी।
- नदी के खनन क्षेत्र तक पहुंचने के लिए सड़को की संख्या न्यूनतम होगी, जिसके लिए नदी के किनारों को नहीं काटी जायेगी।
- यह सुनिश्चित किया जायेगा की नदी के खनन क्षेत्र में तालाब की स्थिति न बने।
- आस पास के तालाबों, कुओं और बोर वेल्स में पानी के स्तर में उतार चढ़ाव का मापन किया जायेगा।
- सड़क के दोनों किनारों पर वृक्षारोंपण किया जायेगा।
- खनन क्षेत्र तथा इसके आस पास कचरे के डिब्बों की व्यवस्था की जायेगी तथा इनके भर जाने पर इनका नियमानुसार निस्तारण किया जायेगा।

1.11 खनन के लाभ

भौतिक लाभ

प्रस्तावित परियोजना के खुलने से आसपास के निम्नलिखित क्षेत्रो में भौतिक बुनियादी ढांचे को बढ़ावा मिलेगा

1. सड़क परिवहन या सड़क संपर्क में वृद्धि।
2. खनिज से अच्छे बाजारी अवसर मिलेंगे।
3. हरियाली / वृक्षारोंपण को बढ़ावा।

सामाजिक लाभ

1. प्रत्यक्ष एवं अप्रत्यक्ष रूप से रोजगार में वृद्धि।
2. खनिज के बिक्री से राजस्व प्राप्त होगा।
3. स्वास्थ्य सम्बन्धी गतिविधियों को बढ़ावा।

पर्यावरणीय लाभ

1. वैज्ञानिक खनन से पर्यावरणीय दुष्प्रभाव में कमी।
2. वैज्ञानिक खनन से नदी के किनारों के आस पास पर उगी फसलों की सुरक्षा।
3. अवैध खनन की गतिविधि में कमी।

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